

Appendix B Preliminary Archaeological Assessment Report

PUBLIC VERSION - REDACTED DUE TO CULTURAL SENSITIVITY



Project EnergyConnect

TransGrid

Preliminary Archaeological Assessment Report

V5 | Final

09 May 2019

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Executive Summary

Jacobs Group (Australia) Pty Ltd was commissioned by TransGrid to prepare a preliminary archaeological assessment report for the proposed Project EnergyConnect (SA/NSW Border to Buronga) (the project). This assessment is provided to inform TransGrid's Preliminary Environmental Investigation (PEI) for the project to aid in the development of a preferred option. This assessment also provides information and recommendations to inform options investigations and the ongoing design process to minimise harm to Aboriginal heritage.

The project is located in the Wentworth Local Government Area (LGA) to the immediate north of the Murray River and Lake Victoria. In NSW the project falls within the Dareton Local Aboriginal Land Council (LALC) boundary and the Barkindji Native Title Group traditional lands. In Victoria, where the project extends south of the Murray River to Red Cliffs, it falls within the First Peoples of the Millewa-Mallee Aboriginal Corporation.

In order to provide flexibility in design and planning, the study area comprises a corridor which has a width of 10 kilometres, within which lies the preferred options and the existing Buronga substation.

Project scope and background

At the time of writing, a preferred option for the project has not yet been finalised, although several options are being considered. These options largely involve a transmission alignment of approximately 160 km providing a connection between the NSW – South Australian border and Red Cliffs substation, Victoria, via Buronga substation, NSW. Other associated infrastructure, such as structure pads, access tracks, laydown areas, borrow pits and camps associated with construction will also need to be finalised.

This assessment covers Aboriginal heritage and considers the potential for unrecorded Aboriginal sites and objects within the study area. An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database maintained by the Office of Environment and Heritage (OEH) was undertaken and yielded 489 sites within the study area. Within the study area there are over 111 burial sites, scarred trees, hearths, middens, one quarry and over 200 artefact sites, either singly (isolated find) or in a group of more than one (artefact scatter). Many of the sites comprised multiple features with two or more site elements. In addition, a search of the Aboriginal Cultural Heritage Register and Information System (ACHRIS) was completed for the study area within Victoria. Site types included middens, artefact scatter, burials, and scarred trees.

Results

The AHIMS sites, ACHRIS sites, ethnographic information and previous investigations have resulted in a pattern of recorded sites within the landscape. This information allows for the development of a predictive model which can be used to identify areas of Aboriginal archaeological sensitivity. Based on the results of the desktop assessment, the following areas of sensitivity have been identified within the study area:

- Most of the sites in the study area are situated adjacent to a water source i.e. rivers and creeks, relict lakebeds, depressions, claypans, swamps and scalds
- River and creek margins are highly sensitive and possess extensive linear deposits of midden and possibly burials, as well as scarred trees and hearths
- Source bordering dunes, lunettes and sand dunes located near water sources are highly sensitive landforms and nearly always contain burials and campsites
- Slightly elevated box plains are moderately sensitive where these occur near ephemeral water sources but sites/relics are sparsely distributed
- Low lying floodplain/wetlands are of low archaeological sensitivity but scarred trees may be found there
- The sandplain, where it abuts the floodplain, is likely to be highly sensitive particularly if there are high cliffs or embankments present
- Dune crests within several kilometres radius of Lake Victoria are of medium sensitivity and usually contain shell middens.

Based on the recorded history and sites, it is clearly concluded that there are many areas of Aboriginal heritage sensitivity within the study area. Previously identified Aboriginal heritage is broadly clustered around Lake Victoria and the major waterways.

Recommendations

Despite the current scope uncertainty, the following recommendations have been formulated to minimise impact to Aboriginal heritage.

Recommendation 1

It is recommended that the preferred option chosen avoids, wherever possible, known Aboriginal heritage items and areas of archaeological sensitivity identified by this assessment.

Recommendation 2

Formal Aboriginal community consultation should continue to accurately and effectively identify the Aboriginal cultural values and knowledge holders associated with the study area. The initial process of relationship and trust building between the Aboriginal stakeholders and TransGrid is a positive step toward achieving good consultation outcomes for the project. The consultation should follow the process outlined by the *Aboriginal Community Consultation Requirements for Proponents 2010* (DECCW 2010a), but also proactively seek positive outcomes beyond these described in legislative guidelines.

Recommendation 3

It is recommended that an Aboriginal Cultural Heritage Assessment (ACHA) be undertaken to support an Environmental Impact Assessment (EIA) for the project. The ACHA must be prepared in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) and include the results of Aboriginal community consultation undertaken as part of the project.

Recommendation 4

It is recommended that a standard Cultural Heritage Management Plan (CHMP) be undertaken for the Victorian section of the project, due to the presence of archaeological sites within the proposed corridor alignment. The CHMP will assess whether a project will have any impact on Aboriginal cultural heritage values and outline appropriate management recommendations. It is recommended that a standard CHMP be undertaken initially, which may develop into a complex CHMP if impacts to Aboriginal Places cannot be avoided in the design phase. The CHMP must be prepared in consultation with the First Peoples of the Millewa-Mallee Aboriginal Corporation and in accordance with the *Aboriginal Heritage Act 2006* (Victorian State Government 2006).

Abbreviations and Acronyms

ACHA	Aboriginal Cultural Heritage Assessment
ACHCRP	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
ACHRIS	Aboriginal Cultural Heritage Register and Information System
AHD	Australian Height Datum
AHIMS	Aboriginal heritage information management system
BTOG	Barkindji Traditional Owner Group
BMEET	Barkindji-Maraura Elders Environmental Team
Code of practice	Code of practice for Archaeological Investigation of Aboriginal Objects in NSW
CHMP	Cultural Heritage Management Plan
DECCW	Department of Environment, Climate Change and Water (NSW) (former)
DBAHC	Dareton Barkindji Aboriginal Heritage Corporation
EIA	Environmental Impact Assessment
EIS	Environmental impact statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPBC Act	<i>Environmental Protection and Biodiversity Act 1999</i> (Commonwealth)
ha	hectares
Jacobs	Jacobs Group (Australia) Pty Ltd
km	kilometre
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
mm	millimetre
NEM	National Electricity Market
NNTT	National Native Title Tribunal
NPW	<i>National Parks and Wildlife Act 1974</i> (NSW)
NPWS	National Parks and Wildlife Services
NSW	New South Wales
NVH&CAC	Nguku Victoria Heritage and Culture Aboriginal Corporation

OEH	Office of Environment and Heritage
PAD	Potential archaeological deposit
PEI	Preliminary Environmental Investigation
PAS	Potential archaeological sensitivity
RAP	Registered Aboriginal Party
SA	South Australia
SNI	South Australia NSW Interconnector
SSI	State Significant Infrastructure

1. Introduction

1.1 Background

TransGrid (New South Wales (NSW)) and ElectraNet (South Australia (SA)) have investigated interconnector and network support options aimed at reducing the cost of providing secure and reliable electricity transmission between NSW and SA in the near term, while facilitating the longer-term transition of the energy sector across the National Electricity Market (NEM) to low emission energy sources. The current preferred option involves constructing an interconnector of approximately 920 kilometres between the power grids of SA (starting at Robertstown) and NSW (finishing in Wagga Wagga), with an added connection to Victoria (Red Cliffs), known collectively as Project EnergyConnect.

Jacobs Group (Australia) Pty Limited was commissioned by TransGrid to provide a preliminary archaeological assessment report to inform a Preliminary Environmental Investigation (PEI) report for the design and construction of Project EnergyConnect (SA/NSW Border to Buronga) (the project), comprising a corridor of around 130 kilometres (km) of transmission line between the SA/NSW Border and Buronga and about 24 km of transmission line between Buronga and the existing Red Cliffs substation in Victoria. This preliminary archaeological assessment covers the known and potential Aboriginal heritage constraints for the project.

The project is proposed to be submitted as Critical State Significant Infrastructure under the EP&A Act and, as such, further environmental assessment will be required in accordance with Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The area assessed within this report comprises a project study area which had a width of 10 km (refer Figure 1.1).

In 2002, TransGrid commenced planning for a South Australia - New South Wales Interconnector (SNI), a high voltage transmission line which aimed to link New South Wales and South Australia electricity grids and the precursor to the current Project EnergyConnect. A number of studies were undertaken to inform the development of the SNI, including detailed Aboriginal heritage investigations. The study area which was allocated for this investigation mirrors the proposed Project EnergyConnect transmission line and all associated results are located within the 10 km buffer proposed in this report.

This report presents the results of the desktop review and initial Aboriginal community consultation for the project. It describes Aboriginal heritage constraints identified by the assessment and includes recommendations for further Aboriginal archaeological investigation.

1.2 Scope and Objectives

The scope of this preliminary archaeological assessment as follows:

- Comply with the legislative requirements, codes of practice and assessment procedures relevant to the project (see Section 2). This report has been prepared following the guidelines set out by the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (DECCW 2011) and the *Aboriginal Heritage Regulations 2018*.
- Conduct a desktop assessment of the study corridor, including a search of the Aboriginal Heritage Information Management System (AHIMS) and the Aboriginal Cultural Heritage Register and Information System (ACHRIS), to identify known Aboriginal heritage objects, sites and places within the study corridor and to identify areas of potential archaeological sensitivity (PAS) that will require further assessment
- Undertake preliminary consultation with Dareton Local Aboriginal Land Council (LALC), the Barkindji Native Title Group, the First Peoples of the Millewa-Mallee Aboriginal Corporation and any other identified Aboriginal stakeholder groups
- Provide conclusions and recommendations for any further archaeological assessment.

The purpose of this preliminary archaeological assessment report is to consider the impacts of constructing the project and to inform TransGrid of any potential Aboriginal cultural heritage constraints. This Aboriginal

archaeological assessment report follows the process outlined by the OEH *Due Diligence Code of Practice* (DECCW 2010b) and the *Aboriginal Heritage Regulation* 2018.

The aim of this report is to document the various stages of the desktop Aboriginal cultural heritage assessment of the project up to the archaeological site survey.

1.3 Study Area

For the purposes of this preliminary archaeological assessment report, the study area is defined as a 10 km corridor (5 km buffer on a nominal centerline) along the transmission line alignment and is used to provide broader context for some aspects (Figure 1.1).

The study area is the area used for databases searches and includes the alignment and a 25 km buffer either side. The project is located within the Wentworth Local Government Area (LGA).

TransGrid has previously examined a number of corridor options in this area as part of the South Australian – New South Wales Interconnector (SNI) Project, the precursor to Project EnergyConnect. These previous alignments are shown in Figure 1.1 for context. To avoid repetition of outcomes, a methodical review has been undertaken and is described below (Edmonds 1988; Edmonds 1999a; 1999b; Edmonds 1999c; Edmonds 2002c). Where practical and consistent, the results from the previous assessment have been used to inform the current assessment without the need to replicate survey and consultation already conducted.

1.4 Limitations

As noted above, this project is proposed to be submitted as Critical State Significant Infrastructure under the EP&A Act. Consequently, it has been assumed that permits under State heritage legislation, such as the *Heritage Act 1977* (NSW) and/or *National Parks & Wildlife Act 1974* (NSW) would not be required. In addition, it is noted that Aboriginal heritage legislation in NSW is undergoing reform. It is noted further that this legislation may be enacted prior to the completion of this project.

It should also be noted that while every effort has been made to quantify and assess the recorded and potential Aboriginal heritage within the study area, the large size of the study area has made detailed refinement difficult.

1.5 Authorship

This report was authored by:

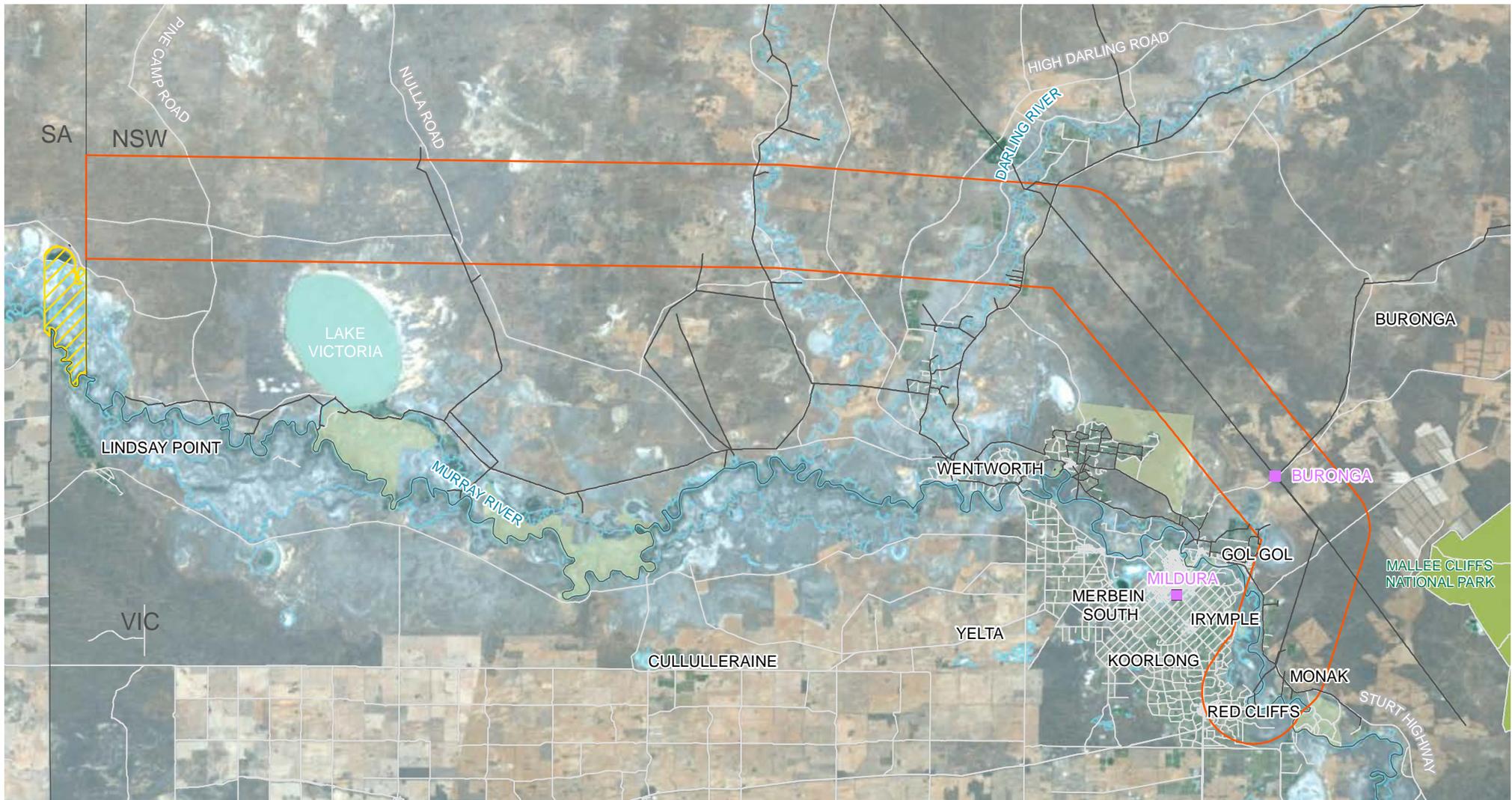
- Andrew Costello (Senior Archaeologist, Jacobs). Andrew holds a Bachelor of Arts with Honours in Archaeology from the University of Melbourne and has over 14 years' experience as a cultural heritage consultant and the appropriate qualifications for undertaking the investigation as required by the *Code of Practice* (DECCW 2010b)
- Alexandra Seifertova (Graduate Archaeologist, Jacobs). Alexandra holds a Bachelor of Arts (Honours) from the University of Sydney and has over one year of experience as an archaeologist.

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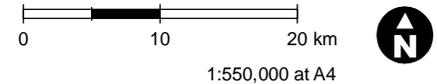
- Fiona Leslie, (Principal Heritage Consultant, Jacobs).

Mapping was prepared by:

- Kasia Dworniczak (Senior Spatial Consultant, Jacobs).



- Energy connect route (2019)
- RAMSAR wetlands
- NSW NPWS Reserves
- Parkland
- TransGrid substation
- Electricity transmission line



Data sources
 Jacobs 2018, AUDEE 2019
 NSW Spatial Services 2019

GDA94 MGA54

Figure 1-1 Locality and study area

2. Legislative Context

This legislative context contains a brief overview of applicable heritage law as relevant in NSW and Victoria. It is intended to be general in nature and for information purposes only. Any specific questions regarding the legislation, including its operation specific to a project and any potential legal ramifications to the client as a result of this general overview, should be addressed to a qualified legal practitioner.

The protection and administration of heritage in Australia is mainly legislated by the States. There is, however, a national heritage scheme as per the *Environment Protection and Biodiversity Act 1999* (EPBC Act) which governs heritage for World, National and Commonwealth heritage. This applies to both Aboriginal and non-Aboriginal heritage.

Commonwealth legislation:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- *EPBC Act*
- *Native Title Act 1993*.

In NSW, Aboriginal heritage, apart from being administered by the *National Parks and Wildlife Act 1974* (NPW Act), is also informed by the Acts which contain some heritage administrative function

NSW legislation:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *NPW Act*
- *Native Title Act (NSW) 1994*
- *Aboriginal Land Rights Act (NSW) 1983*.

Within Victoria, Aboriginal heritage is informed by the following legislation.

VIC legislation:

- *Aboriginal Heritage Act 2006*

These Acts and how their relevant sections and associated regulatory documents (e.g. codes of practice, regulations, guidelines, etc.) govern the Project are described in the tables below.

Table 2.1: Commonwealth legislation

Reference	Requirements
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	<p>Protects Aboriginal cultural property in a wider sense and includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'.</p> <p>The Act may apply to contemporary Aboriginal cultural property as well as ancient sites.</p> <p>The responsible Minister may make a declaration under s10 of the Act in situations where state or territory laws do not provide adequate protection of heritage places.</p>
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>The EPBC Act includes provisions to protect matters of national environmental significance and Commonwealth land. Lists and registers made under the Act include:</p> <ul style="list-style-type: none"> • A National Heritage List of places of national heritage significance • A Commonwealth Heritage List of heritage places owned or managed by the Commonwealth • Management of the Register of the National Estate.

Reference	Requirements
	An independent expert body, the Australian Heritage Council, advises the Minister on the listing and protection of heritage places.
<i>Native Title Act 1993</i>	<p>Recognises and protects native title and provides that native title cannot be extinguished contrary to the <i>Native Title Act 1993</i>. The National Native Title Tribunal (NNTT) is a Commonwealth Government agency set up under this Act and mediates native title claims under the direction of the Federal Court of Australia.</p> <p>NNTT maintains the following registers:</p> <ul style="list-style-type: none"> • National Native Title Register • Register of Native Title Claim • Unregistered claimant applications • Register of Aboriginal land use agreements. <p>The <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> (DECCW 2010a) stipulates that where relevant, consultation must be conducted with Native title holders or registered native title claimants in accordance with the <i>Native Title Act 1993</i>.</p>

Table 2.2: NSW legislation

Reference	Requirements
<i>Environmental Planning & Assessment Act 1979</i> (EP&A Act)	<p>This legislation provides the framework for environmental planning and assessment in NSW. This act includes the requirement for environmental impacts to be considered prior to development approval including:</p> <ul style="list-style-type: none"> • the requirement for impacts or likely impacts upon Aboriginal cultural heritage to be assessed as part of a project’s environmental approval • Local government areas prepare Local environment plans and development control plans in accordance with the EP&A Act to provide guidance on the level of environmental assessment required • Division 5.2 of the Act applies to state significant infrastructure. <p>The project is proposed to be assessed as critical State significant infrastructure and will requires environmental assessment in accordance with Division 5.2 of this Act.</p> <p>Under Division 5.2, Section 5.23, a range of approvals are not required, including Section 90 Aboriginal Heritage Impact Permit (AHIP). SEARs for the project have not yet been issued by the Secretary of the Department of Planning and Environment. For a Division 5.2 project, any investigative or other activities complying with the requirements are also taken to be part of the project approval.</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act)	<p>The NPW Act provides for the protection of Aboriginal objects and Aboriginal places. Under section 5 of the Act, an Aboriginal object is defined as:</p> <p><i>‘any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains’.</i></p> <p>An Aboriginal place is defined under the NPW Act as an area that has been declared by the Minister administering the NPW Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.</p> <p>Under s90 of the NPW Act it is an offence to knowingly destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of an Aboriginal object or Aboriginal place, without the prior written consent from the Director-General of the NSW Office of Environment and Heritage (OEH). Penalties apply to the offence of knowingly impacting on an Aboriginal object or Aboriginal place. The largest penalties apply when a person harms an object that they know to</p>

Reference	Requirements
	<p>be an Aboriginal object (called a 'knowing offence'). However, a 'strict liability' offence still applies whether or not a person knows it is an Aboriginal object or place.</p> <p>Under s89A of the NPW Act it is a requirement to notify the OEH Director-General of the location of an Aboriginal object. Identified Aboriginal items and sites are registered with NSW on the AHIMS.</p> <p>Procedures that accompany the <i>National Parks and Wildlife Amendment Act 2010</i> include the <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i> (DECCW 2010c), the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW 2010a), and the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW 2010b)</p> <p>SEARs for the project are yet to be issued but it is assumed that the Aboriginal heritage assessment "shall be undertaken generally consistent with the <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (DECCW 2011) and related guidelines and requirements."</p>
<p><i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i></p>	<p>This due diligence code of practice (DECCW 2010c) is to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they need further archaeological investigation. A Due Diligence Code of Practice has been developed to guide proponents on how to ensure a defence to the 'strict liability' offence of harm to an Aboriginal object or place. A proponent would be found not guilty of the offence if it can be proved that the proponent demonstrated due diligence in investigating the likelihood of impact to Aboriginal heritage by the proposed activity.</p> <p>This code sets out the reasonable and practicable steps which individuals and organisations need to take in order to:</p> <ul style="list-style-type: none"> • Identify whether or not Aboriginal objects are, or are likely to be, present in an area • Determine whether or not their activities are likely to harm Aboriginal objects (if present) • Determine whether an AHIP application is required. <p>Consultation with the Aboriginal community is not a formal requirement of the due diligence process. However, proponents may wish to consider undertaking consultation if it will assist in informing decision-making. If at any point an application is made for an AHIP then the consultation must be undertaken in accordance with the requirements in clause 180C of the National Parks and Wildlife Regulation 2009 (NPW Regulation).</p> <p>Due diligence amounts to taking reasonable and practicable steps to protect Aboriginal objects. The Due Diligence Code of Practice (DECCW 2010c) provides one process for satisfying the due diligence requirements of the NPW Act. It is not mandatory to follow this code. An individual or corporation can take other measures, provided that such measures are objectively reasonable and practicable and meet the ordinary meaning of exercising due diligence. Provisions relating to the due diligence system were effective from 1 October 2010.</p>
<p><i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (ACHCRP) 2010</p>	<p>The SEARs for the project are likely to require that Aboriginal heritage assessment 'shall be undertaken generally consistent with the <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (DECCW 2011) and related guidelines and requirements.'</p> <p>The ACHCRP establishes the requirements for consultation (under part 6 of the NPW Act) with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of proposed activities on Aboriginal objects and places. The report comprises four stages with associated timeframes which must be adhered to:</p> <ul style="list-style-type: none"> • Stage 1- Notification of project proposal and registration of interest (14 days from date letter sent to register as a registered Aboriginal stakeholders)

Reference	Requirements
	<ul style="list-style-type: none"> • Stage 2- Presentation of information about the proposed project (set up Aboriginal Focus Group (AFG) meetings, prepare info etc) • Stage 3- Gathering information about cultural significance (28 days for registered Aboriginal stakeholders to provide a review and feedback to consultants' methodology) • Stage 4- Review of draft cultural heritage assessment report (registered Aboriginal stakeholders have 28 days from sending of the report to make a submissions).
<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i>	<p>The SEARs for the project are likely to require that Aboriginal heritage assessment 'shall be undertaken generally consistent with the <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (DECCW 2011)) and related guidelines and requirements.'</p> <p>The code of practice (DECCW 2010b) sets out the detailed requirements for archaeological investigations of Aboriginal objects in NSW for activities that require assessment under Part 4 or Part 5 of the EP&A Act.</p> <p>An AHIP or SEARs to undertake sub-surface testing are not required if complying with this Code, as sub-surface testing complying with this Code is excluded from the definition of harm to an Aboriginal object. The Code sets out in detail:</p> <ul style="list-style-type: none"> • Minimum qualifications for anyone undertaking archaeological investigation under the Code in NSW • Assessment steps required to be undertaken for all archaeological investigation • Assessment steps that may be required to be undertaken to adequately characterise the Aboriginal objects being investigated.
<i>Native Title Act (NSW) 1994</i>	<p>The <i>Native Title Act (NSW) 1994</i> was introduced to ensure that the laws of NSW are consistent with the Commonwealth <i>Native Title Act 1993</i>.</p> <p>The <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW 2010a) stipulates that where relevant, consultation must be conducted with Native title holders or registered native title claimants in accordance with the NSW <i>Native Title Act (NSW) 1994</i>.</p>
<i>Aboriginal Land Rights Act (NSW) 1983</i>	<p>The <i>Aboriginal Land Rights Act (NSW) 1983</i> recognises the rights of Aboriginal people in NSW and provides a vehicle for the expression of self-determination and self-governance.</p> <p>The purposes of the Act are:</p> <ul style="list-style-type: none"> • To provide land rights for Aboriginal persons in NSW • To provide for representative Local Aboriginal Land Councils (LALCs) in NSW • To vest land in those LALCs • To provide for the acquisition of land, and the management of land and other assets and investments, by or for those LALCs and the allocation of funds to and by those LALCs • To provide for the provision of community benefit schemes by or on behalf of those LALCs.

Table 2.3: VIC Legislation

Reference	Requirements
<i>Aboriginal Heritage Act 2006</i>	The <i>Aboriginal Heritage Act 2006</i> provides protection for Aboriginal cultural heritage. Aboriginal cultural heritage is protected from harm and it is illegal to carry out an activity that can disturb Aboriginal places without the appropriate authorisation under the Act and the <i>Aboriginal Heritage Regulations 2007</i> .
<i>Aboriginal Heritage Regulations 2018</i> (Victorian State Government 2018)	Replacing the 2007 <i>Aboriginal Heritage Regulations</i> , the updated regulation give effect to the <i>Aboriginal Heritage Act 2006</i> . Standards and set out circumstances for

Reference	Requirements
	<p>Cultural Heritage Management Plans (CHMPS) are prepared along with fees and charges.</p> <p>The Regulations define high impact activities and areas of cultural heritage sensitivity. Where an area of high impact activity occurs within an area of cultural heritage sensitivity, a mandatory CHMP is required:</p> <ul style="list-style-type: none"> • High impact activity <ul style="list-style-type: none"> ○ r 46 (1b) (xxvii) (A) - the works are a linear project that is the construction of an overhead power line with a length exceeding one kilometre or for which more than 10 power poles are erected • Areas of cultural heritage sensitivity <ul style="list-style-type: none"> ○ r 32 - Parks and Nature Conservation Reserves ○ r 25 - Registered cultural heritage places ○ r 26 - Named waterway & water bodies.

3. Environmental Context

3.1 Climate and Vegetation

The study area is located within NSW and crosses into Victoria (VIC). The vast majority of the study area lies within the Murray Darling Depression which occupies southwest NSW, crosses into Victoria, South Australia, and spreads over 19,000,000 ha. It is bounded in the north by Broken Hill and the Murray River to the south.

The study area is bounded by four major water sources, the Murray River in the south, the Darling and Great Darling Anabranch River on the east, and in the west Lake Victoria. These water courses are shown in Figure 1.1.

Land tenure in the study area is predominantly Western Lands Lease with small areas of freehold property (e.g. Avoca Station). Land use within the study area is predominantly sheep grazing for wool and meat. There are also some cattle grazing and cereal cropping and there are limited areas of irrigation along the Darling River. Recreational use of the waterways and their banks in the study area is common (Edmonds 2002a)

Although more than half has been cleared, the banks of the Murray and the Darling consisted of Eucalypt forest of red gum and box. Predominant vegetation is open Acacia savanna with steppe grasses and succulent xerophytic chenopods (Allen 1974).

While intensive land use followed European settlement and resulted in the degradation of the natural environment in ways such as higher salinity levels, greater erosion, there has been no large-scale vegetation clearing of the land in western NSW. The introduction of goats and rabbits has destroyed much native flora and fauna (MDBC 2002) but consequently, Aboriginal site preservation is high in non-irrigated or cropped areas. Under cropped and/or irrigated conditions Aboriginal site preservation is variable.

3.2 Soil Profiles and Landscape

The Murray Darling Basin lies on Tertiary and Quaternary sediments. These are subsequently overlain with the Woorinen Formation which are formed from windblown sands, silts, and calcareous clays from Quaternary deposits, and the Coonambidgal formation which is comprised of alluvial deposits, and channel sands from the Holocene.

Geological maps on a 1:250,000 scale, provided by Geoscience Australia, demonstrate the various soil underlying the project area. Seven geological soil units and five land systems were identified within the study area. Table 3.1 presents a description of these land systems which has been summarised from the *Soil Conservation Service of NSW (SCS) Technical Report No. 25* (Soil Conservation Service of NSW 1991). The land systems and geological units present within the study area are summarised in Table 3.2 and shown in detail in the map series Figure 3.1.

The land systems described in Table 3.2 can be placed into four major geomorphic categories as follows;

- Sandplains - Belvedere, Bulgamurra, Hatfield, Menilta, Overnewton, Roo Roo, Trelega and Huntingfield
- Dunefields - Arumpo, Haythorpe, Mandleman and Marona
- Alluvial Plains - Anabranch, Canally, Darling and Leaghur
- Playas and Basins – Dalmoreve and Quamby

Table 3.1: Geological units underlying the study area

Soil Code	Systems	Description (Geoscience Australia)
Qa	Fluvial	Coonambidgal Formation and other alluvial deposits: unconsolidated, grey, brown, micaceous silty clays, silt, polymictic sand, gravel.
Qad	Fluvial	Unconsolidated, locally mobile pale orange, yellow quartz sand; locally with abundant micaceous and lithic grains.

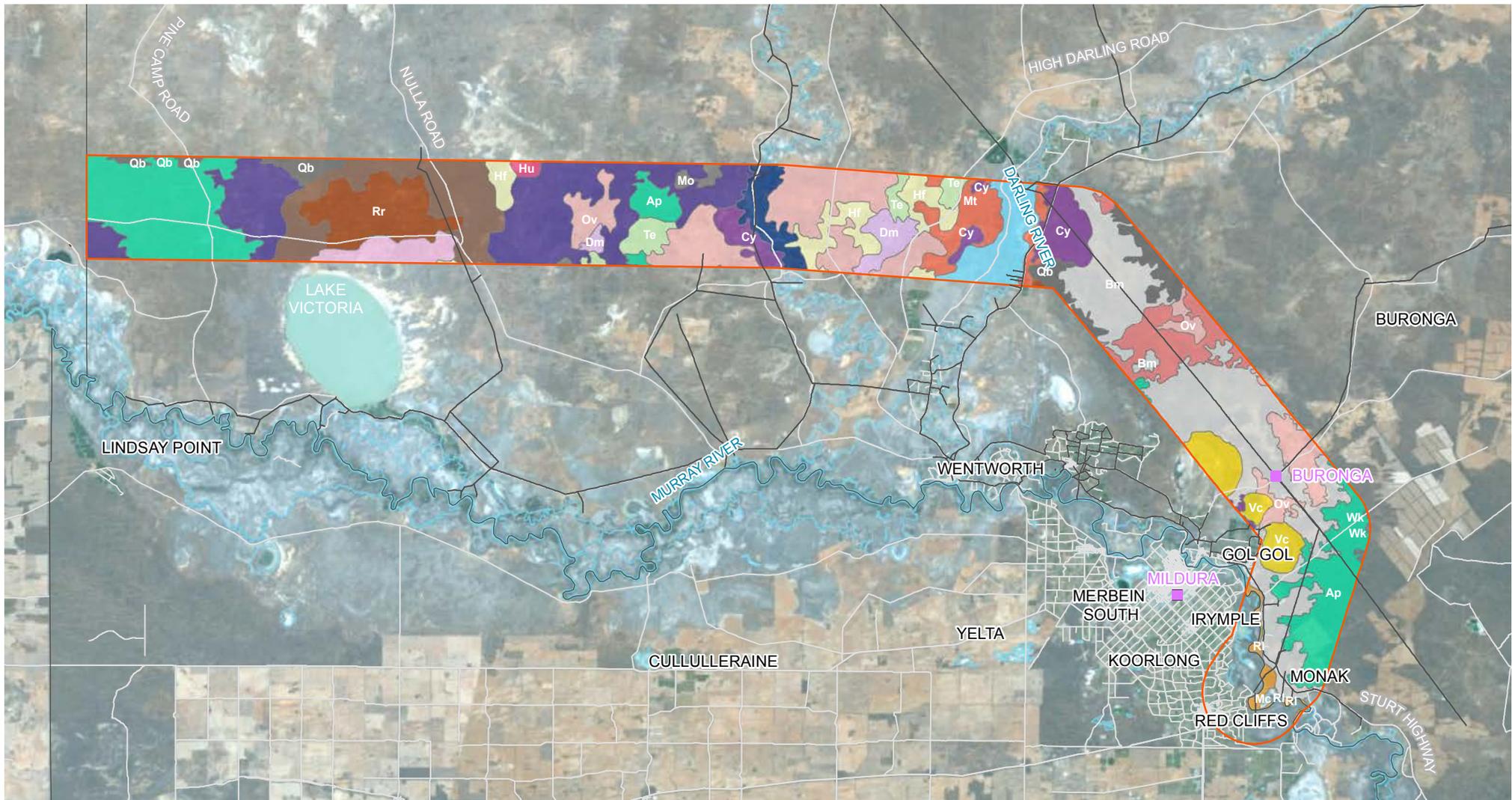
Soil Code	Systems	Description (Geoscience Australia)
Ql	Lacustrine	Friable to plastic finely laminated grey clay, silty clay, humic clay, grey palaeosols, locally with fine to medium sand; may include gypsite, gypsiferous clay and selenite crystals.
Qdl	Lacustrine	Undifferentiated lunettes. Poorly consolidated brown-red, yellow, grey quartz sand, silty clay, clay-pellet aggregates, gypsiferous clay pellets, pale grey gypsite (kopi; older components, increasingly modified by pedogenesis, intercalated with red calcareous and gypsiferous palaeosols with calcrete glaebules, rhizoliths; locally capped by white mobile well-sorted quartz sand.
Qdp	Aeolian	Unconsolidated red and brown clayey siliceous and clay-pellet aggregated admixed with loamy soils; sand component of medium to fine quartz grains with red clay cutans; modified by pedogenesis, forming iron- and carbonate-cemented nodules grading to calcrete hardpans.
Qly	Lacustrine	Yamba Formation and other undifferentiated saline lake deposits. Friable, pale grey gypsite, gypsiferous clay with selenite crystals, grey pelletal gypsum-quartz sand aggregates; locally with grey clay crystalline gypsum mush under black sulphide-rich mud with ephemeral salt crusts of gypsum, halite, thenardite, mirabilite; in places associated with mounds and sheets of quartz sand cemented by ferricrete, calcrete, and/or silcrete.
Qdw	Lacustrine	Woorinen Formation. Unconsolidated red-brown siliceous silty sand; red calcareous silty clay, sandy clay, clay-pellet aggregates; sand component of medium to fine quartz grains with red clay cutans admixed with humic debris and fragmented calcareous tap root and filamental rhizoliths; partly modified by pedogenesis, forming intercalated red calcareous palaeosols with gypsiferous and soft to resistant carbonate glaebule, grading to cemented calcrete hardpans with locally forms massive brecciated sheets.

Table 3.2: Soil profiles and land systems

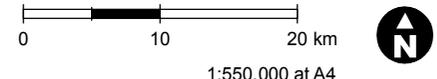
Land System	Symbol	Description
Geomorphic category: Sandplains		
Belvedere	Be	Undulating sandplain with broad, low, linear, east-west trending dunes and broad swales. The sandplain and swales comprise deep red earthy sands and solonized brown soils. The dunes are deep siliceous sands and calcareous red earths. Vegetation comprises clumped belah, rosewood and sugarwood, narrow-leaf hopbush and shrubs
Bulgamurra	Bm	Extensive undulating sandplain with areas of east-west trending dunes and rises and open flats with scattered swamps and depressions. The sandplain comprises solonized brown soils with clumps of belah, rosewood, scattered wilga and nelia. Dunes have deep brownish sands with white cypress pine or mallee and porcupine grass. Swamps and depressions comprise grey cracking clays with fringing black box.
Hatfield	Hf	Extensive undulating sandplains with east-west trending dunes and depressions. The plains comprise solonized brown soils, red and brown texture-contrast soils and red earths with deep brownish sands on the dunes and grey clays in the depressions. Vegetation comprises clumped rosewood and belah, dense bluebush and bladder saltbush on the plains, clumped white cypress pine, prickly wattle and bluebush on the dunes and nitre goosefoot, dillon bush and canegrass in the depressions.
Menilta	Mt	Undulating partially scalded sandplain with unstable dunes adjacent to the Darling River floodplain. There are depressions and swamps in the transitional zone between floodplain and sandplain. The sandplain is of loamy brown soils, siliceous sands and brown and red texturecontrast soils vegetated with scattered belah, rosewood and white cypress pine. There is black box around the depressions and scattered black bluebush, variable speargrass, burrs and forbs."
Overnewton	Ov	Extensive undulating open sandplains with loamy brown soils and dunes and rises of deep brownish sands. Vegetation comprises clumps of belah or rosewood, scattered bluebush and shrubs. The sandy rises have mallee and white cypress pine or nelia, grasses and forbs."

Land System	Symbol	Description
Roo Roo	Rr	Undulating sandplain with isolated rises and circular depressions. The latter are mainly restricted to the sloping margins of the Ana Branch lakes system. The sandplain comprises loamy red texture-contrast soils and brown solonized soils with grey cracking clays in the depressions and deep brownish and siliceous sands on the dunes and rises. There is scattered belah and rosewood, dense bluebush, grasses, burrs and forbs.
Trelega	Te	Sandplains with east-west trending dunes and associated flats and swales. Plains and swales with highly calcareous solonised brown soils and deep earthy sands have stands of dense belah scattered rosewood, wilga, dense bluebush and sense mallee and spinifex on dunes.
Huntingfield	Hu	Undulating sandplains with east-west trending dunes and depressions. Lunettes and dunes of deep sandy red earths, sandplains of scalded to sandy solonized brown soils. Sandy to loamy solonized brown soils in swales. Vegetation comprises clumped rosewood and belah, dense bluebush and bladder saltbush on the plains, clumped white cypress pine, prickly wattle and bluebush on the dunes and nitre goosefoot, dillon bush and canegrass in the depressions.
Geomorphic category: Dunefields		
Arumpo	Ap	Long, linear, east-west trending parallel dunes and sandplain with narrow swales and flats merging to level sandplains. The dunes comprise deep brownish and calcareous sands vegetated with dense mallee and porcupine grass. Swales have highly calcareous brown soils and texture-contrast soils with belah, rosewood and shrubs. The sandplains are brown solonized soils and calcareous red earths and grasses and forbs.
Haythorpe	Hy	Undulating sandplains with well developed linear, east-west trending dunes with narrow swales. Large lakes are often associated with the sandplains. The system comprises red sandy earths, calcareous red earths, sands and solonized brown soils with scattered belah, dense clumps of narrow-leaf and turpentine, black bluebush, speargrass, burrs and forbs.
Mandleman	Mm	Parabolic and unaligned dunes merging into sandplains. Dunes have deep siliceous and brownish sands while the plains and dune swales comprise solonized brown soils and red texture-contrast soils. Vegetation comprises dense mallee and porcupine grass, dense shrubs, grasses and burrs.
Marona		Quaternary dunefield of parabolic and unaligned dunes merging into slightly undulating sandplains, relief to 7m. Dunes and swales of deep red-brownish earthy sands with uniformly dense mallee (<i>Eucalyptus</i> sp.), and porcupine grass (<i>Triodia irritans</i>). Isolated flats of solonized brown soils with belah (<i>Casuarina cristata</i>) and rosewood (<i>Alectryon oleifolius</i>).
Geomorphic category: Alluvial Plains		
Anabranh	An	Ancestral channel of the Darling River comprising a floodplain of grey- fine textured alluvium, sinous perennial river channels, riverside swamps and billabongs, elevated plains and backplains and riverside lunettes. The plains comprise grey cracking clays with brown texture-contrast soils on levees and cemented sands on lunettes. There is scattered and clumped black box and river red gum among the channels. Lignum and nitre goosefoot occupy depressions. Prickly wattle, narrow-leaf hopbush and occasional bluebush occur on lunettes. There are abundant forbs and grasses over the system following flooding.
Canally	Cy	Alluvial flats and dunes adjacent to the Darling River. Partially eroded dunes comprise deep brownish sands while the flats and pans of the floodplains comprise grey cracking clays. Extensive aeolian backplains comprise red texture-contrast soils and solonized brown soils. There is black box, lignum and canegrass on the flats and black box, belah, mallee or prickly wattle on the dunes.
Darling	DI	Lower Darling River and its floodplain. Landforms comprise the floodplain, consisting of grey cracking and non-cracking clays; levees of brown and red texture-contrast soils and lunettes of deep, cemented siliceous and calcareous sands. There is sparse to moderate black box, river red gum and river cooba; stands of lignum, nitre goosefoot, canegrass and narrow-leaf hopbush as well as saltbush, burrs and forbs across the system.
Leaghur	Le	Large active freshwater lakes and swamps frequently flooded by the river, generally round or kidney shaped. Often nested within larger relic Quaternary lake features. Beaches, sand and clay pellet lunettes and sand hills on the eastern margins. Lake beds and associated channels of grey cracking

Land System	Symbol	Description
		clay, beaches of brown to white sands, lunettes of deep cemented yellow to white sands, with or without interbedded strata of pelleted clay. Relief of lakes and channels to 10m, lunettes to 20m. Scattered black box (<i>Eucalyptus largiflorens</i>), river red gum (<i>Eucalyptus camaldulensis</i>), nitre goosefoot (<i>Chenopodium nitriaceum</i>) and lignum (<i>Muehlenbeckia cunninghamii</i>) on lakebeds. Shallower swamps with cumbungi (<i>Typha orientalis</i>), common reed (<i>Phragmites australis</i>), spike rush (<i>Eleocharis</i> sp.) and water couch (<i>Paspalum paspalodes</i>). Numerous aquatic plants in standing water. Lunettes and sand hills with marginal river red gum, and stands of white cypress pine (<i>Callitris glaucophylla</i>), prickly wattle (<i>Acacia victoriae</i>), sandhill wattle (<i>Acacia ligulata</i>), bluebush (<i>Maireana</i> sp.) and grasses.
Geomorphic category: Playas and Basins		
Dalmoreve	Da	Remnant lakes adjacent to the Riverine Plain. Small sub-circular to irregular lake beds of compact or scalded clays and red texture-contrast soils with sandplains and lunettes of solonized brown soils, brown sands or red texture-contrast soils and solonized brown soils. There is a black box, lignum and canegrass on the flats and black box, belah, mallee or prickly wattle on the dunes.
Quamby	Qa	Small relict lakes and lunettes of Quaternary age with extensive associated sandplains and isolated dunes. Lunettes relief to 10m, dunes to 7m. Lake floors of highly saline, gypseous or calcareous grey clays. Lunettes and dunes of deep sandy red earths, copi rises with sandy red texture-contrast soils. Sandplain of scalded to sandy solonized brown soils. Lake beds with chenopods, canegrass (<i>Eragrostis australasica</i>) and forbs. Sandy soils with mallee (<i>Eucalyptus</i> sp.), and porcupine grass (<i>Triodia irritans</i>). Open mallee and chenopods on copi. Sandplains with belah (<i>Casuarina cristata</i>), rosewood (<i>Alectryon oleifolius</i>), sugarwood (<i>Myoporum platycarpum</i>) and mallee plus abundant grasses and forbs.



- | | | | | |
|-------------------------------|-----------------------------------|--------------|------------|-------------------|
| Energy connect route (2019) | Land system of Western NSW | Darling | Menilla | NSW NPWS Reserves |
| TransGrid substation | Anabranche | Hatfield | Overnewton | |
| Electricity transmission line | Arumpo | Haythorpe | Quambie | |
| | Belvedere | Huntingfield | Riverland | |
| | Bulgamurra | Leaghur | Roo Roo | |
| | Canally | Mandleman | Trelega | |
| | Dalmoreve | Marona | Victoria | |



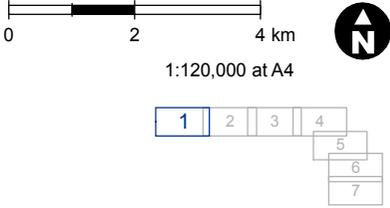
Data sources
 Jacobs 2018, OEH 2019,
 NSW Spatial Services 2019



Figure 3-1 Soils Overview

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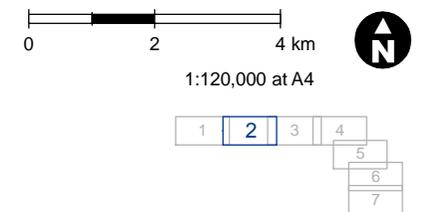
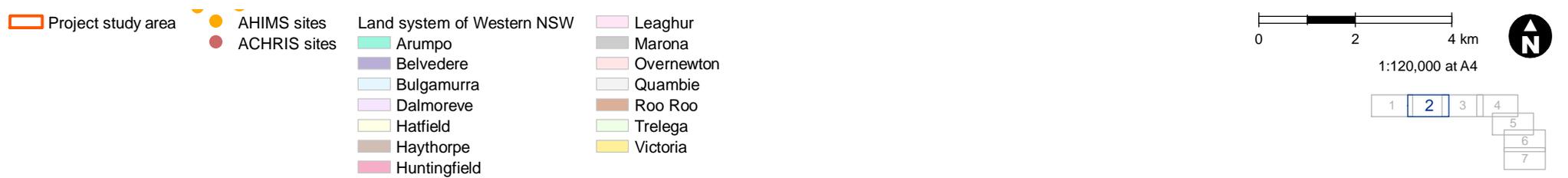
- Project study area
- AHIMS sites
- ACHRIS sites
- Land system of Western NSW
 - Leaghur
 - Arumpo
 - Belvedere
 - Bulgamurra
 - Haythorpe
 - Quambie
 - Riverland
 - Roo Roo
 - Victoria



Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-2 Map series showing land systems and incorporated soil profiles of Western NSW

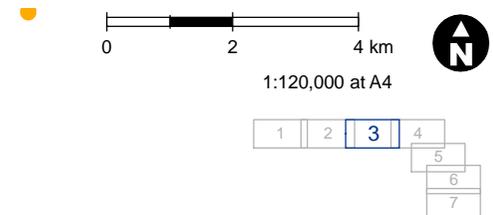
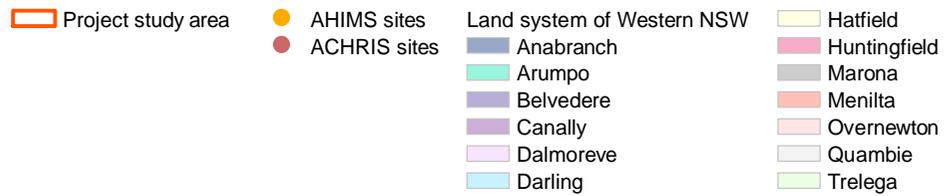
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Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-2 Map series showing land systems and incorporated soil profiles of Western NSW

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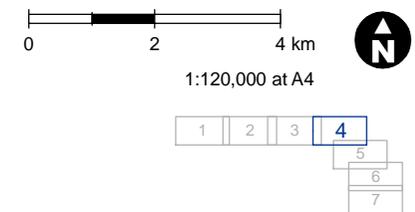
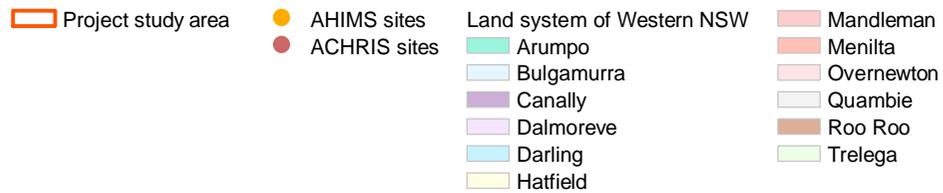


Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-3 Map series showing land systems and incorporated soil profiles of Western NSW

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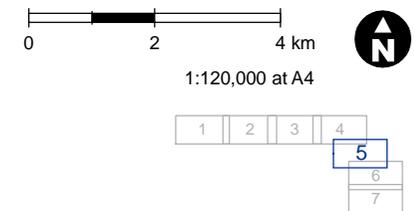


Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-4 Map series showing land systems and incorporated soil profiles of Western NSW

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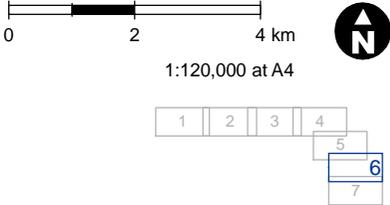


Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-5 Map series showing land systems and incorporated soil profiles of Western NSW

GDA94 MGA54

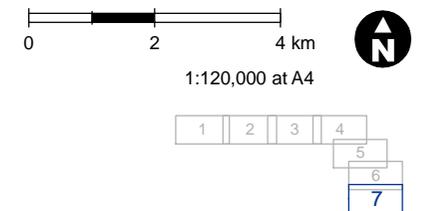
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Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-6 Map series showing land systems and incorporated soil profiles of Western NSW

Redacted for public display



Data sources
Jacobs 2018, OEH 2019, 2018, 1991,
NSW Spatial Services 2018

Figure 3-7 Map series showing land systems and incorporated soil profiles of Western NSW

GDA94 MGA54

4. Study Area Cultural Context

4.1 Historical

The first European to explore the area was Charles Stuart who, in 1829 and 1830, conducted an expedition of the Murrumbidgee and Murray Rivers. Following him in 1836 was Joseph Hawdon who drove cattle from Port Phillip to Adelaide and crossed the Murray at the junction with the Darling River. Some of the first accounts relating to the Aboriginal People of the Darling River catchment come from Hawdon who described Aboriginal people as living in and around the junction (Craib 1992). By the middle of the nineteenth century river boats began navigating up the Murray to Adelaide, resulting in settlement of Wentworth in 1840 and subsequently providing greater access for the area and the arrival of new settlers (Craib 1992).

Although ethnographic accounts exist within the region they are substantially lacking and only provide glimpses into the life of Aboriginal people during this historical period. Curr (1883, p. 85) provides a description of male Aboriginals he observed along the Goulburn River, stating that

'[They were] muscular active men, two out of three being about 5"9. They wore possum skin cloaks and had necklaces of small reeds hung on twine made from wild flax. They had kangaroo skin bags used to carry shields, waddies and utensils and carried their spears and throwing sticks in their hands.'

Many Barkindji people lived on the Mallara Station which was held by Charles Barritt. Mallara and Tarcoola stations had 640 acres set aside to allow for an Aboriginal mission which remained in operation until 1933 when it closed (Cupper 2007) (Lans *et al.* 1988).

There are two homesteads registered on the NSW Heritage database, both located in the Wentworth Shire Council region. Windamingle Homestead is located on the bank of the Great Anabranche of the Darling River and constructed in 1913. Carstairs Homestead was constructed in 1910 and is located adjacent to the Darling River. Unlike the Windamingle Homestead which is constructed from native pine slabs, Carstairs is built from local sandstone (Wentworth Shire Council 2019).

4.2 Aboriginal Context

Outside of the study area, there is evidence of regional occupation from 45,000 years ago, with Lake Victoria showing occupation dates from 21,000 years ago (Balme and Hope 1990; Cupper and Duncan 2006). Sites related to Lake Victoria include burial mounds, artefact scatters and middens. Surface finds are commonly associated with the last 5,000 years.

One such area which contains burial sites is Sturts Billabong which is located approximately 30 km north of the Murray–Darling junction on the Darling River and located a km inside the northern boundary extent of the proposed study area. The dune system present within the area has had over 36 burials recorded. These include four semi-intact burials, two cremations, two possible cremations and 28 scatters of human bone fragments (Littleton 2000:7). All these burials have been subjected to a variety of erosion process, predominantly wind and water.

Around the vicinity of Lake Victoria there are at least seven known burials. Lake Victoria is believed to be a place where spirits of the dead transform into their totemic form to follow Nurelli (the All-father) into the sky. This belief has meant that Lake Victoria is believed by some to contain over 15,000 burials.

The central group of Aboriginal people living along the river now known as the Darling, called it the Barka, hence the origins of the name Barkindji, a term now used to refer to the cluster of related tribes sharing a common language (Paakantyi) and living along the lower reaches of the Darling (Hardy 1976).

According to Tindale (1974), two Paakantyi speaking tribes occupied the study area. These were the Kureinji and the Maraura. The Kureinji tribe occupied the Murray River between Euston and Wentworth. Very little is known about this group of people. The Maraura were located along the Murray River between Wentworth and Paringa

(South Australia), along the western side of the Darling and from Avoca northwest to Popiltah Lake (Tindale 1974) see also Withers (Withers 1989).

4.3 Social Organisation and Language

The Lower Darling at the time of European contact was occupied by the Aboriginal people of the Barkindji language group. This language group is comprised by people who spoke the sub-dialects Barindji, Barkindji, Danggali, Maraura and Wiljakali (Allen 1974).

The Barkindji, specifically a tribe known as the Maraura occupied an area extending along the Murray River from Wentworth to Paringa, and along the western side of the Darling River Anabranh north to Avoca, and along the Darling River to Popilta Lake (Tindale 1974, p. 130, 196).

4.4 Subsistence

The subsistence of the Barkindji was based on riverine resources which included fish, shellfish, waterfowl, freshwater crustaceans, and aquatic plants.

Booney (cited in Allen 1972 : Appendix 1:12) described a hunt: *'The hunters beginning at one end of the ridge drive the wallabies by shouts and noises to where the net is placed... the wallabies run at the net formed as a snare and are then killed... after beating one length, the net is moved further down the ridge and another length is beaten'*.

A variety of fauna were eaten by the local Aboriginal groups, such as dingoes. Birds were also often captured using nets or by grabbing them and pulling them underwater. Gerard Krefft (Krefft 1866) describes one such duck catching scene *'A large net, sometimes 20' deep by 100' long, is spanned across a creek or river, the two ends to which a string is fastened, resting upon some branch of a tree... as soon as they [the birds] are nearing the net another native...gives a peculiar whistle... the net is raised, the ducks taken in this manner at a haul'*. As the Barkindji were riverine based fishing and shellfish collecting was one of the major subsistence activities.

4.5 Tools, Weapons, and Shelter

Both archaeological and ethnographic work allows for an understanding of how the local Aboriginal groups lived and manufactured tools and weapons.

In relation to settlement Kefous (1988) states that Aboriginal people occupied 'a narrow riverine corridor' around the junction of the Murray and Darling rivers. Interestingly Sturt (1833): 196) observed that although the Europeans closely followed the river, the Aboriginals did not as:

'it would...appear that the tribes do not generally frequent the river. They must have a better country back from it, and most probably linger amongst the lagoons and creeks where food is more abundant. The fact is evident from the want of huts upon the banks of the Murray and the narrowness of the paths along its margin'.

In relation to tools, the main object used were spears made from strong reeds and wood. These spears came in a variety of sizes and were used for hunting both marine and land animals. For fishing, spears were typically 1.5 metres long, with land spears being as long as 2.5 metres (Craib 1992). Mesh netting was also constructed for fishing. It was noted by Edward Eyre that nets were constructed from common rush (*Juncus sp.*) which was cut, scraped out with a shell, soaked and then twisted into a thin cord (Bonhomme *et al.* 2001). Hunting spears were also utilised as weapons, as well as wooden clubs, within shields constructed from bark used for ritualised fighting (Craib 1992).

5. Initial Consultation

For the purposes of this preliminary archaeological assessment report, only initial consultation involving phone calls, emails and informal meetings, has been undertaken to date. To avoid repetition of outcomes, a methodical review of the previous assessment undertaken by Archaeological Consulting Services for the South Australian – New South Wales Interconnector (SNI) Project, the precursor to Project EnergyConnect, has been undertaken and is described below (Edmonds 1988; Edmonds 1999a; 1999b; Edmonds 1999c; Edmonds 2002c). Where practical and consistent, the results from the previous assessment have been used to inform the current assessment without the need to replicate survey and consultation already conducted.

A summary of consultation undertaken by Edmonds is presented below. Formal consultation for the SNI was undertaken with the Dareton Local Aboriginal Land Council (DLALC) and the Barkindji people (Edmonds 2002). Other notable groups within the community that were consulted were the Lake Victoria Elders, Dareton Barkindji Aboriginal Heritage Corporation (DBAHC), Nguku Victoria Heritage and Culture Aboriginal Corporation (NVH&CAC) and the Mitchell family. There is some duplication of membership in these groups.

Preliminary consultation for Project EnergyConnect commenced on 21 February 2019, with initial contact being made with various Government and non-Government stakeholders including the Barkindji Traditional Owner Group (BTOG), Dareton LALC, the Barkindji-Maraura Elders Environmental Team (BMEET) and the Western Local Land Services. Follow-up contact was established with these local stakeholders via telephone and in person on 3 and 4 April 2019. In all cases the meetings were focussed on high level project objectives, relationship building and the timing for corridor refinement and the archaeological survey.

It is recommended by this assessment that formal consultation to establish Registered Aboriginal Parties (RAP) for the project be undertaken as soon as practicable. This consultation process has commenced and follows the ACHCRP (DECCW).

6. Archaeological Content

6.1 Previous Archaeological Investigations

Edmonds (2002a)

This archaeological report was the original survey and assessment of the preferred corridor undertaken to support the SNI. The field survey comprised 146 pedestrian and vehicular survey transects of the 150 m wide easement were conducted along the proposed alignment centreline (Figure 6.1). The field survey recorded 80 Aboriginal archaeological sites, many of which contained multiple features. These site complexes breakdown into the following: 31 shell middens, 28 scarred trees, 23 campsites - 8 with a midden component, 8 isolated hearths and 4 hearth complexes, 4+ burials and 6 isolated stone artefacts.

These recorded sites, as a reflection of the semi-arid nature of the landscape, were all situated in proximity to water source (i.e. rivers, lakebeds, claypans, swamps etc.). Edmonds (2002) categorised the landscapes of the study area and assigned general sensitivity and significance designations for each based on site distributions Table 6.1).

Table 6.1: Summary of site types, numbers per land system and archaeological sensitivity along the original SNI corridor

Land System	No. of Sites	Site Types	Archaeological Sensitivity along the Transmission Line Corridor
Anabranche	4	Open campsites, scarred tree, shell middens, isolated hearths	High
Arumpo	12	Open campsites, shell middens, isolated hearths	Moderate
Belvedere	33	Open campsites, scarred tree, hearths, shell middens, isolated artefacts	High
Bulgammurra	4	Open campsites, isolated hearths, isolated artefacts	Low
Canally	19	Open campsites, scarred tree, isolated artefacts, hearths, isolated hearths	High
Darling	11	Open campsites, scarred tree, shell middens, isolated artefacts, hearths	High*
Dalmoreve	2	Open campsite, isolated artefact	Low
Hatfield	0		Low
Haythorpe	1	Open campsites, scarred tree, shell midden	Low
Mallee Dunefield (Vic)	0		Low
Mandleman	0		Low
Menilta	10	Open campsites, scarred tree, isolated artefacts, hearths, burials	Moderate
Overnewton	4	Open campsites, scarred tree, hearths	Low
Riverland	20	Open campsites, scarred tree, hearths, shell middens, isolated artefacts	High
Riverine Plain	2	Surface scatters, shell middens	Low
Roo Roo	8	Open Campsites, shell middens	Moderate
Trelega	0		Low

The land systems described as having high archaeological sensitivity reflected the greatest challenge to avoiding impacts to Aboriginal heritage during the project. The land systems with high archaeological sensitivity are described below from east to west:

- Canally land system east of the Darling River
- Darling River corridor (Darling land system) particularly along the banks and terraces
- Margins of the Menilta and Darling land systems (east and west)
- Margins of the Overnewton and Anabranche (eastern margin) land systems
- Anabranche land system particularly along edges of cliffs (riverside lunettes) and terraces
- Margins of Belvedere and Canally land systems where they are adjacent to the Anabranche
- Haythorpe and Roo Roo land systems within 5 km of Lake Victoria
- Menilta land system adjacent to the Riverland land system
- Riverland land system particularly along channel banks
- Riverine Plain land system along channel banks and along the Mallee Dunefield interface.

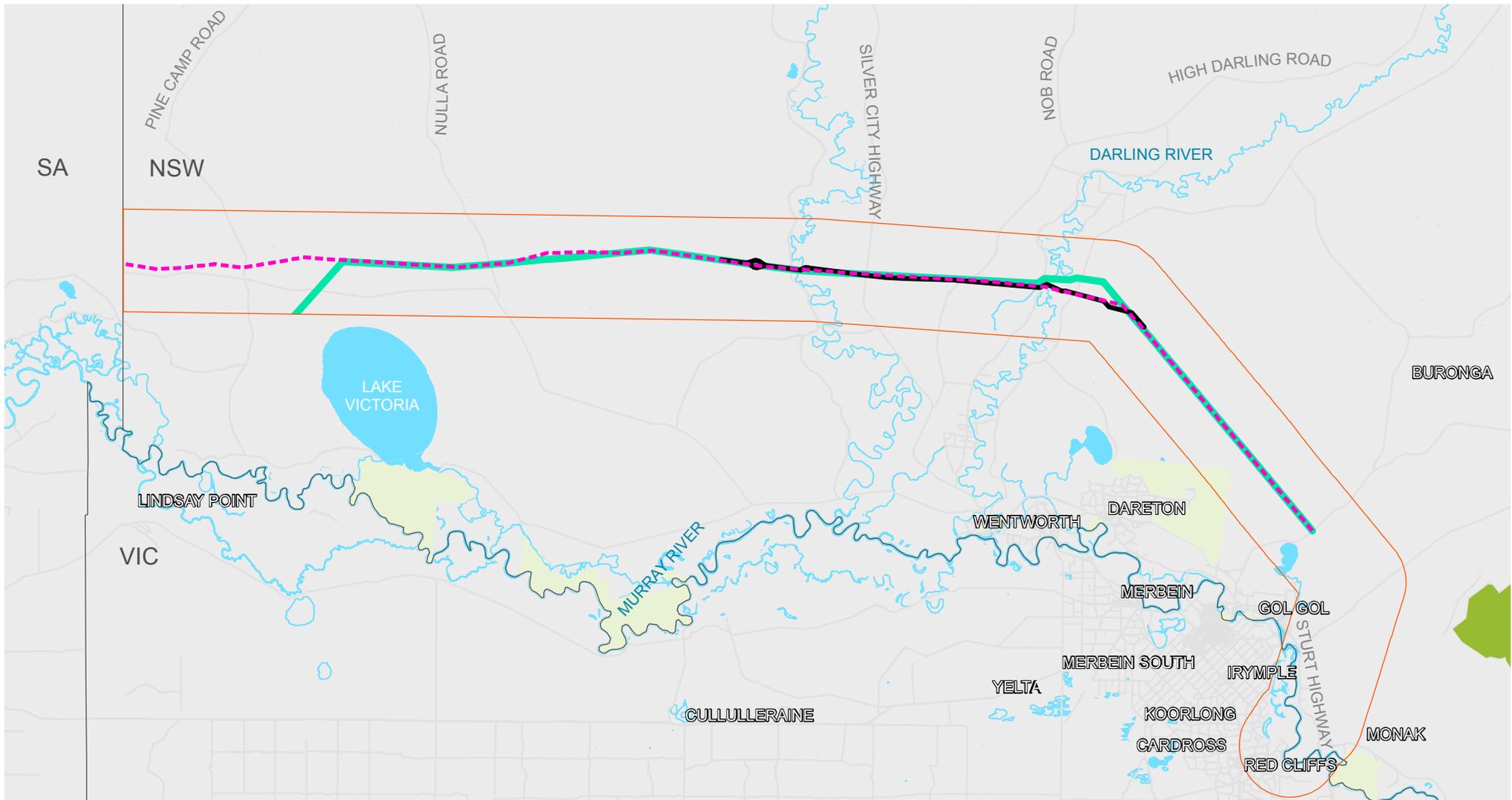
The remaining land systems contain sites which are generally highly localised around relic and ephemeral water sources and it should be possible, using the site gazetteer in conjunction with the aerial photos, to locate transmission towers away from identified archaeological sites in less archaeologically sensitive landforms FA(Edmonds 1999a; 2002b).

Edmonds (2002c)

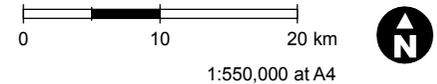
This archaeological assessment report was undertaken to support the SNI project, the precursor to the current EnergyConnect project (Figure 6.1). The study area which was allocated for this investigation mirrors the proposed EnergyConnect transmission line and all associated results are located within the 10 km buffer proposed.

In order to develop the SNI project, the proponent, TransGrid, requested an Environmental Impact Statement to be undertaken in early 2002. After the completion of a cultural heritage assessment of the preferred corridor (Edmonds 2002a), TransGrid proposed some minor re-alignments to the transmission line route in three main areas (East of Darling, West of Darling and West of Anabranche) and a further heritage assessment was conducted of these areas. For this reason, the aims of this new report were to undertake a cultural heritage assessment of the transmission route re-alignment and to study the area close to the Darling River as there was a gap in the existing knowledge of its cultural heritage value.

To establish the cultural heritage values of the area, a field survey was performed within a 50 m wide easement along the proposed route re-alignment centreline. Along and adjacent to the route re-alignment the total survey coverage reached approximately 86ha but after accounting the ground surface visibility and vegetation cover it was reduced to approximately 28ha (around 36%). Along the route of the re-alignment, the field survey recorded the presence of 13 new Aboriginal archaeological sites, cultural modified trees, an open campsite, isolated hearths, hearths complexes and isolated stone artefacts. Previously recorded archaeological sites were identified adjacent or close to the re-alignment, and approximately 20 indigenous archaeological sites located within 100 m of the re-alignment route. These recorded sites, as a reflection of the semi-arid nature of the landscape, were all situated in proximity to water source (i.e. rivers, lakebeds, claypans, swamps etc.).



- Project study area
- Alignment from January 2001
- Alignment from March 2002
- Alignment from November 2002
- NSW NPWS Reserves



Data sources
 Jacobs 2018, OEH 2018 and 2019,
 NSW Spatial Services 2018



Figure 6.1 Current project study area and previous SNI alignments

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Niche (2017)

This archaeological assessment was undertaken to support an Aboriginal Heritage Impact Permit (AHIP) application in relation to a proposed water supply pipeline between Wentworth and Broken Hill, NSW. In relation to Project EnergyConnect (SA/NSW Border to Buronga), this investigation intersects the proposed study corridor for 12 km (N to S orientation) as it follows the Silver City Highway as it travels from Wentworth. The 2017 investigation followed a 270 km stretch of the Silver City Highway and resulted in the investigation of previously unsurveyed land. Areas 10-20 m on either side of the proposed impact pipeline footprint were surveyed, along with several transects on the eastern side of the road reserve. Survey methods included surface and subsurface investigation, along with the development of an archaeological sensitivity map which assisted in the ability to map, visualise and predict surface and subsurface archaeological deposits.

Zones which were highlighted as most sensitive to archaeological finds were landforms such as bordering dunes, lunettes, sand hills, alluvial terraces and dunes located within 600 m of a main water source, as well as areas previously mapped as having surface finds, stone sources were likely and were located within 80-1000 m of mapped drainage networks. Results from this assessment resulted in the location of 240 new Aboriginal sites, 107 of these were sites with stone artefacts, 20 hearth sites, with the rest recorded as stone artefact and hearth; hearth, non-human bone, PAD and shell, PAD sites; stone artefacts with shell; culturally modified tree; shell; and hearth with shell sites. Though there were no associated dates with any finds it has been anticipated that these finds date to the last 5,000 years, though older dates are possible due to the presence of the Woorinen and Lowan Sand Formation. Analysis of finds also demonstrates that surface finds will occur to a depth of 150 mm while subsurface finds will be >150 mm in depth.

GHD (2013)

A monitoring and salvage report was prepared following the grading of a fence line at Nulla Nulla Station in order to prevent harm to Aboriginal archaeological objects during construction. The salvage was located on the north-east border of Lake Victoria and is outside of the southern Project EnergyConnect (SA/NSW Border to Buronga) study area boundary. A result of this report was the salvage of 15 previously recorded archaeological sites and the discovery of nine new sites. Of the newly discovered sites, the dominant artefact type was flaked stone tools, with other artefacts including grinding dish fragments, uni-facial choppers, tool blanks, manuports, and hammer stones.

Johnston (2011)

In 2010, the then Department of Environment, Climate Change and Water (DECCW) received a report from Mr Jay Harmans about uncovered Aboriginal remains in his driveway at Potters Drive (Gol Gol) which were probably exposed by the recent rains. DECCW commissioned Johnston (2011) to do further investigations and to prepare a report on the findings. An inspection on the reported area, located 2.5 km outside of the Project EnergyConnect (SA/NSW Border to Buronga) study area, revealed a large number of remains at various locations in and near the driveway and three located in an adjacent area south of Potters Drive. The burials at Potters Drive were located on the western margin of Gol Gol Swamp, on the north bank of Gol Gol Creek and where the creek enters the swamp.

Previous to this discovery, the driveway was dug by the house-owner who found a complete skull cemented in very firm calcareous sediment. As suggested by the DECCW Aboriginal Cultural Heritage Office, various methods of remediation were set in place, including the placement of fine grave sediment over the driveway to arrest the surface erosion and to protect the burials, and sealing with bitumen the roadside cuttings. The cranium that was excavated was returned to its original location and reburied by the DECCW before the remediation works took place.

A detailed survey of the area was made using a Sokkia SET2010 EDM and a random grid datum of 100E/100N/100Z. Most of the Aboriginal burials were recorded in or near the Harman's driveway in a firmly cemented calcareous sand and approximately 30-60 cm below the natural ground surface. On the base of this survey were recovered from the Potters Drive area at least nine in-situ individual burials and other nine locations showed surface bones which were either not in-situ or too fragmented and small to be adequately analysed. The

investigation revealed also the presence of a scatter of stone artefacts, burnt clay and a shell midden with increasing density towards Gol Gol Creek.

Landskape (2009a)

This report investigated the Aboriginal cultural heritage threatened by the proposed drilling program of the Gol Gol lake. The work proposed to drill up to fifteen groundwater observation bores inside the lake to understand the groundwater flow rates and patterns at the lake. Within approximately 2 km of the proposed bores there have been identified 19 Aboriginal archaeological sites. At the proposed bore location, instead, there were three previously recorded archaeological sites which were open site complexes containing middle shell, stone artefacts, hearths, hearthstones, shells and mounds. In one of these sites there were also culturally modified trees and a single human burial. Survey methods included pedestrian investigations of an area within 50 m of each of the proposed groundwater bores. This investigation and the archaeological sites recorded as a result are located within Project EnergyConnect (SA/NSW Border to Buronga) study area on the north eastern side.

Landskape (2009b)

The 2009 Gol Gol Lake Rehabilitation Scheme report re-examined part of an area previously examined by Craib (1992). The area investigated by Landskape (2009b) is located within the Project EnergyConnect (SA/NSW Border to Buronga) study area on the north eastern side. Within their investigation, two previously recorded sites were identified, and then two additional sites were located which contained shell middens, stone artefacts, hearths and modified trees, and in one site a human burial. The report re-emphasised the importance the region has to the local Aboriginal people and demonstrated the strong presence of archaeological material.

Time Capsule Earth (2009)

In 2008 an archaeological surface assessment was performed on a residential block in Murray Street (Gol Gol, NSW) to satisfy the requirements for a development application in this area. An area of two acres was subject to an archaeological survey. This site is located outside the Project EnergyConnect (SA/NSW Border to Buronga) study area. Within this site, the fieldwork discovered a sparse scatter of fragmented freshwater mussel shell occurred on flood zone (lot 2) and no other form of archaeological remains. Considering the scarcity of these findings, this report conclude that the shell accumulation is not archaeologically significant.

Landskape (2008)

This report was prepared to inform the proposed removal of block dams and other structures along the Darling Anabranh stream course. The report identified 23 previously recorded archaeological sites, and an additional 19 sites were recorded. These new sites consisted of a scatter of silcrete, chert, and quartz flakes, scattered baked clay heat retainers and some fragments of freshwater mussel shell. Some of the identified sites within the report (2008) are located inside the Project EnergyConnect (SA/NSW Border to Buronga) study area, on the banks of the Darling Anabranh.

Time Capsule Earth (2007a)

This report examined the proposed conservation reserve fence line located within Noola Station. The area examined bounded the western edge of Lake Victoria and outside of the EnergyConnect study area. Over 82 previously recorded archaeological sites have been found in the Noola Station. In 2007, 13 new sites were recorded, with most of them located on sandy ridges. The newly recorded sites were hearths, artefact scatters, midden and two isolated finds.

Time Capsule Earth (2007b)

This initial archaeological and cultural heritage assessment investigated an area of approximately 10ha for a proposed residential subdivision located within the property of R & G Panuccio (Lots 1-5,39-41 and 64), Parish of Gol Gol and County of Wentworth. The surveyed area was a vineyard bounded to the south by the River Murray, to east and west by residential estates and to north by the Sturt Highway. This area is located outside the EnergyConnect study area. In the proposed development area, an extensive shell midden was previously recorded, and no new archaeological occurrence was detected during this archaeological survey. The previously

recorded shell midden constitutes an extensive scatter (area approx. 40x200m) of shell fragments which could be part of a large shell midden or several smaller middens. According to the author of this report, the fragmented and disperse characteristic of this shell midden could be the result of intensive and prolonged ploughing of this area. Furthermore, it is likely that the midden was located towards the southwestern end of the scatter consequently to the highest concentration of shell fragments in this area.

Cupper (2001)

This report examined an area 21 km north of Wentworth and was prepared to inform the planned installation of an irrigation infrastructure in the region, and the planting of vines. An archaeological survey resulted in the identification of 10 new archaeological sites including hearths, camp sites, scarred trees, freshwater midden campsite and isolated finds. These sites are located within the study area for EnergyConnect.

Lance (1993)

In 1993 the NSW Works Departments wanted to replace the existing water facilities to improve the freshwater supplies to the towns of Buronga, Gol Gol and Dareton along the Murray River. The preliminary archaeological study of this area revealed the dense presence of shell middens on the high cliffed bank of the Murray River near Gol Gol. The aim of this report was to determine the distribution and significance of two Aboriginal archaeological sites in the area proposed for the development of the new water facilities.

The first shell midden was located near the proposed pumping station area and this archaeological site was found to have been severely damaged by previous activities. Probe testing revealed the presence of some intact deposits and sub-surface testing allowed to find some intact deposits which contained faunal remains, mostly mussel shell, and small numbers of stone artefacts. The second shell midden was an extensive site found on the river bank in Gol Gol township, along the proposed route of the water supply pipeline. This archaeological site revealed occupation deposits with dense scattered shell found to depths of 80 cm below the ground level. Deep shell midden sites are rare in the Central Murray Region and because of its rarity this second midden is of scientific importance. Scarce presence of stone artefacts was recorded in the study area. The archaeological sites recorded from this assessment are located outside of the study area for EnergyConnect.

Craib (1992)

This report was prepared for the National Parks and Wildlife Service (NPWS). The main aim of the study was to examine and clarify the relationship between the environment and the archaeological record within the of the Gol Gol Forest. The whole study area roughly encompassed 800 square km and included the towns of Wentworth, Dareton, Buronga, Gol Gol, Trentham Cliffs, and Monak. The investigation resulted in the identification of 87 Aboriginal sites within the region and aided in the formation of site distribution predictions within the area of Project EnergyConnect (SA/NSW Border to Buronga).

Gaffey (1991)

The 1991 report examined a section of land between Mildura and Wentworth, located within the EnergyConnect study area. Although only one artefact was located through the 1991 archaeological survey, this report provides a re-examination on three well known and identified middens in the area: the Dareton midden, the Tuckers Creek 2 midden, and old Wentworth Road. All three middens were impacted in some capacity by the installation of an optical fibre cable which was to be laid. However, these affected areas have been previously disturbed and are well represented in other sections of the midden.

Bonhomme (1987)

Bonhomme's report on Aboriginal Burials within the Riverine Plain region provides an in-depth knowledge on the burials found in the area and recurring patterns in relation to burial sites. The report was prepared in response to the high level of destruction and disturbance that was occurring in sand quarries which are in high demand by construction companies. This report aimed to examine the location and distribution of Aboriginal burial sites in sand dunes in the Riverine Plain in order to prevent future burials from being destroyed and disturbed. Based on the results of the assessment, Bonhomme concludes by stating that burials will more likely be found in lunettes

and lunette fragments, source bouldering dunes, modern river bank leaves, prior streams levees and channels, alluvial fan remnant, sandplain remnants and reworked dune sets. The analysis and information relating to burials in the Riverine Plain can be applicable to the south-east corner of the EnergyConnect study area.

6.2 Summary

The background archaeology for the study region has been comprehensively reviewed. The following points summarise the findings of previous archaeological surveys in the study region:

- River and creek margins are highly sensitive and possess extensive linear deposits of midden and possibly burials, as well as scarred trees and hearths
- Most of the sites in the study area are situated adjacent to a water source that is, rivers and creeks, relict lakebeds, depressions, claypans, swamps and scalds
- Source bordering dunes, lunettes and sand dunes located near water sources are highly sensitive landforms and nearly always contain burials and campsites
- Slightly elevated box plains are moderately sensitive where these occur near ephemeral water sources but sites/relics are sparsely distributed
- Low lying floodplain/wetlands are of low archaeological sensitivity but scarred trees may be found there
- The sandplain where it abuts the floodplain is likely to be highly sensitive particularly if there are high cliffs or embankments present
- Dune crests within several kilometres radius of Lake Victoria are sensitive and usually contain shell middens.

7. Desktop Assessment and Predictive Model

This desktop assessment aimed to:

- Identify any known Aboriginal heritage sites, objects or Aboriginal cultural places with potential to be impacted by the project
- Identify areas within the study area where there is potential for previously unknown Aboriginal heritage sites which could be impacted by the project.

7.1 Methodology

To complete the desktop assessment, the heritage and spatial data relating to the project was collated. This included:

- A search of the AHIMS register
- A search of the ACHRIS register
- Use of spatial mapping to plot these sites in relation to the study area corridor
- Use of spatial mapping to input soil and landform data to help inform predictive modelling.

Inputting soil and landform information allows site types to be predicted based on an examination of Edmonds (2002a) archaeological assessment of the original SNI alignment. This assessment, as shown in Table 7.1, provides information relating to landform and site types within the study area. These observations allow for previously unknown Aboriginal heritage to be predicted.

7.2 Aboriginal Heritage Information Management Systems (AHIMS)

A search of Aboriginal objects, sites and places registered on the AHIMS within the study area was obtained on 9 November 2018 by Sean Brennan (Graduate Environmental Scientist, Jacobs), and on 25 January 2019 by Alexandra Seifertova (Graduate Archaeologist, Jacobs). The searches include the entire study corridor width of 10 km and a 5 km buffer (refer to Appendix A and Appendix B).

There are 489 previously recorded sites identified within the study area (refer to Appendix B) and consist of:

- 10 artefact, midden and burial sites
- 111 burials
- Three campsite and burial sites
- A single ceremonial site
- Three earth mounds
- 26 hearths
- Seven hearth and midden sites
- 10 hearths with multiple artefacts
- 52 individual artefacts
- 54 middens
- A single midden and burial
- Five midden and multiple artefacts
- 73 modified trees
- 77 multiple artefacts
- Six open camp sites

- Three potential archaeological deposits (PADs)
- A single PAD with artefacts, hearth and midden
- A single quarry
- A single resource gathering site
- 13 site complexes
- 31 undefined entries.

Figure 7.1 shows the breakdown of site types within the study area

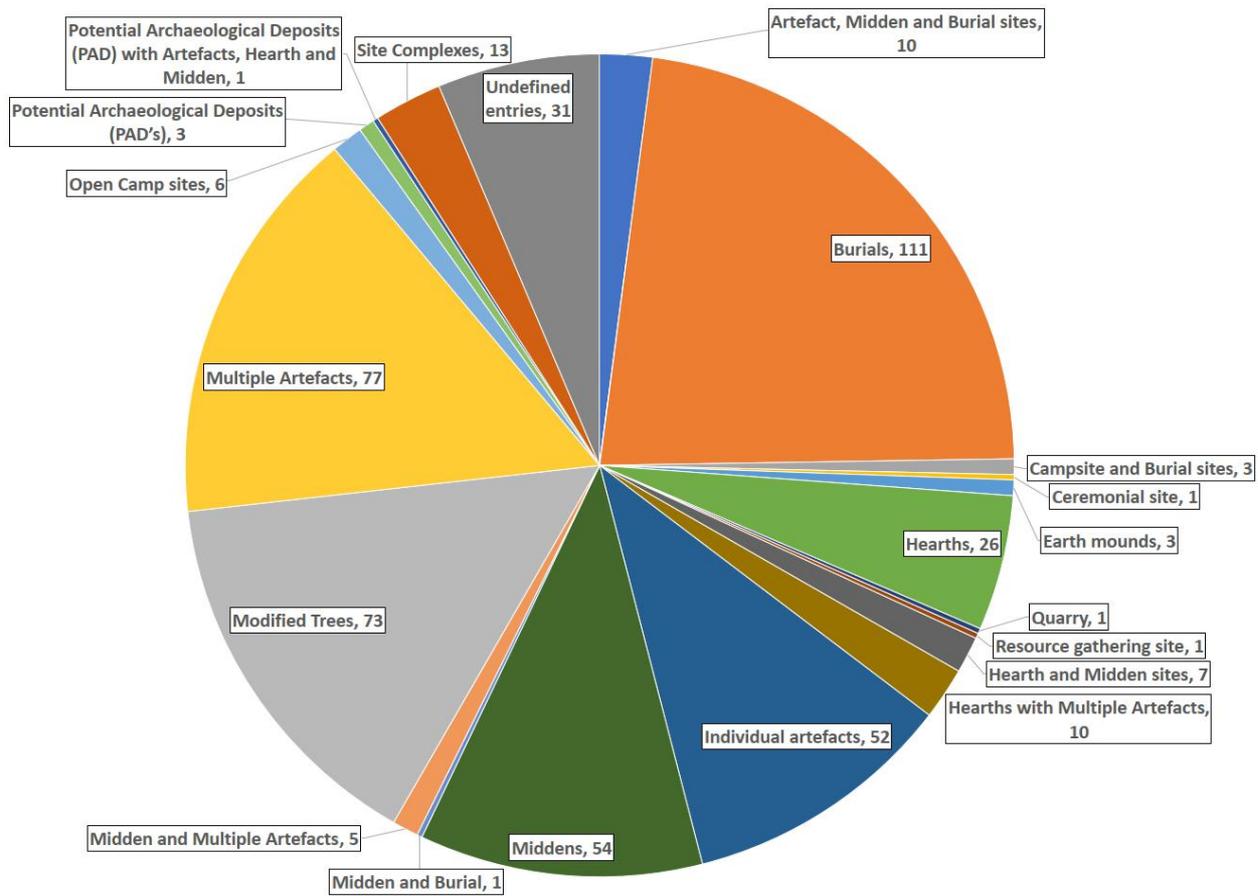


Figure 7.1: Chart showing the breakdown of known Aboriginal site types within the study area

7.3 Aboriginal Cultural Heritage Register and Information System (ACHRIS)

A preliminary search of Aboriginal objects, sites and places registered on ACHRIS within the Victorian section of the study area was obtained on 24 April 2019 by William Truscott (Project Archaeologist, Jacobs). The search was based within Red Cliffs and its vicinity (refer to Figure 7.3).

There are 55 previously recorded sites identified (refer to Appendix C) and consist of:

- A burial
- Seven artefact scatters
- 19 earth features
- 10 low density artefact distributions

- A single object collection
- Two scarred trees
- 15 shell middens.

One artefact scatter appears to be within the study corridor, and several artefact scatters on the outside boundaries.

7.4 Predictive Modelling

Predictive modelling is used in conjunction with existing data sets to determine the potential for archaeological sites, places, or objects within a particular landform. Land systems and landforms in the study area can be analysed to develop predictive models for survey strategy preparation and for comparative analysis of prehistoric Aboriginal settlement patterns between environmental regions. Aboriginal archaeological sites are more likely to be found in certain landforms and an examination of the SNI original alignment report confirms this (Edmonds 2002a).

A total of 14 land systems were identified within the original alignment (refer to Appendix D). Table 7.1 predicts the archaeological sensitivity of those land systems based on the known background archaeology for the entire western region of NSW and a revised assessment of archaeological sensitivity of land systems based on the results of a previous archaeological assessment of the SNI corridor (Edmonds 2002a).

Table 7.1: Predictive archaeological sensitivity of Land systems along the original SNI corridor (Edmonds 2002a)

Land System	Expected Site Types	Archaeologically Sensitive Landforms	Archaeological Sensitivity of Land Systems
Anabranch	Open campsites/ surface finds, Shell middens, Scarred trees, Burials	Riverside lunettes, channels and banks (terraces, floodplain)	Moderate
Arumpo	Isolated artefact, Isolated hearth	Interdunal swales	Low
Belvedere	Open campsites/ surface finds, scarred trees	Margins of Anabranch, margins of depressions	Moderate
Bulgamurra	Open campsites/ surface finds, Isolated artefacts	Margins of Canally, margins of depressions & swamps, linear dunes	Moderate
Canally	Open campsites/ surface finds, Scarred trees, Isolated hearths, Isolated artefacts, Hearths	Scalds on sandplains, margin of Anabranch land system, margins of drainage channels	High
Dalmoreve	Open campsites/ surface finds, Isolated artefacts	Margins of relic lake beds, basins, and depressions	Low
Darling	Open campsites/ surface finds, Shell middens, Scarred trees, Burials	River & creek margins, scalded plains & levees, floodplain	High
Hatfield	Open campsites/ surface finds	Margins of land systems containing depressions	Low
Haythorpe	Open campsites/ surface finds, Scarred trees	Margins of sinks or depressions	Low
Mandleman	Open campsites/ surface finds	None observed on aerial photos	Low
Menilta	Open campsites/ surface finds, Scarred trees	Margins of depressions in Canally/ margins of Darling, particularly dunes	Moderate
Overnewton	Hearths, Isolated artefacts	Scalded sandplain at margin of Anabranch/sandy rises near Anabranch	Moderate

Land System	Expected Site Types	Archaeologically Sensitive Landforms	Archaeological Sensitivity of Land Systems
Roo Roo	Open campsites/ surface finds, Burials, Shell middens	Margins of depressions and pans/sandy	High
Trelega	Open campsites/ surface finds	None observed on aerial photos or during survey	Low

7.4.1 Expected Site Types

The predictive model for site types developed by Edmonds (2002a) for the study area indicates that certain site types are more likely to be prevalent in the landscape. The occurrence and preservation of these will vary dependent on historical and current land use.

Open camp sites/ surface finds

Open campsites/ surface finds relate to a concentration of stone flakes and or hearths in an area. These are the most common site type as they are more likely to survive within the archaeological record. Scatters of finds are often associated with stone tools and can be associated with knapping and/ or food residue (shell and bone remains).

Scared and carved trees

Occasional grouped together under 'Modified Trees', scarred and carved trees exhibit human modification and manipulation. Scarred trees are identifiable by the purposeful removal of bark for the manufacture of artefacts such as containers, shields, and canoes. Carved trees similarly, exhibit evidence of purposeful removal of bark (and wood), but unlike scarred trees have geometric patterns and figures cut into the tree.

Middens

A midden refers to an accumulation of shell deposited from people after they have collected, eaten and discarded shellfish. Midden sites may also contain other faunal remains (e.g. bone), stone artefacts and charcoal from cooking fires. Furthermore, in some area's burials have been recorded in direct association with these midden sites. Midden sites vary widely in size, preservation and content. Within the study area sites are found specifically around the Darling River, Darling Anabranh, and several lakes within the region.

Burials

Burials are most commonly found in soft sandy, alluvial deposits. These soft sands are understood to be chosen for burials as it is lighter and softer to dig. Within the study area there are high number of recorded burials around locations such as Lake Victoria, and Mallee Cliffs.

Isolated finds

Individual artefacts, often stone tools which are located within the landscape. They may have been brought to that specific location through erosion, depositional processes., or cultural means.

Hearths

Hearths can be identified through factors such as the presence of charcoal, a grey/dark smear, or burnt clay. They represent where a fire was lit either for an individual use or multiple uses. Hearth stones are also found in association with hearths as they would have been used to cook food in a slow fashion.

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Project study area AHIMS sites NSW NPWS Reserves Parkland



Data sources

Jacobs 2018, OEH 2018 and 2019,
NSW Spatial Services 2018

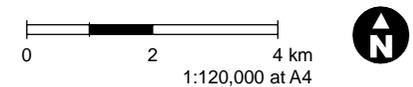


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Figure 7.2 AHIMS sites in relation to the study area

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Project study area ACHRIS sites NSW NPWS Reserves
Parkland



Data sources

Jacobs 2018, ACHRIS 2019,
NSW Spatial Services 2018

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Figure 7-3 ACHRIS sites in relation to the Victorian section of the study area

8. Conclusions and Recommendations

At the time of writing, a preferred option for the proposal has not yet been finalised, although several options are being considered. These options largely involve a transmission alignment of approximately 160 km providing a connection between the NSW – South Australian border and Red Cliffs substation, Victoria, via Buronga substation, NSW.

Once a preferred alignment option has been settled, further environmental and heritage assessment will be required to assess the impact on any locations within that preferred option that will cause ground disturbance. Other associated infrastructure, such as structure pads, access tracks, laydown areas, borrow pits and camps associated with construction will also need to be finalised and assessed.

The following recommendations have been formulated to help minimise potential impacts to Aboriginal heritage during the design phase of the project.

Recommendation 1

It is recommended that the preferred option chosen avoid, wherever possible, known Aboriginal heritage items and areas of archaeological sensitivity identified by this assessment.

Recommendation 2

Formal Aboriginal community consultation should continue to accurately and effectively identify the Aboriginal cultural values and knowledge holders associated with the study area. The initial process of relationship and trust building between the Aboriginal stakeholders and TransGrid is a positive step toward achieving good consultation outcomes for the project. The consultation should follow the process outlined by the *Aboriginal Community Consultation Requirements for Proponents 2010* (DECCW 2010a), but also proactively seek positive outcomes beyond these described in legislative guidelines.

Recommendation 3

It is recommended that an Aboriginal Cultural Heritage Assessment (ACHA) be undertaken to support an Environmental Impact Assessment (EIA) for the project. The ACHA must be prepared in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) and include the results of Aboriginal community consultation undertaken as part of the project.

Recommendation 4

It is recommended that a standard Cultural Heritage Management Plan (CHMP) be undertaken for the Victorian section of the project, due to the presence of archaeological sites within the proposed corridor alignment. The CHMP will assess whether a project will have any impact on Aboriginal cultural heritage values and outline appropriate management recommendations. It is recommended that a standard CHMP be undertaken initially, which may develop into a complex CHMP if impacts to Aboriginal Places cannot be avoided in the design phase. The CHMP must be prepared in consultation with the First Peoples of the Millewa-Mallee Aboriginal Corporation and in accordance with the *Aboriginal Heritage Act 2006*.

9. Reference List

Allen, H. 1974 The Bagundji of the Darling Basin: Cereal Gatherers in an Uncertain Environment. *World Archaeology* 5(3):309-322.

Balme, J. and J. Hope 1990 Radiocarbon dates from midden sites in the lower Darling River area of western New South Wales. *Archaeology in Oceania* 25:85-101.

Bonhomme, T. 1987 *Aboriginal Burials and Sand Mining on the Riverine Plain, NSW*, Unpublished report prepared for National Parks and Wildlife Services (NSW).

Bonhomme, T., J. Craib and Associates. 2001 *Darling Anabranh Cultural Heritage Study*, Darling Anabranh Management Plan Steering Committee., Report prepared for Darling Anabranh Management Plan Steering Committee.

Craib, J. 1992 *A Reconnaissance survey of Aboriginal archaeological resources in the Wentworth-Gol Gol area, Western NSW*, Report prepared for the National Parks and Wildlife Service NSW.

Cupper, M. 2001 *An Archaeological Survey of an Area Proposed for Viticulture on Bellevue Station near Wentworth, NSW*, Unpublished report prepared for Nicol Projects.

Cupper, M. 2007 *Snapper Mineral Sands Project Cultural heritage assessment*.

Cupper, M.L. and J. Duncan 2006 Last glacial megafaunal death assemblage and early human occupation at Lake Menindee, southeastern Australia. *Quaternary Research* 66:332-341.

Curr, E.M. 1883 *Recollections of Squatting in Victoria: Then Called the Port Phillip District (From 1841 to 1851)*. Echuca: Rich River Printers.

DECCW 2010a *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. Retrieved 17 May 2018 from

DECCW 2010b *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*, Sydney.

DECCW 2010c *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*. Sydney: NSW Government.

DECCW 2011 *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*.

Edmonds, V. 1988 *Riverlink - The NSW-SA 275 Kv Interconnection Aboriginal Archaeological Study for the NSW Section.*, Report prepared for Sinclair Knight Merz, Sydney.

Edmonds, V. 1999a *An archaeological assessment of Avoca station proposed rural subdivision on the Darling River north of Wentworth, western New South Wales*, Report prepared for Nicol Projects and Wentworth Shire Council, Mildura.

Edmonds, V. 1999b *An Archaeological Assessment of Avoca Station Proposed Rural Subdivision on the Darling River north of Wentworth, Western NSW*, Report prepared for Nicol Projects and Wentworth Shire Council.

Edmonds, V. 1999c *Desktop Heritage assessment SANI Proposed Corridors in NSW and Victoria*, Report prepared for Sinclair Knight Merz, Sydney.

Edmonds, V. 2002a *Cultural Heritage Assessment (NSW): Proposed High Voltage Transmission Line Between South Australia and New South Wales (SNI)*, Unpublished report prepared for Sinclair Knight Merz, Sydney.

Edmonds, V. 2002b *Indigenous Heritage Assessment for a Proposed Aquaculture Development, Lake Charm, Northwest Victoria*, Report prepared for A.R. & P.A. Burge, Leongatha.

Edmonds, V. 2002c *Supplementary Report Post EIS Re-alignment: Cultural Heritage Assessment (NSW) Proposed High Voltage Transmission Line between South Australia and New South Wales (SNI)*, Unpublished report prepared for Sinclair Knight Merz, Sydney.

Gaffey, P. 1991 *Archaeological Study of Mildura- Wentworth Optical Fibre Cable Route*, Unpublished report prepared for Telecom.

GHD 2013 *Bulla Conservation Reserve Monitor and Salvage*, Unpublished report prepared for NSW Office of Water.

Hardy, M.E. 1976 *Lament for the Barkandji: The Vanished Tribes of the Darling River Region*. Adelaide: Rigby.

Johnston, H. 2011 *Interim report on the Potters Lane, Gol Gol, Aboriginal burials and associated Aboriginal objects*, Unpublished report prepared for DECCW.

Kreff, G. 1866 *On the Manners and Customs of the Aborigines of the Lower Murray and Darling Rivers*. In, *Transcriptions of the Philosophical Society of New South Wales 1862-1865*, pp.357-374.

Lance, A. 1993 *A Study of Two Aboriginal Shell Midden Sites, Gol Gol New South Wales*, NSW.

Landskape 2008 *Darling Anabranh Project Additional In-stream Infrastructure: Cultural heritage investigation*, Unpublished report prepared for the New South Wales Department of Environment and Climate Change.

Landskape 2009a *Gol Gol Lake Groundwater Observation Bores: Aboriginal cultural heritage assessment*.

Landskape 2009b *Gol Gol Lake Rehabilitation Scheme: Aboriginal Cultural Heritage Assessment*, Unpublished report prepared for the Lower Murray Darling Catchment Management Authority.

Lans, R., T. Smith and B. Smith 1988 *The History of Pooncarie and District*. Wentworth, NSW: Shire of Wentworth.

Littleton, J. 2000 Taphonomic Effects of Erosion on Deliberately Buried Bodies. *Journal of Archaeological Science* 27(1):5-18.

MDBC 2002 *Lake Victoria Cultural Landscape Plan of Management*. ACT: Murray–Darling Basin Ministerial Council.

Niche 2017 *Broken Hill Long Term Water Supply Pipeline, NSW Aboriginal Cultural Heritage Assessment*, Unpublished draft report prepared for Department of Primary Industries and NSW Water Solutions.

Soil Conservation Service of NSW 1991 *S.C.S. Technical Report 1988-1991*, Soil Conservation Service of NSW, Condobolin.

Sturt, C. 1833 *Two Expeditions into the Interior of Southern Australia, during the Years 1828, 1829, 1830 and 1831 - with Observations on the Soil, Climate and General Resources of the Colony of New South Wales*. (2 vols.). London: Smith, Elder & Co.

Time Capsule Earth 2007a *Archaeological and Cultural Heritage Assessment of Noola Conservation Reserve Infrastructure*, Unpublished report prepared for New South Wales Department of Water and Energy and Lower Murray Darling CMA. .

Time Capsule Earth 2007b *Initial archaeological assessment and s87 application for the Panuccio residential subdivision, Gol Gol, NSW*, Proposed Residential Subdivision, Gol Gol, NSW.

Time Capsule Earth 2009 *Cultural Heritage Assessment and s90 Application: Metcalf residential property, Lot 2, Murray Street, Gol Gol, NSW*, A report prepared for A. Metcalf.

Tindale, N.B. 1974 *Aboriginal tribes of Australia: Their terrain, environmental controls, distribution, limits and proper names*. Berkeley: University of California Press.

Victorian State Government 2006 *Aboriginal Heritage Act 2006*.

Victorian State Government 2018 *Aboriginal Heritage Regulations 2018*

Wentworth Shire Council 2019 *Heritage of the Wentworth Shire*. Retrieved from <http://www.wentworth.nsw.gov.au/3-heritage-of-the-wentworth-shire.aspx>.

Withers, M. 1989 *Bushmen of the Great Anabranh*. Wentworth, NSW: Maxine Withers.

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Appendix A. AHIMS Search Results

Redacted for public display

Appendix B. AHIMS Extensive Search Results

Redacted for public display

Appendix C. ACHRIS Search Results

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Appendix D. Original SNI Land System, Transects and Sites

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