West Wyalong Solar Farm

Aboriginal Archaeological Survey Report

Report to Lightsource Development Services Australia

Bland Shire Local Government Area

January 2019

artefact

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EXECUTIVE SUMMARY

Artefact Heritage Services Pty Ltd (Artefact Heritage) has been engaged by Lightsource Development Services Australia Pty Ltd to prepare an archaeological survey report (ASR) for construction and operation of a 90 MW AC solar farm in West Wyalong. The solar farm will be constructed on two rural lots at 228-230 Blands Lane, West Wyalong comprising a total of 560 hectares (ha)the study area.

The proposal is a State Significant Development (SSD), application number SSD_18_9504. The NSW Department of Planning and Environment issued Secretary's Environmental Assessment Requirements (SEARS) for this project on 21 September 2018 (SEARS 2018).

An archaeological survey of the site was undertaken in conjunction with the West Wyalong Local Aboriginal Land Council (LALC) over three days from 9 October to 11 October 2018.

The Aboriginal archaeological survey found that:

- No previously recorded Aboriginal sites are located within the study area
- Four newly identified sites were located within the study area
- No areas of potential archaeological deposit were identified within the study area
- The study area is of moderate Aboriginal archaeological sensitivity

The following recommendations have yet to be ratified through consultation with the registered Aboriginal parties for the study area. The Aboriginal cultural heritage consultation requirements for proponents 2010 (Consultation Requirements) (DECCW 2010b) have commenced, and an Aboriginal Cultural Heritage Assessment Report (ACHAR) is in preparation (Artefact Heritage in prep).

- An ACHAR must be prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011). The ACHAR would outline further mitigation measures which would be required prior to construction and identify registered Aboriginal parties for the project through the Consultation Requirements.
- Where avoidance is possible permanently fenced (for the lifetime of the solar farm) NO GO zones must be implemented prior to construction and the sites identified on all construction plans.
- A permanently fenced buffer (for the lifetime of the solar farm) should be constructed around WWSF Bee Tree 01 (AHIMS ID 43-4-0058) at the dripline in consultation with an ecologist or arborist. Tree health is to be maintained during construction and operation of the solar farm.
- Where impacts are to occur to WWSF IF01 (AHIMS ID 43-4-0056), WWSF IF02 (AHIMS ID 43-4-0071), and WWSF AS01 (AHIMS ID 43-4-0057) all surface artefacts associated with these sites must be collected. Surface collection must be undertaken by a qualified archaeologist in conjunction with representatives from the registered Aboriginal parties identified for the project. Detailed analysis and recording of all collected stone artefacts and collation of data in a salvage report.
- At the end of the operational life of the solar farm a reassessment of the NO GO zones should be conducted for future protection of the sites.

- Aboriginal cultural heritage awareness training should be provided to key construction personnel.
- Unexpected finds remain protected under the NPW Act. If unforeseen Aboriginal objects are uncovered during construction, work must cease, and an archaeologist, OEH and West Wyalong LALC must be informed.
- If changes are made to the proposed works which could impact locations outside of the current study area, further archaeological investigation may be required.
- If suspected human remains are located during any stage of the proposed works, work must stop immediately, and the NSW police must be notified. The OEH should be notified is the remains are found to be Aboriginal ancestral remains.

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ABBREVIATIONS

ACHAR	Aboriginal Cultural Heritage Assessment Report
AHIP	Aboriginal Heritage Impact Permit
AHIMS	Aboriginal Heritage Information System
AHMS	Archaeological and Heritage Management Solutions
ALR Act	*Aboriginal Land Rights Act 1983*
Artefact Heritage	Artefact Heritage Services Pty Ltd
ASR	Archaeological Survey Report
ATSHIP Act	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
BCC	Blacktown City Council
BP	Before Present (that is 1950)
Consultation Requirements	Aboriginal cultural heritage consultation requirements for proponents 2010
Code of Practice	Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010
DC	Direct Current
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water (now OEH)
Due Diligence Code of Practice	Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales
EIS	Environmental Impact Assessment
EPBC Act	*Environment Protection and Diversity Conservation Act 1999*
Guide	Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW
GPS	Global Positioning System
ha	hectares
km	kilometres
KNC	Kelleher Nightingale Consulting Pty Ltd
JMcD CHM	Jo McDonald Cultural Heritage Management
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area

m	metres
MW	megawatt
m	metres
mm	millimetres
NHL	National Heritage List
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage
PAD	Potential Archaeological Deposit
RNE	Register of the National Estate
RAP	Registered Aboriginal Party
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
WWSF	West Wyalong Solar Farm

1.0 INTRODUCTION

1.1 Background

Lightsource Development Services Australia Pty Ltd (the proponent) are proposing to construct and operate a 90 megawatt (MW) solar farm in West Wyalong. The proposed solar farm will be constructed on two rural lots at 228-230 Blands Lane, West Wyalong (Figure 1.1).

On 21 September 2018, the project was assessed as being State Significant Development (SSD) (SSD_18_9504) and requiring the preparation of an Environmental Impact Assessment (EIS). The NSW Department of Planning and Environment issued Secretary's Environmental Assessment Requirements (SEARs) for the preparation of the EIS with the following requirements for heritage assessment:

> *Heritage – including an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, including consultation with the local Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (SSD_18_9504)*

The proponent has engaged Artefact Heritage Services Pty Ltd (Artefact Heritage) to prepare the assessment of Aboriginal and non-Aboriginal cultural heritage values for the EIS through preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR) and Historical Archaeological Assessment (HAA).

This Aboriginal archaeological survey report (ASR) has been prepared to support the Aboriginal Cultural Heritage Assessment Report (Artefact Heritage 2018a. The HAA will form a separate document (Artefact Heritage 2018b).

1.2 Study area

The study area consists of two rural lots (Lot 17 and Lot 18 in DP753081) at 228- 230 Blands Lane, West Wyalong comprising a total of 560 hectares (ha) (Figure 1.1). The study area is fronted by Blands Lane to the north. It is located within the Bland Shire Local Government Area (Bland Shire LGA) within the Parish of Clear Ridge and County of Gipps. It is contained within the boundary of West Wyalong Local Aboriginal Land Council (West Wyalong LALC).

1.3 Description of works

Figure 1.2 shows the current proposed layout of the solar farm. The proposed components of the solar farm would comprise:

- Installation of approximately 296,000 solar panels in the south part of the study area. These will be placed on a mounting structure with tracking capabilities. Each panel will be approximately 1.95 metres (m) x 0.992 m with a depth of 50 millimetres (mm). They will be dark blue in colour with an aluminium frame and will be coated with an anti-reflective coating in order to maximise daylight absorption.
- Substation and battery energy storage system.
- Internal access roads and access points.

- Perimeter security fencing.
- Powerline easement from substation to existing powerline.

Power generated by the facility will be transmitted to the local energy grid via a new substation to be installed on the site. Access to the facility will be from Blands Lane.

1.4 Study objectives

The objectives of this ASR are to identify and record Aboriginal archaeological values, identify and record Aboriginal cultural values where possible and provide management and mitigation recommendations for Aboriginal archaeological sites located within the study area in accordance with:

- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (Code of Practice) (Department of Environment, Climate Change & Water [DECCW] 2010a)

This ASR will be provided as an appendix to the ACHAR that is currently being prepared (Artefact Heritage 2018b).

1.5 Authorship

Anna Darby (Heritage Consultant, Artefact Heritage) completed the archaeological survey and wrote this report. Anna has a Bachelor of Science (Honours) and has three years' experience in archaeological fieldwork including Aboriginal cultural heritage surveys across the Sydney Basin.

Michael Lever (Senior Heritage Consultant, Artefact Heritage) managed the project and supervised the field survey, and provided input and review to the report. Michael has a Bachelor of Arts (Honours) in archaeology, is a current PhD candidate in archaeology at the University of Sydney and has eight years' experience in archaeological survey in NSW, Victoria and WA.

Vanessa Edmonds (Principal, Artefact Heritage) provided project direction and technical review. Vanessa has a Masters degree in Archaeology and Palaeoanthropology and has over 30 years' experience undertaking Aboriginal cultural heritage surveys nationwide.

1.6 Aboriginal community involvement

An archaeological survey of the study area was undertaken over three days from 9 to 11 October 2018, together with representatives of the West Wyalong Local Aboriginal Land Council (LALC).

1.7 Report structure

- **Section 2** - Legislative context: outlines relevant legislation for this assessment
- **Section 3** - Environmental context: Provides a succinct overview of the environmental context of the proposal
- **Section 4** - Aboriginal historical and archaeological context: Provides an overview of the Aboriginal history of the area and the results of previous archaeological investigation
- **Section 5** - Archaeological survey: Describes the survey conducted for this assessment and the results
- **Section 6** – Results: Describes the Aboriginal sites present within the study area

- **Section 7** – Analysis and discussion: Provides a discussion of the results of the site survey
- **Section 8** - Significance assessment: Provides an assessment of the archaeological significance of the study area
- **Section 9** - Impact assessment: Assesses potential impacts to identified Aboriginal sites and areas of archaeological potential.
- **Section 10** - Management measures: Outlines relevant management and mitigation measures for the proposal.
- **Section 11** – Recommendations: Outlines recommendations for future assessment as required

Figure 1.1: Study area 228-230 Blands Lane, West Wyalong

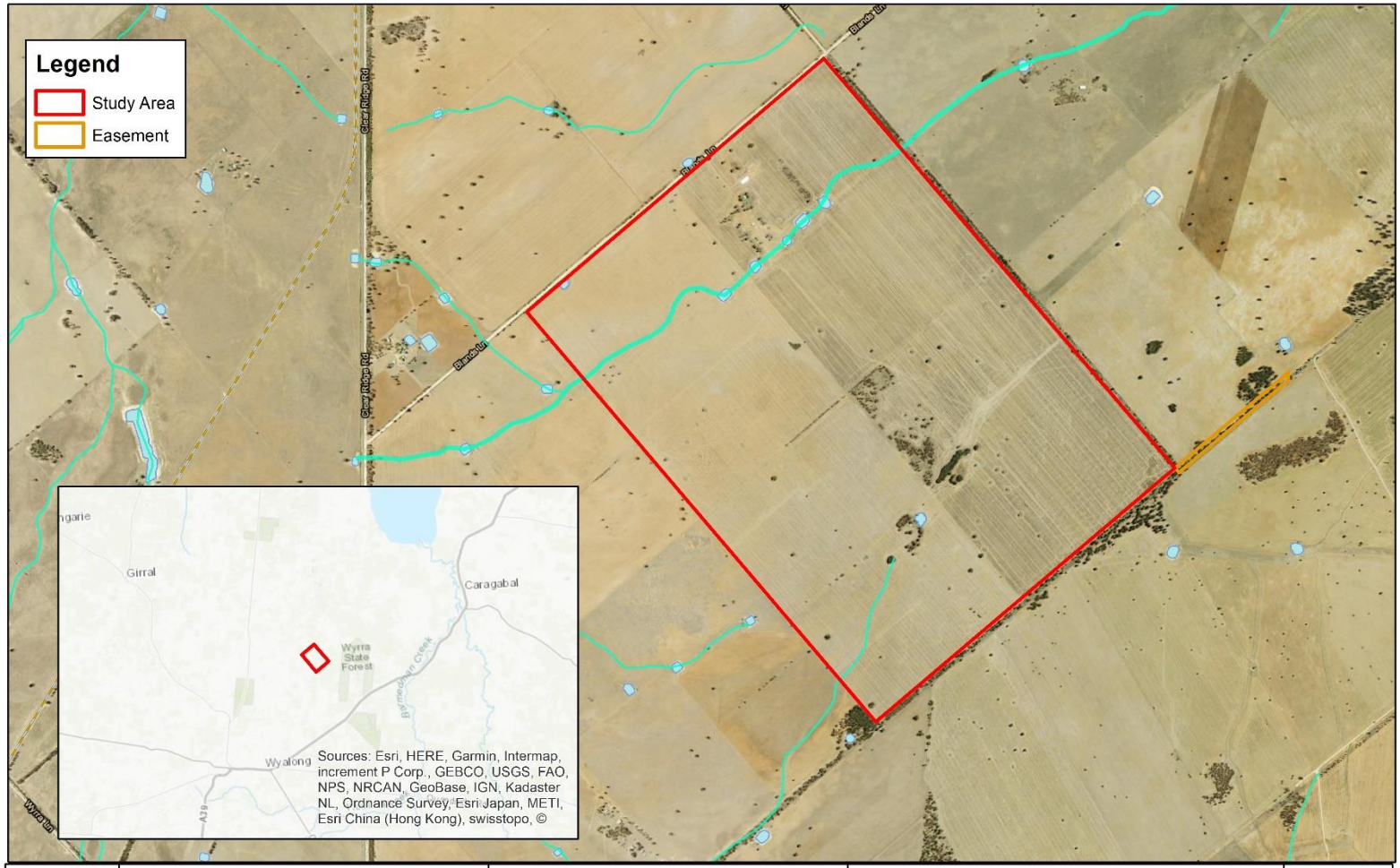

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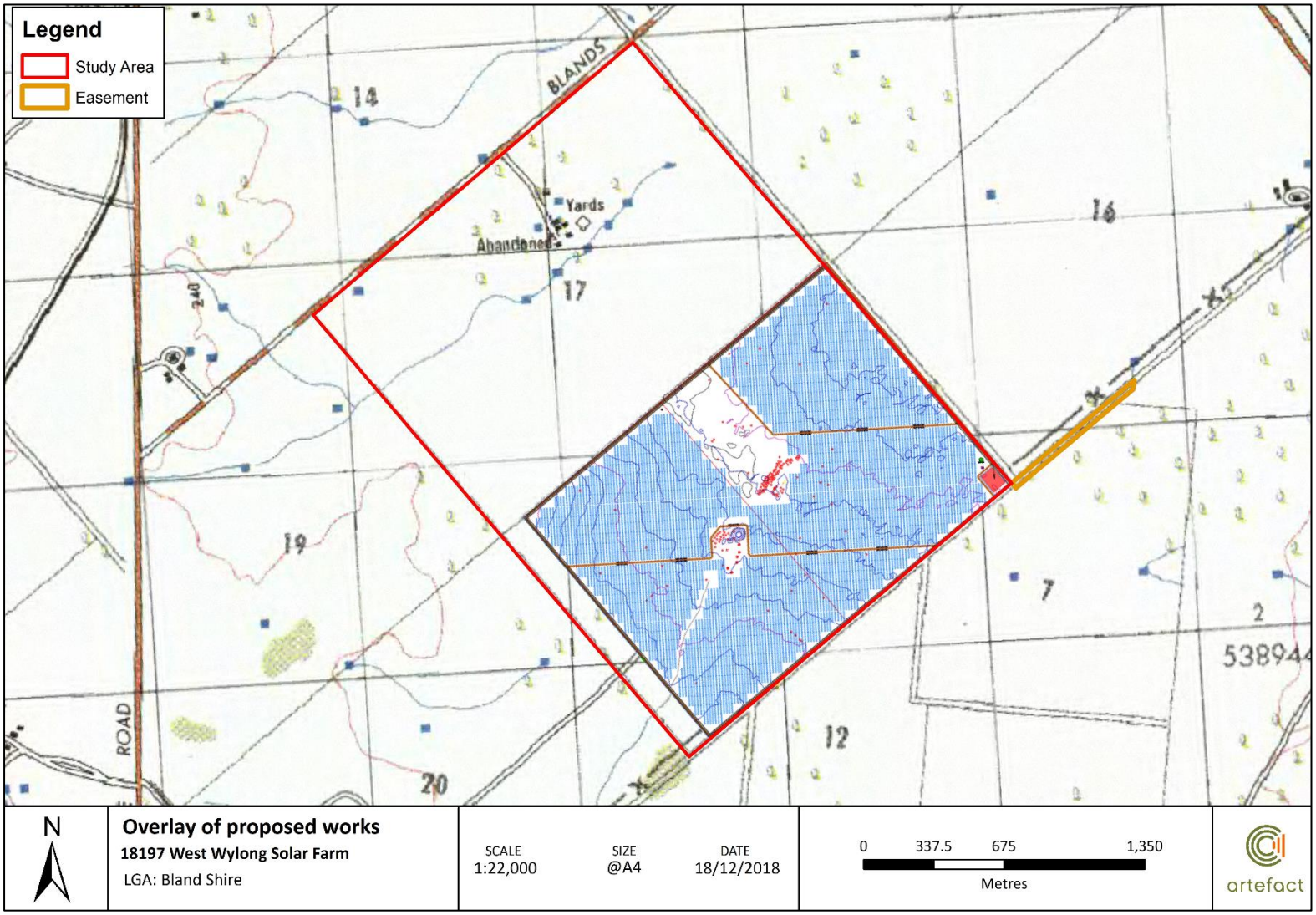
Figure 1.2: West Wyalong Solar Farm layout



2.0 LEGISLATIVE CONTEXT

2.1 State legislation

2.1.1 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides statutory protection to all Aboriginal Places and objects. An Aboriginal object is defined by the NPW Act as:

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

An Aboriginal Place is declared by the Minister, under Section 86 of the NPW Act, in recognition of its special significance with respect to Aboriginal culture. However, areas are only gazetted as Aboriginal Places if the Minister is satisfied that sufficient evidence exists to demonstrate that the location was and/or is of special significance to Aboriginal culture. Aboriginal Places gazetted under the NPW Act are listed on the State Heritage Register established under the *Heritage Act 1977*.

The protection provided to Aboriginal objects applies irrespective of the level of their significance or issues of land tenure. Aboriginal objects and places are afforded automatic statutory protection in NSW whereby it is an offence to knowingly or unknowingly harm or desecrate an Aboriginal object or Aboriginal Place under Section 86 of the NPW Act.

In accordance with Section 89A any person who is aware of the location of an Aboriginal object must in the prescribed manner, notify the Chief Executive within a reasonable time after the person first becomes aware of that object. The prescribed manner is to complete an Aboriginal Heritage Information Management System Site Recording Form (DECCW 2010a: 14).

In order to undertake a proposed activity which is likely to involve harm to an Aboriginal Place or object, it is necessary to apply to the Office of Environment and Heritage (OEH) for an Aboriginal Heritage Impact permit (AHIP). AHIPs are issued by OEH under Section 90 of the NPW Act, and permit harm to certain Aboriginal objects or Aboriginal Places. The West Wyalong Solar Farm has been designated SSD_ (18_9504) and under Part 4, Division 4.7, section 4.41 of the *Environmental Planning and Assessment Act 1979* an AHIP is not required (section 2.1.4).

There are no gazetted Aboriginal places within the proposal areas. All Aboriginal objects, whether recorded or not, are protected under the NPW Act. Section 6.0 presents information on Aboriginal objects located in the study area.

2.1.2 Native Title Act 1994

The *Native Title Act 1994* was introduced to work in conjunction with the Commonwealth *Native Title Act 1993*. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act. There are no Native Title claims currently registered in the study area.

2.1.3 Aboriginal Lands Right Act 1983

The *Aboriginal Land Rights Act 1983* (ALR Act) established Aboriginal Land Councils (at State and Local levels). These bodies have a statutory obligation under the ALR Act to:

(a) take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and

(b) promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area.

The study area is within the boundary of West Wyalong LALC.

2.1.4 *Environmental Planning and Assessment Act 1979*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act consists of three main parts of direct relevance to Aboriginal cultural heritage; Part 3 which governs the preparation of planning instruments, Part 4 which relates to development assessment processes for local government (consent) authorities, and Part 5 which relates to activity approvals by governing (determining) authorities.

Part 4, Division 4.7 of the EP&A Act specifies that any State environmental policy may declare any development to be State significant development as can the Minister, by a Ministerial planning order.

The West Wyalong Solar Farm has been designated State Significant Development (SSD_18_9504).

Under Part 4, Division 4.7, section 4.41 the following authorisations are not required for State significant development that is authorised by a development consent granted after the commencement of this Division (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):

1 (c) an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*

1 (d) an Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*

2 Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of State significant development that is authorised by a development consent granted after the commencement of this Division.

The State Environmental Planning Policy (State and Regional Development) 2011 (Part 2 (11)) also excludes the application of development control plans for State significant development.

Under Part 5, Division 5.1 (environmental impact assessment) the determining authority cannot carry out an activity or grant approval for an activity that is likely to significantly affect the environment unless an environmental impact statement is prepared.

2.2 Commonwealth legislation

2.2.1 *Environment Protection and Diversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legislative framework for the protection and management of matters of national environmental significance, that is, flora, fauna, ecological communities and heritage places of national and international importance. Heritage items are protected through their inscription on the World Heritage List (WHL), Commonwealth Heritage List (CHL) or the National Heritage List (NHL).

Under Part 9 of the EPBC Act, approval under the EPBC Act is required for any action occurring within, or outside, a Heritage place that has, will have, or is likely to have a 'significant impact' on the

heritage values of a World, National or Commonwealth heritage listed property (referred to as a 'controlled action' under the Act). A 'significant impact' is defined as:

> an impact which is important, notable, or of consequence, having regard to its context or intensity. If an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

The EPBC Act stipulates that a person who has proposed an action that will, or is likely to, have a significant impact on a site that is listed on the WHL, NHL or CHL must refer the action to the Minister for Sustainability, Environment, Water, Population and Communities (hereafter the Minister). The Minister will then determine if the action requires approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on this assessment.

There are no WHL, NHL or CHL listed sites within the study area.

2.2.2 Australian Heritage Council Act 2003

The Register of the National Estate (RNE) is an evolving record of Australia's natural, cultural and Aboriginal heritage places that are worth keeping for the future. The Australian Heritage Commission compiles and maintains the RNE under the *Australian Heritage Council Act* 2003. Places on the RNE that are in Commonwealth areas, or subject to actions by the Australian Government, are protected under the EPBC Act by the same provisions that protect Commonwealth heritage places (see above).

Following amendments to the *Australian Heritage Council Act* 2003*,* the RNE was frozen on 19 February 2007, meaning no new places can be added, or removed. The RNE is now maintained on a non-statutory basis as a publicly available archive within the Australian Heritage Database and contains over 13,000 places including many places of local or State significance.

There are no sites listed on the RNE within the study area.

2.2.3 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act), deals with Aboriginal cultural property (intangible heritage) in a wider sense. Such intangible heritage includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. These values are not currently protected under the NPW Act.

There is no cut-off date and the ATSIHP Act may apply to contemporary Aboriginal cultural property as well as ancient sites. The ATSIHP Act takes precedence over state cultural heritage legislation where there is conflict. The Commonwealth Minister who is responsible for administering the ATSIHP Act can make declarations to protect these areas and objects from specific threats of injury or desecration. The responsible Minister may make a declaration under Section 10 of the Commonwealth Act in situations where state or territory laws do not provide adequate protection of intangible heritage.

Where an Aboriginal individual or organisation is concerned that intangible values within the proposal are not being adequately protected they can apply to the Minister for a declaration over a place.

No intangible places were identified during the survey or the background research.

3.0 ENVIRONMENTAL CONTEXT

The environmental context of the study area is to assist in the prediction of:

- The potential of the landscape over time to have accumulated and preserved Aboriginal objects
- The ways Aboriginal people have used the landscape in the past with reference to the presence of resource areas, surfaces for art, other focal points for activities and settlement
- The likely distribution of the material traces of Aboriginal land use based on the above.

3.1 Environmental background

3.1.1 Geology

The study area is within the Murray Darling Basin and is within the catchment area of the Lachlan River, which is situated 60 kilometres (km) to the northeast.

The study area is within the NSW South Western Slopes biogeographic region. This is an extensive area of foothills and isolated ranges comprising the lower inland slopes of the Great Dividing Range extending from north of Cowra through southern NSW into western Victoria. This bioregion is dominated by a sub-humid climate characterised by hot summers and low winter temperatures. Mean annual rainfall in the vicinity of the study area is approximately 470 mm. Highest rainfall months are generally in mid winter then late spring early summer.

The bioregion lies wholly in the eastern part of the Lachlan Fold Belt which consists of a complex series of north to northwesterly trending folded bodies of Cambrian to Early Carboniferous sedimentary and volcanic rocks. Granites are common and mostly located in large scale upfolded bodies of rock. Granite landscapes occur either as central basins surrounded by steep hills formed on contact metamorphic rocks, or as high blocky plateau features with rock outcrops and tors. Hilly landscapes developed on the sedimentary and volcanic rocks are controlled by structural features (bedding and faults) and typically form lines of hills extended along the strike of more resistant rocks such as quartzite. The valleys between ranges are in generally softer rocks such as shale, phyllite or slate. Limited areas of Tertiary basalt with underlying river gravels and sands occur, and as the country becomes lower to the west and north, wide valleys filled with Quaternary alluvium and occasional lakes become the dominant landscape form (King et al.1998).

The study area is approximately four kilometres northwest of the Booberoi Hills. These form a range 14 km in length reaching heights of 310 m above sea level. The geology of the Booberoi Hills is comprised of Silurian-Devonian sedimentary rocks including sandstone, siltstone, mudstone and igneous elements such as basalt. Harder metamorphic rocks such as silcrete are not uncommon inclusions in the sedimentary matrix of the Booberoi Hills (NSW Geology Plus 2018). It is likely the Booberoi Hills were an important regional source of raw stone materials for Aboriginal people occupying the study area landscape and surrounds.

3.1.2 Hydrology

There are no major waterways within 10 kilometres of the study area. Sandy Creek is a partly-perennial stream, which traverse 5 km to the north of the study area. Barmedman Creek (previously Back Creek) is a mainly-perennial river which traverses12 km east of the study area. Ephemeral drainage lines and tributaries of Barmedman Creek are located within 2 km of the study area. Lake

Cowal is a large and shallow ephemeral lake situated 15 km to the northwest of the study area and an important Aboriginal archaeological and cultural area. Isolated ephemeral drainage lines cross the study area northeast to southwest and are associated with minor changes in topography. These ephemeral drainage lines may have provided a focus for transient Aboriginal occupation in an otherwise dry landscape.

3.1.3 Soils

The overall pattern of soils in the study area landscape is one where shallow, stony soils are found on the tops of ridges and hills. Moving downslope, texture contrast soils are the norm with subsoils derived from the underlying weathered rock and the topsoils being a homogenised surface mantle of coarser material derived from all parts of the slope. On valley floors subsoils have drabber colours indicative of poor drainage and they may accumulate soluble salts. Dryland salinity is widespread. Alluvial sands and loams are more common than clays in most parts of the landscape but alluvial clays become more important nearer to the Riverine Plain. Over the Quaternary, soils in these landscapes have accumulated a considerable quantity of windblown silt and clay from western NSW.

Soils in the study area consist of the Spy Hill soil landscape and the Wah Way soil landscape, with the Marsden soil landscape adjacent to the southern boundary of the study area (Figure 3.1) (King et al. 1998). The Spy Hill soil landscape usually occurs on gently undulating plains and rises on the Devonian Wyalong Granite and reworked granite materials. It is moderately deep (500-800 mm), with moderately well-drained, red earths that occur on upper slopes and some mid-slopes and lower slopes. Shallow to moderately deep, well-drained earthy Sands and Siliceous Sands occur on some slopes along some drainage lines. Red podzolic soils are found on mid and lower slopes and are moderately deep and well drained. Yellow and brown solodic soils occur along some drainage lines and while deep, greater than one metre, these soils do not drain well.

The Wah Way soil landscape occurs on the Wah Way Plain and the Plains Country extending westwards to parts of the Barmedman Creek Floodplain. The soils are predominantly very deep (>1.5 m), poorly drained clays with red, grey and brown clays. Very deep (1.5 m), imperfectly drained red brown earths/red clays intergrades occur on some slightly more elevated plains. Localised small areas of gilgai occur. The Marsden soil landscape is characterised by broad alluvial plains in the vicinity of Marsden and west of Caragabal, with conspicuous gilgai microrelief. Deep (1.5 m), very poorly drained grey clays dominate gilgai depressions along with brown and occasional humic gleys. Moderately deep to deep (>1.2 m), imperfectly drained red clays and some grey clays occur on gilgai puffs or crests (King et al.1998).

Gilgai plains are features that were first observed in Wiradjuri country. The word is derived from ‘gilgaay’ meaning waterhole. A gilgai describes a hollow in the ground surrounded by a raised rim. Gilgais occur on plains of heavy clay soil, where the terrain is of low relief, and they are characterised by the presence of hollows, rims, and mounds. They are formed by alternating periods of expansion during wet weather and contraction, causing deep cracking, during hot, dry weather (Schaetzl 2007). Gilgai soils are present in the study area and can impact on Aboriginal stone artefacts by moving these vertically through expansion and contraction.

Figure 3.1: Soil landscapes within the study area

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3.1.4 Native flora

The study area is modelled within the Mallee and Mallee-Broombush dominated woodland and shrubland. This community typically has a canopy layer co-dominated by the Mallee eucalypts *Eucalyptus behriana* (Bull Mallee) and *E. dumosa* (White Mallee), with either (on flat land) *E. socialis* (Red Mallee), or (on low rises) *E. polybractea* (Blue Mallee) and *E. viridis* (Green Mallee). Additional conspicuous tree species may include *Casuarina cristata* (Belah), *Callitris glaucophylla* (White Cypress Pine), and *C. endlicheri* (Black Cypress Pine). The shrub layer may vary strongly from site to site but typically includes *Acacia* species. Ground cover is variable but includes daisies, small chenopods, rock ferns and a variety of other grass species. Areas of gilgai plains are generally covered by tree or large shrub canopy to an extent of about 30 per cent surface cover, with about ten trees per hectare on average. Many herbs and grasses surround gilgais, several of which are amphibious and able to take advantage of ephemeral inundation.

3.1.5 Native fauna

There has been extensive clearance of native vegetation and a relative lack of study of the NSW South Western Slopes biogeographic region. As a result, accurate reconstructions of native fauna populations are not readily available. A scoping study for the entire region identified 479 vertebrate taxa, which divided into the following categories: Amphibians five per cent, Reptiles 18 per cent, Birds 64 per cent, Bats four per cent, Mammals 46 per cent. Mammalian species were dominated by kangaroos (*Macropod* sp.), wombats (*Vombatus ursinus*) and smaller desert marsupials (NSW National Parks and Wildlife Service 2001).

3.1.6 Conclusions

The landscape surrounding the study area was a resource rich landscape with abundant raw material and food resources. Past Aboriginal populations would have used the entire range of flora and fauna available to them not only for material items such as skin cloaks, wooden tools and weapons and shelter but also food. For example, the nuts of the Cypress, which would have been available in the study area, contained seeds which were used in cooking (Clayton and Barlow 1997). In addition, the resources available formed an important part of their ceremonial and religious way of life. For example, the occurrence prior to clearing of carved trees symbolising burial sites.

Aboriginal people were highly skilled at subsistence in dry environments. They had deep knowledge of the locations of soaks and subsurface water resources and were able to range through very dry country. The study area is in a Mallee bioregion. Extensive modern research and historical ethnographic depictions document a range of Aboriginal techniques for extraction of water from Mallee plants even during very dry conditions (Noble and Kimber 1997). Although the study area is not located near sources of permanent water it contains two ephemeral drainage lines. In dry areas ephemeral waterways may have played a far higher role in past Aboriginal local subsistence than they would where water was more abundant. These waterways would have allowed transient use of the study area during periods of high rainfall that is during winter through to late spring/early summer and would have assisted travel through the landscape of resource rich zones such as Lake Cowal and the Booberoi Hills.

Anthropological research indicates that the usual maximum daily ranging distance of hunter gatherers was approximately 10 km (summarised in Winterhandler 2001: 21). The study area is located at an approximate midpoint between several major water resources. It is 14 km west of Barmedman Creek, 15 km southwest of Lake Cowal and 5 km south of Sandy Creek. The study area is also 4 km west of lithic resources at the Booberoi Hills. This would suggest that the ephemeral drainage lines of the study area may have been used as a staging point or camp during travel between local resources.

3.2 Historical background and land use

The area surrounding West Wyalong was first visited by non-Aboriginals in 1817. John Oxley was the first to pass through what is now the Bland Shire. In June of that year he was in the vicinity of Ungarie, approximately 34 km to the west of the study area. Oxley was unimpressed by the land and stated that the area would remain uninhabited. However, in the late 1800s the land was discovered to be ideal for the cultivation of wheat (Bland Shire Council's State of Environment Report 2010). In 1898, the Lands Department set aside 12,000 acres for homestead selection to the east of Wyalong, in blocks of 400 to 700 acres. In 1902, a further 7,000 acres was set aside for the same purpose. From the early 20th century the area saw a huge influx of settlers, confident of agricultural success. These new settlers took up the newly subdivided land and set about developing their agricultural businesses clearing the land for cropping and pastoral activities. The areas surrounding the study area would have been heavily timbered with dense areas of Mallee. Good Box, Iron Bark and Pine were also available in large quantities for fencing and building purposes (English 2014).

The first official pastoral lease within the study area, was gazetted in 1848 and called Lake Cowal. The run was listed as having frontages to the Billabong Creek, downstream from Billabong (another run), and extending along the Billabong boundary to within 11 km of the future township of Wyalong. Following the *Land Act 1884*, The Lake Cowal run was converted into two pastural holdings, 701 and 162 (Bland District Historical Society 1993). The study area falls within Lake Cowal 701.

The towns of Wyalong and West Wyalong were established after gold was discovered in 1893 by Joseph Neeld and the Neeld family developed claims on the best of the land. By 1895, after the first load of stone was sent to Barmedman producing a high yield, thousands of people descended into the area (Bland District Historical Society 1993). The gold rush extended through much of the Bland Shire including with the current study area in the boundaries of the Bourke Cooper Dowling and Gipps Gold Field that was proclaimed in 1880 (Figure 3.2). A variety of mining techniques were used locally, ranging from small shaft mines to deep-lead mines with poppet heads. Associated activities may have included establishment of stamping plants and excavation of settling ponds. Soil disturbance resulting from these activities would likely have had a significant impact on any Aboriginal archaeological deposits if present.

In 1913, the Lake Cowal and Barrawang Lands were subdivided for homestead farms (Figure 3.3). Homestead farms were designed to be able to maintain a settler, his family and home under reasonable conditions (English 2014).

Figure 3.2: Lake Cowal run, red arrow indicates the approximate location of the study area

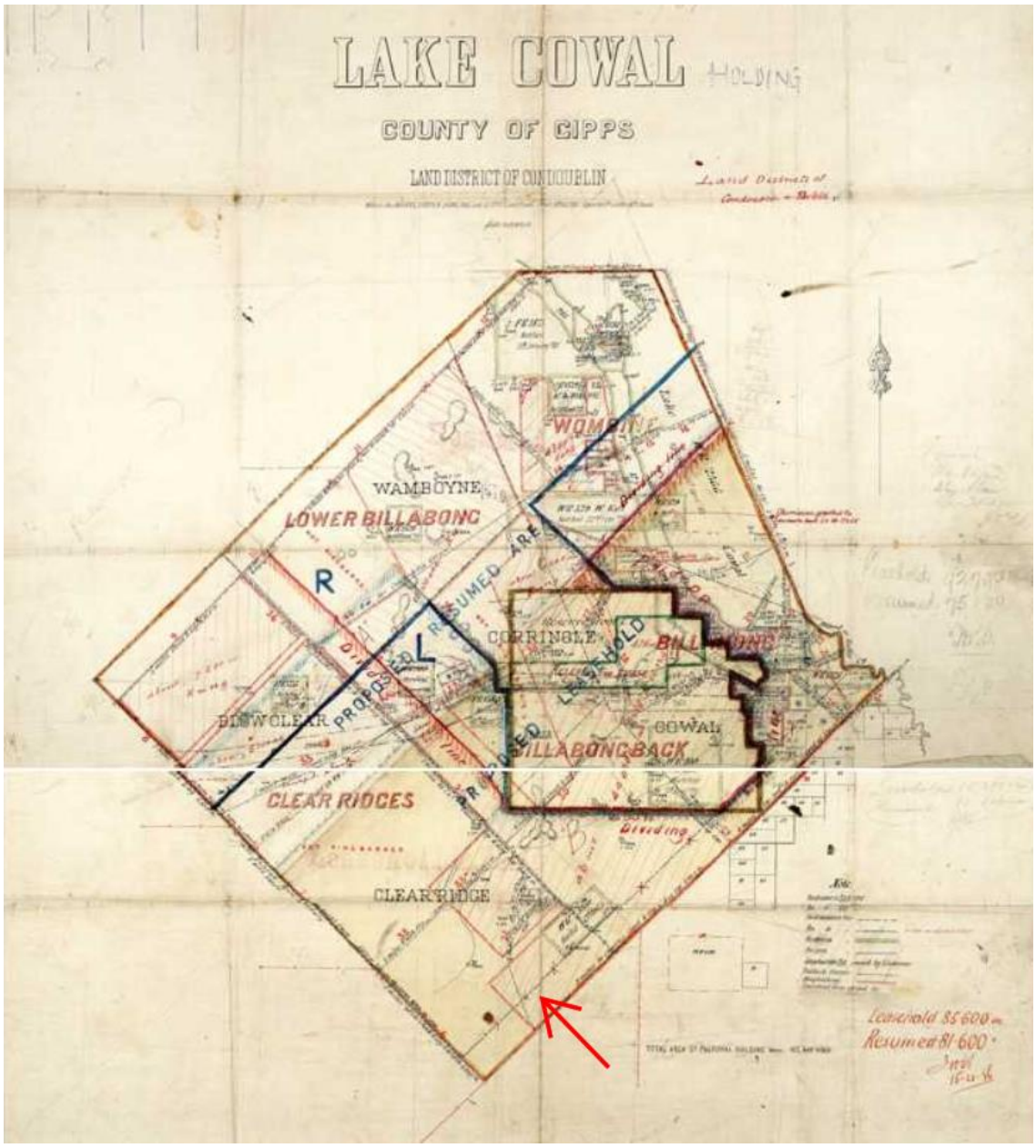
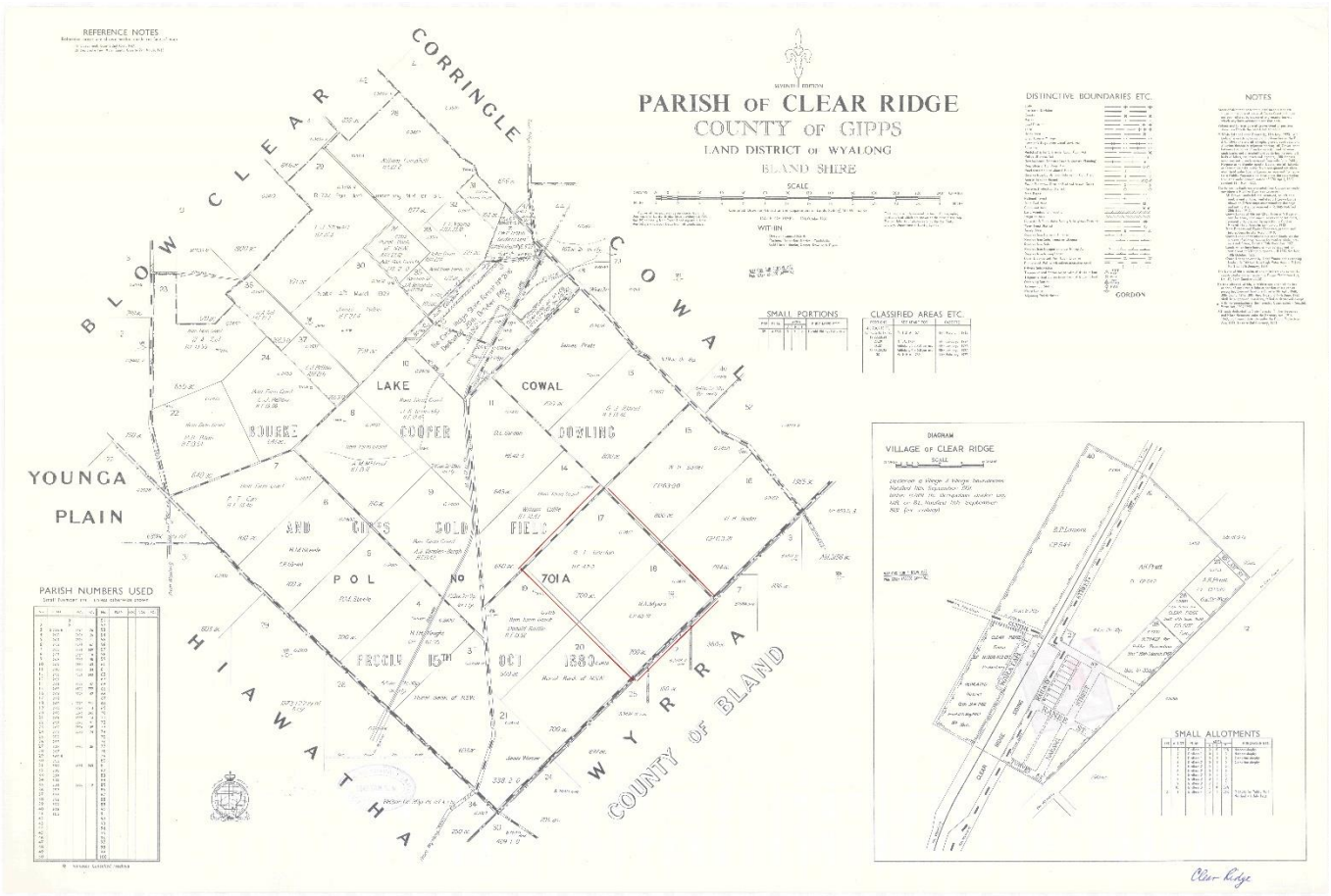


Figure 3.3: 1913 parish map, study area in red. Source: HRLV Viewer



4.0 ABORIGINAL CONTEXT

4.1 Aboriginal histories of the locality

Traditional Aboriginal tribal boundaries within Australia have been reconstructed, primarily, based on surviving linguistic evidence and are therefore only approximations. Social interaction, tribal boundaries and linguistic evidence may not always correlate, and it is likely boundaries and interaction levels varied and fluctuated over time. The study area is within the traditional boundaries of the Wiradjuri language group (Tindale 1974). Clusters of neighbouring clans which shared a common dialect and political and economic interests defined themselves from other clusters by a language name (Barwick 1984). The territories of these clans were often small, consisting of several kilometres of river frontage and some back country.

The Wiradjuri language group is described by Tindale (1974) as the largest tribal grouping in Australia. The territory extends from the Blue Mountains in the east, north to Nyngan and south to Albury. The Lachlan and Macquarie Rivers were a rich resource that provided food and transport. The food from the rivers was supplemented with kangaroos, wallabies, bandicoots, emus, turkeys, snakes and lizards, especially in those seasons when people moved from the rivers into the ranges or plains. Bulrush roots, grass seeds, daisy yams, along with roots and tubers also formed part of their subsistence (Tindale 1974). Trees in the area not only provided food and fuel but were also used for the manufacture of tools and implements. For example, spears, shields, and digging sticks. Bark was used to build houses, make canoes, coolamons and other containers.

The first recorded contact between the Wiradjuri people and Europeans occurred at Bathurst on the Macquarie River where Governor Lachlan Macquarie met a group of senior Wiradjuri men wearing possum skin cloaks. The gold rush of the 1850s in the eastern Wiradjuri lands saw the local European population around Orange and Bathurst boom, becoming one of the most densely populated areas in the state. The diseases brought by the Europeans were noncompatible with the Aboriginal people, which would have spread well beyond the new colonist's population centres. This, combined with the pastoral settling of the slopes and plains that had begun some decades earlier, displaced many Wiradjuri placing pressure on the traditional social systems and economies.

4.2 Aboriginal Heritage Information Management System

The location of Aboriginal sites is considered culturally sensitive information. It is advised that this information, including the Aboriginal Heritage Information Management System (AHIMS) data appearing on the heritage map for the proposal be removed from this report if it is to enter the public domain.

An extensive search of the AHIMS database was undertaken by Anna Darby on the 17 September 2018 (AHIMS search ID 370985). An area of approximately 25 square kilometres was included in the search. The AHIMS search provides archaeological context for the area and identifies whether any previously recorded Aboriginal sites are located within or near the study area. The parameters of the search were as follows:

GDA 1994 MGA 55	505029 – 555029 m E 6233873 – 6283873 m S
Buffer	0 m
Number of sites	115

A total of 115 Aboriginal sites were identified in the extensive AHIMS search area. The frequency of recorded site features is summarised in Table 4.1. A registered Aboriginal site is made up of one or more features and these features should not be confused with registered Aboriginal site. Office of

Environment and Heritage lists 20 standard site features that can be used to describe a site registered with AHIMS. For the 115 sites within the search area, ten combinations of site features were recorded. The majority of recorded site features are artefacts (n=64), with hearths (n=22) the second highest feature. One site was recorded as restricted, communications with OEH determined that the restricted site was not in the study area.

Table 4.1: Frequency of site features from AHIMS data

Site Feature	Frequency	Percentage (%)
Artefact	64	55.7
Hearth	22	19.1
Modified Tree (Carved or Scarred)	15	13.0
Artefact, Hearth	7	6.1
Artefact, Modified Tree (Carved or Scarred)	2	1.7
Artefact, Stone Quarry	1	0.9
Burial, Artefact	1	0.9
Grinding Groove	1	0.9
Grinding Groove, Water Hole	1	0.9
Restricted	1	0.9
Total	***115***	***100***

The distribution of recorded sites within the study area are shown in Figure 4.1 and Figure 4.2. No Aboriginal sites were recorded within the study area, a description of the closest recorded Aboriginal site to the study area is below.

TL8 (AHIMS ID 43-4-0036)

This site is the closest recorded Aboriginal site to the study area, approximately 5 km northeast of the study area. This site is recorded in 1997 as an artefact located 50 m from the bank of Sandy Creek. No further detail was available from the site card for AHIMS ID 43-4-0036.

Figure 4.1: Distribution of AHIMS sites within the extensive search area

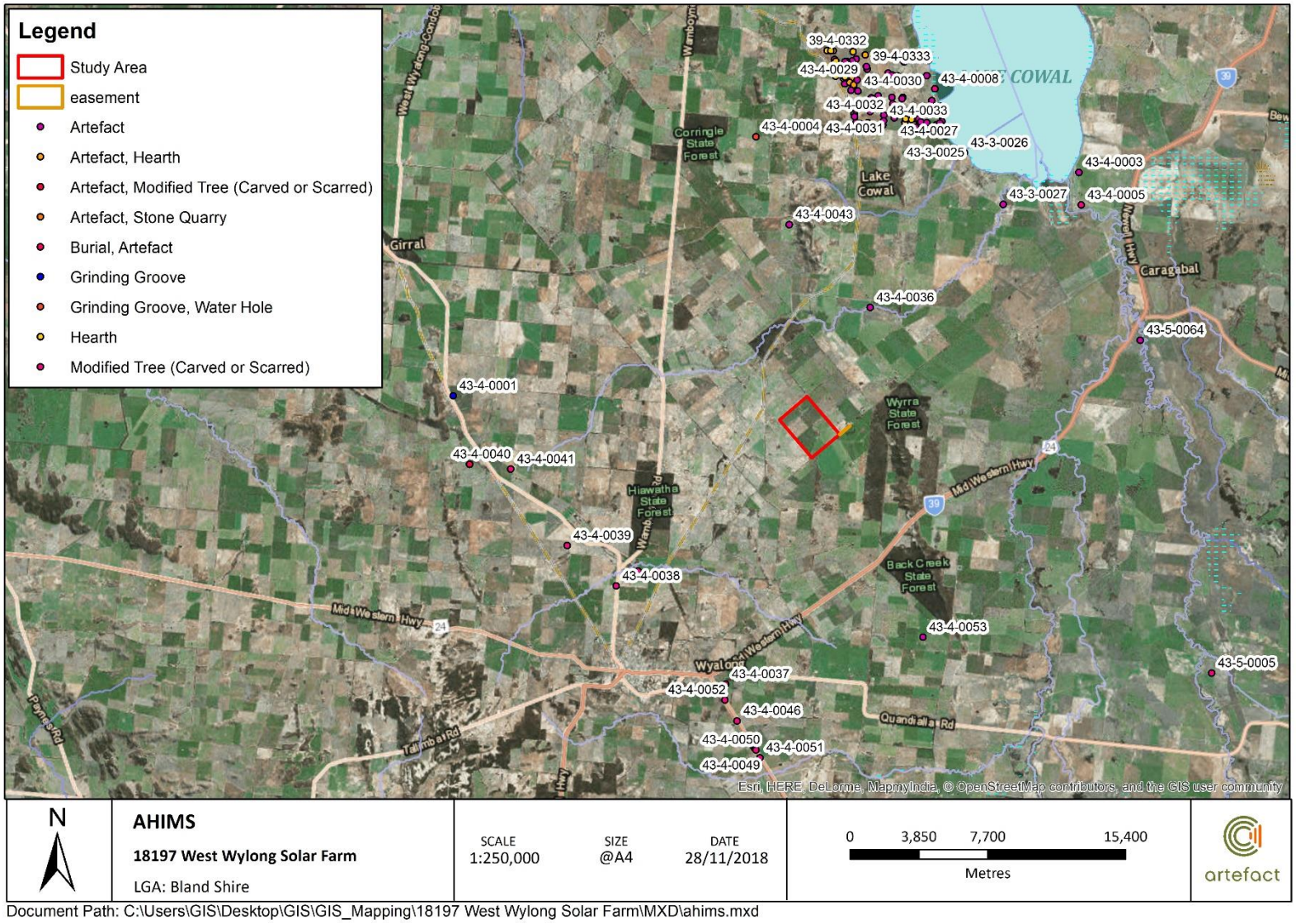
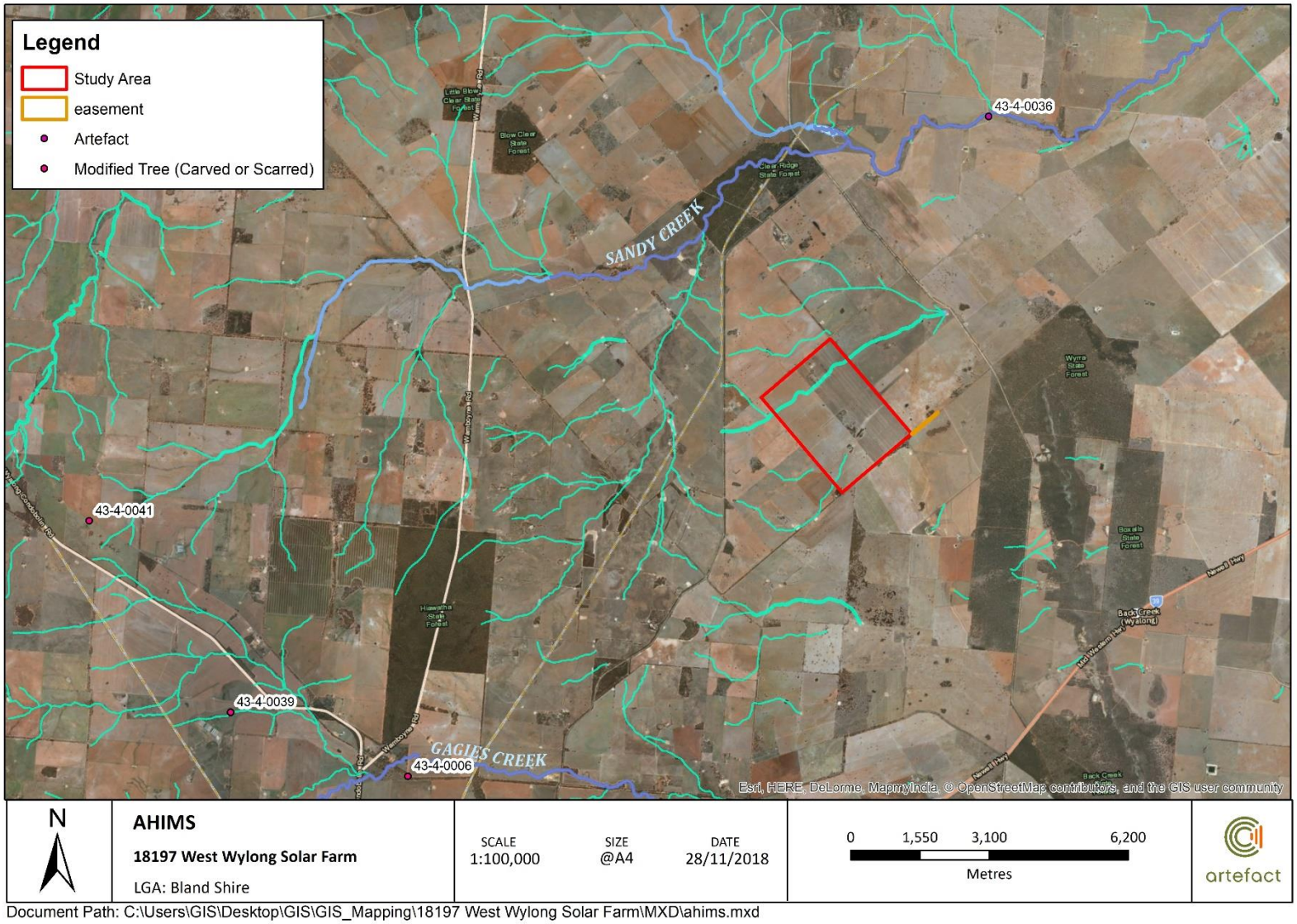


Figure 4.2: AHIMS sites in close proximity to the study area



4.3 Previous archaeological assessments

Very little archaeological research has been undertaken within the region, except for the discrete environmental context around Lake Cowal, approximately 15 km to the northeast of the study area.

Niche Environment and Heritage (2017) - Cowal Gold Operations – Processing Rate Modification

Niche Environment and Heritage (Niche) was engaged by Evolution Mining (Cowal) Pty Limited for the Cowal Gold Operations to undertake an Aboriginal Cultural Heritage Assessment for the proposed processing rate modification. The Cowal Gold Operations is situated within Mining Lease 1535 at Lake Cowal approximately 17 km northeast of the current study area. The modifications focused on the eastern and southern sides of the mine.

A total of 65 Aboriginal archaeological sites were identified in the study area, and were comprised of stone artefact sites, ovens, heat retainers and a single scarred tree. The majority of sites were artefact sites with low densities of artefacts, however, there was one large site recorded and many of the open sites had multiple features present. Three of the sites were assessed as having high significance, five sites of moderate significance and 57 sites of low significance, but it was recognised that all sites are important to the Aboriginal community. The impact assessment concluded that cumulative impact from the Modification would be relatively low.

Sinclair Knight Merz (2013) - Oakover Pavement Reconstruction Project, Goldfields Way, West Wyalong, New South Wales

Sinclair Knight Merz (2013) was engaged by Roads and Maritime Services to conduct an Aboriginal archaeological survey along a section of the Goldfields Way south of West Wyalong.

This survey was undertaken approximately 14 km south of the current study area. The Goldfields Way traverses a plains landform that is comprised of inactive alluvial plains and colluvial sheet wash plains. As a result of the field survey a total of seven culturally modified scarred trees were recorded including a Bee Tree. This tree was likely scarred as a result of cutting into the heartwood of the tree to place smoking embers to pacify bees in order to remove honey further up the tree, or as an access point from which to remove the honey directly. A stand of Quandong trees was also recorded as being of high cultural value as a valuable food resource used by Aboriginal people in the region.

Colin Pardoe Bio-Anthropology & Archaeology (2013) - Cowal Gold Mine Extension Modification Aboriginal Cultural Heritage Assessment

Colin Pardoe Bio-Anthropology & Archaeology were engaged by Barrick (Cowal) Limited to prepare an Aboriginal Cultural Heritage Assessment for the Cowal Gold Mine Extension Modification.

The entire extension area was surveyed for this assessment. Conditions of exposure and visibility were poor. The survey relocated several previously recorded sites and recorded two new large sites on the back plains containing stone artefacts and ovens. It was also observed that the low-density background scatter of stone artefacts and heat retainers was continuous across the survey area.

Management recommendations for the sites included salvage and application of informative analyses such as radiocarbon dating, biochemical analysis of artefacts and use-wear studies. Recommendations for the background scatter were consistent with the existing management plan, which includes surface collection and collection after grader scraping of representative artefacts.

Archaeological Consulting Services (1999) - An Aboriginal Heritage Assessment of the Barmedman Bridge Replacement, Main Road 57 between Temora and West Wyalong, Western NSW

In 1999, Archaeological Consulting Services conducted survey on the eastern side of the Barmedman bridge, approximately 3 km south of the township of Barmedman and approximately 37 km south of the current study area.

Background studies revealed that one isolated quartz flaked piece had been located close to the study area during an archaeological assessment conducted over two decades ago. This isolated find is not registered on AHIMS. The report noted that generally Aboriginal site numbers and density of archaeological material within the Barmedman district are quite low. No Aboriginal sites or objects were identified during the survey and the isolated quartz flake was not relocated.

The report concludes that there is a strong indication that Aboriginal cultural heritage may have been present in the study area at low densities prior to European settlement. However, roadworks and other developments have severely disturbed soils in the study area and it is unlikely that any surface or subsurface archaeological deposit remained (Archaeological Consulting Services 1999).

4.4 Predictive model

Based on the background environment and previous archaeological assessments, the following conclusions can be made regarding the potential archaeological sensitivity of the study area:

- Archaeological evidence will most likely comprise low density scatters of stone artefacts
- These will predominantly be located in proximity to a watercourse
- Stone artefacts where present will reflect the availability of local raw materials from the Booberoi Hills including sandstone, siltstone, mudstone and igneous elements such as basalt
- Artefacts are likely to occur in low densities or isolated deposits consistent with the modelled use of the study area as a transient or ranging location
- If Gilgai soils are present in the study area, artefacts may be vertically displaced
- Artefacts may be displaced due to soil deflation resulting from agricultural land use including clearing, ploughing and cropping
- Mature indigenous trees where present in the study area may be culturally modified.
- Based on the lack of permanent water and sources of suitable stone raw materials the study area in conjunction with the moderate levels of disturbance through land use the study area is predicted to be to be of low to moderate archaeological sensitivity.

5.0 ARCHAEOLOGICAL SURVEY

5.1 Aims

The aims of the archaeological survey were to:

- Cover a representative sample of the study area that will potentially be impacted by the proposed works
- Reinspect any previously registered sites
- Record any new Aboriginal objects or sites observed during the survey
- Identify areas of potential archaeological deposit (PAD) that may be present in areas that have had no or minimal disturbance
- Liaise with the West Wyalong LALC regarding the proposed works and the archaeological potential of the study area
- Collect information to ascertain whether further archaeological investigation is required.

5.2 Timing and personnel

The archaeological survey was conducted over three days on 9, 10 and 11 October 2018. Personnel and timing for the archaeological survey are presented in Table 5.1.

Figure 5.1: Timing and personnel for the archaeological survey

Participant	Organisation	Role	Date of participation
Michael Level	Artefact Heritage	Senior Heritage Consultant/Survey supervisor	9 October to 11 October 2018
Anna Darby	Artefact Heritage	Heritage Consultant	9 October to 11 October 2018
Braydn Davis	West Wyalong Land Council	Field Officer	9 October 2018
Linton Howarth	West Wyalong Land Council	Field Officer	9 October to 11 October 2018
Jesse Hampton	West Wyalong Land Council	Field Officer	10 to 11 October 2018
Lee Hampton	West Wyalong Land Council	Field Officer	11 October 2018

5.3 Constraints

The vast majority of the study area had been sown with a wheat crop which was failing due to drought conditions. This wheat crop comprised the chief constraint for ground surface visibility during the survey.

5.1 Sampling strategy

The study area is large comprising 560 ha and the powerline easement. Full survey coverage of the study area was not practicable therefore a survey sampling strategy was required. A sample survey is acceptable, with justification, under the Code of Practice.

The study area where the solar farm will be located comprises a single landform. Survey units (SUs) were defined arbitrarily for the survey methodology and do not reflect changes in topography.

An initial intensive survey strategy was adopted to robustly assess a representative area. This initial strategy was to walk a series of transects at 15 m apart across each survey unit in parallel lines at a pace that allowed opportunity to identify any features or objects. At the end of each transect the team would reposition along a new transect line at the same spacing and walk on the reverse compass bearing. This strategy was implemented for survey unit one (SU1) and the easement (Figure 5.2). This resulted in an effective total survey of these areas.

The sampling strategy employed for survey units two (SU2) and three (SU3) was less intensive and employed transects with four personnel in pairs spaced 10 m apart (Figure 5.2). Each pair of transects was separated by 100 m.

5.2 Survey methodology

All survey units were traversed on foot. A handheld Global Positioning System (GPS) was used to track the path of the survey team, to record the coordinates of survey transects and the location of finds. The coordinate system projection used for all site recording was GDA94 MGA 56.

All ground exposures were examined for Aboriginal objects (stone artefacts, imported shell, or other traces of Aboriginal occupation). Mature trees were examined for signs of cultural modification.

A photographic record was kept during the survey. Photographs were taken of ground visibility vegetation and disturbance in survey units. Photographs were also taken of any identified Aboriginal cultural material. Scales were used for photographs where appropriate.

5.3 Recording site extents in relation to the study area

Where areas where scatters of stone artefacts were identified towards the margins of each survey unit, efforts were made by the survey team to delineate the identified extent of the scatter by surveying in a radius of up to 50 m from the identified artefacts. It is possible that these scatters may continue beyond that point. However, consensus among the survey team was that the radius surveyed was adequate to provide an accurate representation of each scatter.

Figure 5.2: Survey units

5.4 Survey results

5.4.1 The easement

The easement was surveyed as the area represented on client supplied mapping (Figure 5.2). It extends northeast from the southeast corner of the main study area and terminates at an overhead powerline (Figure 5.6). It measures approximately 780 m long and 30 m wide (2.34 ha) (Figure 5.3 and Figure 5.4).

The landscape within the easement is heavily disturbed due to vegetation clearance, ploughing and cropping. Soils were predominantly yellow or red with high sand content. Vegetation in the easement contained Belah and Acacia trees with an understory of grasses. Throughout the area trees and fence posts have been uprooted and burnt, and soils have been mechanically moved into windrows (Figure 5.5; Figure 5.6). Visibility in the burnt areas was high (approximately 80 per cent) while the reminder of the easement had low visibility due to dense grass and leaf litter (Figure 5.3; Figure 5.4).

No Aboriginal objects or areas of potential archaeological deposit were identified within the easement.

Figure 5.3: Beginning of the easement, facing east (Photographed by M Lever, 9 October 2018)

Figure 5.4: End of the easement, facing east (Photographed by M Lever, 9 October 2018)

Figure 5.5: View north east of the vegetation in the easement (Photographed by M Lever, 9 October 2018)

Figure 5.6: View east of the disturbance (Photographed by M Lever, 9 October 2018)

5.4.2 Survey unit one

Survey unit one (SU1) comprises the south-eastern portion of the study area (Figure 5.2). The unit measures approximately 84.3 ha.

SU1 is comprised of a plain landscape that is cleared of native vegetation except for several White Cypress Pines (Figure 5.7; Figure 5.8). The northwest corner of SU1 contains a homestead comprised of a ruinous residence within a clump of Belah trees. The extent of the homestead and trees was approximately 230 m by 30 m (Figure 5.10). Except for a small buffer of approximately three metres along the fence lines the remainder of the study area has been ploughed and sown with wheat.

Surface visibility within SU1 was moderate (60 per cent) in the wheat crop and low (40 per cent) under the trees due to leaf litter (Figure 5.9).

Disturbance within the survey unit included ploughing for the wheat crop and earth works associated with the residential building.

Two isolated stone artefacts were identified in SU1 and are described further in section 7.1.

Figure 5.7: View north of SU1 (Photographed by M Lever, 9 October 2018)

Figure 5.8: View north of SU1 (Photographed by M Lever, 9 October 2018)

Figure 5.9: Ground cover in SU1 (Photographed by M Lever, 9 October 2018)

Figure 5.10: View north west of building and trees (Photographed by M Lever, 9 October 2018)

5.4.1 Survey unit two

Survey unit two (SU2) consists of the central and southwestern corner of the study area (Figure 5.2). SU2 measures approximately 321 ha.

The landform was flat and almost totally cleared. The vast majority of the study area contained wheat crop (Figure 5.13), dissected by an unsealed track. A dam and a cluster of Western Grey Box were present in the southeast portion of the survey unit. Two clusters of Mallee trees measuring approximately 200 m by 150 m were observed in the centre of SU2. Other trees in SU2 included isolated Cypress Pines and one small clump of Belah trees in the west (Figure 5.11; Figure 5.12).

Two ephemeral drainage lines were observed, one in the south west section of the survey unit, and another between the track and the dam mentioned above (Figure 5.15). The contours of these drainage lines had been largely reduced through ploughing. They were identifiable as slight declivities with increased soil dampness and preferential crop growth (Figure 5.12). Localised areas of burning were also observed possibly due to tree and fence post removal.

Disturbance within SU2 two included earth works for dam construction and ploughing. Visibility in south and east sections of SU2 was 60 per cent due to the relatively good condition of the wheat crop. In the western section, the wheat crop was in poor condition, and visibility there was high (90 percent) (Figure 5.18;Figure 5.19).

One artefact scatter, and one culturally modified tree were identified in SU2. These are described further in Section 7.1.

Figure 5.11: View west of the south section of SU2 (Photographed by M Lever, 9 October 2018)

Figure 5.12: View west of SU2 showing ephemeral drainage line (Photographed by M Lever, 9 October 2018)

Figure 5.13: View north west of SU2 from the south end (Photographed by M Lever, 9 October 2018)

Figure 5.14: View west of SU2 showing cluster of Grey Box (Photographed by M Lever, 9 October 2018)

Figure 5.15: View east of the north west side of SU2 (Photographed by M Lever, 11 October 2018)

Figure 5.16: View south from the north side of SU2 (Photographed by M Lever, 11 October 2018)

Figure 5.17: View west of the west side of SU2, showing Mallee in the background (Photographed by M Lever, 11 October 2018)

Figure 5.18: Ground cover in the north of SU2 (Photographed by M Lever, 10 October 2018)

Figure 5.19: Ground visibility in the western portion of SU2 (Photographed by M Lever, 11 October 2018)

5.4.1 Survey unit three

Survey unit three (SU3) consists of the northern section of the study area. It measures approximately 156 ha.

The landform is a plain landscape dissected by an unsealed dirt track. It contains an ephemeral drainage line aligned east- west. Soils in the immediate vicinity of the drainage line slope very gently towards it, to a maximum of 1 m below surrounds (Figure 5.20 - Figure 5.23). Four dams are constructed along this drainage line (Figure 5.24). In the eastern section of SU3 the remains of a homestead complex were observed, with the house having been destroyed by fire. Approximately 60 m south of the ruins are two sheds that are currently being used for agricultural purposes. Vegetation surrounding the homestead complex include Western Grey boxes, Mallee and Cypress pines. An unsealed driveway extends from the complex to Blands Lane, at the gate two mature Sugar Gums (*Eucalyptus cladocalyx*) were observed (Figure 5.26). These trees are not endemic to the area. Other vegetation in SU3 included the wheat crop, and isolated groups of Western Grey Box, Mallee and Cypress Pines. In the northeast section in an area measuring approximately 500 m by 500 m is large amount of quartz and shale debris, possibly indicative of previous mining in the area (Figure 5.27).

Visibility in the western section of SU3 was high while the in the eastern section the visibility was moderate due to the condition on the crop. Visibility in the homestead complex was low due to dense grass and leaf litter. Disturbance within the survey unit included earthworks associated with the homestead complex, damming of the drainage line, and ploughing and sowing the wheat crop.

No Aboriginal objects or areas of potential archaeological deposit were identified within SU3.

Figure 5.20: View south of the eastern section of SU3 (Photographed by M Lever, 11 October 2018)

Figure 5.21: View north of the eastern section of SU3 (Photographed by M Lever, 11 October 2018)

Figure 5.22: View south of SU3 (Photographed by M Lever, 11 October 2018)

Figure 5.23: View south east showing of SU3 (Photographed by M Lever, 11 October 2018)

Figure 5.24: Dam constructed in SU3 (Photographed by A Darby, 12 October 2018)

Figure 5.25: View east showing the homestead complex (Photographed by M Lever, 11 October 2018)

Figure 5.26: View north of the sugar gums at entrance (Photographed by A Darby, 12 October 2018)

Figure 5.27: High density of quartz and shale debris and ground cover (Photographed by M Lever, 11 October 2018)

5.4.1 Coverage

A summary of survey coverage, in accordance with the Code of Practice, is provided in Table 5.1 and Table 5.2 below.

Table 5.1: Survey coverage summary – survey units

Survey unit	Survey unit area (m^2)	Landform	Visibility (%)	Exposure (%)	Effective coverage (m^2)	Effective coverage (%)
The easement	22,832	Gilgai plain	80	40	7,306	32
SU1	842,995	Plain	60	60	303,478	36
SU2	3,210,459	Plain, drainage line	80	90	2,311,530	72
SU3	1,536,318	Plain, drainage line	80	80	125,588	72

Table 5.2: Survey coverage summary – landforms

Landform	Landform area (m^2)	Area effectively surveyed ($m^{2)}$	Percentage of landform effectively surveyed (%)	Number of artefacts or features
Gilgai plain	22,832	7,306	32	0
Plain	5,461,443	2,293,806	42	4
Drainage line	153,259	95,021	62	0

6.0 RESULTS

No previously registered Aboriginal sites were located within the study area. The Aboriginal archaeological survey identified four Aboriginal sites within the study area. These comprise one artefact scatter, two isolated artefacts and one culturally modified tree. These sites are described below.

6.1.1 West Wyalong Solar Farm IF 01 (WWSF IF 01) (AHIMS ID 43-4-0056)

Site type: Artefact
Centroid: MGA Zone 55 530745 mE 6258631 mN
Site length: 1 m
Site width: 1 m

WWSF IF01 (AHIMS ID 43-4-0056) is an isolated stone artefact located in the southeast of SU1, within the wheat crop and approximately 60 m from the southern fence line. The site contains one complete red chert flake measuring 30 mm in length and 40 mm in width (Figure 6.1 to Figure 6.4).

The surface visibility across the site was high due to the poor condition of the wheat crop. The landform is considered to have been disturbed from the ploughing of the crop and the artefact is unlikely to be in situ.

Figure 6.1: View North showing the location of WWSF IF 01 (Photographed by M Lever, 9 October 2018)

Figure 6.2: View south showing the location of WWSF IF 01 (Photographed by M Lever, 9 October 2018)

Figure 6.3: WWSF IF 01 in situ (Photographed by M Lever, 9 October 2018)

Figure 6.4: Close up of WWSF IF 01 (Photographed by M Lever, 9 October 2018)

6.1.2 West Wyalong Solar Farm IF 02 (WWSF IF02) (AHIMS ID 43-4-0071)

Site type: Artefact
Centroid: MGA Zone 55 530981 mE 6259155 mN
Site length: 1 m
Site width: 1 m

WWSF IF02 (AHIMS ID 43-4-0071) is located on a flat landform in the western portion of SU1, approximately 85 m from the eastern boundary fence line. The site contains one silcrete flake measuring 30 mm in length, 17 mm wide and 7 mm thick (Figure 6.5 to Figure 6.8).

The site was observed in an exposure due to the poor condition of the crop. The landform is considered to have been disturbed from the ploughing of the crop and the artefact is unlikely to be in situ.

Figure 6.5: WWSF IF02 in situ (Photographed by M Lever, 9 October 2018)

Figure 6.6: Close up of WWSF IF02 (Photographed by M Lever, 9 October 2018)

Figure 6.7: View south showing location of WWSF IF02 (Photographed by M Lever, 9 October 2018)

Figure 6.8: View east showing location of WWSF IF02 (Photographed by M Lever, 9 October 2018)

6.1.3 West Wyalong Solar Farm artefact scatter 01 (WWSF AS01) (AHIMS ID 43-4-0057)

Site type: Artefact Scatter
Centroid: MGA Zone 55 530161 mE 6258506 mN
Site length: 1.9 km
Site width: 550 m

WWSF AS01 (AHIMS ID 43-4-0057) is located in the southwestern portion of the study area and encompassed the southern section of SU2 (Figure 6.9 to Figure 6.11). Fourteen Aboriginal artefacts, including a fragment of grinding stone, were recorded (Table 6.1) across the site in various exposures within the wheat crop and one artefact on the outskirts next to the fence line (Figure 6.12 to Figure 6.14).

While only a small fragment of the grinding stone remains, it is of particular interest as its presence indicates that Aboriginal people were carrying out subsistence activities such seed grinding, and potentially camping in the study area (Figure 6.15). A basalt manuport was also observed (Figure 6.16). All stone materials observed are available locally in the Booberoi Hills up to 4 km away from the study area.

Until recently several fences divided the study area into separate paddocks, this would have localised the scatter to the paddock. The artefact scatter is concentrated around an ephemeral drainage line adjacent to an existing Belah tree which has been identified as culturally modified for the procurement of honey (Figure 6.20: Location of artefacts within WWSF AS01). The association between the artefact scatter and the culturally modified tree is unknown.

Table 6.1: Artefacts associated with West Wyalong Solar Farm AS01

Material	Type	Length (mm)	Width (mm) Thickness
Chert	Flake	30	15
Chert	Backed flake scrapper	30	34
Basalt	Medial flake	30	18
Basalt	manuport	80	60

Material	Type	Length (mm)	Width (mm) Thickness
Silcrete	Flake	25	20
Silcrete	Grinding Stone fragment	80	50
Silcrete	Flake with retouch	38	25
Silcrete	Flake	15	15
Chert	Flake	30	30
Silcrete	Flake	20	15
Quartz	Flake	25	25
Silcrete	Right marginal flake	15	10
Chert	Flake	20	30
Silcrete	Flake	12	15

Figure 6.9: View west of WWSF AS01 (Photographed by M Lever, 9 October 2018)

Figure 6.10: View north from middle WWSF AS01 (Photographed by M Lever, 9 October 2018)

Figure 6.11: View south from middle WWSF AS01 (Photographed by M Lever, 9 October 2018)

Figure 6.12: Example of artefact observed in WWSF AS01 (Photographed by M Lever, 9 October 2018)

Figure 6.13: Example of artefact observed in WWSF AS01 (Photographed by M Lever, 10 October 2018)

Figure 6.14: Example of silcrete artefact observed in WWSF AS01 (Photographed by M Lever, 10 October 2018)

Figure 6.15: Grinding stone fragment (Photographed by M Lever, 10 October 2018)

Figure 6.16: Basalt manuport (Photographed by M Lever, 10 October 2018)

6.1.4 West Wyalong Solar Farm Bee Tree (WWSF Bee Tree) (AHIMS ID 43-4-0058)

Site type: Modified tree (carved or scarred)
Centroid: MGA Zone 55 529430 mE 6258172 mN
Site length: 25 m
Site width: 30 m

WWSF Bee Tree (AHIMS ID 43-4-0058) is located in the north-western portion of SU2 in a cluster of Belah trees. The tree is on the eastern side of the cluster and is approximately 25 m high. The scar is on the east facing side of the track, oblong in shape with approximately 60 mm of regrowth, the remaining scar is 800 mm long, 100 mm wide and 80 mm deep. The bark of the Belah tree is not widely used for items such as coolamons or housing and is likely the result of cutting into the heartwood of the tree to place smoking embers to pacify bees in order to remove honey further up the tree. The cut marks on the trunk have been made with a steel axe. These could have travelled into the District quite early via trading networks although they may also be the result of more recent Aboriginal historical use.

Figure 6.17: View west of WWSF Bee Tree (Photographed by M Lever, 10 October 2018)

Figure 6.18: Close up of WWSF Bee Tree (Photographed by M Lever, 10 October 2018)

Figure 6.19: Newly recorded Aboriginal sites within the study area

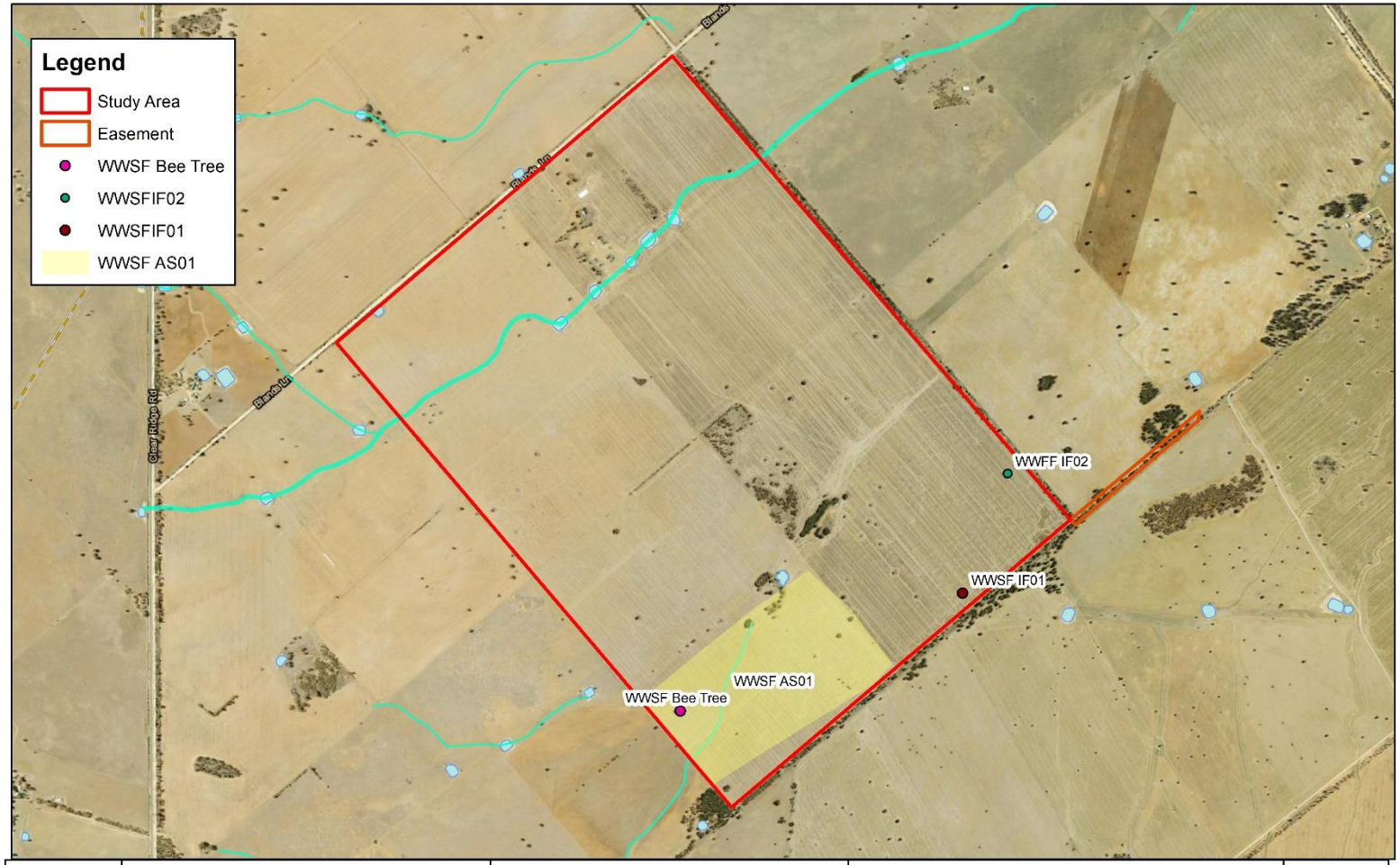
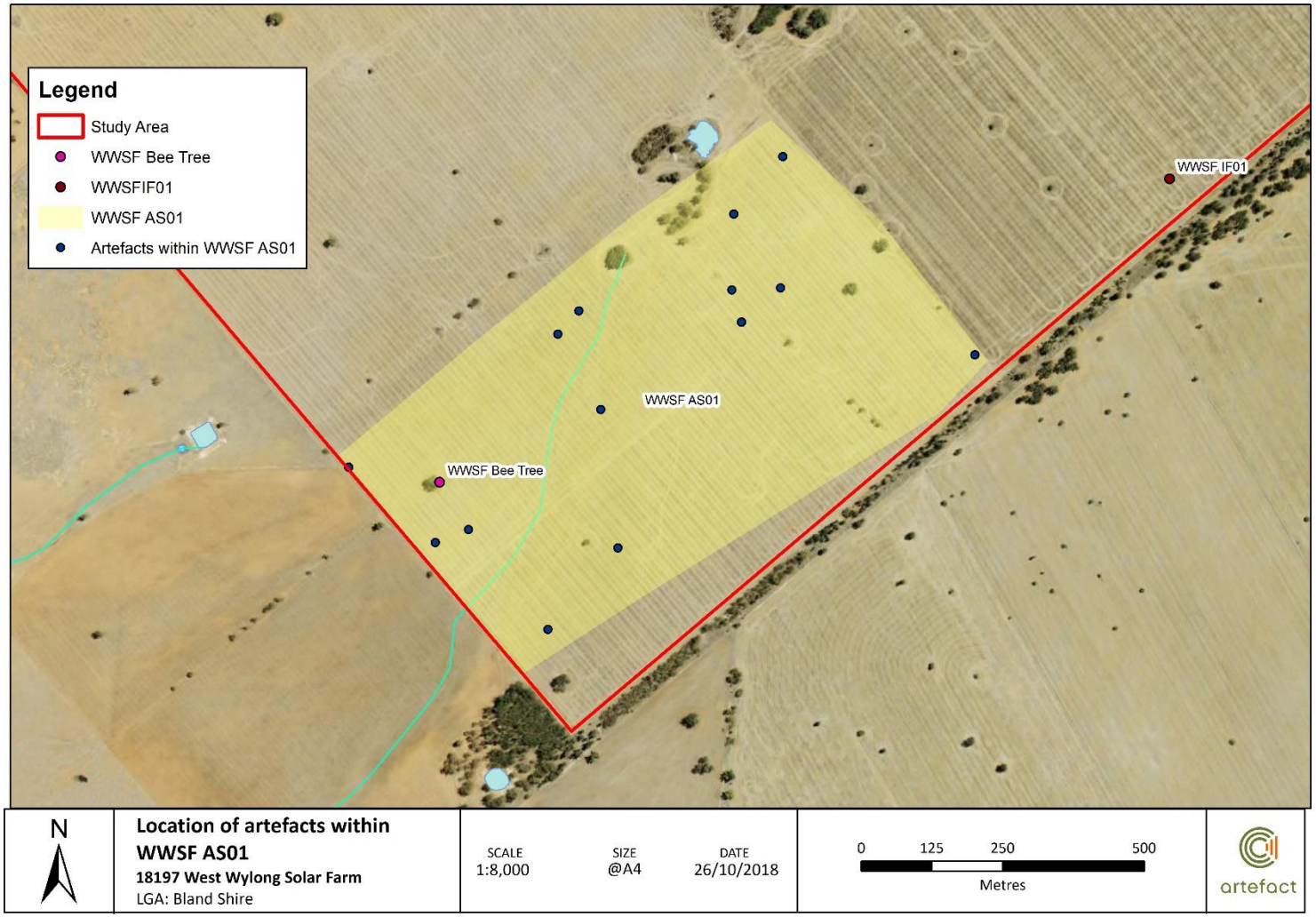


Figure 6.20: Location of artefacts within WWSF AS01 (AHIMS ID 43-4-0057)



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7.0 ANALYSIS AND DISSCUSION

The study area is within the NSW South Western Slopes biogeographic region and within the catchment area of the Lachlan River. The landform within the study area is predominately comprised of a plain with ephemeral drainage lines. These ephemeral drainage lines may have provided a focus for transient Aboriginal occupation in an otherwise dry landscape. The closest waterway, Sandy Creek, is 5 km to the north with the resources rich Lake Cowal 15 km northwest of the study area. Four km to the southeast is the Booberoi Hills that are likely to have been an important regional source of raw stone materials for Aboriginal people occupying the study area landscape and surrounds.

The survey located and identified two isolated artefacts, an artefact scatter, and a culturally modified tree. These Aboriginal site types generally fit with the predication that the study area would be of low to moderate potential. A brief summary of the results with regard to the predictive model is presented below:

- Stone artefacts were the most common site type observed. The artefacts recorded were primarily manufactured from silcrete and chert, both of which are natural stone resources in the area. Two basalt artefacts, including a manuport, and a fragment of grinding stone made from sandstone were also recorded. All these stone materials are available from the Booberoi Hills around four km away. The fragment of grinding stone also suggests that Aboriginal people were camping in the area.
- The artefact scatter had a low density (0.000025 artefacts per square metre), with 0.000003 artefacts per square meter density within the total study area.
- Although the study area is not located near sources of permanent water it contains two ephemeral drainage lines. In dry areas ephemeral waterways may have played a far higher role in past Aboriginal local subsistence than they would where water was more abundant. These waterways would have allowed transient use of the study area during periods of high rainfall, that is during winter through to late spring/early summer and would have assisted travel through the landscape between resource rich zones such as Lake Cowal and the Booberoi Hills.
- Culturally modified trees were predicted to be present on mature trees in areas of preserved native vegetation. The study area has been cleared within recent years and historically and as a result only a small portion of the study area contained mature trees. One culturally modified tree was identified during the survey. The scar was made as a result of resource acquisition. One previously recorded bee tree has been identified in the region (SKM 2013). Both trees are thought to have been scarred in the process of acquiring honey from within the hollow trunk. While Bee Tree 1 (AHIMS ID 34-4-0058) was a Mallee tree this is a Belah tree. Scarring as a result of acquiring food sources has not been fully documented in the region and requires further research.
- The study area is predicted to be an approximate midpoint for hunter gather campsites as it is between several major water resources, as well as within close proximity of the lithic resources at the Booberoi Hills. This would suggest that the ephemeral drainage lines of the

study area may have been used as a staging point or camp during travel between local resources.

- Areas of disturbance were most extensive within the extent of the crop and the area around the homestead complex. Historical land use of the study area included mining and livestock grazing, the land is currently been used for crops. Six dams were observed within the study area, the construction and maintenance of these would also have caused extensive disturbance.
- Ploughing to sow crops causes vertical displacement and to some extent horizontal displacement of soils and as a result the archaeological contexts would also be disturbed.

8.0 SIGNIFICANCE ASSESSMENT

8.1 Significance assessment criteria

An assessment of the cultural heritage significance of an item or place is required in order to form the basis of its management. The Guide (OEH 2011: 10) provides guidelines, in accordance with the Burra Charter (Australia ICOMOS 2013) and the NSW Heritage Branch (Heritage Office 2001) for significance assessment with assessments being required to consider the following criteria:

- Social values – does the area have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Historic values – is the area important to the cultural or natural history of the local area and/or region and/or state
- Scientific values - does the area have the potential to yield information that will contribute to an understanding of the cultural and natural history of the local area and/or region and/or state
- Aesthetic values – is the area important in demonstrating aesthetic characteristics in the local and/or region and/or state.

Scientific values should be considered in light of the following criteria:

- Research potential - does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness - how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity - is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential - does the subject area contain teaching sites or sites that might have teaching potential?

It is important to note that heritage significance is a dynamic value.

8.2 Archaeological significance assessment

A summary of archaeological significance for Aboriginal sites in the study area is provided in Table 8.1.

Table 8.1: Summary of archaeological significance

Site name/ AHIMS ID	Research potential	Representative value	Rarity	Educational potential	Overall archaeological significance
WWSF IF01 (AHIMS ID 43-4-0056)	Low	Low	Low	Low	Low

Site name/ AHIMS ID	Research potential	Representative value	Rarity	Educational potential	Overall archaeological significance
WWSF IF02 (AHIMS ID 43-4-0071)	Low	Low	Low	Low	Low
WWSF AS01 (AHIMS ID 43-4-0057)	Moderate	Moderate	Moderate-High	Moderate	Moderate
WWSF Bee Tree (AHIMS ID 43-4-0058)	High	High	High	High	High

8.2.1 West Wyalong Solar Farm IF01 (AHIMS ID 43-4-0056)

West Wyalong Solar Farm IF01 consists of a single chert flake on a disturbed context due to the wheat crop. Surface visibility in the area was high. Due to the level of disturbance and the singularity of artefact the site was assessed as demonstrating low archaeological significance.

8.2.1 West Wyalong Solar Farm IF02 (AHIMS ID 43-4-0071)

West Wyalong Solar Farm IF02 consists of a single silcrete flake observed within the wheat crop in the eastern portion of SU1. The site was assessed as having little to no intact archaeological deposit and low archaeological significance due to the level of disturbance. Silcrete is abundant in the surrounding areas and therefore the material within the site is not considered rare and has limited research potential.

8.2.1 West Wyalong Solar Farm AS01 (AHIMS ID 43-4-0057)

West Wyalong Solar Farm AS01 consists of 14 artefacts concentrated around the south western ephemeral drainage line. The site was assessed as having moderate research potential and representative value due to the high number of artefacts when the predictive modelling indicated low potential. The presence of the basalt manuport indicates the movement of materials, while the grinding stone fragment indicates the Aboriginal people were camping in the area. As a result, the site was assessed as having moderate education potential with moderate to high rarity.

8.2.2 West Wyalong Solar Farm Bee Tree (AHIMS ID 43-4-0058)

West Wyalong solar farm bee tree is located in the south east of the study area within the boundaries of the artefact scatter. The culturally modified Belah free is the resulted of removing the bark and cutting into the heartwood to place smoking embers to smoke the bees, enabling the removal of the honey further up the tree. The association of the bee tree and the artefact scatter is unknown. Culturally modified trees are also a rarity within the modern landscape due to the clearing activities and the life span of trees. Due to the above reasons the site is assessed as high potential and significance across the four categories.

8.3 Cultural significance

Linton Howarth (West Wyalong LALC) did not make any comments with regard to cultural sensitivity of the study area but noted that the cultural materials, in the form of stone artefacts and the WWSF Bee Tree (AHIMS ID pending), were observed in an area that was predicted to have few if any

Aboriginal sites. Mr Howarth also noted that the area could have been used as a travel route between the Booberoi Hills east of the study area to the Manna Mountain Range northwest of the study area in the direction of Condobolin, as well as Lake Cowal to the north.

Cultural values of the study area will be further explored by the ACHAR (Artefact Heritage 2018a)

9.0 IMPACT ASSESSMENT

The impact assessment is based on the likely disturbance caused in conjunction with the current proposed design. This includes the construction of the solar panels (depth of impact of the base unit), construction and excavation work associated with the substation, internal access roads, as well as potential ancillary sites (such as construction compounds, bridge construction sites, and stockpile sites)

A summary of identified impacts is outlined in Table 9.1 below.

Table 9.1: Summary of impacts associated with the solar farm works

Name	Type of harm	Degree of harm	Consequence of harm
WWSF IF01 (AHIMS ID 43-4-0056)	Direct	Total	Total loss of value
WWSF IF02 (AHIMS ID 43-4-0071)	Direct	Total	Total loss of value
WWSF AS01 (AHIMS ID 43-4-0057)	Direct	Partial	Partial loss of value
WWSF Bee Tree (AHIMS ID 43-4-0058)	Indirect	Minimal	Minimal loss of value

Figure 9.1: Location of Aboriginal sites in relation to the proposed solar farm layout (REV 15)

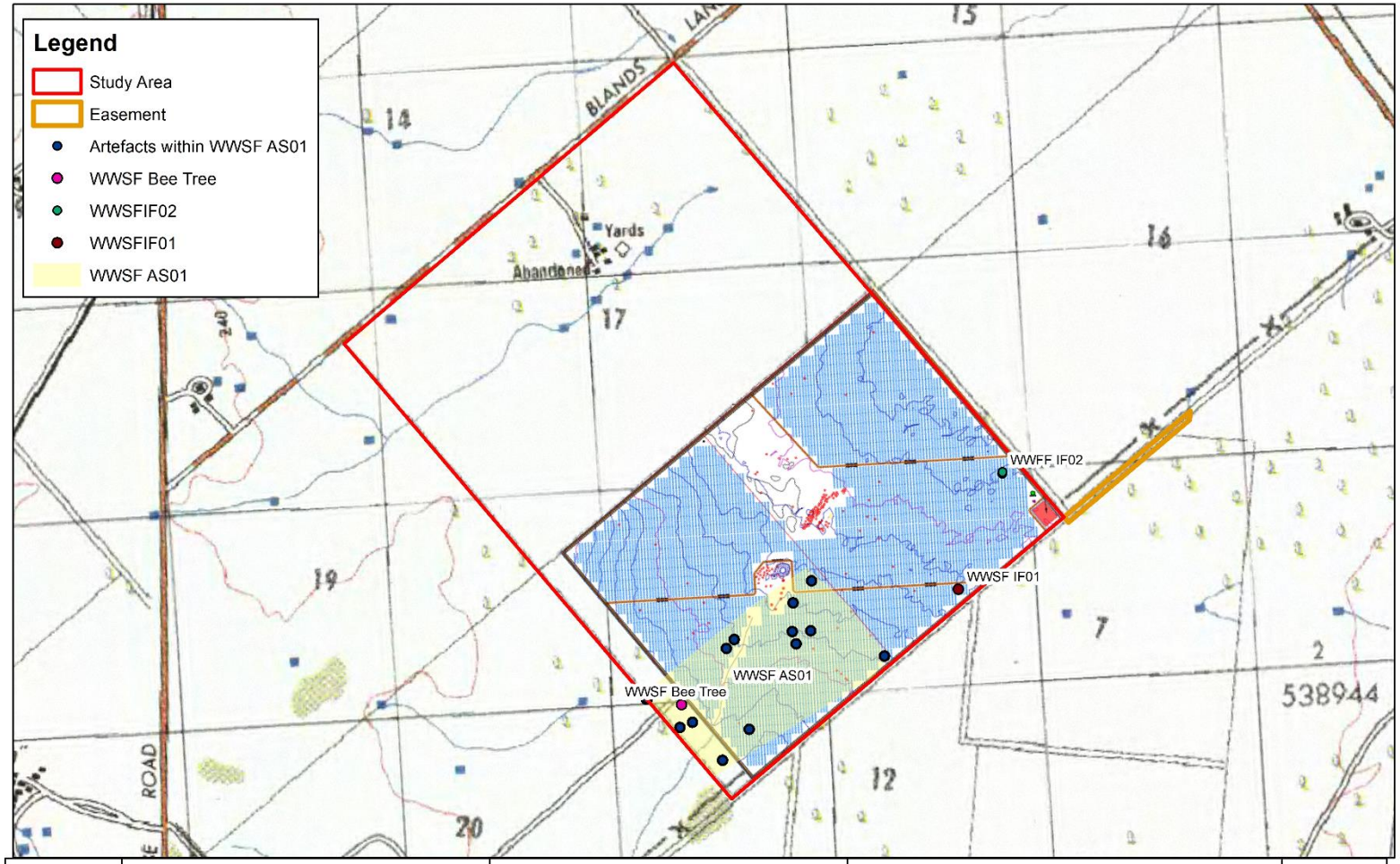

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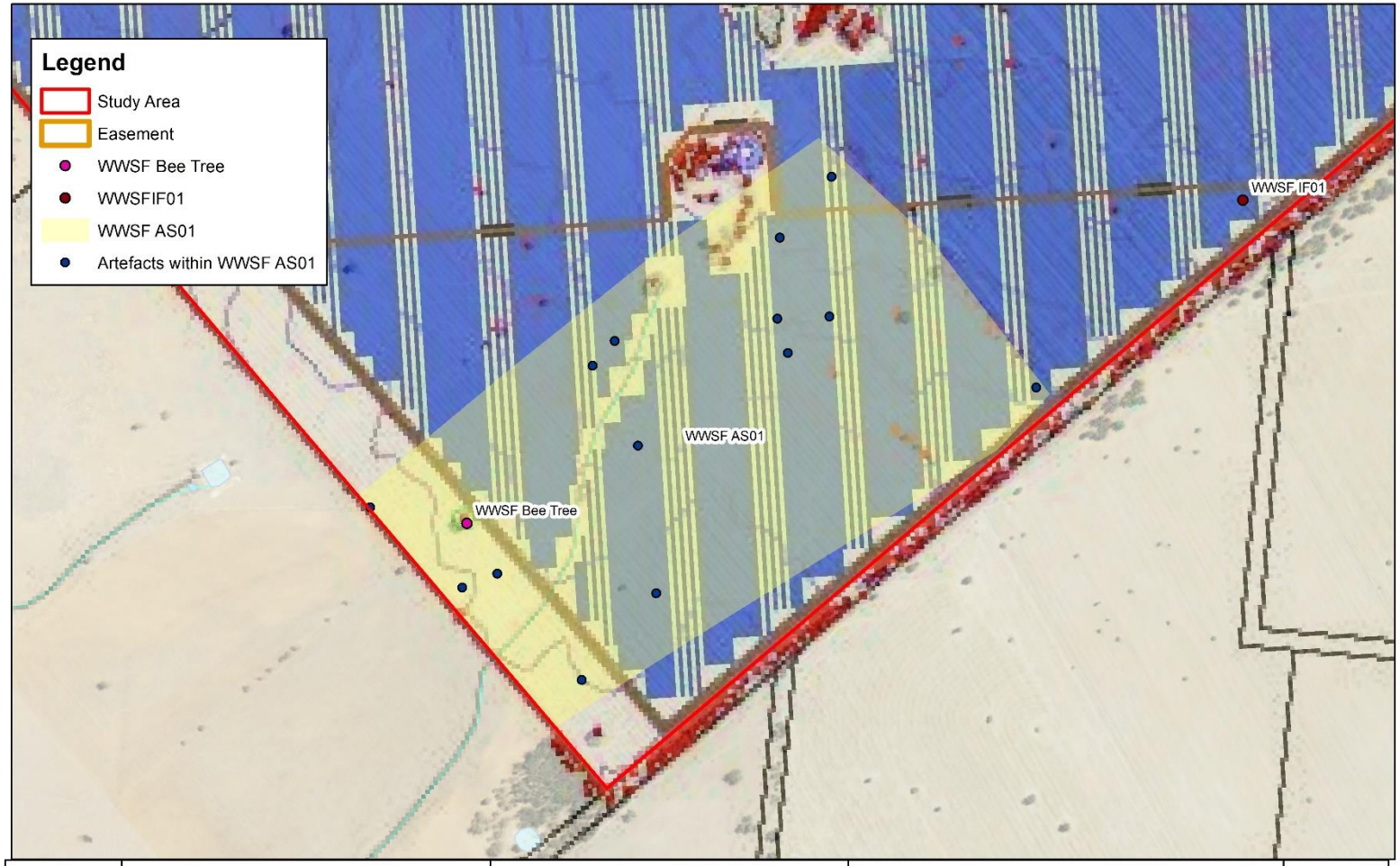
Figure 9.2: Overlay of proposed impacts associated with WWSF AS01 (AHIMS ID 43-4-0057) and WWSF Bee Tree (AHIMS ID 43-4-0058)



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10.0 MANAGEMENT AND MITIGATION MEASURES

10.1 Avoidance

The overall guiding principle for cultural heritage management is that where possible Aboriginal sites should be conserved. Avoidance can be achieved through such measures as:

- Design changes to reduce or avoid impacts on Aboriginal sites
- Buffering and exclusion zones
- Construction Environmental Management Plans which include specific Aboriginal heritage management measures to be implemented
- Cultural heritage awareness training.

From the current design layout for the solar farm, Table 9.1 in indicates that WWSF IF01 (AHIMS ID 43-4-0056), and WWSF IF02 (AHIMS ID 43-4-0071), will be totally impacted while WWSF AS01 (AHIMS ID 43-4-0071) will be partially impacted and WWSF Bee Tree (AHIMS ID 43-4-0058) is adjacent to the proposed works and will not be directly impacted by the current design.

Where sites can be avoided permanent buffering (for the life of the solar farm) and identification of NO GO zones is required.

10.1.1 WWSF Bee Tree (AHIMS ID 43-4-0058)

WWSF Bee Tree (AHIMS ID43-4-0058) was identified as containing high archaeological significance. The importance of scarred trees lies in their diversity and education information devised from them. Mitigation measures for WWSF Bee Tree (AHIMS ID 43-4-0058) include creating a fenced buffer for the tree around the dripline, to be done in consultation with an ecologist or arborist.

10.1.2 WWSF AS01 (AHIMS ID 43-4-0057)

It may be possible to avoid impacts to part of WWSF AS01 (AHIMS ID 43-4-0057) where the artefacts occur close to the drainage line (Figure 9.2). If this is possible permanent buffering will be required

Prior to the commencement of any personnel (including site staff and contractors) working on site the following must be undertaken by the Sponsor (the Sponsor will be responsible for all associated costs).

10.2 Salvage

If conservation is not practicable, measures must be taken to mitigate against impacts to Aboriginal sites through salvage.

- Surface collection of stone artefacts
- Analysis and reporting

Table 10.1 summaries the degree of harm and mitigation measures proposed each of the Aboriginal sites. As stated above two Aboriginal isolated artefacts would be fully impacted while WWSF AS01 (AHIMS ID 43-4-0057) will be partially impacted. Due to the low density nature of all three stone artefact scatters it will not be feasible to totally avoid impact to all stone artefacts.

Surface collection is recommended for all identified stone artefacts that will be impacted by the works. The artefacts are all of low-moderate archaeological significance but are representative of the types of artefacts found in the study area and can provide some research potential. All collected surface artefacts would be analysed, photographed and returned to the study area for reburial at an on site conservation area to be determined by the proponent in consultation the Aboriginal stakeholders for the project.

10.3 Cultural heritage awareness training

Aboriginal cultural heritage awareness training should be provided to key construction personnel. The training should cover the following topics:

- Aboriginal and archaeological significance of the study area
- Identification of NO GO zones and where to find this information on construction plans
- The type and nature of Aboriginal cultural material that may potentially be found within the activity area
- The process for unexpected finds
- Legislation for the protection of Aboriginal cultural heritage and implications

10.4 Unexpected finds

An unexpected finds policy must be implemented in the event of Aboriginal archaeological deposits being identified during ground disturbing works.

An unexpected finds policy would involve the following actions:

- Stop work within the affected area, protect the potential archaeological find, and inform environment staff or supervisor.
- Contact a suitable qualified archaeologist to assess the potential archaeological find.
- If Aboriginal archaeological material is identified, works in the affected area must cease, and the Office of Environment and Heritage (OEH) must be informed. Further archaeological mitigation may be required prior to works recommencing.

10.5 Aboriginal ancestral remains

In all cases, the special importance of Aboriginal ancestral remains must be acknowledged and respected and the wishes of the Aboriginal community must be respected when making decisions regarding ancestral remains.

To avoid doubt, the precautionary principle must be applied to all physical remains suspected to be Aboriginal ancestral remains.

If any human remains are disturbed in, on or under the land, you must:

- not further disturb or move these remains
- immediately cease all work at the particular location
- notify NSW Police

- notify OEH Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location
- not recommence any work at the particular location unless authorised in writing by OEH.

An Aboriginal community representative must be present where it is reasonably suspected burials or human remains may be encountered. If human remains are unexpectedly encountered and they are thought to be Aboriginal, the Aboriginal community must be notified immediately. Recording of Aboriginal ancestral remains must be undertaken by, or be conducted under the direct supervision of, a specialist physical anthropologist or other suitably qualified person.

Archaeological reporting of Aboriginal ancestral remains must be undertaken by, or reviewed by, a specialist physical anthropologist or other suitably qualified person, with the intent of using respectful and appropriate language and treating the ancestral remains as the remains of Aboriginal people rather than as scientific specimens.

10.6 Summary

Table 10.1 provides a summary of the recommended mitigation measures.

Table 10.1: Summary of recommended mitigation measures

Site	Degree of harm	Mitigation measure
WWSF IF01 (AHIMS ID 43-4-0056) WWSF IF02 (AHIMS ID 43-4-0071)	Total	• Surface collection of stone artefacts prior to construction • Cultural heritage awareness training to highlight Aboriginal significance of area and process for unexpected finds • Detailed analysis and recording of all collected stone artefacts and collation of data in a salvage report • Reburial of artefacts at an on site conservation area to be determined by the proponent in consultation with Aboriginal stakeholders

Site	Degree of harm	Mitigation measure
WWSF AS01 (AHIMS ID 43-4-0057)	Partial	• Surface collection of all stone artefacts potentially impacted prior to construction • Permanent buffering of NO GO zones where stone artefacts can be conserved • NO GO zones to be identified on all constructions plans and plans to be kept on site at all times for reference • Cultural heritage awareness training to highlight Aboriginal significance of area, identification of NO GO zones and process for unexpected finds • Detailed analysis and recording of all collected stone artefacts and collation of data in a salvage report • Reburial of artefacts at an on site conservation area to be determined by the proponent in consultation with Aboriginal stakeholders
WWSF Bee Tree (AHIMS ID 43-4-0058)	Minimal	• Permanent buffering (for the lifetime of the solar farm) of a NO GO zone to be constructed around the dripline of the tree (minimum) in consultation with an ecologist or arborist. • Reassessment of the protection zone surrounding the tree at the conclusion of the operation of the solar farm. • Tree health to be maintained during construction and operation of the solar farm • Cultural heritage awareness training to highlight Aboriginal significance of area, identification of NO GO zones and process for unexpected finds • Detailed analysis and recording of the tree in a salvage report

11.0 RECOMMENDATIONS

The following recommendations regarding Aboriginal heritage are based on consideration of:

- Statutory requirements under the National Parks and Wildlife Act 1974
- The requirements of the Code of Practice for archaeological investigation of Aboriginal objects in New South Wales (DECCW 2010)
- SEARS (SSD_18_9504)
- The results of the background research, site inspection and sensitivity assessment
- The likely impacts of the proposed development.

It was found that

- No previously recorded Aboriginal sites are located within the study area
- Four newly identified sites were located within the study area
- No areas of potential archaeological deposit were identified within the study area
- The study area is of moderate Aboriginal archaeological sensitivity

The following recommendations have yet to be ratified through consultation with the registered Aboriginal parties for the study area. The Aboriginal cultural heritage consultation requirements for proponents 2010 (Consultation Requirements) (DECCW 2010b) have commenced, and an Aboriginal Cultural Heritage Assessment Report (ACHAR) is in preparation (Artefact Heritage in prep).

- An ACHAR must be prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011). The ACHAR would outline further mitigation measures which would be required prior to construction and identify registered Aboriginal parties for the project through the Consultation Requirements.
- Where avoidance is possible permanently fenced (for the lifetime of the solar farm) NO GO zones must be implemented prior to construction and the sites identified on all construction plans.
- A permanently fenced buffer (for the lifetime of the solar farm) should be constructed around WWSF Bee Tree 01 (AHIMS ID 43-4-0058) at the dripline in consultation with an ecologist or arborist. Tree health is to be maintained during construction and operation of the solar farm.
- Where impacts are to occur to WWSF IF01 (AHIMS ID 43-4-0056), WWSF IF02 (AHIMS ID 43-4-0071), and WWSF AS01 (AHIMS ID 43-4-0057) all surface artefacts associated with these sites must be collected. Surface collection must be undertaken by a qualified archaeologist in conjunction with representatives from the registered Aboriginal parties identified for the project. Detailed analysis and recording of all collected stone artefacts and collation of data in a salvage report.
- At the end of the operational life of the solar farm a reassessment of the NO GO zones should be conducted for future protection of the sites.

- Aboriginal cultural heritage awareness training should be provided to key construction personnel.
- Unexpected finds remain protected under the NPW Act. If unforeseen Aboriginal objects are uncovered during construction, work must cease, and an archaeologist, OEH and West Wyalong LALC must be informed.
- If changes are made to the proposed works which could impact locations outside of the current study area, further archaeological investigation may be required.
- If suspected human remains are located during any stage of the proposed works, work must stop immediately, and the NSW police must be notified. The OEH should be notified is the remains are found to be Aboriginal ancestral remains.

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APPENDIX 1 – EXTENSIVE AHIMS SEARCH

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