

Addendum

**Proposed Collector Wind Farm
Aboriginal Cultural Heritage Assessment Report**

A report to RATCH-Australia Corporation

July 2015



New South Wales Archaeology Pty Ltd ACN 106044366

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	1
1.1 INTRODUCTION.....	1
1.2 PARTNERSHIP WITH ABORIGINAL COMMUNITIES	1
1.3 DESCRIPTION OF IMPACT.....	1
1.4 OBJECTIVES AND METHODS	2
1.5 RESULTS.....	2
1.6 IMPACT ASSESSMENT	2
1.7 RECOMMENDATIONS	3
2. INTRODUCTION	4
2.1 INTRODUCTION.....	4
3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY	6
4. METHODOLOGY	8
5. LANDSCAPE CONTEXT	13
5.1 TOPOGRAPHY, GEOLOGY AND VEGETATION	13
6. ARCHAEOLOGICAL CONTEXT	16
6.1 SOCIAL GEOGRAPHY.....	16
6.2 PREVIOUSLY RECORDED ABORIGINAL OBJECTS	20
6.3 ARCHAEOLOGY – THE LOCAL AREA	27
6.4 PREDICTIVE MODEL OF ABORIGINAL OBJECT AND LOCATION	33
7. SURVEY RESULTS.....	37
8. STATUTORY CONTEXT.....	52
9. SIGNIFICANCE ASSESSMENT.....	53
9.1 SIGNIFICANCE ASSESSMENT CRITERIA - INDIGENOUS	53
9.2 SIGNIFICANCE VALUE OF THE ABORIGINAL OBJECTS IN THE STUDY AREA.....	54
10. THE PROPOSED ACTIVITY	55
10.1 IMPACT HISTORY	55
10.2 PROPOSED IMPACTS	55
10.3 PROPOSED IMPACTS	56
11. RECOMENDATIONS.....	58
12. REFERENCES.....	59

LIST OF FIGURES

Figure 1 AHIMS Sites; north end near proposed substation.	22
Figure 2 AHIMS Sites; west side of site.	23
Figure 3 AHIMS Sites; east side of site.	24
Figure 4 AHIMS sites; south side of site.	25
Figure 5 Sketch map of <i>Survey Unit 1/Locale 1</i>	38
Figure 6 Sketch map of <i>Survey Unit 54/Locale 1</i>	39
Figure 7 Sketch map of <i>Survey Unit 45/Locale 2</i>	41
Figure 8 Location of all known Aboriginal object locales; north end, note substation at north end of site.	44
Figure 9 Location of all known Aboriginal object locales; west end.	45
Figure 10 Location of all known Aboriginal object locales; east end.	46
Figure 11 Location of all known Aboriginal object locales; south end.	47
Figure 12 Survey Units; north end.	48
Figure 13 Survey Units; west end.	49
Figure 14 Survey Units; east end.	50
Figure 15 Survey Units; south end.	51

LIST OF TABLES

Table 1 Table of Aboriginal object locales found in the Collector Wind farm site in 2010.	20
Table 2 Aboriginal objects listed on NSW OEH AHIMS search.	21
Table 3 Artefact numbers and distribution density of Cullerin Range Deviation sites recorded by Koettig and Silcox (1985).	26
Table 4 Summary of artefact locale data.	37
Table 5 Survey Coverage	42
Table 6. Archaeological significance assessment of recorded Aboriginal object locales.	54
Table 7 Impact assessment of Aboriginal object locales within the proposal area.	57

LIST OF PLATES

Plate 1 Location of Aboriginal object in <i>Survey Unit 1/Locale 1</i> ; looking 70°.	37
Plate 2 Location of Aboriginal object in <i>Survey Unit 54/Locale 1</i> ; looking 200°. .	39
Plate 3 Location of Aboriginal object in <i>Survey Unit 45/Locale 2</i> ; looking 10°. ...	40

1. EXECUTIVE SUMMARY

1.1 Introduction

New South Wales Archaeology Pty Ltd conducted an assessment of the proposed Collector Wind Farm in October 2010. This was documented in a final report in 2012 (Dibden 2012).

Project Approval for the Wind Farm was granted to Ratch-Australia Wind Developments Pty Ltd (Ratch) in 2013. Approval was granted under Part 3A of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). It included Concept Approval for the construction, operation and decommissioning of up to 55 wind turbines and associated infrastructure.

Changes have been made to the proposed layout as a result of detailed design and further consultation. Ratch is now seeking a modification to the Project Approval from the NSW Department of Planning and Environment (DoP&E) under Section 75W of the EP&A Act.

This Addendum report documents the Aboriginal Cultural Heritage Assessment undertaken in respect of changes to the project layout.

1.2 Partnership with Aboriginal Communities

This assessment has been conducted in accordance with the Aboriginal consultation process as outlined in the NSW Office of Environment and Heritage (NSW OEH) Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (NSW DECCW 2010a) and the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC July 2005). Three groups are Registered Aboriginal Parties (RAPs) in the project.

The RAPs have been consulted in regard to the proposed modification and current assessment. The recent field survey of the proposal area has been undertaken with the assistance of Myrhya Freeman, Pejar Local Aboriginal Land Council (PLALC).

1.3 Description of Impact

Since the heritage fieldwork was conducted in 2010, a number of changes have occurred to the project layout. A number of turbines were removed as a condition of approval of the project. More recently, further changes have been made to the alignment of roads, cabling and compounds as part of the ongoing design development.

1.4 Objectives and Methods

This assessment has been conducted to assess all areas in which impacts would occur that have not been surveyed previously. A comprehensive field inspection has been undertaken.

The study has sought to identify and record Aboriginal objects and historic heritage, to assess the archaeological potential of the landscape and to formulate management and mitigation strategies based on the results of background research, a field survey and significance assessment.

The NSW OEH has prepared a document which provide a series of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales (NSW DECCW 2010b). This report has been prepared in accordance with these guidelines.

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) as relevant, which have been prepared specifically for development applications assessed under Part 3A of the Environmental Planning and Assessment Act 1979.

1.5 Results

No previously recorded Aboriginal objects are located within the proposed modification area. A total of three Aboriginal object locales containing stone artefacts have been recorded during the field assessment. These are each assessed to be of low archaeological significance.

It is noted that no previously recorded Non-Indigenous heritage items are listed as being present and none were identified during the field survey.

1.6 Impact Assessment

The results of the current assessment are entirely comparable with the findings of the original study (*cf* Dibden 2012). That is, the revised impact areas are of very low archaeological potential and significance. The landscape is comprised of very large amorphous landforms which are not archaeologically sensitive. In addition, they do not contain micro-topographic features likely to have been targeted by Aboriginal land users for activities other than sporadic and low intensity use such as hunting and gathering, travel and so on.

It is concluded that the modification would result in insignificant impacts to Aboriginal material heritage.

Given the nature and density of the artefact locales recorded in the proposal area and the low scientific significance rating they have been accorded, unmitigated impacts is considered appropriate. However, in order to accommodate the higher cultural values of the Indigenous heritage, a strategy of impact avoidance, if feasible, is recommended in regard to these locales. This recommendation is in accordance with the requirement of the consent which is to avoid/minimise impacts (to the greatest extent practicable). Accordingly, wherever practical, an exclusion zone of approximately 20-25m should be placed around identified heritage items to ensure no access during construction.

1.7 Recommendations

The following recommendations are provided in summary form:

- No Survey Units have been identified in the proposal area to warrant further archaeological investigation such as subsurface test excavation. While the Effective Survey Coverage achieved during the field survey was low, recourse to predictive modelling and the resultant assessment of the archaeological potential of all Survey Units is considered to be generally adequate for the purposes of reliably determining the archaeological status of the proposed impact areas.
- While the Aboriginal stone artefacts locales recorded are very low density distributions of stone artefacts and the archaeological significance of these locales is assessed to be low, it is nevertheless recommended that if feasible a strategy of avoidance of impacts be adopted.
- The recommendations made in this addendum report should be incorporated as applicable within the Cultural Heritage Management Plan, yet to be developed for the project.

2. INTRODUCTION

2.1 Introduction

New South Wales Archaeology Pty Ltd conducted an assessment of the proposed Collector Wind Farm in October 2010. This was documented in a final report in 2012 (Dibden 2012).

Project Approval for the Collector Wind Farm was granted to Ratch-Australia Wind Developments Pty Ltd (Ratch) in 2013. Approval was granted under Part 3A of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). It included Concept Approval for the construction, operation and decommissioning of up to 55 wind turbines and associated infrastructure.

Ratch is seeking a modification to the Project Approval due to changes to the proposed layout resulting from the outcomes of detailed design and further consultation. The modification is being sought under Section 75W of the EP&A Act.

The Statement of Commitments, appended to the Project Consent, Conditions of Approval, states:

Additional archaeological assessment will be conducted in any areas proposed to be disturbed which have not been surveyed during the assessment completed to date prior to work commencing (CoA, SoC, Item 4.02).

This addendum report documents the assessment undertaken in order to fulfil the above condition.

In accordance with the NSW DECCW Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW and the NSW DEC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC 2005), this report aims to document:

- The Aboriginal objects and declared Aboriginal places located within the area of the proposed activity, as relevant;
- The cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places that exist across the whole area that will be affected by the proposed activity, and the significance of these values for the Aboriginal people who have a cultural association with the land, as relevant;
- How the requirements for consultation with Aboriginal people have been met (as specified in clause 80C of the NPW Regulation);
- The views of those Aboriginal people regarding the likely impact of the proposed activity on their cultural heritage (if relevant);

- The actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified, as relevant;
- Any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places (if relevant); *and*
- Any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm, or, if this is not possible, to manage (minimise) harm (if relevant).

This heritage assessment has been conducted by Dr Julie Dibden (ANU: BA honours; PhD). Assistance in the field was provided by Oscar Rayner, NSW Archaeology Pty Ltd, and Myrhya Freeman, Pejar Local Aboriginal Land Council. This report has been written by Julie Dibden and Andrew Pearce.

We gratefully acknowledge the assistance provided to NSW Archaeology Pty Ltd during the course of this project by the following people:

- Delise Freeman – Pejar Local Aboriginal Land Council;
- Fiona McKay and Nick Graham-Higgs – NGH Environmental; and
- Neil Weston – Ratch.

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

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY

The NSW OEH manages Aboriginal cultural heritage in NSW in accordance with the National Parks and Wildlife Act 1974 (NPW Act). Part 6 of the Act provides specific protection for Aboriginal objects and Aboriginal places by administering offences for harming them without authorisation. When an activity is likely to impact Aboriginal objects or declared Aboriginal Places, approval of the Director-General of the NSW OEH is required, issued in the form of an Aboriginal Heritage Impact Permit (AHIP) under s90 of the NPW Act. It is noted that given this project is a transitional Part 3A Major Project, s90 of the NPW Act does not apply. This project has, however, been conducted in accordance with the NSW OEH Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (ACHCRP) (NSW DECCW 2010) and, where relevant, the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC July 2005).

NSW OEH requires effective consultation with Aboriginal people because it recognises that:

- Aboriginal people should have the right to maintain culture, language, knowledge and identity;
- Aboriginal people should have the right to directly participate in matters that may affect their heritage; and
- Aboriginal people are the primary determinants of the cultural significance of their heritage.

The purpose of the NSW OEH Aboriginal Cultural Heritage Consultation Requirements for Proponents document (NSW DECCW 2010) is to facilitate positive Aboriginal cultural heritage outcomes by:

- affording an opportunity for Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to be involved in consultation so that information about cultural significance can be provided to NSW OEH to inform decisions regarding applications for an AHIP (or terms of approval); and
- providing Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project with the opportunity to participate in decision-making regarding the management of their cultural heritage by providing proponents information regarding cultural significance and inputting into management options (NSW DECCW 2010).

The decision as to whether or not to issue an AHIP *or terms of approval* is based on the supply by a proponent of adequate information to the NSW OEH so as to enable the Director-General to make an informed decision with regard to the Aboriginal heritage values of Aboriginal object(s) and/or place(s) potentially harmed by an activity. As part

of this process proponents must provide the opportunity for Aboriginal persons who hold cultural knowledge relevant to the proposed project area to be involved in consultation so that they may provide information relating to the cultural significance of objects or places that may be impacted (NSW DECCW 2010).

When evaluating an AHIP application or project, NSW DECCW will consider, amongst other things, the:

- cultural and scientific significance of the Aboriginal object(s) and/or place(s);
- potential or likely impact of the proposal on the Aboriginal object(s) and/or place(s);
- adequacy of any proposed measures to avoid or reduce impacts; and
- the results of consultation with Aboriginal people (NSW DECCW 2010).

The OEH requirements outline four main consultation stages to be implemented in the course of consultation undertaken with Aboriginal people. NSW Archaeology Pty Ltd, on behalf of the proponent, followed that procedure in 2010 (see Dibden 2012).

Registered Aboriginal Parties

The following groups are registered in the process of Aboriginal consultation for the Collector Wind Farm project:

- Pejar Local Aboriginal Land Council;
- Buru Ngunawal Aboriginal Corporation;
- Gundungurra Aboriginal Heritage Association Inc.

In respect of the modification to the Project Approval, NSW Archaeology Pty Ltd, on behalf of the proponent, advised the RAPs in writing of the need for the heritage assessment to be updated to ensure that all areas in which impacts would occur have been adequately assessed.

Given Pejar Local Aboriginal Land Council and Buru Ngunawal Aboriginal Corporation had been involved in the previous field survey, both groups were invited to assist in the current assessment. However, only Pejar Local Aboriginal Land Council was able to do so.

A draft copy of this report will be provided to RAPS for their review, consideration of management options and comment.

4. METHODOLOGY

This archaeological and cultural heritage study has included the following components:

- A NSW OEH Aboriginal Heritage Information Management System site search to determine whether or not previously recorded Aboriginal objects are present in the impact area.
- A review of Non-Indigenous heritage registers to determine whether or not historic items present in the proposal area are listed.
- 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.
- An historical overview of the region and local area.
- A review of impacts relating to the construction of the 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.
- A discussion of survey results.
- A site significance assessment.
- The formulation of management and mitigation strategies ensuing from the above.

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 OEH Aboriginal Heritage Information Management System;
- Relevant archaeological reports;
- Historical sources and databases;
- Relevant topographic maps;
- Parish maps; and
- GIS data relating to proposed impacts.

The field survey entailed a comprehensive pedestrian survey and was undertaken by three people. The survey strategy was to inspect and assess all areas of proposed impacts. Survey coverage is described in Section 7 of this report.

The field survey was aimed at locating Aboriginal objects and Non-Indigenous heritage 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.

Survey Units are linear transects (encompassing proposed roads, electrical connections and turbines) measuring 100 metres in width. The survey methodology entailed walking parallel transects across individual Survey Units. Because of the high degree of vegetation ground cover, the field survey was particularly focused on any areas of ground surface exposure that may have been present within each Survey Unit. Each Survey 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 the proposal area as practicable.

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.

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, while the artefact is the elementary unit recorded, it is the Survey Unit which is utilised as a framework of recording, analysis, and management (*cf* Wandsnider and Camilli 1992). Survey Units have been defined according to broad landform morphological types.

It is noted that since undertaking the original field survey and in regard to the proposal layout, some of the Survey Units and artefact locales as originally documented in the Dibden 2012 report will now sustain limited or no impacts.

The location of Indigenous and Survey Units has been made using ArcGIS mapping and a hand-held non-differential GPS. The data collected forms the basis for the documentation of survey results outlined in Section 7. The variables recorded are defined below:

Survey Unit Variables

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

Morphological type:

- Crest: - element that stands above all or almost all points in the adjacent terrain – smoothly convex upwards in downslope profile. The margin is at the limit of observed curvature.
- Simple slope: - element adjacent below crest or flat and adjacent above a flat or depression.
- Lower slope: - slope element not adjacent below a crest or flat but adjacent above a flat or depression.
- Flat: - planar element, neither crest nor depression and is level or very gently inclined.
- Drainage depression: - landform element that stand below all or almost all points in the adjacent terrain.

Slope class and value:

- Level 0 - 1%.
- Very gentle 1 - 3%.
- Gentle 3 – 10%.

Geology

The type of geology was recorded and as well the nature of its occurrence such outcrops, shatter or gravels if present. All quartz outcrops whether bedrock or scree was recorded and in addition the level of visual interference from background quartz shatter was noted.

Soil

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

Geomorphological processes

The following gradational categories were recorded:

- eroded
- eroded or aggraded

Geomorphological agents

The following geomorphological agents were recorded:

- precipitation: *creep; landslide; sheet flow*
- wind

- biological: *human; nonhuman*

Survey coverage variables were also recorded; these are described further below. The archaeological sensitivity of each Survey Unit was defined according to assessed artefact density as very low or low.

Aboriginal Object Recording

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

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

Artefact density has been defined in arbitrary categories (based on a consideration of artefact density calculated in detailed subsurface work conducted elsewhere) as follows;

- Very low: <1 artefact per square metre;
- Low: between 1 and 10 artefacts per square metre.

The potential for soil to contain subsurface archaeological deposit (based on depth) was recorded. Similarly to Survey Unit recordings, this observation is based solely on the potential for soil to contain artefacts; it does not imply that subsurface artefacts will be present or absent, nor does it refer to a prediction of artefact density.

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. A consideration of these provide a measure with which to assess the effectiveness of the survey so as to provide an informed basis for the formulation of management strategies.

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

The survey coverage data includes an estimate of the area surveyed within a Survey Unit, that is, the area subject to actual inspection; the surveyed area is always less than the Survey Unit in area given that not all parts of a Survey Unit are visually examined.

Two variables were used to measure ground surface visibility during the study; the area of ground exposure encountered and the quality and type of ground visibility (archaeological visibility) within those exposures. The survey coverage variables estimated during the survey are defined as follows:

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

Archaeology Visibility – an estimate of the average levels of potential archaeological surface visibility within those exposures of bare ground. Archaeological visibility is generally less than ground exposure as it is dependent on adequate breaching of the bare ground surface which provides a view of the subsurface soil context. Based on subsurface test excavation results conducted in a range of different soil types across the New South Wales southeast it is understood that artefacts are primarily situated within 10 - 30 cm of the ground profile; reasonable archaeological visibility therefore requires breaching of the ground surface to at least a depth of 10 cm (see Dibden 2005a; 2005b, and 2005c).

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

5. 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. 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 Aboriginal objects 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 environmental context of the study area.

5.1 Topography, Geology and Vegetation

The Collector Wind Farm is located northwest of Collector and c. 33 kilometres southwest of Goulburn. The area is a rural landscape and is predominantly grazing country. It is situated in the Southern Tablelands region of New South Wales, within the South Eastern Highlands bioregion and the catchment of the Murrumbidgee River. The landscape lies between ca. 670 – 840 metres in altitude. Slopes generally range from 0 - 10% on broad ridge crests and valleys, to c. 20% on the steeper simple slopes.

The landforms encompassed by the proposal include crests, simple slopes, flats, lower slopes and drainage depressions. All streams are either 1st or 2nd order streams which would not have provided Aboriginal land users with either reliable or abundant water. The landscape is characterised as generally amorphous and does not possess focal points or features which are likely to have been targeted by Aboriginal people for repeated or sustained camping activities.

In a geological context, the study area lies within the eastern Lachlan Fold Belt. The majority of the area is an undulating granite plain with some rounded granite boulder outcrops formed from the Silurian to Early Devonian Wyangala batholith comprised of gneissic, massive biotite and hornblende biotite granites. In addition, there is a lesser proportion of the study area (in the northwest) which consists of Ordovician sedimentary units predominantly made up of silty sandstone and micaceous siltstone, and accompanied by their metamorphic derivatives, phyllite, shale, slate, quartzite and minor amounts of porphyry. These areas are generally eroded to bedrock with intermittent and very shallow soil cover. There are also discrete areas which contain Tertiary deposits of gravels, sand, clay, claystone and sandstone (Biosis Research 2004; Brunner and Offenberg 1968).

Granite cobbles and low outcrops occur across the southern section of the proposal area. The northern and eastern sections are generally underlain with metasedimentary geology which outcrops sporadically on elevated landforms such as crests. Soils within the proposal area are generally highly eroded. This has significant ramifications in regard to the stability and integrity or otherwise, of artefact bearing soil formations in the proposal area both on both crests and within valleys.

While the vegetation communities within the study area have substantially been cleared over the last 150 years for agricultural grazing, some areas of woodland are present. On the granitic geology and in some places on the metasedimentary, some stands comprised of Yellow Box (*Eucalyptus Melliodora*), Blakely's Red Gum (*E. blakelyi*), Apple Box (*E. bridgesiana*) with some Broad-leaved peppermint (*E. dives*) and Red Stringybark (*E. macrorhyncha*) exist. Areas of higher elevation on granitic soils to the south carry some Ribbon Gum (*E. viminalis*) and Snow Gum (*E. pauciflora*) communities. While the metasedimentary ridgelines have some examples of dry forest featuring Brittle Gum (*E. mannifera*), White or Scribbly Gum (*E. rossii*) and Broad-leaved peppermint (nghenvironmental 2010).

Summary

The proposed areas of impact subject to the modification are located predominantly on a sparsely treed undulating plateau/plain which possesses relatively low biodiversity values. The area does not contain reliable or abundant sources of potable water. The area experiences cold temperatures seasonally as well as strong winds. In an Aboriginal landuse context, the area is likely to have been utilised by Aboriginal people for a limited range of activities which may have included short stays, hunting and gathering forays and travel through country. Such activities are likely to have resulted in low levels of artefact discard. The nature of stone artefacts discarded can be expected to have been correspondingly limited in terms of artefact diversity and complexity.

In the broader region, the usually large body of water that forms Lake George, and its immediate environs, would have been one locus of intensive habitation and activity for the local Aboriginal people. Not only did it represent a cosmologically significant site

(Wally Bell pers. comm. October 2010), but it was also relatively higher in biodiversity values. This area also provided more sheltered contexts as well as a ready access to drinking water. To the north, the Lachlan River was also a major reliable water source. Artefact discard is likely to have been greater in these areas, reflecting more frequent and/or sustained occupation. It is possible that artefact diversity may also have been greater near to major lakes and rivers.

6. ARCHAEOLOGICAL CONTEXT

6.1 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 130m 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 c. 6,000 BP, sea levels had more or less stabilised to their current position. With the changes in climate during the Holocene, Aboriginal occupants had to deal not only with reduced landmass, but changing hydrological systems and vegetation; forests again inhabited the grass and shrublands of the Late Glacial Maximum. As Mulvaney and Kamminga (1999: 120) have remarked:

When humans arrived on Sahul's 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 Sahul¹ 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 at Burrill Lake (Lampert 1971), two sites near Buchan in Victoria; Cloggs Cave (Flood 1980) and New Guinea 2 (Ossa *et al.* 1995). The Bulee Brook 2 site in the south coast hinterland ranges, excavated by Boot (1994), provides evidence that occupation of this zone had occurred by at least 18,000 years ago. Pleistocene occupation sites are, however, few with the majority of recorded sites dating from the mid to late Holocene. It is nevertheless reasonable to assume that the Collector area was occupied and utilised by Aboriginal people from the late Pleistocene onwards.

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

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 in 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 so that the area of present day Collector, located south of Goulburn, fell within the traditional boundaries of the Ngunawal cultural group. 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).

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.

The paucity of reliable ethno-historic sources for the 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 supplied but can be expected to be reasonably high.

Attempts to reconstruct the home territories occupied by the various Aboriginal cultural groups of the broader Goulburn/Canberra region are in large part reliant on evidence drawn from ethnohistorical sources. Unfortunately, when the early European settlers first came into contact with these Aboriginal groups, generally a higher priority appears to have been given to the exploration and assumption of land rather than the recording of detailed information concerning the Aboriginal peoples they were displacing. Very soon after European contact, introduced diseases devastated the Aboriginal population and thereafter, with an increasing number of white settlers from the 1820s, much of the

Aboriginal language and lifestyle had changed before it could be accurately recorded. The earliest European reports regarding the Aborigines of the region are provided through the often cursory written observations made by the first explorers, adventurers and settlers to the district. However, given the aforementioned circumstances, these sources can only present fragmentary and incomplete accounts of the traditional culture of those Aboriginal groups who inhabited the area. Because of this, reliable information is limited regarding traditional Aboriginal culture and the extent of group territories at the time of European arrival.

Based on linguistic evidence collected in the late nineteenth century, primarily by anthropologists Curr, Howitt and Mathews, Tindale (1974) determined that the area of present-day Goulburn was situated at the boundary of two Aboriginal ‘tribes’ – the Gandangara to the north and the Ngunawal to the south. Traditional Ngunawal lands are described as extending north from Queanbeyan to Goulburn, and west to Tumut and Gundagai, so that the region of present day Collector fell within these traditional boundaries of the Ngunawal cultural group (Avery 1994). Bluett indicates that the Ngunawal in turn were comprised of three subgroups, each based within the three different regions of Yass, Lake George and Canberra/Queanbeyan within their overall territory. A ceremonial ground being located in each of these three regions. However, George Augustus Robinson in 1844 designated the Onerwal of Yass and the Koronial or Yammoit Mittung on the Limestone Plains as being the two groups that comprised the Ngunawal (Avery 1994).

William Wright recorded that at the time of initial white settlement, the Aboriginal population of the broader Canberra district numbered between 400 and 500 people. This group came together once a year for a large ceremony, and then dispersed to spend the remainder of the time in small mobile groups of 20 to 30 individuals. From records made during the distribution of blankets to Aboriginal people, it appears that Aboriginal groups within the region had widespread affiliations with other groups, extending as far as the Tumut Valley, Yass, Boorowa, Goulburn, Gundaroo, Braidwood, Cooma and the Illawarra area. The groups whose territory incorporated the Canberra area are indicated to have made frequent travels to Braidwood in order to barter for salt, to the Yass Plains to hunt kangaroo and gather grass seed, to the Shoalhaven to procure sandstone for spear sharpening, the Monaro to obtain volcanic stone to make hatchets, to Kiandra to harvest bogong moths, and to the South Coast for fishing (Avery 1994).

Ethnohistorical sources indicate that within the southern tablelands a broad range of resources were accessed by the Ngunawal as they moved through their country. Open plains surrounded by woodland attracted kangaroos, wallabies, wallaroos, wombats, emus and a variety of other fauna which were hunted by men and older boys. Meanwhile, women and children collected small game and vegetable foods that included birds, lizards, possums, native cats, fish, mussels, bird eggs, yams, berries, grubs and grass seed. In particular, the various swamps and waterways with their thick reed beds were an abundant food source which included many types of aquatic birds (Avery 1994).

In research conducted for her unpublished PhD thesis, Karen Williams has reconstructed the range that the Ngunawal people would have moved through in order to access the seasonal resources and raw materials that were required for their subsistence over the course of a year. As indicated by Wally Bell (Oct. 2010 pers. comm.), the range described by Williams' very closely accords with traditional cultural knowledge of the extent of Ngunawal territory.

For the Ngunawal, within their country, Lake George - known as *Ngungara* in traditional language - and its immediate environs, are of extreme significance. Not only was the lake a reliable source of food and water, but more importantly it is from *Ngungara* that the Ngunawal creator being *Nadyund Bouruage* originates (Don Bell – cited in Gugler 2010). Because of this, Lake George was a central focus of activity for the Ngunawal and this is evident in the number of site complexes located nearby. This applies not only to the areas fringing the lake but also other nearby areas including the prominent ridgeline immediately to the west of the lake which has an abundance of stone artefacts distributed across it (Wally Bell Oct. 2010 pers. comm.).

Away from Lake George and other ceremonial grounds, the most frequently used areas for the Ngunawal were the travel routes along which they moved through country. One major route extended from the west at Yass to Gundaroo and Lake George, and then continued east to Queanbeyan and beyond, passing through the country of other cultural groups and eventually linking to the coast. Another route went north from Lake George, leading to the abundant resources that were found along the Lachlan River. It is along these travel corridors where the highest density and most complex distribution of Aboriginal objects will be found (Wally Bell Oct. 2010 pers. comm.).

The study area lies away from these main travel corridors, so that it was less frequented by the Ngunawal (Wally Bell Oct. 2010 pers. comm.). Nevertheless, the area would have been occupied on occasion, albeit less intensively, and the resources present exploited. Such occupation would have resulted in the discard of stone artefacts and these will be distributed across the entire study area.

For the Ngunawal of today, there continues to exist a strong connection with their past, their cultural inheritance and their country. Cultural knowledge has been passed on and arising from this is the desire to conserve Ngunawal heritage, especially given all that has been lost since the arrival of Europeans. Because of this there is a variance between the *cultural significance* and the *scientific significance* of Aboriginal objects. Scientific significance places higher values on an Aboriginal object or suite of objects from which new information can potentially be derived and is, accordingly, linked with considerations of rarity or the number of associated objects. However, Aboriginal cultural significance places value on each object as a physical connection to their cultural past and their current identity.

6.2 Previously Recorded Aboriginal Objects

A search of the NSW OEH Aboriginal Heritage Information Management System (AHIMS) has been undertaken in respect of this study (#180348 – 5 July 2015). The search covered an area of 50 square kilometres, encompassed by Eastings: 715000 – 720000 and Northings: 6135000 – 6145000, with a buffer of 50 metres.

A total of 15 sites are listed on AHIMS for the search area, none of which are located within the proposed modification area (Figures 1 - 4).

Three of these sites, CR09 – AHIMS #51-5-0022, CR10 – AHIMS #51-5-0023 and CR11 – AHIMS #51-5-0024, are old recordings located immediately to the north of the proposed substation. These are discussed further below.

Five Aboriginal object locales were recorded during the original survey conducted for the Wind Farm in 2010. These are described in Dibden 2012 and summarised in the table below.

Table 1 Table of Aboriginal object locales found in the Collector Wind farm site in 2010.

AHIMS	ID	Feature	Survey Unit	Landform
51-5-0198	SU29/Locale 1	4 stone artefacts	Survey Unit 29	Simple slope
51-5-0197	SU37/Locale 1	1 stone artefact	Survey Unit 37	Crest
51-5-0196	SU37/Locale 2	1 stone artefact	Survey Unit 37	Crest
51-5-0195	SU42/Locale 1	2 stone artefacts	Survey Unit 42	Crest
51-5-0194	SU45/Locale 1	18 stone artefacts	Survey Unit 45	Crest

The AHIMS register only includes sites which have been reported to NSW OEH. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal objects situated within the local area or indeed within the study area itself.

The Aboriginal objects on AHIMS for the total site search area are listed below in Table 1, and the location of those nearest the study area is shown in Figures 1-4. It should be noted that sites recorded in AGD have been converted to GDA for mapping.

Table 2 Aboriginal objects listed on NSW OEH AHIMS search.

Site ID	Site name	Datum	Easting	Northing	Context	Site features	Site types	Recorders
51-5-0194	Lerida CWF-SU45/L1	GDA	717884	6142324	Open site	Artefact : 18		Mr. Andrew Pearce
51-5-0195	Lerida CWF-SU42/L1	GDA	718568	6138010	Open site	Artefact : 2		Mr. Andrew Pearce
51-5-0196	Lerida CWF-SU37/L2	GDA	719838	6137202	Open site	Artefact : 1		Mr. Andrew Pearce
51-5-0197	Lerida CWF-SU37/L1	GDA	719787	6137022	Open site	Artefact : 1		Mr. Andrew Pearce
51-5-0198	Lerida CWF-SU29/L1	GDA	718051	6141254	Open site	Artefact : 4		Mr. Andrew Pearce
51-5-0056	Norfolk Creek 1	AGD	719730	6144020	Open site	Artefact : -	Open Camp Site	Kerry Navin, Mr. Kelvin Officer
51-5-0023	CR10 Cullerin Range	AGD	718600	6143800	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0021	CR08 Gunning	AGD	718250	6144000	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0022	CR09 Cullerin Range	AGD	718500	6143850	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0024	CR11 Cullerin Range	AGD	718700	6143800	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0025	CR12 Cullerin Range	AGD	719150	6144050	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0026	CR13 Cullerin Range	AGD	718700	6143900	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0027	CR14 Cullerin Range	AGD	718350	6144100	Open site	Artefact : -	Open Camp Site	Rex Silcox
51-5-0075	Cullerin Survey Unit 8/Locale 1	AGD	718486	6144545	Open site	Artefact : 25		Doctor. Julie Dibden
51-5-0076	Cullerin Survey Unit 6/Locale 1	AGD	718795	6144606	Open site	Artefact : 2		Doctor. Julie Dibden

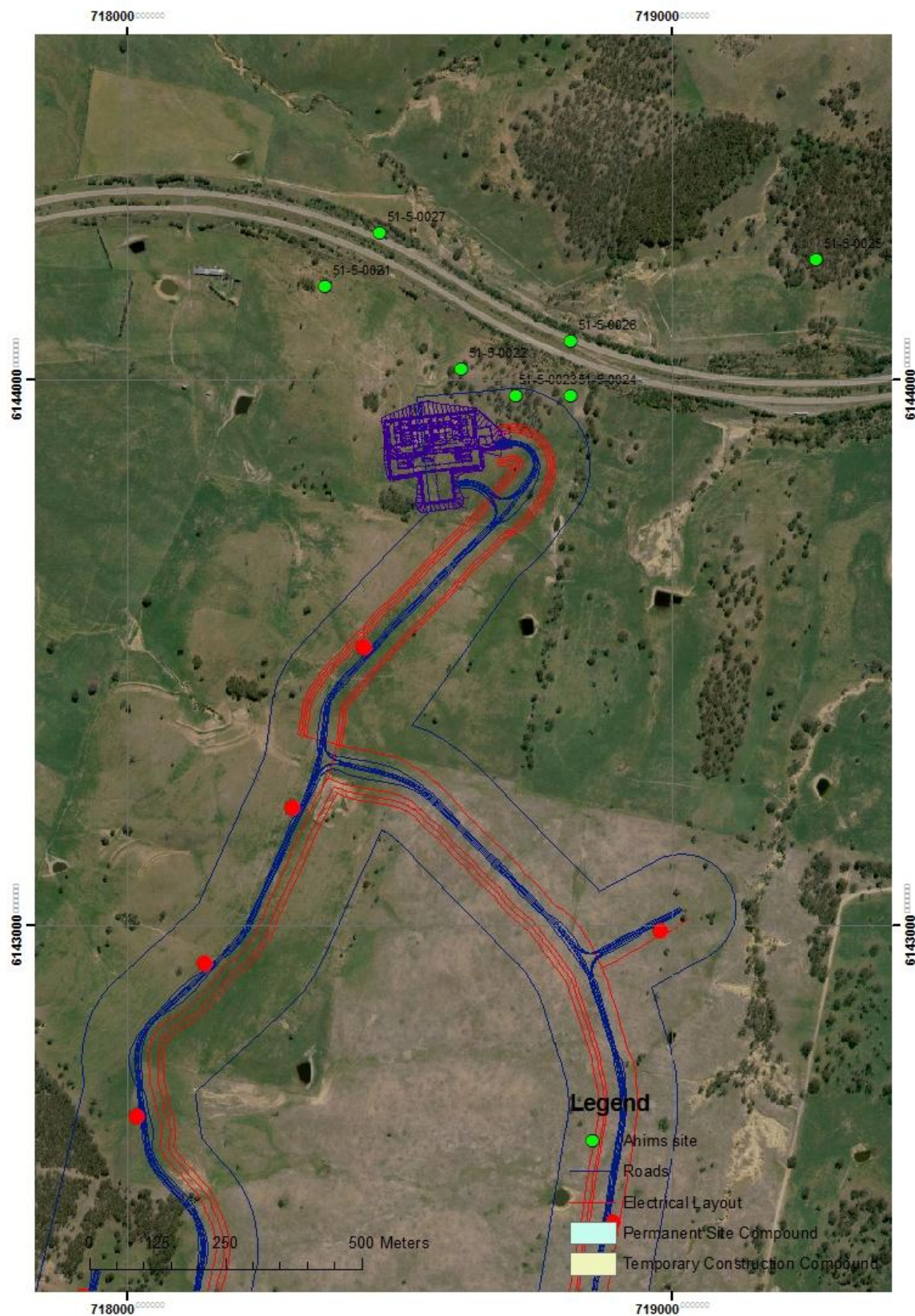


Figure 1 AHIMS Sites: north end near proposed substation.

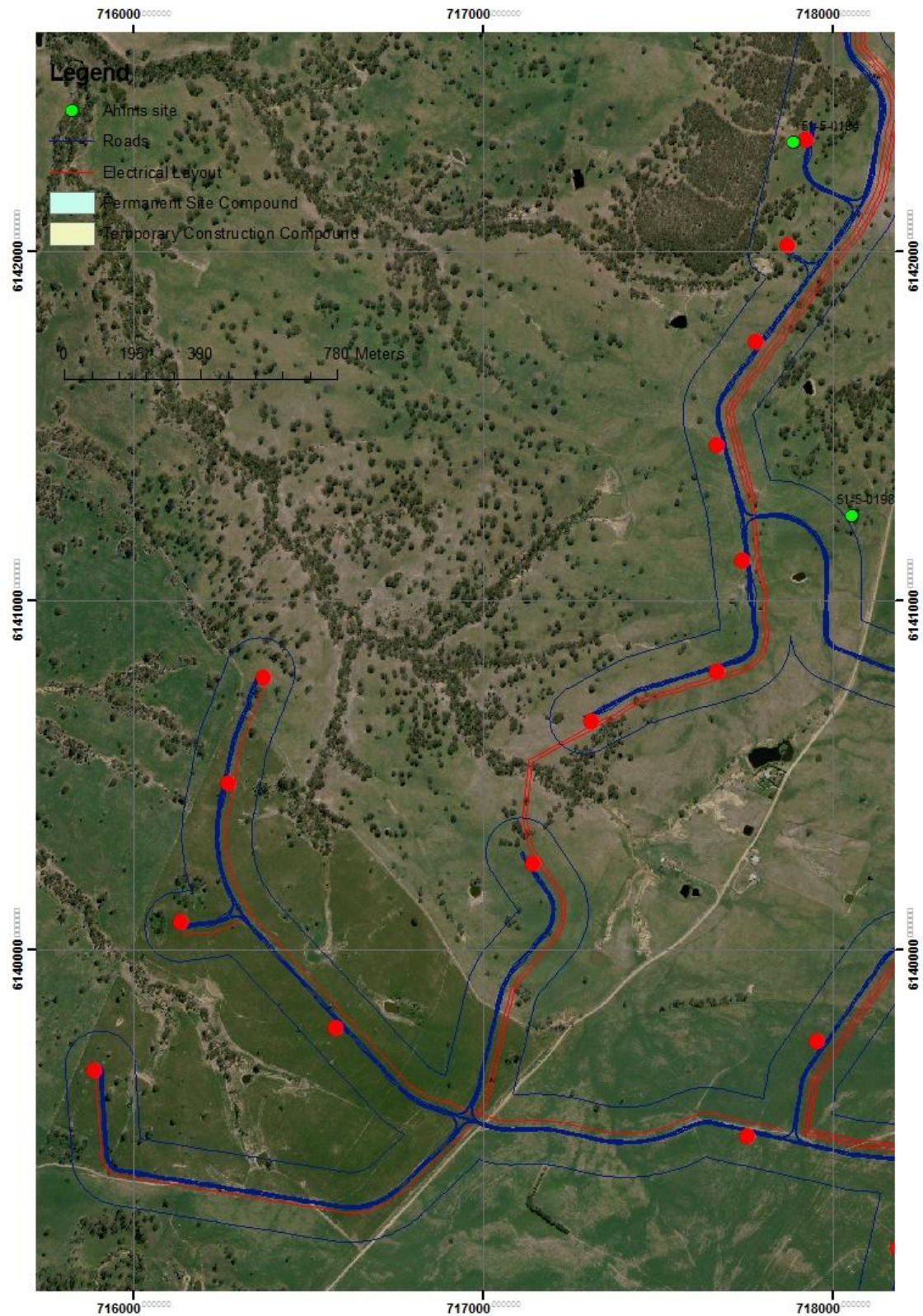


Figure 2 AHIMS Sites; west side of site.

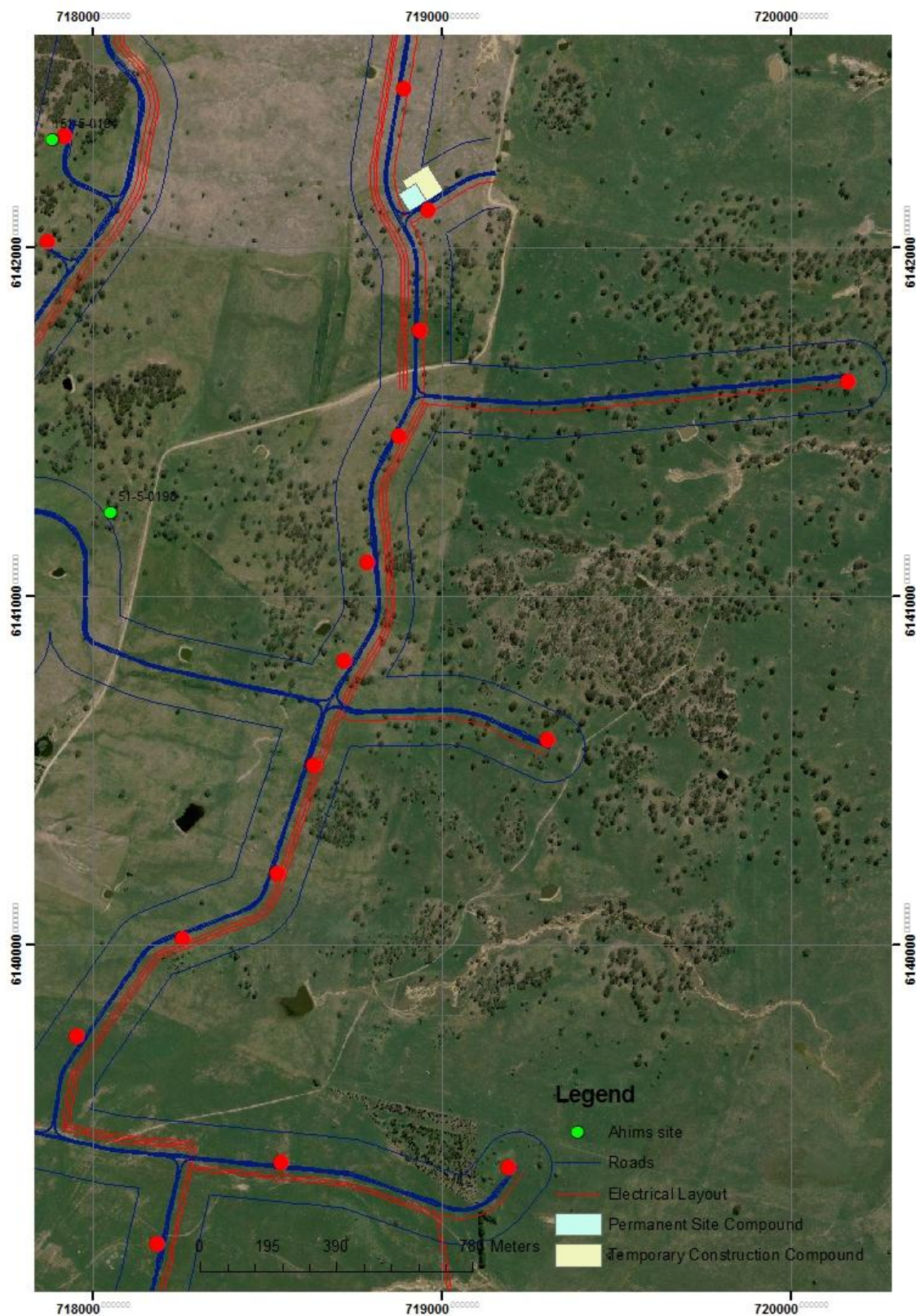


Figure 3 AHIMS Sites; east side of site.

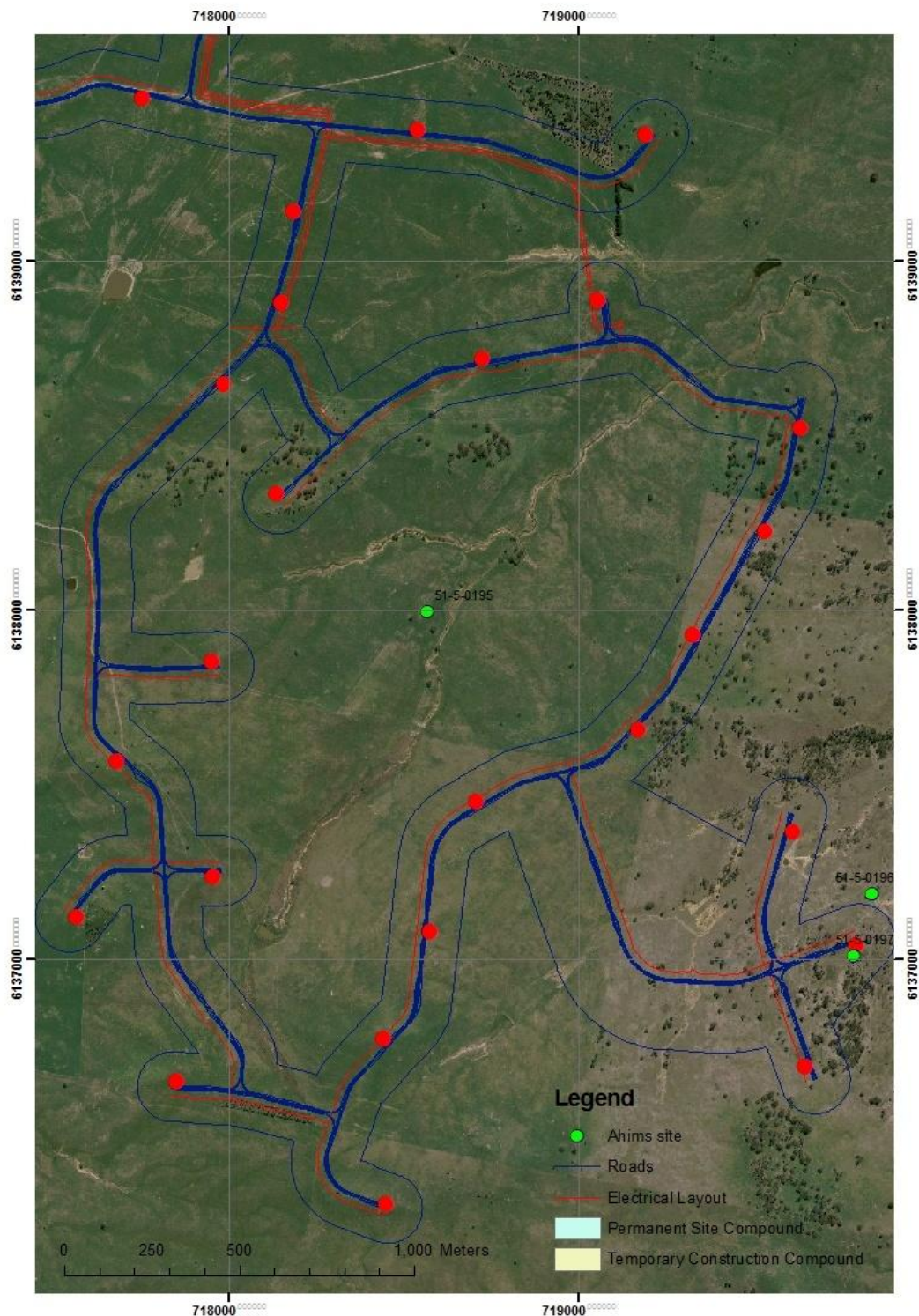


Figure 4 AHIMS sites; south side of site.

Two archaeological assessments, both conducted in relation to the then proposed Hume Highway by-pass route, have taken place in part in a section of land that runs along the most northerly boundary of the modification area.

Dallas (1985) conducted a survey of the Cullerin Range Bypass which extended between Breadalbane and Gunning for a distance of 31 kilometres. A c. three kilometre section of

this survey route passed along a part of the northern boundary of the proposal area. A total of seven low density artefact scatters were recorded, six of which were found to the east of the Cullerin Range. Dallas (1985) indicates that the frequency of sites along the survey route was low, at 1 per 4.4 kilometres, but that this was probably the product of both the 'straight line' survey and the intermittent nature of creeklines traversed along that route. Dallas (1985) suggests that the dryer hilly terrain in the area was used for transitory occupation, but that more favourable conditions for habitation were located downstream, closer to the Lachlan River.

Due to changes in the alignment of the bypass route, a subsequent survey was conducted by Koettig and Silcox (1985) along a survey route 3 km long and 200 metres wide. During the survey an additional seven sites were recorded. Three of these, CR09 – AHIMS #51-5-0022, CR10 – AHIMS #51-5-0023 and CR11 – AHIMS #51-5-0024 are located within the modification area, although in an area where no impacts are currently proposed. All sites were situated on moderate slopes associated with a main ridge, with the exception of CR12, located on top of a ridge, and CR14, located on top of a knoll. All artefact locales were situated within 200 metres of a creekline. The number and distribution density of artefacts at each site was found to be extremely low (Table 3). All locales were recorded in areas of shallow sheetwash erosion, although it was noted that many areas of erosion did not possess artefacts and that where artefacts were located, they did not occupy the entire eroded area. Silcox (1993) summarised the results of both bypass 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.

Table 3 Artefact numbers and distribution density of Cullerin Range Deviation sites recorded by Koettig and Silcox (1985).

Site	Number of artefacts	Average density
CR8 - Site # 51-5-0021	17+	1/10 m ²
CR9 - Site # 51-5-0022	14	1/21 m ²
CR10 - Site # 51-5-0023	6	1/65 m ²
CR11 - Site # 51-5-0024	3	1/75 m ²
CR12 - Site # 51-5-0025	30+	1/40 m ²
CR13 - Site # 51-5-0026	7	1/40 m ²
CR14 - Site # 51-5-0027	50+	1/80 m ²

Thereafter, Koettig (1986) carried out an excavation of one of the sites (CR14 - Site #51-5-0027) on the Bypass route which was situated on a small knoll immediately overlooking a creekline. An extensive assemblage of mostly quartz artefacts was retrieved with material occurring in variable density across the site. Prior to excavation, a surface salvage retrieved 403 artefacts from an area of 2,750 m². Excavation of part of this site produced a further 1,844 artefacts. From these findings Koettig (1986) calculated that the total number of artefacts that would be expected to be present in a subsurface context across the entire 2,750 m² area was in the vicinity of 100,000 - 120,000 (we calculate this to c. 43 artefacts per square metre). Both quartz and silcrete material was

found to have been worked by both direct percussion and bipolar flaking techniques. The relatively high artefact density in this site could well be a factor of its location on an elevated landform situated immediately above a creekline as well as its position between two opposed, prominent ridges which would make such a location an obvious thoroughfare and nodal place in the broader landscape.

The following discussion in Section 6.3 will present a review of additional previous archaeological work in the region for the purposes of producing a predictive model of site type and location relevant to the study area.

6.3 Archaeology – The Local Area

Few previous archaeological studies have been undertaken within the immediate local area (however, see above), while a number of studies have been carried out 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.

Just to the northeast of Collector, Koettig (1982) conducted surface salvage at C-AB2 and C-AB1. This work was carried out in relation to the proposed construction of a dual carriageway on the Federal Highway. C-AB2 was situated on a low rise between two drainage lines that join to form Byrnes Creek and encompassed an area that extended for c. 100 metres. C-AB1 was located c. two kilometres east of C-AB2, next to Byrnes Creek and in a similar topographic context. From C-AB2, 6,491 stone artefacts were recovered, ranging in size from 2 millimetres to 12 centimetres. Quartz comprised 94.6% of the raw material, with a high percentage of quartz waste material less than 1 centimetre in size, while silcrete (2.8%) was the second most common material. At C-AB1, 178 artefacts were recovered with similar percentages of raw material to that exhibited at C-AB2. It was noted that an outcrop of quartz which showed evidence of knapping (C-AB3), was located just 300 metres to the south of C-AB2. Because of a high waste to tool ratio of 71:1 at C-AB2, Koettig (1982) proposed that the site was probably a knapping location.

Stone (1986) conducted an archaeological survey in relation to the proposed dual carriageway between the Cullerin deviation and the Yass bypass. Surveying along a 200 metre wide easement for a distance of 18 kilometres, two low density artefact scatters were recorded west of Gunning. Both were located on slopes adjacent to streams that flow into Jerrawa Creek and each were assessed to be of low research potential due to being highly eroded.

Closer to Goulburn, Koettig (1983) surveyed the proposed highway by-pass route in areas to the south and east of the township. 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 artefact 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 Gundary Creek, was found to be a

high density site with stratified deposit. Koettig (1883) recovered 650 artefacts from test pits.

Paton (1990) subsequently conducted test excavation at site G17 as 15% of the site was to be effected by the proposed Goulburn highway by-pass construction. Paton (1990) retrieved a total of 15,257 stone artefacts, several European artefacts and several bone fragments from 29 trenches. Raw material proportions for the stone artefacts were:- quartz 85%, silcrete 10%, chert 2%, quartzite 1.2%, volcanic 0.8%, basalt 0.2% and others 0.8%, noting that quartz is known to outcrop on a hill about 750 metres from the site. There was little evidence of the manufacture of formal tool types at the site, with less than 1% of artefacts being identified as formal tools. One bone fragment was identified as being a 4cm section of a human bone. Dating of the site suggested that it was up to 5,000 years old, and occupied up until the present.

Extrapolating from the excavated area, Paton (1990) estimated that the site held about 4.5 million artefacts, indicating that it was probably occupied on a regular basis over several thousand years. Situating his findings within the models of occupation and site patterning for the area proposed by Koettig (1983), Lance and Koettig (1986) and Fuller (1989), G17 is characterized as being a site which was the focus of human activity, regularly used as a base camp by Aboriginal groups 'because of its reliable resources and comfortable camping conditions'.

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.

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 50 metres 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, however, only five artefacts were recovered. The artefacts 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 five 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 1,000 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 variable and low numbers on average; 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 five kilometres of a proposed Telstra optical fibre cable route between Goulburn and 'The Forrest', and located three very low density artefact scatters, four isolated finds and a possible scarred tree.

Silcox (1993a) carried out test excavations at a proposed ironstone mine access road situated ca. five kilometres north of the proposal area, 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 four artefacts from a total of 57 pits at the site situated on the gentle slope. At the ironstone mine site, situated on the broad flatfish saddle, no Aboriginal objects were found.

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

Silcox (1995) surveyed the route of a proposed power line and Telstra radio base at Sunnyside, some 14 kilometres southwest 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 metres from a tributary creekline. S2 consisted of four artefacts distributed across an area of 50 metres 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 two 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 southwest of the Goulburn township. One small artefact scatter and one isolated find were recorded. The scatter was located in the middle of a lower slope, 150 metres 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 kilometres northwest 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 recorded, two possible scarred trees identified, and one quartz flake was 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 immediately to the southwest 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 metres 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 northeast 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, calculated according to effective archaeological visibility, was found to be extremely low.

Saunders (2007) conducted a survey in relation to proposed subdivisions on Pomeroy and Gurrundah Roads, Parkesbourne, c. 14 kilometres northeast of the current study area. Situated along low gradient basal slopes immediately adjacent to the Wollondilly River, 14 Aboriginal object locales were identified, comprised of 12 artefact scatters and two isolated finds. All but two of the locales were assessed to have the potential to contain further artefacts.

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 1m x 1m 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 c. one kilometre from Middle Creek.

Jo McDonald Cultural Heritage Management Pty Ltd (2003) undertook a survey of the Gunning Wind Farm, situated on the Cullerin Range northwest of the Cullerin Wind Farm. 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 hilltops were considered to be of low archaeological potential, while elevated contexts close to water were considered to be of higher sensitivity.

Austral Archaeology Pty Ltd (2005) subsequently conducted subsurface testing at the Gunning Wind Farm in six areas identified by Jo McDonald Cultural Heritage Management Pty Ltd (2003) as having potential archaeological deposit. A total of 15 excavator scrapes were dug, however, no artefacts were identified. Austral Archaeology Pty Ltd (2005) attributed the absence of subsurface artefactual material to the elevation

of the site and its distance to reliable water, as well as the skeletal nature of the soils, these being less than 15 centimetres deep.

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 nine kilometres 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 six 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 proposed impact zones encompassed ridge crest, slopes and drainage depression. Six artefact sites and one scarred tree were recorded. Stone materials recording included rhyolite, quartz and silcrete and volcanics. The majority of site recordings were made near water.

Dibden (2005) conducted a survey in relation to the proposed Cullerin Wind Farm located immediately to the north of the Collector Wind Farm. Surveying predominantly on ridge crests, knolls and saddles, in conditions which afforded reasonable effective survey coverage, four locales containing stone artefacts were recorded. The artefacts were distributed in low densities and the Survey Units in which they are situated were similarly assessed to contain low density artefact distributions. These findings were attributed to an absence of reliable fresh water source in the proposal area as well as the limited resources that would have been present in the former woodland zone. As such, the study area was assessed to be of low archaeological potential and sensitivity.

Austral Archaeology Pty Ltd (2007) undertook a survey in relation to the proposed Capital Wind Farm, located on the eastern side of Lake George. Five Aboriginal archaeological surface sites were recorded during the survey, consisting of two small artefact scatters and three isolated finds. Four sites, HH 1, 2 & 3 and WC 1, were located on gently sloping topography adjacent to creek tributaries while site HH 4 was located on a moderate sloping ridge top. In addition, six areas of potential archaeological deposit (PAD) were also identified; one associated with the recorded surface site WC 1. The remaining five areas of PAD were identified sensitive on the basis of topographic features, location and/or their estimated research potential. No surface sites recorded during assessment will be impacted by the proposed development.

Austral Archaeology Pty Ltd (2007) characterised the Capital Wind Farm study area as having distinct areas of high, moderate and low archaeological and cultural sensitivity,

with areas of high and moderate archaeological sensitivity located on slightly elevated, gently sloping topography associated with local resource bases and/or reliable watercourses, and areas of low archaeological sensitivity on high, steep and rocky ridgelines at a distance to resources and freshwater. Accordingly, the eastern edge of Lake George was deemed to be a zone of high archaeological and cultural sensitivity.

Thereafter, six distinct areas were subjected to subsurface investigation and a total of 348 artefacts were retrieved from a total of 83 test pits (Austral Archaeology Pty Ltd 2009). The majority of artefacts were found to be of quartz (66%), with remainder composed of silcrete (22%), chert (11%) and quartzite (1%). All artefact densities from the six excavation sites were found to be uniformly low, calculated to range from 0.32 artefacts per square metre to 13.46 artefacts per square metre. The overall artefact assemblages of four of the six test areas were described as being suggestive of little more than background artefact scatter, while the densities at the two other areas were assessed to be particularly low so as to indicate that those areas were not used frequently or extensively.

Dibden (2008) surveyed the proposed Yass Valley Wind Farm and recorded 116 Aboriginal object locales, most of which were low density stone artefact scatters. Artefact locales were frequently recorded on knolls and saddles of ridge crests and within valley bottom contexts. The majority of sites contained either single or otherwise very few artefacts. The majority of sites on crests were situated in deflated and eroded soil profiles. Given the relatively large areas of exposure encountered (in drought conditions), and the very few artefacts recorded, it was concluded that artefact density, generally, was very low. This result was consistent with the relevant predictive model of Aboriginal land use.

Dibden (2012) conducted the assessment for the Rye Park Wind Farm located north of Yass. Thirteen Aboriginal object locales were recorded, the majority of which were very low density stone artefact distributions. The project area was assessed to contain very low density stone artefact abundance and hence to be of low cultural and archaeological sensitivity.

The assessment of Bango Wind Farm (Dibden 2013) recorded 14 stone artefact locales. All stone artefact recordings were very low density distributions and any unrecorded stone artefacts, either in surveyed areas or in adjacent terrain, were likewise predicted to be present in very low or very low/low densities only.

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 described in Section 6.4 below.

6.4 Predictive Model of Aboriginal Object and Location

Stone artefact distributions of variable artefact densities are the most common Aboriginal object found within the region. A general correlation between different types of watercourses and the nature of the evidence of past Aboriginal occupation is also

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 five 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.

As indicated, 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 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 surface of the ground and/or in subsurface contexts. Stone artefacts will be 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. In the region, sheltered environmental contexts are likely to have been utilised for camping. The detection of artefacts during a surface survey depends on whether or not the potential archaeological bearing soil profile is visible.

Given the environmental context of the proposed Collector Wind Farm, stone artefacts are predicted to be distributed across this landscape in variable densities. The broader area in which the majority of the wind farm infrastructure is proposed is comprised of amorphous crests, slopes and flats, located away from reliable water and in an area of limited biodiversity. Based on the results and assessment of the previous survey of the Wind Farm, it is predicted that the artefact density in the modification area will be generally very low and, in parts, negligible.

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 low prospect of suitable rock exposures being present in the study area grinding groove sites are unlikely to be present.

Burials sites

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

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 although some trees of moderate age remain. 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. Quarries are rare site types in the region. A stone quarry is unlikely to be recorded during the current study although it is possible.

7. SURVEY RESULTS

Three stone artefact locales were recorded during the field inspection. These are listed in Table 4 and described below:

Table 4 Summary of artefact locale data.

ID	Feature	Survey Unit	Landform
SU1/Locale 1	1 stone artefact	Survey Unit 1	Crest
SU54/Locale 1	1 stone artefact	Survey Unit 37	Crest
SU45/Locale 2	2 stone artefacts	Survey Unit 45	Crest

Survey Unit 1/Locale 1

717844e 6138389n GDA

One stone artefact was recorded on road on a broad undulating crest landform (Plate 1). The artefact was recorded within an exposure measuring >50 x 3 metres. Ground exposure in this location is calculated to have been 80%, with archaeological visibility estimated at 70% within that area. Ground surface visibility surrounding the area of exposure is low. There is a potential for additional artefacts to occur at this locale. However, it is predicted that artefact densities are likely to be very low in this landform.

The artefact is a brown silcrete flaked piece: Size class 2.



Plate 1 Location of Aboriginal object in *Survey Unit 1/Locale 1*; looking 70°.

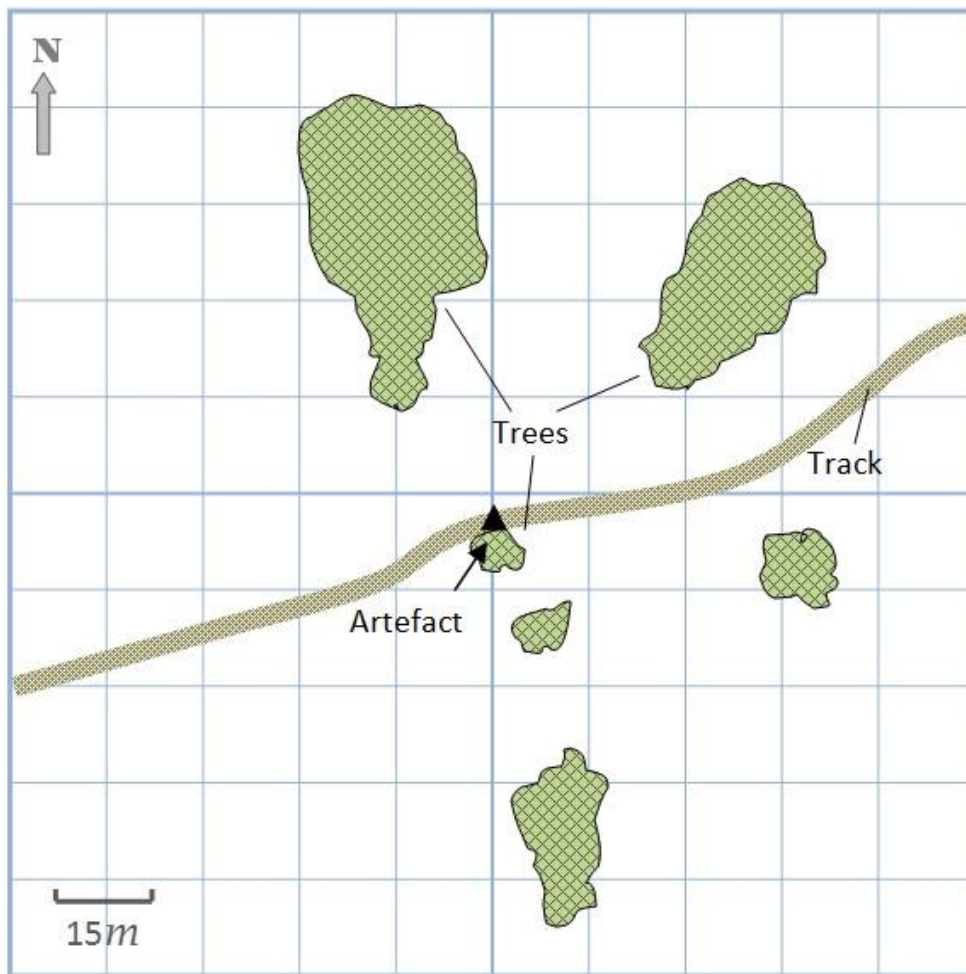


Figure 5 Sketch map of Survey Unit 1/Locale 1.

Survey Unit 54/Locale 1

719600e 6137333n

GDA

One stone artefact was in a large area of excavated exposure associated with a farm dam on a flat landform (Plate 2). The artefact was recorded within an exposure measuring approximately 300 sq metres. Ground exposure in this location is calculated to have been 95%, with archaeological visibility estimated at 40% within that area. Ground surface visibility surrounding the area of exposure is low. There is a potential for additional artefacts to occur at this locale. However, it is predicted that artefact densities are likely to be low in this landform.

The artefact is a quartz flake portion (distal): Size class 2.



Plate 2 Location of Aboriginal object in *Survey Unit 54/Locale 1*; looking 200°.

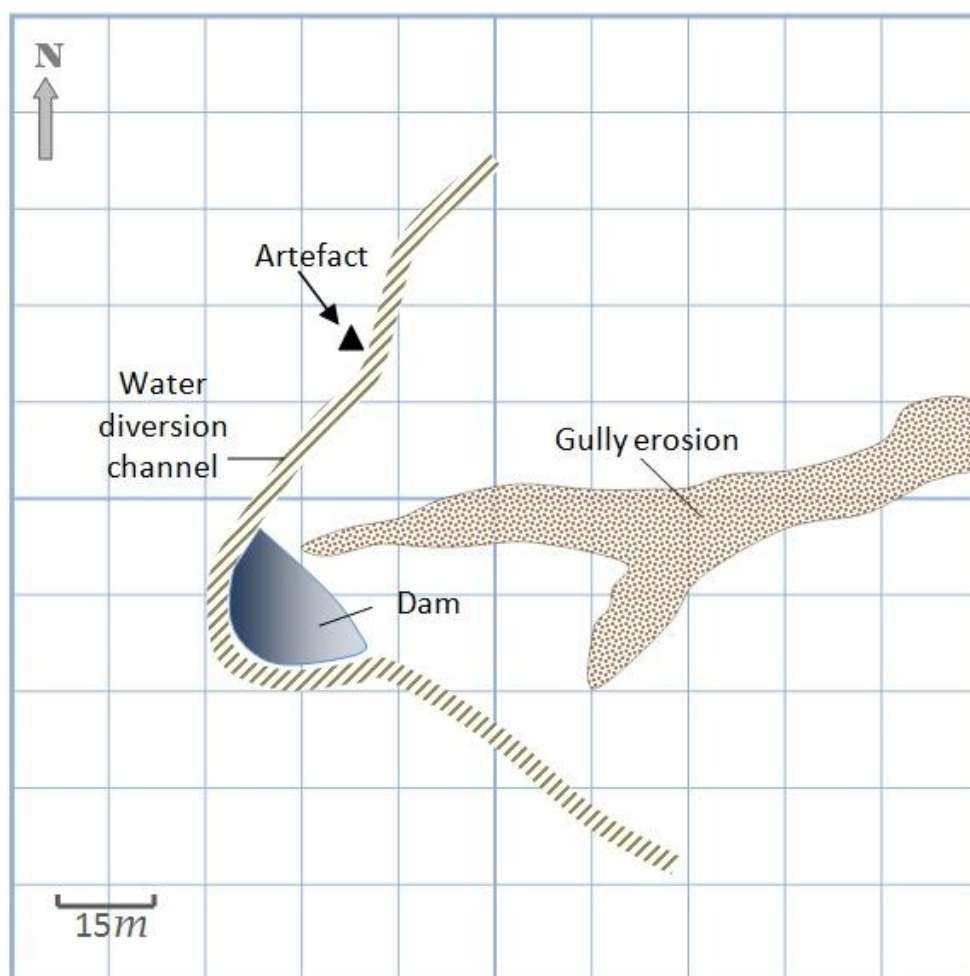


Figure 6 Sketch map of *Survey Unit 54/Locale 1*.

Survey Unit 45/Locale 2

718678e 6143900n GDA

Two stone artefacts were found in a bare earth exposure on a broad undulating crest landform (Plate 3). The artefacts were recorded 10 metres apart in a 30 x 30 m area of exposure. Ground exposure in this location is calculated to have been 20%, with archaeological visibility estimated at 90% within that area. Ground surface visibility surrounding the area of exposure is generally low. The area is eroded to bedrock and contains abundant shale shatter. The site has no subsurface potential (no soil). There is a potential for additional artefacts to occur at this locale. However, it is predicted that artefact densities are likely to be very low in this landform.

The artefacts are:

- brown silcrete flake: 47 x 23 x 15mm;
- brown silcrete flake fragment: 25 x 20 x 15mm.



Plate 3 Location of Aboriginal object in *Survey Unit 45/Locale 2*; looking 10°.

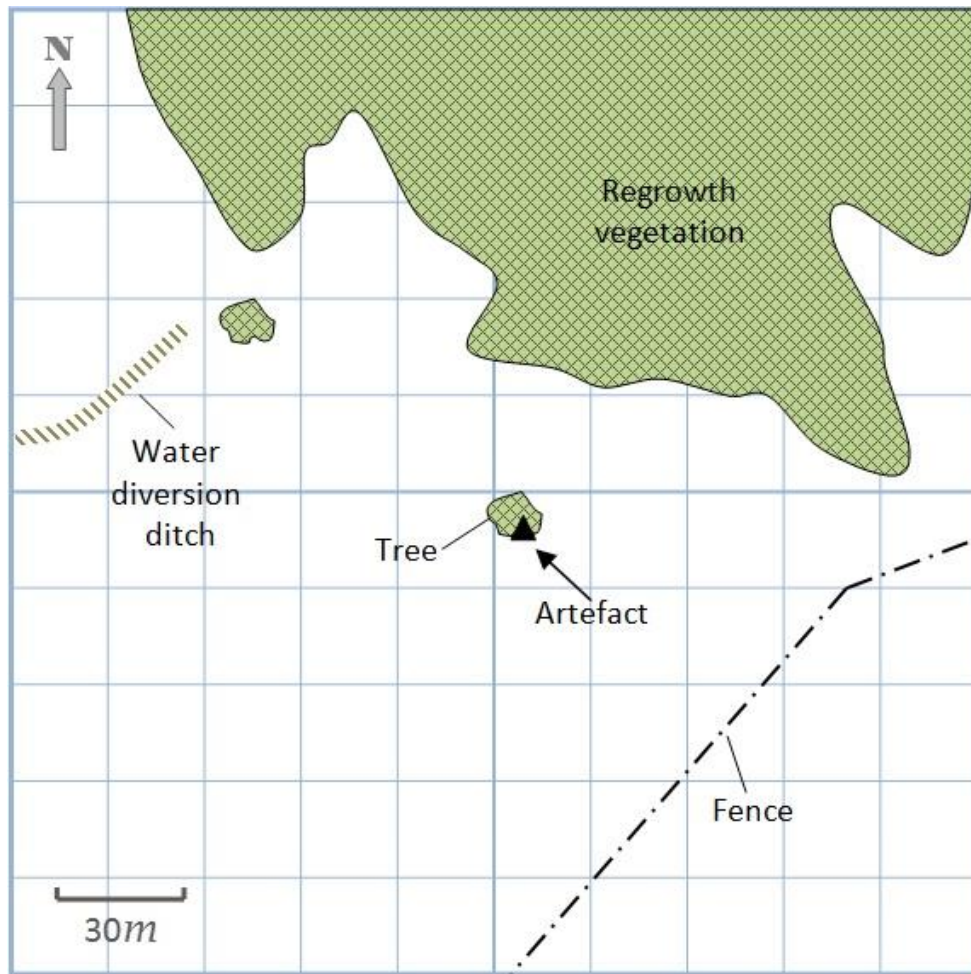


Figure 7 Sketch map of Survey Unit 45/Locale 2.

Survey Coverage

Survey Units are shown on Figures 12-15 below. The survey entailed walking linear transects (>25km) which measured approximately 100 metres in width. The development area surveyed during this assessment measured approximately 248 hectares in area (Table 5). It is estimated that approximately 50 hectares of that area was subject to direct survey inspection. Ground exposures inspected are estimated to have been 0.99 hectares in area. Of that ground exposure area, net effective coverage, accounting for archaeological visibility, is estimated to have been 0.89 hectares. Effective Survey Coverage (ESC) is therefore calculated to have been 0.36% of the survey area. This result is comparable to that achieved in the original survey. That is, despite covering a large survey area, given low levels of ground exposure, the ability to observe archaeological materials was low. Accordingly, the assessment and conclusions rely heavily on the predictive model applicable to the area.

Table 5 Survey Coverage

SU	Landform	Length metres	Area	Direct inspection	Ground exposure	Net effective exposure	Effective Survey Coverage
SU1a	Crest	4341	434100	86820	1736	1562.76	0.36
SU4a	Simple slope	311	31100	6220	124	111.96	0.36
SU21a	flat/drainage depression	334	33400	6680	134	120.24	0.36
SU26a	crest	6432	643200	128640	2573	2315.52	0.36
SU27a	crest	2046	204600	40920	818	736.56	0.36
SU28a	flat/drainage depression	2558	255800	51160	1023	920.88	0.36
SU29a	Simple slope	1221	122100	24420	488	439.56	0.36
SU33a	Crest	997	99700	19940	399	358.92	0.36
SU34a	Simple slope	1166	116600	23320	466	419.76	0.36
SU44a	Simple slope	1280	128000	25600	512	460.8	0.36
SU45a	Crest	1121	112100	22420	448	403.56	0.36
SU51	simple slope	179	17900	3580	72	64.44	0.36
SU52	Crest	205	20500	4100	82	73.8	0.36
SU53	Crest	896	89600	17920	358	322.56	0.36
SU54	flat/drainage depression	1386	138600	27720	554	498.96	0.36
SU55	Simple slope	406	40600	8120	162	146.16	0.36
		24879	2487900	497580	9952	8956.44	0.36

Discussion and Impact Assessment

The proposal area is likely to contain stone artefacts across the majority, if not all the Survey Units defined during this assessment. Accordingly, the three stone artefact locales recorded are expected to be indicative of the archaeological status of the proposal area only, rather than a comprehensive inventory. All stone artefacts recordings are very low density distributions and any unrecorded stone artefacts, either in surveyed areas or in adjacent terrain, are likewise predicted to be present in very low or very low/low densities only. In many areas, artefact density is probably negligible. These results are comparable to those obtained during the original survey (*cf* Dibden 2012).

The proposed modification areas are generally located in landforms and terrain which is highly amorphous and generally undifferentiated. During the field survey no landforms or micro-topographic features were identified that are likely to have been environmental focal points that Aboriginal people would have habitually occupied and hence which would result in high density concentrations of artefacts. In addition, biodiversity is relatively low and drainage depressions are ephemeral. Accordingly, Aboriginal use of this landscape is predicted to have been sparse, of low intensity, and restricted to a limited range of activities; - movement through country, hunting and gathering forays and so on. These types of activities would have resulted in artefact discard which is patchy and low density in distribution.

It is concluded that the proposed impacts to the archaeological resource can be considered to be of low significance. Two of the three Aboriginal object locales are located outside areas of proposed impacts. The five previously recorded Aboriginal object locales are likewise situated outside areas of proposed impact (see Figures 8 - 11).

The Indigenous cultural value of the landscape in general, as well as the Aboriginal objects it contains, is considerably higher than the scientific value. Both the landscape and the objects which are encompassed within it, are material testament to the lives of Indigenous people's ancestors and the focus of their current identity, concerns and aspirations. Therefore, the proposed impacts will have an impact on the cultural significance which attaches to the area.

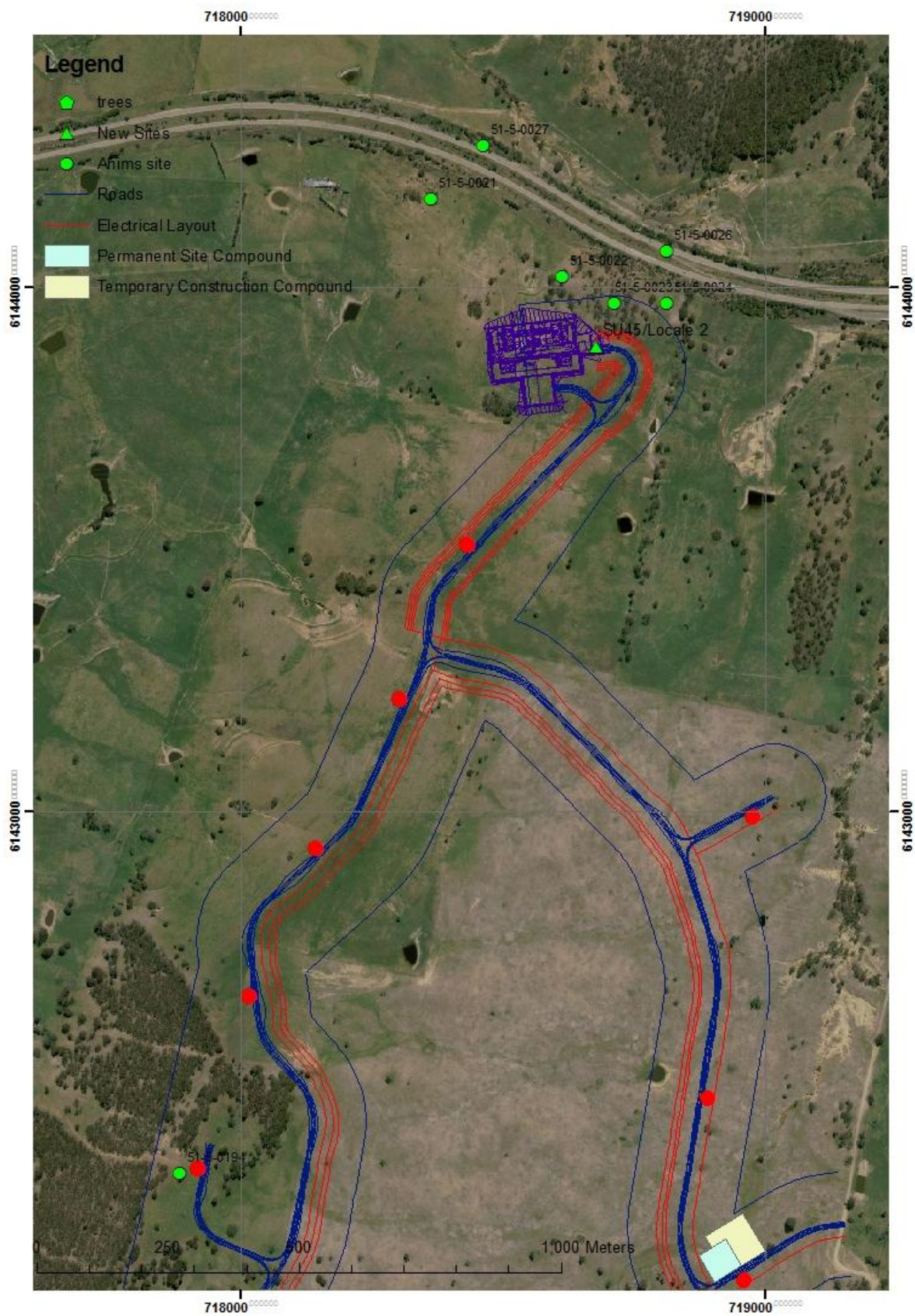


Figure 8 Location of all known Aboriginal object locales; north end, note substation at north end of site.

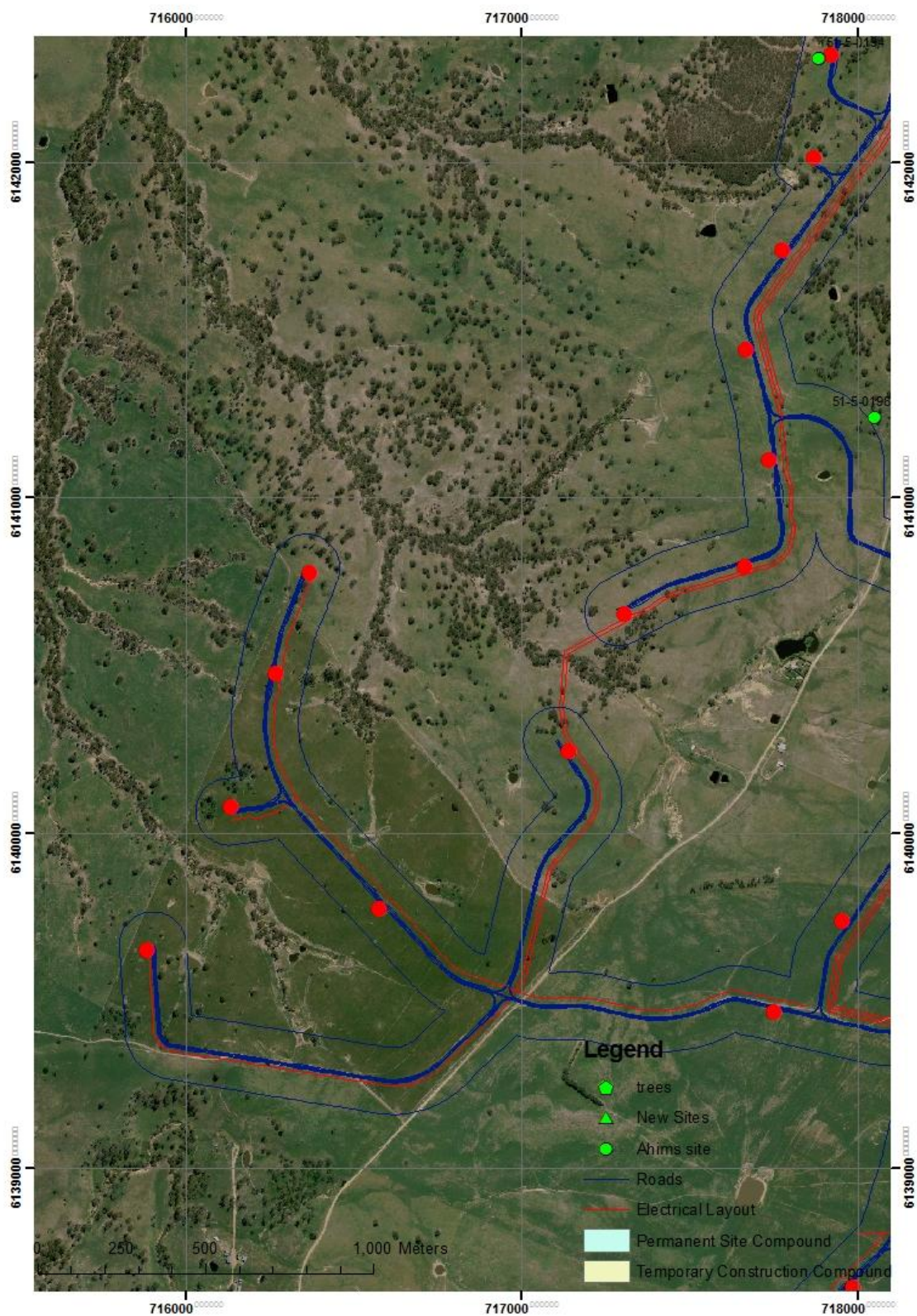


Figure 9 Location of all known Aboriginal object locales; west end.

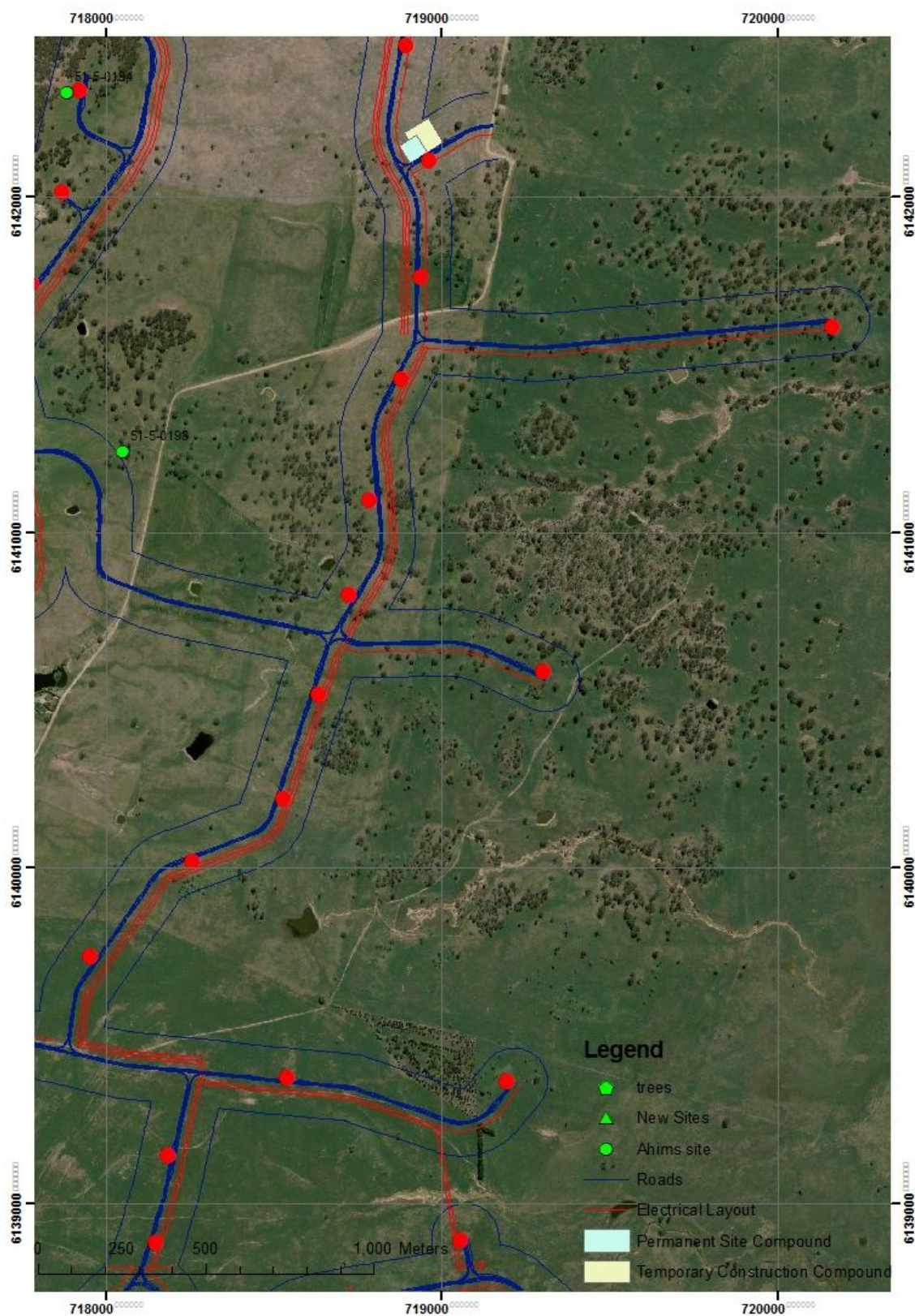


Figure 10 Location of all known Aboriginal object locales; east end.

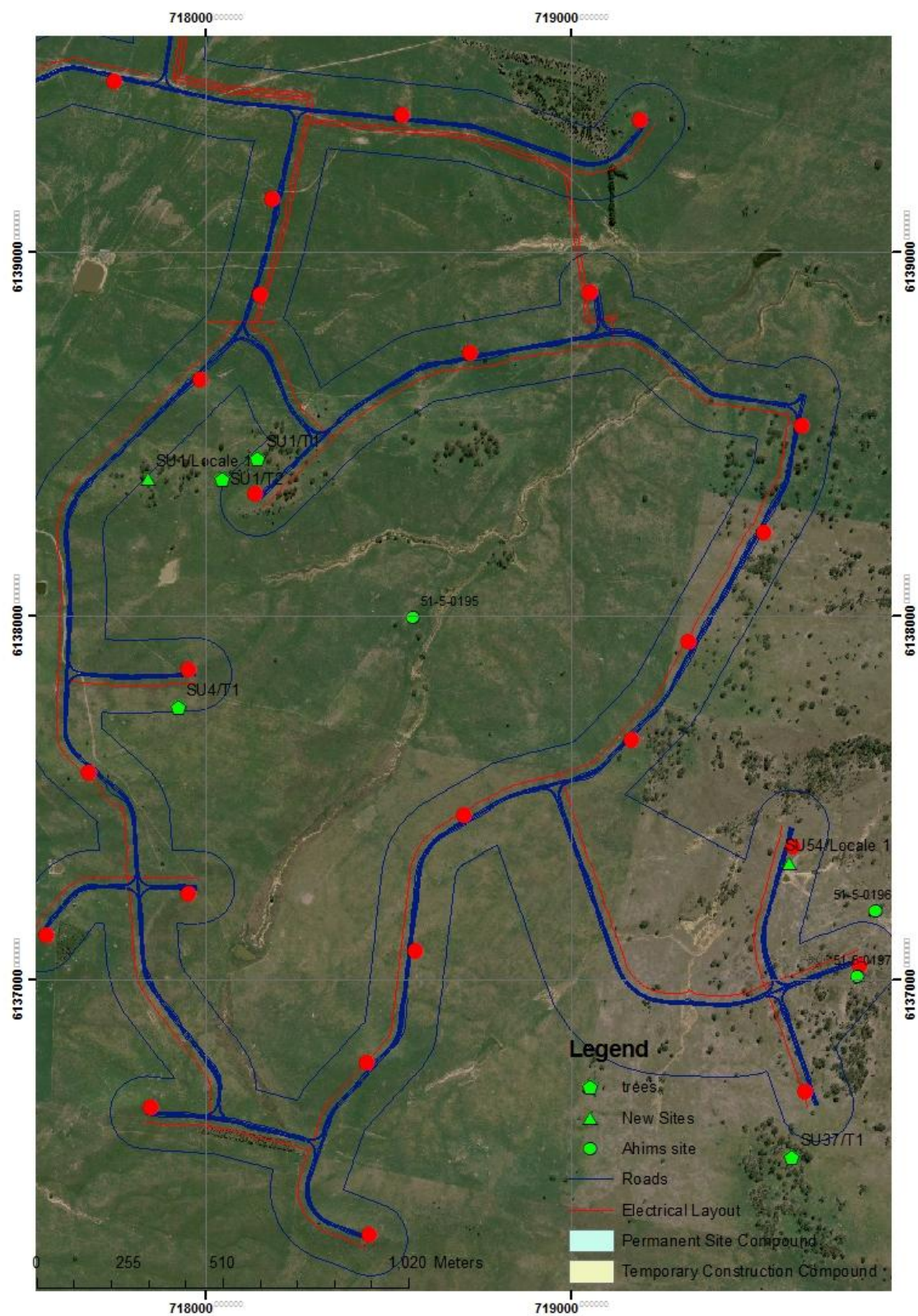


Figure 11 Location of all known Aboriginal object locales; south end.

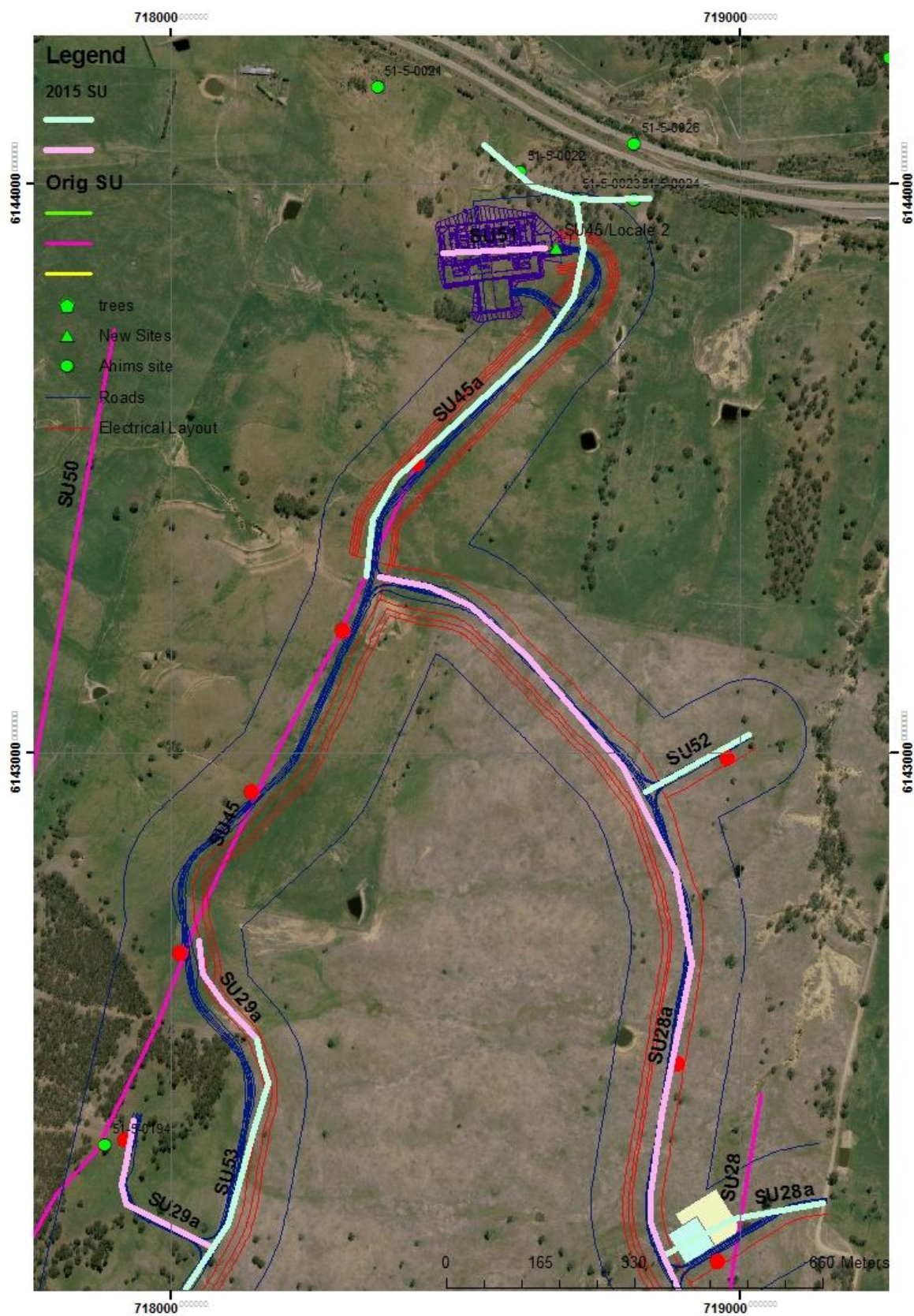


Figure 12 Survey Units; north end.

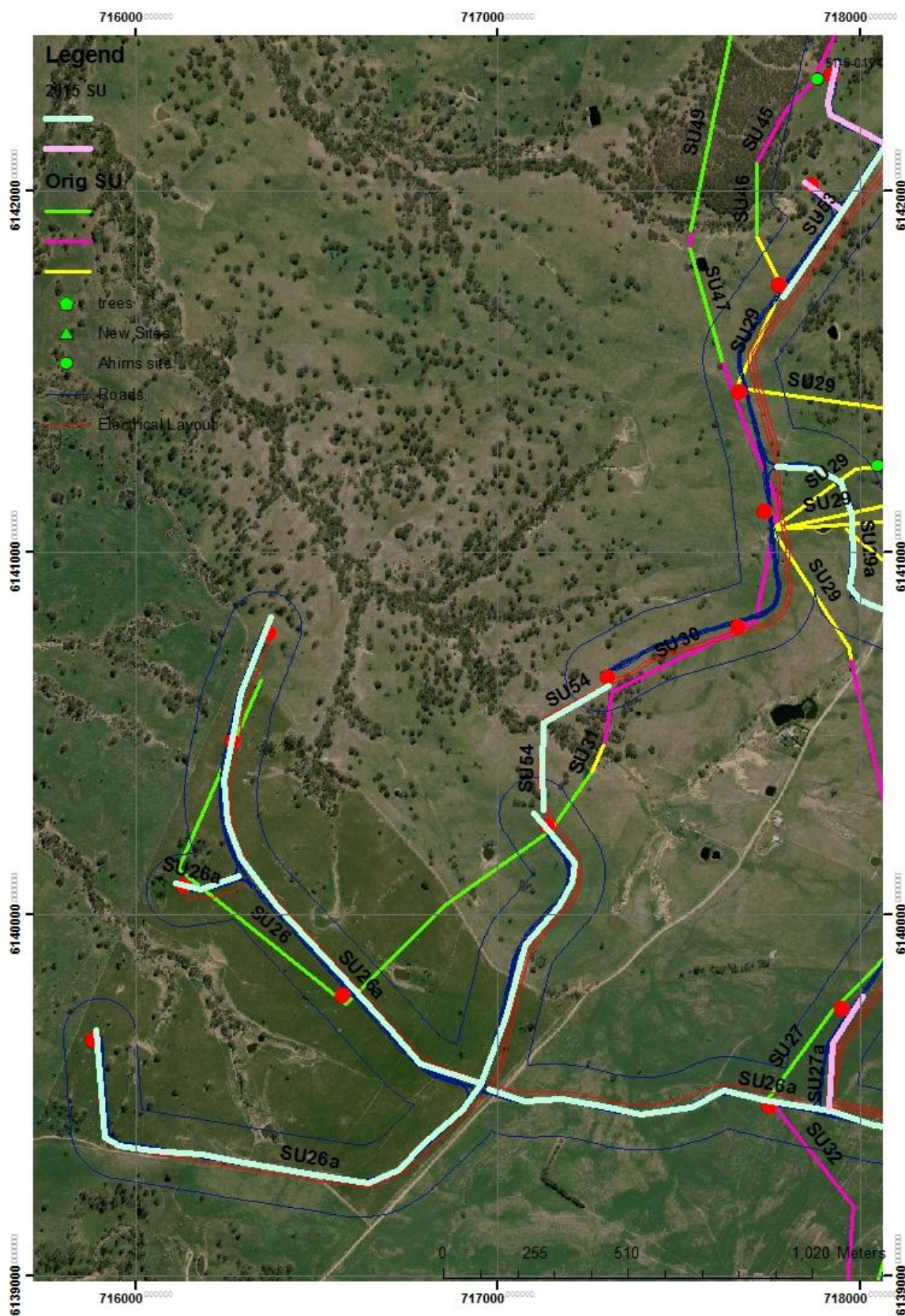


Figure 13 Survey Units; west end.

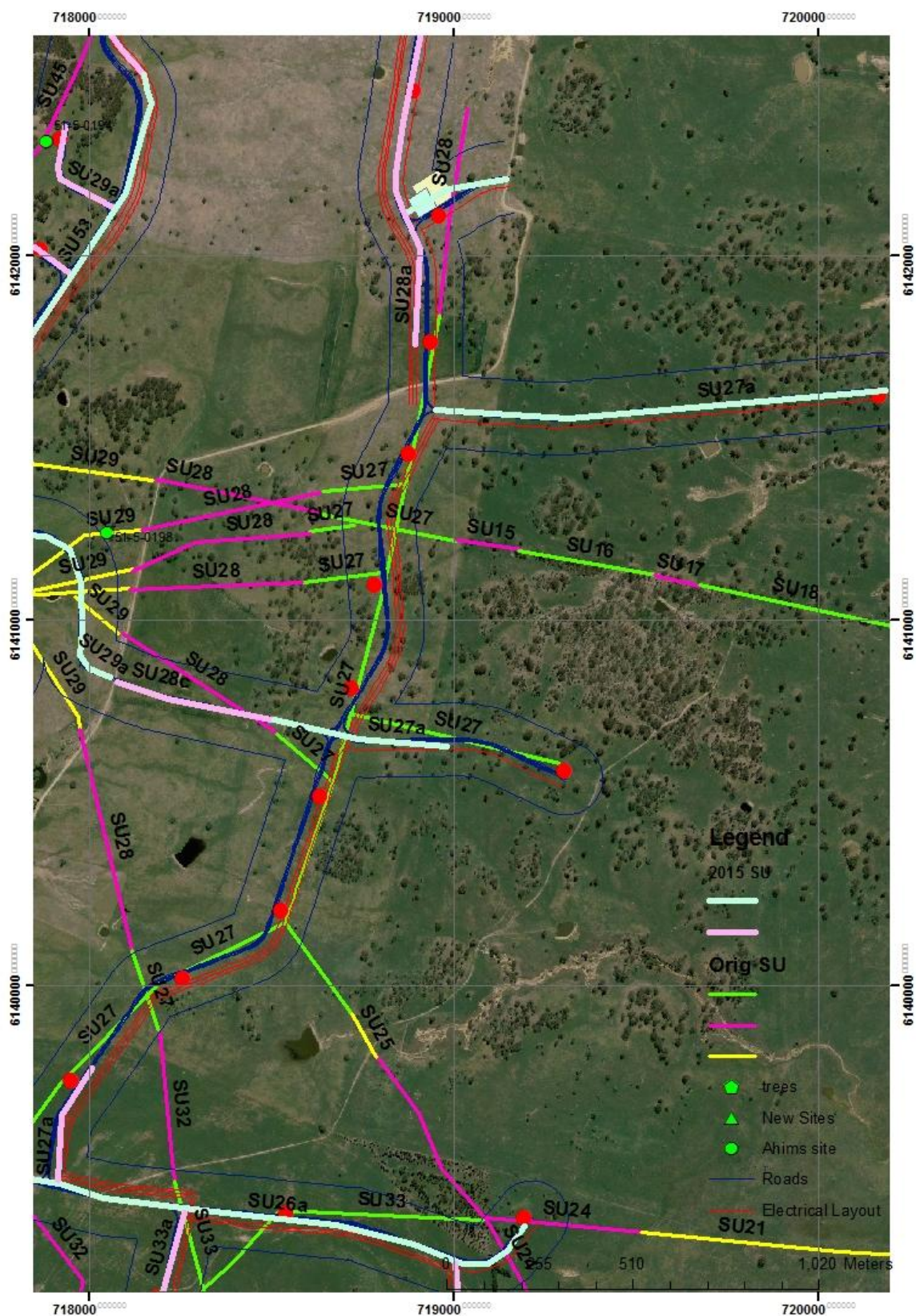


Figure 14 Survey Units; east end.

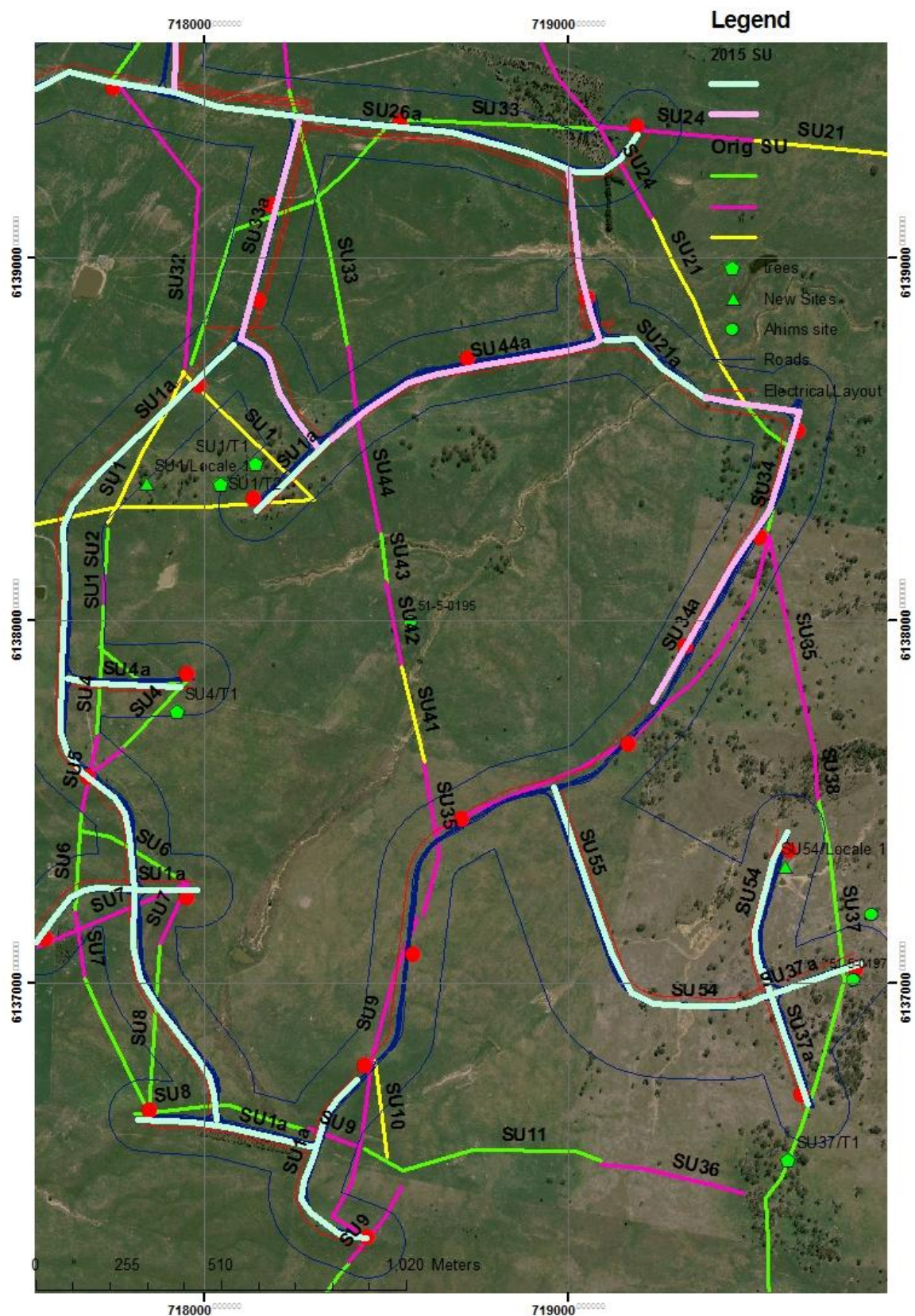


Figure 15 Survey Units; south end.

8. 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 and 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 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.

9. SIGNIFICANCE ASSESSMENT

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

9.1 Significance Assessment Criteria - Indigenous

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

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

- cultural value to contemporary Aboriginal people,
- archaeological 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 highly 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.

9.2 Significance Value of the Aboriginal Objects in the Study Area

The scientific significance of the recorded Aboriginal artefact locales in the project area are listed below in Table 6.

Table 6. Archaeological significance assessment of recorded Aboriginal object locales.

Name	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site	Significance	Criteria
SU1/L1	Very low	moderately disturbed: vehicle track	Yes	Yes	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
SU54/L1	Low	highly disturbed: water diversion channel; eroding	No	Yes	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in majority of Survey Unit
SU45/L2	Very low	highly disturbed: eroded	No	No	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 majority of Survey Unit

10. THE PROPOSED ACTIVITY

In this section, the nature and extent of the proposed activity and any potential harm to Aboriginal areas, objects and/or places is identified. The information contained in this section of the report is provided in accordance with the NSW DECCW 2010 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. These prior and existing land uses have caused significant changes to geomorphological processes in the area (accelerated erosion), with an associated effect on the archaeological resource.

10.1 Impact History

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

The local area has been utilised for stock grazing since the 1820s. The majority of the proposal area is situated on a gently undulating plain presently comprised of grassland. The effects of grazing across the area have included vegetation loss and subsequent erosion primarily by precipitation and wind, as well as soil compaction due to stock treadage. In addition to grazing, over time much of the proposal area has been cultivated for pasture improvement and annual fodder production. Such cultivation has occurred not only on broad crests and ridges, but also frequently of the wide flats associated with drainage depressions.

Land clearance and subsequent erosional processes are likely to have resulted in varying levels of prior impacts to Aboriginal objects. The vast majority of trees that could potentially host evidence of Aboriginal cultural scarring will have been destroyed, while Aboriginal objects located in or on the ground are highly likely to have been disturbed and/or moved, resulting in loss of their original depositional context (both spatially and vertically).

10.2 Proposed Impacts

The following section provides a brief overview of the various components of the proposed wind farm.

Wind Turbine Generators

The proposal is for 55 wind turbine generators.

Hardstands and Foundations

At each wind turbine generator site a crane operation area (including crane hardstand and turbine footings) measuring c. 50 m x 50 m in size would be established.

Access Roads

On-site access roads would connect each wind turbine generator site and provide off-site access. For the construction phase, access tracks would be up to 8 metres wide.

Electrical Works

Site electrical works would comprise the following:

- underground 33 kV electrical cabling and control cables linking each wind turbine generator to the substation and control room, respectively. Cable routes would, as far as possible, parallel the internal access roads to avoid unnecessary vegetation clearance and ground disturbance;
- wind farm substation, comprising transformers and switchgear, to step-up the voltage from 33 kV to 330 kV allowing grid connection.

A Permanent and Temporary Site Compound

10.3 Proposed Impacts

Ecologically Sustainable Development (ESD) is defined in the Protection of the Environment Administration Act 1991. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- (a) the precautionary principle,
- (b) inter-generational equity,
- (c) conservation of biological diversity and ecological integrity,
- (d) improved valuation, pricing and incentive mechanisms.

The principles of ecologically sustainable development and the matter of cumulative harm have been considered for this project. The proposed impacts will take place within a landscape that has sustained a high level of prior impacts. The works would therefore occur in areas which have already received a certain level of impact and harm. Accordingly, considerations of ecologically sustainable development and cumulative impacts can be considered largely irrelevant in the matter at hand.

The proponent is committed to the implementation of an exclusion zone of approximately 20-25m placed around identified heritage items wherever this is practicable and this will be incorporated in the Cultural Heritage Management Protocol.

Nevertheless, avoidance or the mitigation of harm has been considered in relation to the proposed activities. The proponent has sought to avoid impacts to all Aboriginal object

locales known to be present in the entire wind farm, including the modification area. However, SU45/L1 is located in the area of the proposed substation and cannot be avoided.

An impact assessment is set out below in Table 7. The location of Aboriginal object sites in respect of the proposed impacts is shown in Figures 8 - 11. Note that no impacts are proposed for all previously recorded Aboriginal objects.

Table 7 Impact assessment of Aboriginal object locales within the proposal area.

Aboriginal object site	Significance	Type of harm	Degree of harm	Consequence of harm
SU1/L1	Low local scientific significance.	nil	nil	nil
SU54/L1	Low local scientific significance.	nil	nil	nil
SU45/L2	Low local scientific significance.	Direct	Whole Installation of substation <i>Note impacts unavoidable.</i>	Total loss of value

11. RECOMENDATIONS

The recommendations are made on the basis of:

- A consideration of the relevant legislation.
- The results of the investigation as documented in this report.
- Consideration of the type of development proposed and the nature of proposed impacts.
- The discussion in Section 8 regarding impacts.

The proponent is committed to the condition of consent (D3) to avoid/minimise impacts to heritage to the greatest extent practicable. Furthermore, the proponent commits to place, wherever practical, an exclusion zone of approximately 20-25m around identified heritage item; this will be incorporated in the Cultural Heritage Management Protocol.

The following recommendations are made:

1. No further archaeological investigations are required in respect of the proposal. No areas were identified that could be characterised as places with a high probability of possessing subsurface Aboriginal objects with high potential conservation value. Accordingly, archaeological test excavation has not been undertaken in respect of the proposal as it could not be justified (*cf.* NSW DECCW 2010a: 24).
2. The proponent should, in consultation with the project archaeologist, develop a Cultural Heritage Management Protocol, which documents the procedures to be followed for impact avoidance or mitigation. The development of an appropriate Cultural Heritage Management Protocol should be undertaken in consultation with the project archaeologist, the relevant Aboriginal communities and the NSW OEH.

The Cultural Heritage Management Plan would be prepared to guide the process for management and mitigation of impacts to Aboriginal cultural heritage and to set out procedures relating to the conduct of additional archaeological assessment, if required, and the management of any further Aboriginal cultural heritage values which may be identified.

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

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