VIRTUSHERITAGE

Finley Solar Farm

231 Broockmanns Road, Finley, NSW

DRAFT
DUE DILIGENCE ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

DRAFT ♦ March 2020

Prepared for KDC on behalf of Providence Asset Group

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B	19.3.2020		Dr Sutton	Reviewed by Dr Sutton Virtus Heritage Pty Ltd
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F	29.04.2020	Vanessa Hardy Cultural Heritage Connections Pty Ltd	Dr Sutton	Reviewed by Dr Sutton Virtus Heritage Pty Ltd

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All queries related to the content, or to any use of this report must be addressed to Dr Mary-Jean Sutton.

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EXECUTIVE SUMMARY

Virtus Heritage was engaged by KDC on behalf of Providence Asset Group to prepare an Aboriginal archaeological due diligence assessment for the Finley Solar Farm project located on the southern side of Broockmanns Road, Finley NSW 2713 (refer to Figure 1). The proposal site is legally known as Part Lot 61 DP1053533. It is situated within the Berrigan Shire Council Local Government Area (LGA).

The proposed works include the development of a grid-connected solar PV installation operating at no larger than 5MW.

Consultation

The project area lies within the boundaries of the Cummeragunja Local Aboriginal Land Council (LALC). Brett Hamilton and Roland Atkinson of the Cummeragunja LALC attended the site survey to assist with identifying Aboriginal sites and objects and provide cultural information about the project area. A copy of this draft report was provided to the LALC for review and comment. Verbal comment was provided via telephone on the 29/4/2020 and is included in **Appendix A**.

In summary, the Cummeragunja LALC, its board and members, have no objection to the proposed development. While they do not expect any material of Aboriginal heritage significance to be located on site, they would appreciate appropriate efforts be made to identify and protect any unexpected finds during ground surface disturbing works.

Environmental Context

The project area is within the Riverina Bioregion. The Riverina includes the alluvial fans of the Lachlan, Murrumbidgee and Murray Rivers west of the Great Dividing Range and extends down the Murray. The Murray and Murrumbidgee Rivers (along with their major tributaries, the Lachlan and Goulburn Rivers), flow west across the Riverina Plain from the highlands in the east.

The region has been extensively cleared. There are no extant trees within the project area. Prior to European occupation and subsequent intensive agricultural land use, the region would have provided a variety of flora and fauna resources for local Aboriginal people.

Archaeological Context

The results of the background archaeological research, including heritage searches and a review of previous assessments in the region indicate that the most common site type in the project area vicinity is scarred trees. Mound sites have also been frequently recorded, but this may be in part because they are highly visible and occur along well defined areas adjacent to waterways. The archaeological context of the project area indicates that artefact scatters are most likely to occur on well drained areas near reliable water. The likelihood of sites being preserved into the present will be highly dependent on the impacts of previous land use.

Site Inspection Results

The site inspection was undertaken on the 16 March 2020 within lands in the Cummeragunja LALC area. The inspection was carried out by the archaeologist, Vanessa Hardy in collaboration with Brett Hamilton (Sites Officer) and Roland Atkinson of the Cummeragunja LALC. The survey team walked sample sections of the area spaced approximately 5-8 metres apart. The northern boundary of the study area was estimated on the ground as it was not clearly demarcated. Photographs of the area are included in **Appendix D**.

Recommendations

The following recommendations have been made based on the information provided on project impacts, consultation to date, relevant archaeological and environmental background research, and the results of the site inspection.

1) There is no impediment to the proposed development in the project area on Aboriginal archaeological grounds and it is recommended that development can 'proceed with caution' as outlined in the Code of Practice.

2) As detailed in the Code of Practice, the proponent should retain this report as a record of actions taken and decisions made according to the due diligence process.

3) The Cummeragunja LALCs have reviewed a draft version of this report and have no objections to the proposed development on cultural heritage grounds. They recommend that appropriate efforts be made to identify and protect any unexpected finds during ground surface disturbing works.

4) All site workers and personnel involved in site impact works associated with the proposal site should be inducted and briefed on the possible identification of Aboriginal sites and objects during construction and their responsibilities according to the provisions of the *NPW Act, 1974,* in case any additional unknown objects or items are uncovered during excavation.

    a. As part of this induction, the contact telephone numbers of DPIE regional archaeologist and EnviroLine 131 555, the relevant Providence Asset Group or delegate's Environmental Officer responsible for this project should also be given to all site workers and personnel, in case unknown objects or items are uncovered during excavation.

    b. As part of this induction, workers should be made aware that in the event that any suspected human remains are uncovered on site, the area of these suspected remains should be secured and cordoned off and the NSW Police notified. No further works can be undertaken until the NSW Police provide written advice. If these remains are deemed to require archaeological investigation by the NSW Police or NSW Coroner, then the DPIE and the relevant Aboriginal parties must be notified. A plan of management for the preservation of any identified Aboriginal human remains or for their salvage must be put in place or conducted under an AHIP application developed in consultation with all Aboriginal stakeholders and the DPIE.

    c. KDC on behalf of Providence Asset Group may wish to consider the input and engagement of interested Aboriginal stakeholders in the development of inductions and tool box talks for this project.

1. INTRODUCTION

Virtus Heritage was engaged by KDC on behalf of Providence Asset Group to prepare an Aboriginal archaeological due diligence assessment for the proposed Finley Solar Farm project.

1.1 Project Area and Context

The project is located on the southern side of Broockmanns Road, Finley NSW 2713 (refer to **Figure 1**). The proposal site is legally known as Part Lot 61 DP1053533. It is situated within the Berrigan Shire Council Local Government Area (LGA).

The lot consists of a large rural lot which contains a dwelling in the north western portion of the site located within a separate lot with the remainder of the site used for agricultural purposes. A low number of scattered trees are present on the site with the site consisting of predominantly low grassland. The subject site is irregularly shaped comprising approximately 74.7 hectares. The site has frontage to Broockmanns Road to the north with a canal forming the southern boundary of the site. The surrounding area is made up of large rural lots undertaking agricultural activities with some ancillary development such as single dwellings and sheds.

The site is located approximately 2.1 km west of Finley town centre on Broockmanns Road. Broockmanns Road is single lane in each direction, unsealed, unmarked with no kerb or guttering on either side. The Finley electrical substation of which the development proposed to connect to is located approximately 1.4 km south east of the site on Tongs Street. A large-scale solar development is located approximately 2.3 km west of the site, accessed via Broockmanns Road. The Finley Solar Farm was recently approved as State Significant Development (SSD) with an approved capacity of 170MW.

1.2 Project Description

The solar farm project at Finley includes a grid-connected solar PV installation operating at no larger than 5MW. It is proposed to connect into the electrical transmission grid via the existing transmission lines which run along Hamilton Street and Dales Road.

The Finley Solar Farm will include the following components:

- 14,196 x 425w Solar PV panel;
- 182 x Single Axis Solar Trackers;
- 2 x 2,500kVA Inverters; and
- 1 x Medium Voltage Power Station unit.

A 4m wide access road is proposed connecting the Finley Solar Farm to the approved access to Broockmanns Road at the northern area of the lot. The solar farm will be fully fenced with a gate for access in the north west corner. A car park area, off load area and temporary construction office are indicatively located on the Concept Plan (refer to **Figure 2**).

1.3 Report Aims

This report was compiled with reference to the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) and where applicable, the requirements of the *Code of Practice for Archaeological*

Investigation of Aboriginal Objects, NSW (hereafter referred to as the 'Code of Practice') (DECCW 2010b). The purpose of this report is to provide advice on Aboriginal archaeological (scientific) values of the project area in relation to the proposed works to guide the client in its decision making process.

In general, the aims of a due diligence assessment are to:

- identify whether or not Aboriginal objects are, or are likely to be, present in the area;
- if objects are present or likely to be present, determine whether the proposed development activities are likely to harm Aboriginal objects; and
- determine whether further assessment or an Aboriginal Heritage Impact Permit (AHIP) is required.

1.4 Regulatory Context

The site is zoned RU1 Primary Production under the Berrigan Local Environmental Plan 2013 (LEP 2013). The proposed land use, defined as electricity generating works, is prohibited within the RU1 zoned as "Any other development not specified in item 2 or 4" (LEP 2013). As a result, permissibility of the project will require an alternative approval pathway, noting the proposal is permissible under Clause 34 of SEPP (Infrastructure) 2007.

1.4.1 State Environmental Planning Policy (Infrastructure) 2007

Division 4 Electricity generating works or solar energy systems

34 Development permitted with consent

(1) Development for the purpose of electricity generating works may be carried out by any person with consent on the following land—

(a) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land,

(b) in any other case—any land in a prescribed rural, industrial or special use zone.

Definition:

prescribed rural, industrial or special use zone means any of the following land use zones or a land use zone that is equivalent to any of those zones—

(a) RU1 Primary Production,

(b) RU2 Rural Landscape,

(c) RU3 Forestry,

(d) RU4 Primary Production Small Lots,

(e) IN1 General Industrial,

(f) IN2 Light Industrial,

(g) IN3 Heavy Industrial,

(h) IN4 Working Waterfront,

(i) SP1 Special Activities,

(j) SP2 Infrastructure.

Clause 34 allows a solar energy system to be carried out with consent within prescribed rural, industrial or

special use zones which includes RU1 Primary Production. The Finley Solar Farm is not a permissible use under the Berrigan Local Environmental Plan in the RU1 zone, therefore this clause will need to be relied upon in terms of land use permissibility

1.4.2 State Environmental Planning Policy (State and Regional Development) 2011

Regional development classification applies to both local and designated development applications exceeding certain criteria defined by Schedule 7 of the SEPP SRD.

5 Private infrastructure and community facilities over $5 million

Development that has a capital investment value of more than $5 million for any of the following purposes:

(a) air transport facilities, electricity generating works, port facilities, rail infrastructure facilities, road infrastructure facilities, sewerage systems, telecommunications facilities, waste or resource management facilities, water supply systems, or wharf or boating facilities,

(b) affordable housing, child care centres, community facilities, correctional centres, educational establishments, group homes, health services facilities or places of public worship.

The proposed development is considered to be private infrastructure with a CIV greater than $5 million and as a result the development is deemed to be regionally significant development and the application will be referred to the JRPP for determination.

The *National Parks and Wildlife Act 1974* (NPW Act), the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Heritage Act, 1977* are the relevant statutory controls protecting Aboriginal heritage within New South Wales.

1.4.3 National Parks and Wildlife Act 1974

Under the provisions of the NPW Act, all Aboriginal objects are protected regardless of their significance or land tenure. Aboriginal objects are defined as '*any deposit, object or material evidence (not being a handicraft made for sale) relating to Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains'*.

Aboriginal objects are therefore limited to physical evidence and may also be referred to as 'Aboriginal sites', 'relics' or 'cultural material'. Aboriginal objects can include pre-contact features such as scarred trees, middens and artefact scatters, as well as physical evidence of post-contact use of the area such as Aboriginal built fencing or stockyards and missions.

The NPW Act also protects Aboriginal Places, which are defined as *'a place that is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects'*. Aboriginal Places can only be declared by the Minister administering the NPW Act. The NPW Act protects Aboriginal objects and Aboriginal places in NSW. Under the *National Parks and Wildlife Act 1974* (NPW Act), including the 2010 amendments, it is an offence to harm an Aboriginal object:

- Which the person knows is an Aboriginal object (a 'knowing offence')
- Whether or not a person knows it is an Aboriginal object (a 'strict liability offence').

At 1 October 2010, the maximum penalty for a knowing offence is $550,000 for an individual or $1.1 million for a corporation and a 2 year gaol term. The maximum penalty for a strict liability offence is $110,000 for an individual or $220,000 for a corporation (DECCW 2010b:5). A person or organisation who exercises due diligence in determining that their actions would not harm Aboriginal objects has a

defence against prosecution for the strict liability offence if they later unknowingly harm an object without an AHIP (DECCW 2010b, 2010:5). The due diligence defence is not available for activities which harm Aboriginal places. The Code of Practice sets out a procedure which, when followed, will satisfy the due diligence requirement. If a person or company can demonstrate that they exercised due diligence and determined that it was unlikely that Aboriginal objects would be harmed, then they have a defence to prosecution under the strict liability offence under Section 86(2) of the NPW Act (DECCW 2010b 2010:5).

Harm includes activities that destroy, deface or damage an Aboriginal object or Aboriginal Place, and in relation to an object; move the object from the land on which it has been situated. Under Section 91 of the Act, the DPIE must be informed upon the identification of all Aboriginal Objects. Failure to do this within reasonable time is an offence under the Act. Under Section 90 of the Act, it is an offence for a person to destroy, deface, damage or desecrate an Aboriginal Object or Aboriginal Place without the prior issue of Section 90 consent. Section 90 consents may only be obtained from the Biodiversity and Conservation Division (BCD) of the DPIE. Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them. If harm to Aboriginal objects and places is anticipated an Aboriginal Heritage Impact Permit (AHIP) is required.

The Act also provides for stop-work orders under Section 91A if an action is likely to significantly affect an Aboriginal object or Aboriginal Place. The order may require that an action is to cease or that no action is carried out in the vicinity of the Aboriginal object or Aboriginal Place for a period of up to 40 days.

1.4.4 Heritage Act, 1977

The *Heritage Act, 1977* (as amended in 2009) protects and aims to conserve the environmental heritage of New South Wales. *Environmental heritage* is broadly defined under Section 4 of the *Heritage Act* as consisting of "those places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance" (Heritage Branch, DoP 2009:4). Aboriginal places or objects that are recognized as having high cultural value (potentially of local and State significance) can be listed on the State Heritage Register and protected under the provisions of the *Heritage Act.*

Amendments to the *Heritage Act* made in 2009 have changed the definition of an archaeological *'relic'* under the Act, so that it is no longer based on age. A relic is now an archaeological deposit, resource or feature that has *heritage significance* at a local or State level. This significance, based approach to identifying 'relics' is consistent with the way other heritage items such as buildings, works, precincts or landscapes are identified and managed in NSW (Heritage Branch, DoP 2009:1). Section 4(1) of the *Heritage Act* (as amended 2009) defines 'relic' as follows:

> ***Relic*** *means any deposit, artefact, object or material evidence that:*
> *(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
> *(b) is of State or local heritage significance* (Heritage Branch, DoP, 2009:6).

Other relevant State and Commonwealth legislation are discussed below.

1.4.5 Environmental Planning and Assessment Act 1979

The EP&A Act requires that consideration be given to environmental impacts as part of the land use planning process. In NSW, environmental impacts include cultural heritage impacts. Part 3 of the Act

relates to planning instruments including those at local and regional levels, Part 4 of the Act controls development assessment processes and Part 5 of the Act refers to approvals by determining authorities.

1.4.6 Native Title legislation

The Native Title Act 1993 (NTA) provides the legislative framework to:

- recognise and protect native title
- establish ways in which future dealings affecting native title may proceed and to set standards for those dealings, including providing certain procedural rights for registered native title claimants and native title holders in relation to acts which affect native title
- establish a mechanism for determining claims to native title
- provide for, or permit, the validation of past acts invalidated because of the existence of native title.

The *NSW Native Title Act 1994* was introduced to make sure the laws of NSW are consistent with the Commonwealth's NTA on future dealings. It validates past and intermediate acts that may have been invalidated because of the existence of native title.

The National Native Title Tribunal has a number of functions under the NTA, including maintaining the Register of Native Title Claims, the National Native Title Register and the Register of Indigenous Land Use Agreements and mediating native title claims.

1.4.7 Other Acts

The Australian Government *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* may be relevant if any item of Aboriginal heritage significance to an Aboriginal community or historical heritage is under threat of injury or desecration and state-based processes are unable to protect it. The *Environment Protection and Biodiversity Conservation Act 1999* is relevant to projects where there are heritage values of national significance present.

1.5 Consultation

Aboriginal people are the primary determinants of their culture and heritage, and cultural values can only be assessed and advised by the relevant Aboriginal parties for the locality. It should be noted that Aboriginal heritage refers both to Aboriginal archaeological sites and sites/places of cultural value to Aboriginal people, protected under the *National Parks and Wildlife Act, 1974* (NPW Act, 1974) as "Aboriginal Objects" and "Aboriginal Places". Sites and places of Aboriginal cultural significance can only be identified by the relevant local Aboriginal people and are likely in many cases (for example, song lines and story places) to not contain any archaeological evidence.

This assessment was conducted by an archaeologist providing advice on the archaeological (scientific) values of the project area. The cultural values of the project area were assessed by the Cummeragunja Local Aboriginal Land Council (LALC).

The Cummeragunja LALC were contacted at the start of the project and invited to participate in the field assessment. Two representatives of the LALC attended the site inspection. No specific areas of cultural concern or interest were raised during the site inspection. A wide-ranging discussion was had about the nature of settlement and lifestyle in the region. It was discussed that the project area was a considerable distance from a natural water source in modern times but that many thousands of years ago, the waterways would have been different. It was also noted that prior to European modifications

to the Murray River, its flood plain would have extended many kilometres in times of flood.

A draft copy of this report was provided to the Cummeragunja LALC for comment and review. Comments were received via phone on 29/4/2020. A full summary of the comments is included in **Appendix A**.

In general, the Cummeragunja LALC, its board, and members have no objection to the proposed development on Aboriginal heritage grounds. However, they suggest that measures be put in place to ensure any unexpected finds are dealt with appropriately. This could be in the form of an unexpected finds protocol and engagement of Cummeragunja LALC members to assist in the development and delivery of inductions and tool box talks for Aboriginal heritage for this project. They would also appreciate consideration of employment opportunities for Aboriginal community members.

1.6 Limitations

This report is limited to the assessment of project impacts described in information provided by KDC on behalf of Providence Asset Group and mapped in this report. Virtus Heritage takes no responsibility for errors within the DPIE's Aboriginal Heritage Information Management Systems (AHIMS) data, and the Heritage Division, NSW listings and has assumed information provided by the DPIE is accurate.

The site inspections undertaken were confined to areas of proposed works illustrated in **Figure 1** and **Figure 2**.

1.7 Project Team and Qualifications

This report was compiled by Vanessa Hardy B.A. (Hons), Prehistoric and Historical Archaeology, University of Sydney. Quality review was undertaken by Dr Mary-Jean Sutton (PhD, Archaeology, University of Queensland; B.Arts, Hon.s. Prehistoric and Historical Archaeology, University of Sydney). Project information and description of works was provided by KDC on behalf of Providence Asset Group.

1.8 Acknowledgements

We would like to acknowledge the assistance of the following individuals for the completion of this report:

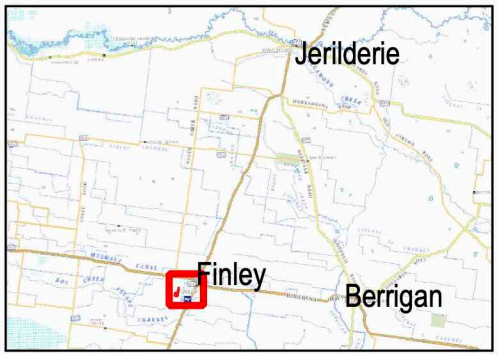
- Roland Atkinson and Brett Hamilton of the Cummeragunja LALC; and
- Rosie Turner, Town Planner, KDC.

VIRTUSHERITAGE

Figure 1
Locality Plan and Project Area

Legend

Project Area



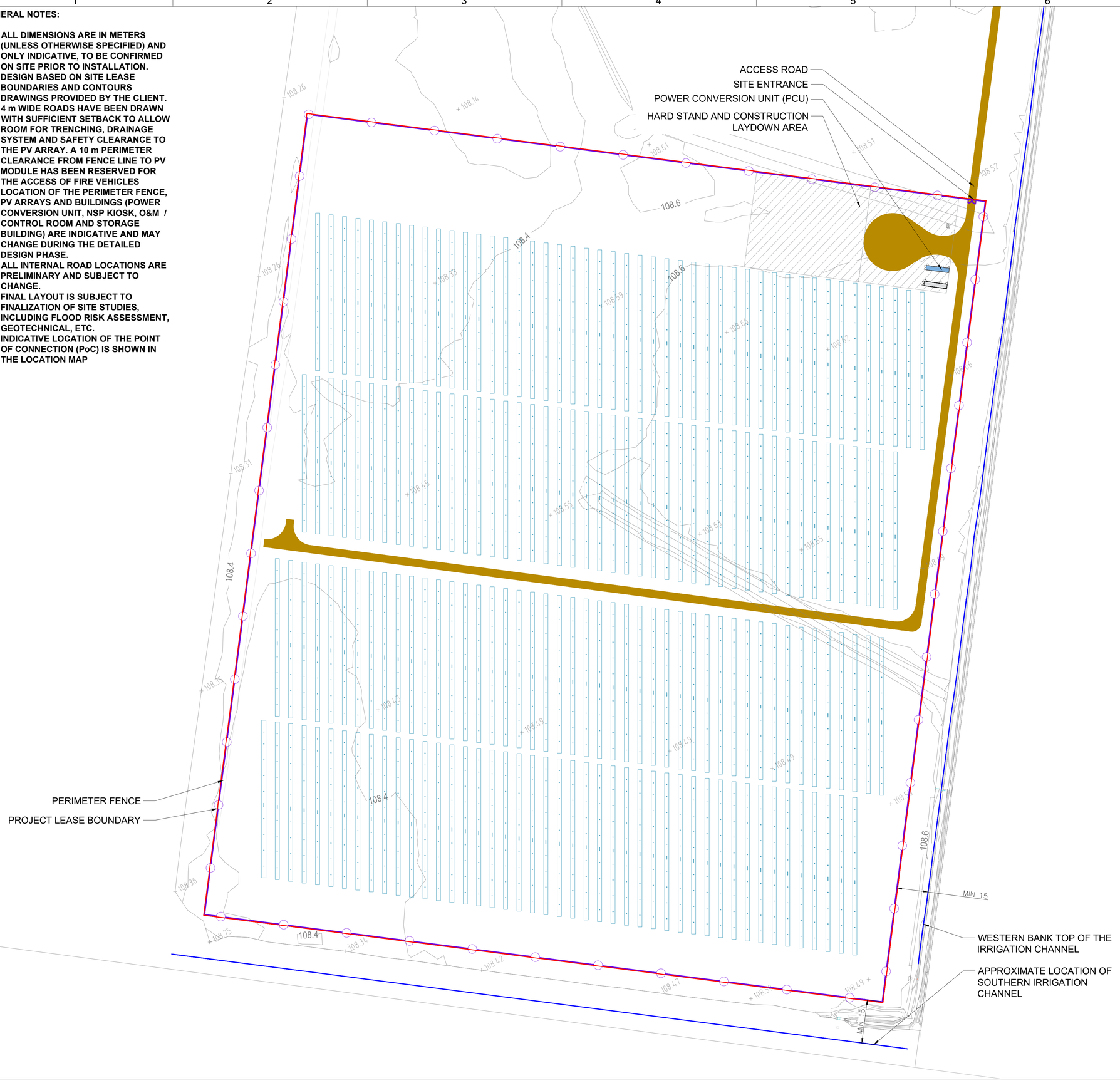
Source: NSW Spatial Services; Providence Asset Group DWG: FINLEY - PV Plant Layout [090320] provided by KDC 18.03.2020
Projection: GDA94 MGA zone 55

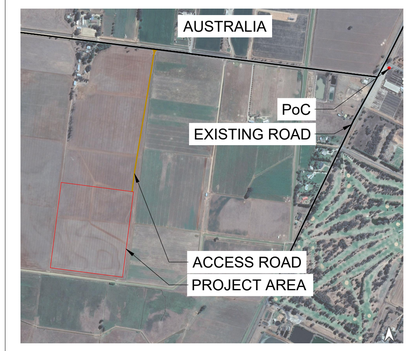
Maps and figures contained within this document may be based on third party data, may not be to scale and are intended for use as a guide only. Virtus Heritage does not warrant the accuracy of such maps or figures.

368000
369000
370000
371000
372000
6056000
6055000
6054000
6053000
Riverina Hwy
Brockmanns Rd
FINLEY
Newell Hwy
Airport
N
0
0.5
1
1.5
2
2.5 km

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METERS (UNLESS OTHERWISE SPECIFIED) AND ONLY INDICATIVE, TO BE CONFIRMED ON SITE PRIOR TO INSTALLATION.
2. DESIGN BASED ON SITE LEASE BOUNDARIES AND CONTOURS DRAWINGS PROVIDED BY THE CLIENT.
3. 4 m WIDE ROADS HAVE BEEN DRAWN WITH SUFFICIENT SETBACK TO ALLOW ROOM FOR TRENCHING, DRAINAGE SYSTEM AND SAFETY CLEARANCE TO THE PV ARRAY. A 10 m PERIMETER CLEARANCE FROM FENCE LINE TO PV MODULE HAS BEEN RESERVED FOR THE ACCESS OF FIRE VEHICLES
4. LOCATION OF THE PERIMETER FENCE, PV ARRAYS AND BUILDINGS (POWER CONVERSION UNIT, NSP KIOSK, O&M / CONTROL ROOM AND STORAGE BUILDING) ARE INDICATIVE AND MAY CHANGE DURING THE DETAILED DESIGN PHASE.
5. ALL INTERNAL ROAD LOCATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE.
6. FINAL LAYOUT IS SUBJECT TO FINALIZATION OF SITE STUDIES, INCLUDING FLOOD RISK ASSESSMENT, GEOTECHNICAL, ETC.
7. INDICATIVE LOCATION OF THE POINT OF CONNECTION (PoC) IS SHOWN IN THE LOCATION MAP





LOCATION MAP - SCALE: 1:1,500,000

LEGEND

- PROJECT LEASE BOUNDARY
- EXISTING CONTOUR LINE
- PERIMETER FENCE
- PROPOSED ACCESS/MAINTENANCE ROAD
- HARD STAND AND CONSTRUCTION LAYDOWN AREA
- PROPOSED GATE
- POWER CONVERSION UNIT (PCU)
- NETWORK SERVICE PROVIDER (NSP) KIOSK
- O&M BUILDING / CONTROL ROOM AND STORAGE
- PROPOSED PV TRACKER

SYSTEM SUMMARY

ELECTRICAL CONFIGURATION:

TOTAL PV PLANT CAPACITY (DC): 6,033.3 kWp
TOTAL INVERTER CAPACITY (AC): 5,000.00 kVA (@35C)
PV PLANT MAXIMUM EXPORT CAPACITY (AC): 4,990.00 kVA
DC:AC RATIO: 1.21:1 (REFERRED TO MAXIMUM EXPORT CAPACITY)
STRINGS OF 26 MODULES
273 STRINGS PER INVERTER

PV MODULES:

MFR:	RISEN SOLAR TECHNOLOGY
MODEL:	JAGER PLUS RSM156-6-425M
NAMEPLATE:	425Wp
QUANTITY:	14,196

INVERTERS:

MFR:	SMA
MODEL:	SUNNY CENTRAL 2500-EV
NAMEPLATE:	2500 kVA@35C; 2250 kVA@50C
QUANTITY:	2

MV POWER STATION:

MFR:	SMA
MODEL:	MV POWER STATION 5000-S-AU
QUANTITY:	1

TRACKER ARRAY:

MFR:	NEXTRACKER
MODEL:	NX HORIZON (1P SINGLE-AXIS TRACKER)
CONFIGURATION:	1 MODULE IN PORTRAIT 3 STRINGS PER ROW
RANGE OF MOTION:	E-W +/-60°
PITCH:	7 M
GCR:	31.1%
QUANTITY:	1P78 - 182
FENCE AREA:	~14.97 HA
LEASE AREA:	~14.97 HA

N

1:1000 0 20 50 100
SCALE IN METERS

PROVIDENCE ASSET GROUP

RINA CONSULTING
WWW.RINAGROUP.ORG
WWW.RINACONSULTING.ORG

PRELIMINARY NOT FOR CONSTRUCTION

SOLAR FARM GENERAL ARRANGEMENT

Finley
231 Broockmans Road, Finley NSW
NEW SOUTH WALES, AUSTRALIA

REV	DATE	DESCRIPTION	DWN	CHKD
1	03/03/20	ISSUE FOR INITIAL SUBMITTAL	UZ	JLG
2	11/03/20	ISSUE FOR REVISED INITIAL SUBMITTAL	UZ	JLG
3				

LATITUDE:
35.65 ° S
LONGITUDE:
145.55 ° E

SCALE 1:1000

ORIGINAL SIZE: ISO A1

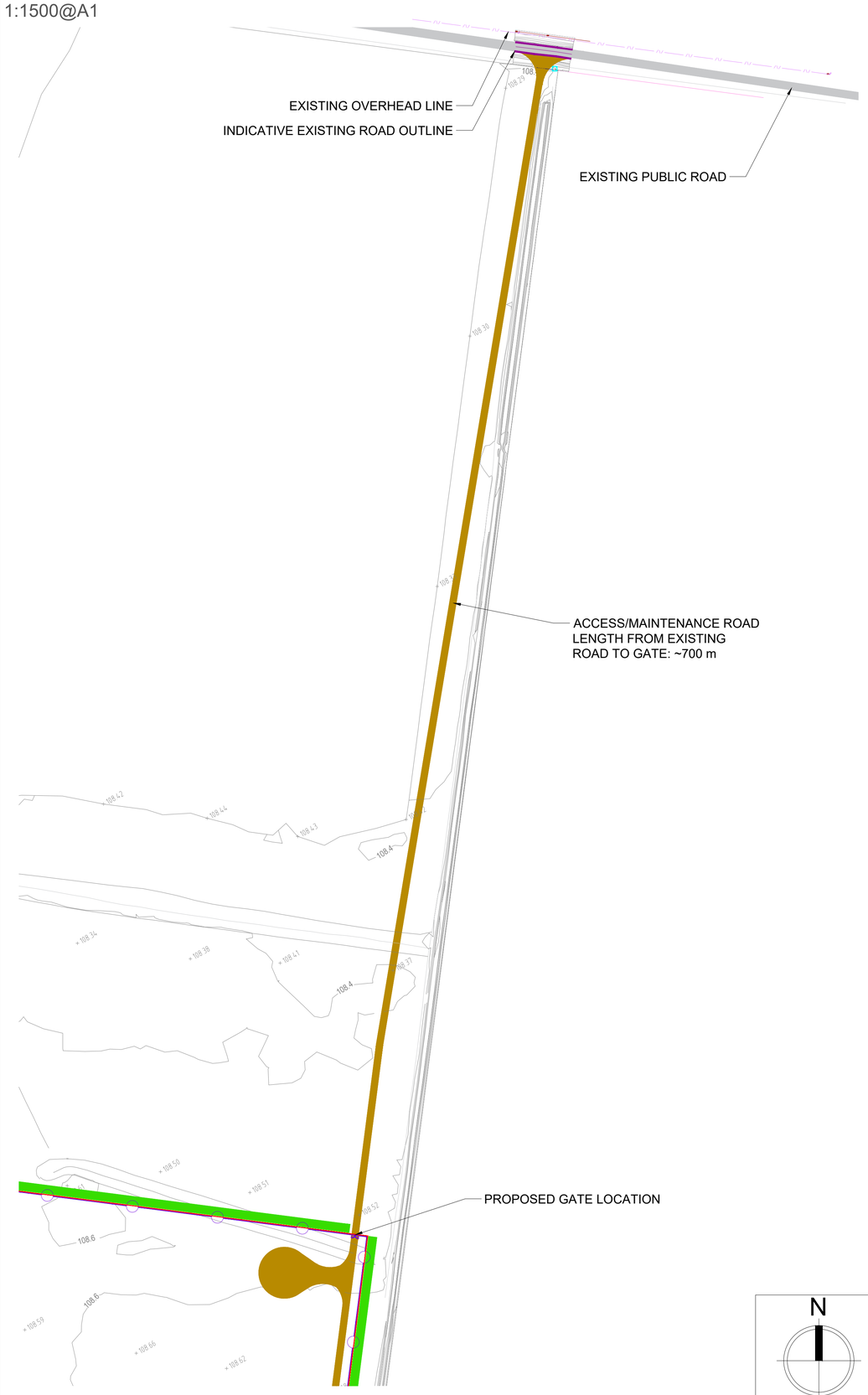
SHEET FI-2

DETAIL A | SETBACK INFORMATION
1:1500@A1

GENERAL NOTES:

1. **ALL DIMENSIONS ARE IN METERS (UNLESS OTHERWISE SPECIFIED) AND ONLY INDICATIVE, TO BE CONFIRMED ON SITE PRIOR TO INSTALLATION.**
2. **DESIGN BASED ON SITE LEASE BOUNDARIES AND CONTOURS DRAWINGS PROVIDED BY THE CLIENT.**
3. **4 m WIDE ROADS HAVE BEEN DRAWN WITH SUFFICIENT SETBACK TO ALLOW ROOM FOR TRENCHING, DRAINAGE SYSTEM AND SAFETY CLEARANCE TO THE PV ARRAY. A 10 m PERIMETER CLEARANCE FROM FENCE LINE TO PV MODULE HAS BEEN RESERVED FOR THE ACCESS OF FIRE VEHICLES**
4. **LOCATION OF THE PERIMETER FENCE ARE INDICATIVE AND MAY CHANGE DURING THE DETAILED DESIGN PHASE.**
5. **FINAL LAYOUT IS SUBJECT TO FINALIZATION OF SITE STUDIES, INCLUDING FLOOD RISK ASSESSMENT, GEOTECHNICAL, ETC.**
6. **BASED ON THE CONTOUR DRAWINGS THE SITE IS PRACTICALLY FLAT**

DETAIL B | PROPOSED ACCESS ROAD ROUTE
1:1500@A1



PROVIDENCE ASSET GROUP

RINA CONSULTING
WWW.RINAGROUP.ORG
WWW.RINACONSULTING.ORG

PRELIMINARY NOT FOR CONSTRUCTION

KEY SITE DETAILS

Finley
231 Brockmans Road, Finley NSW
NEW SOUTH WALES, AUSTRALIA

REV	DATE	DESCRIPTION	DWN	CHKD
1	03/03/20	ISSUE FOR INITIAL SUBMITTAL	UZ	JLG
2	11/03/20	ISSUE FOR REVISED INITIAL SUBMITTAL	UZ	JLG
3				

LATITUDE:
35.65 ° S
LONGITUDE:
145.55 ° E

SCALE
AS SHOWN

ORIGINAL SIZE: ISO A1

SHEET
FI-3

2. ENVIRONMENTAL CONTEXT

This section of the report describes the environmental context of the project area spanning previous land-use history, topography and landforms, soils and geology, and fauna and flora. These factors are integral influences of Aboriginal land use, the resultant patterning of archaeological sites, and the survival of sites in the modern landscape.

2.1 Previous Land Use History

John Oxley explored the Riverina in 1817 along the Lachlan River. Charles Sturt explored the Murrumbidgee and lower Murray from 1828-1831. In 1836, Thomas Mitchell arrived at the junction of the Murrumbidgee and Lachlan Rivers ((Eardley 1999). Following rapidly on from these explorations, pastoral runs began to be developed. In the 1840s cattle were the dominant industry, but by the 1860s sheep numbers surpassed that of cattle (Eardley 1999).

Riverboat trade was an important aspect of growth of the region and the local timber was sold to the boats as fuel. By the 1840s most of the land fronting the eastern Murray had been taken up by European settlers. In many places twin towns were established on both sides of the river because it formed the border between the two colonies of NSW and Victoria (Buchan 1974). The impact of European incursion into the region would have been rapid and wide reaching.

Damming of the Murray River began from the 1860s onwards. This facilitated the movement of stock and irrigation into previously dry areas. This and the removal of red gums for fuel for riverboats changed the flooding and hydrology of the river, in turn effecting fish stocks (Buchan 1974). Changes to hydrology effect sedimentation build up and vegetation. Clearing of native vegetation and grazing also increases erosion. After the droughts in the 1880s intensive irrigation came to the region. Initially on a small scale, by the 1930s a number of large dams had been built (HO & DUAP 1996). Rice growing from the 1940s, and more recently cotton have increased the need for water and therefore irrigation modifications. Channels for irrigation based on the Mulwala canal and the Murray River irrigate over 400,000 square kilometres of land (Buchan 1974). Agriculture includes rice, fruit and vineyards. The Mulwala Canal runs through the town of Finley. The town developed with the arrival of intensive irrigation.

The project area has been heavily impacted by European settlement. The land has been completely cleared of vegetation, intensively ploughed and been subject to ongoing erosion. Localised disturbances such as excavating and infilling of drainage and irrigation channels as well as vehicle access, have created additional impact. Such impacts have reduced the likelihood of intact Aboriginal sites and Aboriginal objects being located.

2.2 Topography, Hydrology and Climate

The Murray River and its tributaries together drain over a million square kilometres and approximately one seventh of the Australian continent. Within this large topographic basin, a smaller geologically formed basin of around 135,000 square kilometres is drained by the Murray River and the lower reaches of some of its tributaries. This area extends west from the highlands east of Albury to the mouth of the Murray in South Australia. It is known as the Murray basin as distinct from the Murray River Basin and includes four distinct ecological zones. One of these zones is the riverine plain of the project area (Buchan 1974).

The project area is within the Riverina Bioregion. Topographically, the project area is within a broad level plain with slopes of <1% and local relief of <9 metres. Local elevation is from 90 to 180 metres (NSW NPWS 2003).

The Riverina includes the alluvial fans of the Lachlan, Murrumbidgee and Murray Rivers west of the Great Dividing Range and extends down the Murray. The Murray and Murrumbidgee Rivers (along with their major tributaries, the Lachlan and Goulburn Rivers), flow west across the Riverina Plain from the highlands in the east. The three overlapping alluvial fans are centred on the eastern half of the Murray Basin. The landscape of the upper catchment is described as 'a series of overlapping, low gradient alluvial fans' (NSW NPWS 2003: 92). Closer to the rivers are floodplain with overflow lakes. The sediment deposition, along with soils, landscapes and vegetation are ultimately controlled by the discharge from past and present streams (NSW NPWS 2003).

There are two former hydrological systems that have been identified in the Murray Basin. The earliest system is known as the 'Prior Stream' system. It does not seem to relate to the current hydrology of the area. Evidence for it can be seen in features such as rounded depressions associated with lunettes, crescent shaped sand dunes, levees, and sand and clay sheets. This system appears to have been characterised by deposition, representing limited drainage in arid conditions. The features of this system have been found to range in age up until around 36,000 years before present (BP) (Buchan 1974). The second prior drainage system is known as the 'Ancestral River' system and is thought to represent hydrological change for the region. The system has been dated to between around 30,000 to 8,000 years ago. The observed alluvium is indicative of land degradation caused by the rivers and is thought to represent an increased flow during wet periods (Buchan 1974). Both the later phases of the 'Prior Stream' and the 'Ancestral River' phase coincide with Aboriginal occupation of the region. Therefore, earlier hydrology may influence site location.

The current course of the Murray River is around 17 kilometres to the south of the project area. The closest waterway to the project area is Tuppal Creek, a tributary of the Murray River, approximately 9-10 kilometres to the south/southwest. To the north Billabong Creek is over 30 kilometres to the north of the project area. The Murray and its tributaries would have provided water and abundant food resources for Aboriginal people. In the areas between major waterways, other water sources such as swamp lands and temporary water catchment would have been present. In the past ephemeral waterholes or 'Gilgais' were present, as well as temporary drainage lines in times of flood (OEH 2010). The first European occupation of what is now the town of Finley was a shepherd's hut located on a swamp that has now been turned into Lake Finley. The lake is approximately 3 km to the northeast of the project area. The landscape of the project area and its immediate surrounds is now filled with modified channels.

The climate of the Riverina is persistently dry semi-arid climate. This is characterised by hot summers and cool winters with little seasonal variation across the region, although temperatures tend to be slightly higher in the north of the region. Rainfall is usually highest in May and September. Summer rainfall is most commonly localised thunderstorms and annual rainfall tends to increase from west to east and north to south (NSW NPWS 2003).

2.3 Geology, Geomorphology and Soils

The geology of the project area is described as quaternary alluvium of the Shepparton Formation on the Riverine Plains (OEH 2010).

As discussed above, the region is dominated by quaternary alluvial sediment. Underlying rock formations are early Palaeozoic sediments and granites of the Lachlan Fold belt. Almost no rock outcrop occurs across the Riverina (NSW NPWS 2003). The features of each of the three overlapping alluvial fans (Lachlan, Murrumbidgee and Murray Rivers) differ slightly. The Lachlan is more clay based, the other two are similar and carry more sandy soils. The Murray fan is more confined with more active anabranch channels. In times of extreme flood water can cross between on fan systems from one to another.

The history of the formation of the fans shows and decrease in discharge through time. In the period 15-30,000 years ago, previous streams carried sand great distances in wide channels with long meanders, onto the clay plains. The alluvium becomes deeper and older to the west of the basin, reaching up to around 500 metres deep. Modern river channels are predominantly comprised of sandy soils with some saline heavy grey and brown clays towards the outer edges of the floodplains on the higher terraces that are rarely flooded (NSW NPWS 2003).

The soil landscape of the project area is mapped as is 'Wait-A-While' (OEH 2010). These soils are stagnant alluvial soils of Red-brown earths/transitional Red-brown earths. Less commonly transitional Red-brown Earths/Brown Podzolic Soils occur along with Cracking Grey and Brown Clays. The topsoils are prone to structural decline and erosion from wind. The parent materials include silts and sands from past flow regimes. There is poor drainage in low lying areas (OEH 2010). .

Table 1. Soil Landscape Group

SOIL LANDSCAPE GROUP	GEOLOGY	TOPOGRAPHY
Wait-A-While Stagnant alluvial landform	Cainozoic/Quaternary alluvium of the Shepparton Formation on the Riverine Plains. Parent materials include clays, silts and sands from various past flow regimes of the Murray and Murrumbidgee Rivers and their associated palaeochannels.	The Riverina is dominated by river channels, floodplains, backplains, swamps, lakes and lunettes that are all of Quaternary age.

2.4 Flora and Fauna

The region has been extensively cleared. There are no extant trees within the project area. Prior to European occupation and subsequent intensive agricultural land use, the region would have provided a variety of flora and fauna resources for local Aboriginal people.

The major river channels support river red gum (*Eucalyptus camaldulensis*) and river cooba (*Acacia stenophylla*) communities. On higher ground, towards the perimeter of the flood plains, on heavy grey and brown clays, black box (*Eucalyptus largiflorens*) woodlands dominate with an understorey of salt-tolerant grasses, saltbushes and daisies. On the highest terraces, which are rarely flooded, yellow box (*Eucalyptus melliodora*) communities occur along with cypress pine and grey box (*Eucalyptus microcarpa*) (Eardley 1999 cited in NSW NPWS 2003).

As distance from the rivers increases, treeless plains occur, and saltbush communities are common. Other smaller landform types such as, levees, dunes, lunettes, swamps and lakes, would have provided pockets of varied resources.

A large variety of bird species, marsupials including wallabies and the northern hairy nosed wombat, have seen a decline in numbers since intensive agricultural use of the region, but would have once been available to the Aboriginal inhabitants. Riverine resources such as fish and water-based plants (water lily tubers) would have been important parts of the diet and tool kit of the local people. Yams, seeds and fruits were also eaten (Buchan 1974). Wetlands and lakes would have provided yet another set of resources (NSW NPWS 2003). Overall, the region had plentiful resources to support large numbers of Aboriginal inhabitants.

3. ARCHAEOLOGICAL CONTEXT AND ETHNOHISTORY

This section presents the ethnohistorical and archaeological context for the evaluation of the project area, specifically known archaeological sites identified by previous archaeological investigations, and the understanding of Aboriginal heritage developed by previous archaeological and heritage studies.

3.1 Ethnohistorical Context

This section provides a description of the Aboriginal heritage context as relevant to the proposal. The Aboriginal heritage context includes a summary of Aboriginal history within the locality and material evidence of Aboriginal land use. Language groups and clan boundaries are frequently contested or subject to different versions of recording depending on the sources of information. Our knowledge of the pre-contact social organisation and behavioural patterns of Aboriginal people often comes from early non-Aboriginal historical records. The information is, therefore, subject to the historical and cultural biases of the recorders. It is also important to remember that at the time many of the observations were made, the lifestyles of Aboriginal communities may have already been significantly altered by the presence of non-Aboriginal settlement.

This section is not meant to be a definitive history of Aboriginal people in the locality of Finley, rather it is provided to give some insight into the historical circumstances that have influenced Aboriginal people connected to the region over time. It also aims to provide an overview of Aboriginal land use and its implications for understanding the survival of Aboriginal sites and potential occupation deposits within the project area.

3.1.1 People

The region is the traditional land of a number of Aboriginal groups that lived on the Hay Plain and around the rivers. These groups include the Wiradjuri, Nari-Nari, Mudi-Mudi, Gurendji and the Yida-Yida. The lands along the Murray were home to the Bangerang, Yorta-Yorta, Baraba-Baraba, Wamba-Wamba, Wadi-Wadi and Dadi-Dadi communities (NSW Department of Lands 1987, cited in Eardley 1999). The early European settlers to the Riverina region tended to see the land between the Murrumbidgee and the Murray Rivers as a distinct entity and the rivers as dividing boundaries. This was very different to how the Aboriginal people viewed the land.

The area is known as the traditional lands of the Bangerang people (HO & DUAP 1996). Bangerang Country included both sides of the Murray River from Albury to Moama. The river was used as a thoroughfare as well as for its plentiful resources. Trade took place via the river and the region was well known in post-European times for its bark canoes. One squatter in 1848 (E. M. Curr) recorded travelling with an Aboriginal guide in a traditional canoe with its fire hearth (HO & DUAP 1996), showing canoes were still in use by this time.

While it is impossible to estimate with accuracy the population numbers prior to European incursion, the records of early European explorers suggest that there were many thousands of Aboriginal people living on the Murry River (Buchan 1974). It is notable that although small family groups were seen, many observers noted larger groups. Sturt (cited in Buchan 1974) recorded sightings on separate occasions of groups of 80, 100, 120, 250 and one of around 270 people.

Buchan's (1974) suggests, based on an overview of multiple ethnographic sources:

- Immediately after European contact Aboriginal social organisation on the Murray was based on

groups of between 80-150 people on the upper Murray and between 200-300 on the lower Murray.

- Each group would have had its own territory and consisted of a number of related extended families.
- These groups would have come together to form larger groups for specific purposes. For example, it is likely that the Bangerang would have joined with the Wiradjuri and Monaro groups at the summer Bogong moth feasts in the alpine country (HO & DUAP 1996).

3.1.2 Material Culture

Many observations were made of the technology used by the people who lived along the Murray and surrounds. Buchan (1974) quotes a number of European historic records including those of Sturt, Curr and Beveridge. Some of the detail is repeated here to provide an indication of the variety of material culture used by local people.

The local technology include a variety of spears. Larger game were hunted with long spears of mallee sapling and launched with a spear thrower. Smaller reed spears were used for smaller game and shorter spears were used for fishing. A combined canoe paddle with a spear on the other end was also observed, perhaps an indication of the central role canoes and fishing played in the local culture. Canoes up to five and a half metres long, capable of carrying five people, have been recorded.

Canoes were made of bark, and canoe scars have been recorded on numerous trees in the region. Other scars show bark being used for huts and carrying vessels. Digging sticks were used by women to dig up tubers, and burrowing animals and grubs. Animal skins were used for warmth and also for water carrying containers. Grinding stones have also been found in sites. Stone suitable for tool manufacture is not common in the region. Stone was traded for possum skin cloaks and other items (Roland Atkinson pers. comm.).

Nets were also an important and widely used technology. They were made of fibre and could by up to 90+ metres wide. Varying types of nets were used to trap ducks and other water birds, fish, crayfish, and emu. Small net bags were also used to carry items. As well as spears and nets, fish were trapped in weirs or fish traps. These could be made of wooden stakes or stones placed across a channel so that fish would be trapped within as waters receded.

Technology varied with the seasons. Cloaks were designed for colder weather and rarely used in winter. In summer temporary windbreaks or light shelters were used or sometimes no shelter was required. In winter more substantial huts were built. These were observed by European explorers, often in large numbers and referred to as 'villages'.

Toys used by children and others were also observed. Children were given smaller sized toy spears and shields. Two toys commonly used were a ball and a 'watchwie'. Balls were made from tightly rolled possum skins and a 'watchwie' was something like a throwing hammer. It was an oval piece of solid wood with a long length of reed or cane grass attached to one end. It was held by the tail and spun around and released. Competitions were had for who could throw the toy the furthest. The large variety of material culture employed by the local people may have been in part due to the semi-sedentary nature of their habitation patterns.

3.1.3 Land Use and Activity

As mentioned above, the populations along the Murray tended to be semi-sedentary at least for parts of the year. This involved construction of substantial huts and fish traps. One of the distinct activities of the area is the use of 'ovens'. This method of cooking involved a number of steps. A hole was dug around 0.5 – 1

metre deep and a fire started in the base. Large pieces of clay placed in the fire. When the clay was hot enough some of the clay was removed with ashes. Damp green grass was then put in the hole in two layers, above and below the food to be cooked. The hot clay was then put back on top and covered with earth. The food inside was essentially steam baked for about two hours. This enabled large quantities of food to be cooked. The ovens would be repeatedly used. This results in large mounds of ash, charcoal and burnt clay piled up, which can be identified in the archaeological record (Buchan 1974). This site type is distinctive in the region. There have also been suggestions that they were used for plant processing. Other hearth sites occur without 'mounds' and midden material is often found in association with mounds. Burials can also be located within mound sites.

3.1.4 Contact and Interaction

In the 1845 census an estimated 2,000 Aboriginal people were living in the 'Murrumbidgee Pastoral District'. This included the Murray and project area region. This included 300 at Gerapthana River, near Deniliquin, close to the border of Bangerang and Narinari country, and 200 at Urana in Bangerang country. Approximately 1,200 Bamerang people had been recorded in 18841 (HO & DUAP 1996). It is likely these populations were already significantly reduced from pre-European contact numbers.

The presence of large midden sites along both sides of the Murray River suggests possibly previously much higher populations. The squatter, E. M. Curr made many observations of the Aboriginal people in the area from the 1840s. He noted middens of up to 50 metres in circumference. It is likely that by the time he was observing these sites, many middens had already been destroyed for use in construction (HO & DUAP 1996). By 1850, Curr had recorded that as few as 80 Aboriginal people were surviving in the Western Murray area (HO & DUAP 1996).

At least up until the 1840s and 1850s records of traditional cultural activities continued. European depictions of corrobborees showed a continuation of social gatherings. By the 1880s events such as corrobborees were being staged for non-Aboriginal audiences and recordings of traditional practices decline in the record. However, we know from elsewhere that the seeming 'disappearance' of Aboriginal culture in the later part of the 19th and early 20th centuries is often a result of the lack of recording rather than a true absence of Aboriginal people.

3.1.5 Continued Connection

While many individuals who survived the European incursion would have left for other areas or been forced onto missions and reserves, some Aboriginal people stayed and worked within the developing industries of the region. Aboriginal stockmen were highly regarded and seen as more skilful than their non-Aboriginal counterparts (HO & DUAP 1996). Many Aboriginal people would have had to take work on the surrounding stations or in the growing towns. Many of the towns in the region still have substantial Aboriginal populations.

The Yorta Yorta and Wiradjuri people have notably been involved in ongoing maintenance and promotion of their culture. Wiradjuri people have been successful, despite considerable obstacles, in maintain and reviving the Wiradjuri language. Through these efforts it is now possible to take a Graduate Certificate in Wiradjuri Language, Culture and Heritage at Charles Sturt University.

Between 1860 and 1993, there were approximately 17 separate attempts by Yorta Yorta people to reclaim land and/or receive compensation for land loss. In 1983 around 485 hectares of the former Cummeragunja Reserve was returned by the NSW government to the Yorta Yorta people (NOHC 2009). Conversations with the LALC representatives on site included references to ways the Reserve is being used and plans for future use to facilitate ongoing cultural practice.

3.2 Heritage Register and Database Searches

The following heritage registers and database searches were undertaken as part of this preliminary assessment:

- National Native Title Tribunal (NNTT);
- Aboriginal Heritage Information Management System (AHIMS);
- The Australian Heritage Database (AHD);
- State Heritage Register (SHR) and Inventory (SHI); and
- Berrigan Shire Local Environmental Plan (2013).

3.2.1 National Native Title Tribunal

A search was undertaken of the National Native Title Register maintained by the National Native Title Tribunal (NNTT) on 11 March 2020 of the project area to identify if Native Title exist over the project area. The searches indicated that no Native Title issues exist for the area (refer to **Appendix B**).

3.2.2 Aboriginal Heritage Information Management System (AHIMS search)

Searches were conducted of the AHIMS register on 2 May 2020 for any Aboriginal heritage sites recorded within or in close proximity to the project area. No sites were located. In order to provide a context of sites, the search was broadened to a 30 x 30 kilometre area centred on the project area. The search covered the area datum: GDA, Zone: 55, Eastings: 353000 – 383000, Northings: 6037000 - 6067000. The number of previously registered Aboriginal sites within this larger area was 25 (refer to **Appendix C**, and Figure 3).

The results of the search indicate that n.o AHIMS sites are registered within the boundaries of the project area.

3.2.3 Australian Heritage Database

The Australian Heritage Database (AHD) is a Commonwealth administered heritage database that includes entries from the former Register of the National Estate and the current Commonwealth and National Heritage Lists. This database was searched on the 6 March 2020 for all Indigenous heritage items within the Berrigan Shire LGA.

The results of the search indicate no registered Indigenous heritage items within the project area.

3.2.4 NSW State Heritage Register and NSW State Heritage Inventory

The State Heritage Register is a heritage database administered by the NSW Heritage Branch of the Office of Environment and Heritage. This database includes heritage listings for State significant heritage items. This database was searched on the 6 March 2020.

The results indicate no registered Aboriginal places within the LGA or within the project area.

3.2.5 Berrigan Shire Local Environmental Plan (2013)

The Berrigan Shire LEP is a planning instrument administered by Berrigan Shire Council, which contains provisions and listings of items of environmental heritage including heritage, conservation areas and archaeological sites within Schedule 5. The LEP was searched on 6 March 2020.

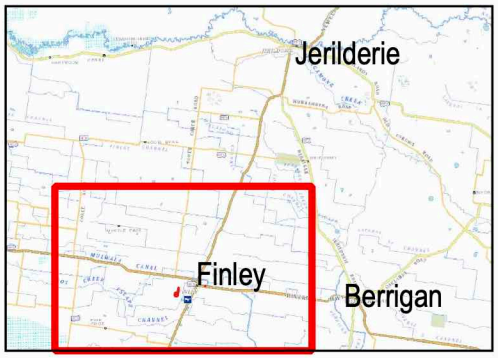
The results of the search indicate no registered Indigenous heritage items within the project area.

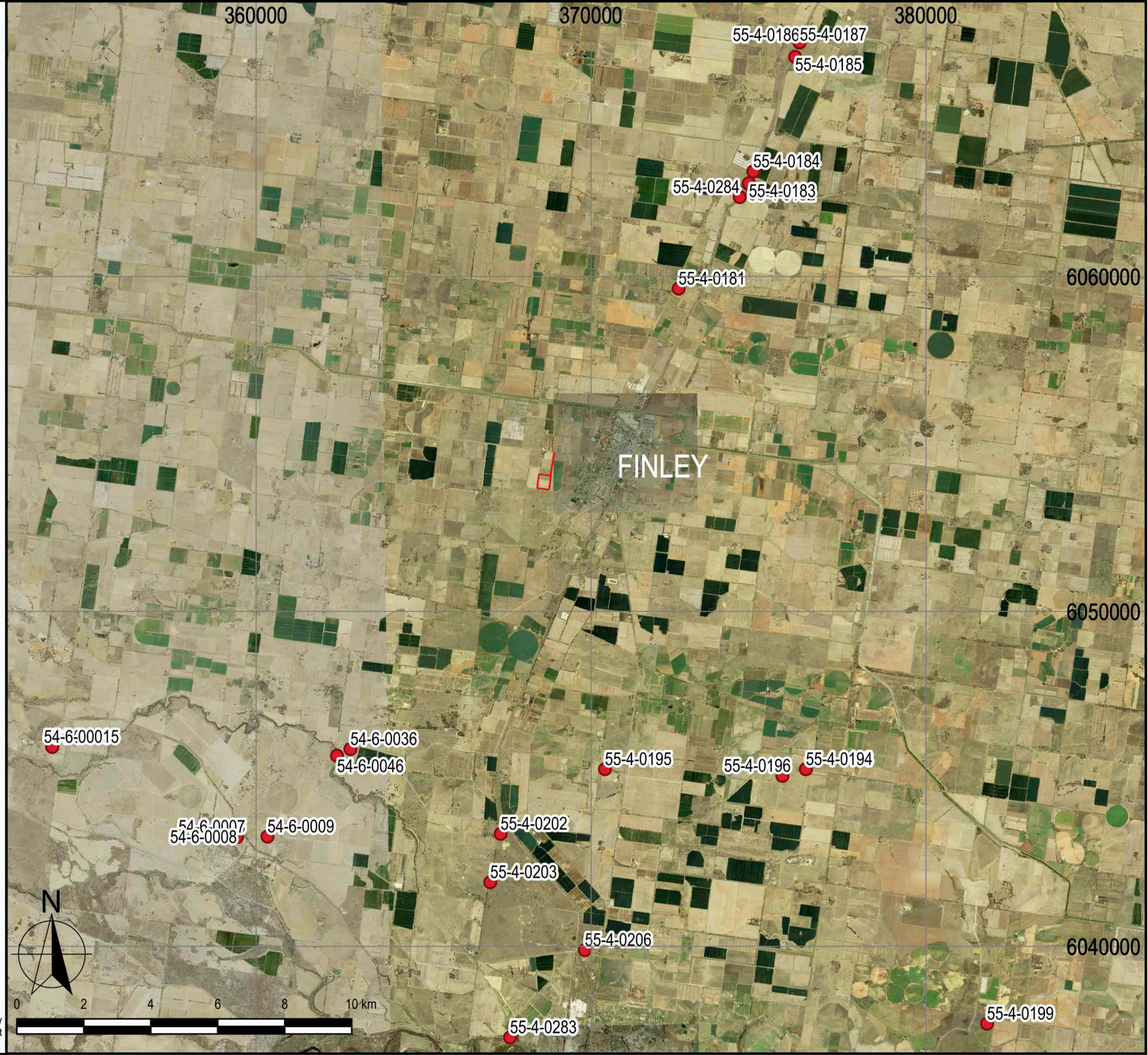
VIRTUSHERITAGE

Figure 3
AHIMS Search Results

Legend

- Project Area
- AHIMS Site





Source: NSW Spatial Services; Providence Asset Group DWG: FINLEY - PV Plant Layout [090320] provided by KDC 18.03.2020; Report generated by AHIMS Web Service on 02/03/2020 for Vanessa Hardy for the following area at Datum :GDA, Zone : 55, Eastings : 353000 - 383000, Northings : 6037000 - 6067000 with a Buffer of 0 meters. Additional Info : due diligence. Number of Aboriginal sites and Aboriginal objects found is 25

Maps and figures contained within this document may be based on third party data, may not be to scale and are intended for use as a guide only. Virtus Heritage does not warrant the accuracy of such maps or figures.

3.3 Previous Archaeological Research

A review of the DPIE AHIMS library and online searches were undertaken to obtain copies of previous Aboriginal heritage studies and archaeological investigations within the locality of the project area (refer to **Table 2**). This section discusses a number of studies in the locality that can assist in building up a picture of the potential archaeology of the region. This in turn can help to predict the types of sites that may be expected to be present within the project area.

A regional overview study for the NSW side of the Murray River Valley was undertaken in 1973-4 (Buchan 1974). The study area for the project included "a 30 mile [48 kilometre] wide strip" along the north bank of the Murray River from Albury to Mildura. This includes the project area for this assessment. Targeted survey areas and reassessments of known sites were included in the study. Target survey areas centred on Corowa, Deniliquin, Hay and Mildura. The current project area was not physically surveyed.

A total of 198 sites were recorded. Site recordings and choice of target survey locations was influenced by local knowledge and reporting of potential sites. Almost half (94) of the sites were oven mounds. This may partly be due to their visibility and ease of recognition. Other site types recorded included: scarred trees (75), open campsites (12), midden sites (8), burials (6), ceremonial sites (2), and one site described as an archaeological deposit. This was a stratified deposit located on top of a dune. It was noted that most of the sites recorded had been subject to some kind of disturbance since European settlement of the area (Buchan 1974: 38). It was noted that stock and feral animals (especially rabbits) had caused impact to sites as well as erosion and human construction.

A linear survey for optic fibre cable was undertaken between Darlington Point, Coleambally, Finley and Jerilderie by Giles Hamm (1995). During the survey 20 new sites were recorded. They were all scarred trees on Yellow box. They were generally associated with natural drainage features. The sites were predominantly along the Newell Highway as that was the route of the cable survey.

An assessment for a proposed drainage channel through the Pinelea drainage basin (Edmonds 1996) was located approximately 10 km to the south of the study area. It was noted that the area is within a former floodplain of the Murray River and consists of sediments mainly deposited by prior streams. The assessment area was assessed as being approximately 79 hectares of which around 80% was surveyed. The western end of the linear survey area was within around one kilometre of Tuppal Creek. A total of ten scarred trees were recorded as part of the survey. It was recommended that the trees could be avoided and would not be subject to impact by the proposed development. it was not assessed that there was potential for additional sites or a high likelihood that archaeological deposits would be preserved sub-surface.

Another linear survey was undertake from Deniliquin to Moama. Deniliquin is approximately 60 kms west of Finley. The assessed corridor was approximately 69 km long. The only major waterway crossed by the survey was the Edward River (NOHC 2009). A total of nine scarred trees were recorded during the assessment.

An assessment of the proposed Mulwala to Finley 132kV line upgrade was another linear survey that passed within two kilometres south of the project area along Broughams Road (OZARK 2008). The existing power line was also considered. It is less than one kilometre to the north of the current project site. This assessment was undertaken in a very similar landscape with similar soils to the current assessment. A total of 59 'spots' were inspected as part of the assessment. No sites were recorded. It was noted that the clay soils of the local area were less likely to have been favoured camping sites as the clay does not drain like sand and tends to get sticky when even light rain falls. Additionally, the distance from permanent water reduced the likelihood of finding evidence of past Aboriginal occupation.

A 2017 assessment of a solar farm project was located approximately 2.5 km west of the project area (RPS 2017). This landscape is the same as the current project area on the same soils. Based on the distance to water and the visual inspection of the area the RPS assessment was that it was unlikely that Aboriginal objects would occur in the area.

The AHIMS search is consistent with the findings of other assessments. The most common site type is modified trees, with mound sites and artefact sites also present. The AHIMS search results are included in **Appendix C.**

Table 2. Previous Archaeological Surveys within the Locality

AUTHOR/ DATE	LOCALITY	INVESTIGATION AND DISTANCE TO PROJECT AREA	NO. RECORDED SITES	SITE TYPES	SITES WITHIN PROJECT AREA
Buchan 1974	A wide (approx. 48 km) strip from the north bank of the Murray River from Albury to Mildura	Target survey and regional assessment including the project area	198 including previously recorded sites revisited	94 oven/mounds, 75 culturally modified trees, 8 middens, 12 open campsites, 6 burials, 2 ceremonial sites and 1 'archaeological deposit'	0
Hamm 1995	Linear survey Darlington Point-Coleambally and Finley-Jerilderie	Archaeological Assessment Targeted survey of 26 km route for the Finley to Jerilderie portion. The southernmost point of the Finley section began at the northern end of town on the Newell Highway approximately 3-3.5 km from the project area.	17 in the Finely to Jerilderie portion, 3 in the Darlington Point-Coleambally portion	culturally modified trees	0
Edmonds 1996	Pinelea Dranage Basin near Finley	Linear survey of proposed drain approximately 4-4.5 km to the south of the project area	7	culturally modified trees	0
NOHC 2009	Deniliquin to Moama linear route	Archaeological Survey of proposed transmission corridor. approximately	9	culturally modified trees	0

AUTHOR/ DATE	LOCALITY	INVESTIGATION AND DISTANCE TO PROJECT AREA	NO. RECORDED SITES	SITE TYPES	SITES WITHIN PROJECT AREA
		60 km west of the project area			
OzArk 2008	Mulwala to Finley transmission line upgrade	Nearly 68 km of proposed transmission line corridor with its western end passing less than 1 km to the north and less than 2 km to the south of the project area	None	N/A	0
RPS 2017	Finley	Solar Farm project approximately 2.5 km west of the project area	None	N/A	0

3.4 Regional Character

Aboriginal people have occupied the project area region for tens of thousands of years. A large variety of sites containing physical evidence of past Aboriginal land use remain within the local region. Site types include modified trees, earth mounds/ovens, midden sites, open campsites, and burials.

In general terms, proximity to a permanent water supply is the main factor influencing the location of Aboriginal habitation sites. In areas favourable for past occupation, the level of disturbance and type of land use will affect the likelihood of occupation evidence remaining. Scarred trees will only occur where suitable aged trees have not all been cleared. Surface or sub surface sites are less likely to be preserved where intensive agriculture or other impacts have modified the land surface. The following general predictions have been made for the region:

- Edmonds (1996) suggested that prior stream formations including levee banks and linear sandhills as well as linear depressions are the most sensitive landforms across the Riverine Plain.
- Streams and lagoons back from the main river margins may also have been particularly favoured areas (NOHC 2009).
- Buchan (1974:12) also suggests that the regional pattern of occupation was focused on the river valleys with the riverine plain having little evidence of occupation largely due to the lack of water and the related fact that relatively few animals inhabit these zones. Buchan does note that it is likely that during winter when resources on the River were scarcer there may have been increased movement inland and towards upland areas.
- Undoubtedly people would have traversed these areas even if they were not used for larger campsites or used repeatedly.
- When areas are subject to transient use, the probability of locating archaeological evidence of the use is greatly reduced.

- As there is no naturally occurring stone in the immediate vicinity, stone had to be traded, usually from south of the Murray (Buchan 1974). Quartz is the most commonly recorded stone used along with chert, silcrete, and quartzite.
- Culturally modified (scarred) trees are relatively common in the region where mature trees are still present.

Research, including excavations, has tended to focus on the mound sites and burials of the Murray Valley (Edmonds 1996). The 'oven' or 'mound' sites are relatively common along the Murray River plain. Larger sites are formed from repeated use and accumulation. There is some suggestion that the mounds may represent plant processing. Many of the smaller ones tend to be located along swamp and creek margins (Edmonds 1996: 15). Burials can sometimes be found in mound sites, presumably because they are within areas where the soil has been disturbed and therefore, easier to dig.

3.5 Summary

The results of the background archaeological research, including heritage searches and a review of previous assessments in the region indicate that the most common site type in the project area vicinity is scarred trees. Mound sites have also been frequently recorded, but this may be in part because they are highly visible and occur along well defined areas adjacent to waterways. The archaeological context of the project area indicates that artefact scatters are most likely to occur on well drained areas near reliable water.

The likelihood of sites being preserved into the present will be highly dependent on the impacts of previous land use.

4 PREDICTIVE MODEL AND ARCHAEOLOGICAL POTENTIAL

Based on the known archaeological, environmental and landscape context of the locality, a predictive model for evidence of Aboriginal occupation for the project area is presented below:

Scarred trees and **carved trees** contain evidence of scars and carved patterns which can be attributed as having Aboriginal cultural origin. Scarred trees are typically created by the removal of bark from the trunk of the tree (usually with a stone axe) to make shields, canoes, implements and other types of items which leave a wound on the tree trunk. Carved trees contain carved patterns on the tree trunk and are often found in association with ceremonial grounds, burials or cultural sites. This is a commonly recorded site type in the project area region, but due to the total clearance of trees in the project area it is not expected that this site type will occur.

Earth mounds are oval or circular shaped features containing burnt earth and clay as well as charcoal/ash. They can also contain shell, animal bone, stone artefacts and occasionally burials. They vary greatly in size from as small as 20 cm to 150 cm in height and from 5 m to 150 m in diameter. They tend to be found on or adjacent to floodplains on high ground near reliable water sources. It is considered unlikely that this site type will be present in the project area due to the distance from permanent or semi-permanent water.

Isolated artefacts and **open campsites (artefact scatters)** are the locations of stone artefacts, often material that has been discarded as part of making stone tools or over frequent episodes of occupation/visitation in an area. Surface disturbance and aggrading landforms will affect the likelihood of locating artefact sites. Objects are most likely to be found within close proximity of a reliable water course, well drained elevated areas where the landscape has not been heavily modified.

Middens are the accumulation of debris from fish, crustaceans and shell fish (shells, fish bones) consumed as part of Aboriginal people's diet. Middens often occur within close proximity to freshwater and saltwater sources which have potential to contain mussels, oysters and other types of edible shellfish. In this region middens occur along lake or lagoon shores as well as on creek or river banks. They largely contain freshwater mussel shell but can also include animal bone, stone artefacts and charcoal. Burials in midden sites have been recorded in small numbers (Edmonds 1996: 16). Due to the lack of known significant water source in the project area it is not anticipated that midden sites will be present.

There are no known **bora grounds** or **stone arrangements** within the project area based on Aboriginal consultation to date and previous archaeological and historical research for this assessment.

Burial sites while not common, have been found in the region. They are usually located within sandy deposits that were easy to dig such as riverbanks. They are also sometimes found in earth mound sites. It is not expected that the project area contains the types of soil or locations suitable for burials.

Petroglyphs (also referred to as Rock Engravings) are art sites where marks have been made in stone by Aboriginal people (for example, spirit figures, animals, implements and footprints). **Rock shelter sites with art** consist of rock overhangs used for shelter by Aboriginal people and where smooth surfaces on the walls of the shelter (sandstone surfaces) are painted with ochres and pigments) and **rock shelter sites with occupation deposits** include sediment deposits that potentially retain archaeological material. Due to lack of suitable geology it is not expected that this site type will occur.

Aboriginal axe grinding grooves are grooves most often found in sandstone where Aboriginal people have sharpened or manufactured stone axes and other implements and in some cases, ground seed and

grains in the sandstone forming 'bowls'. This site type may occur if suitable geology is present such as outcropping sandstone or suitable sandstone shelves in creek beds. Due to lack of suitable geology it is not expected that this site type will occur.

Potential Archaeological Deposits refers to soil profiles within landforms which are predicted to contain buried evidence of Aboriginal occupation. This buried evidence is most often stone artefact scatters which survive most frequently in the archaeological record. These will have a similar landscape distribution to open camp sites, i.e. in well drained elevated areas near reliable water. However, they will be in areas where the landform is aggrading, or disturbance has not exposed sites. Given the extent of ploughing and erosion in the project area it is not highly likely that such deposits will occur.

How archaeological potential is defined and to be assessed in this report is provided in **Table 4.**

Table 3. Definitions of Archaeological Potential

ARCHAEOLOGICAL POTENTIAL	DEFINITION
Low to Zero	Landforms that have been totally modified and have low to zero potential for any remaining original soil profile or intact archaeological deposits. This category includes existing roads, quarry areas or any area where the original soil profile (topsoil – A horizon) has been stripped and the landform completely modified. This landform may also include areas where there is no intact A horizon soils due to high levels of erosion.
Low	Landforms that may have been utilised by Aboriginal people in the past, but at a lower intensity relative to all surrounding landforms, resulting in a lower artefact density than all surrounding landforms. This category also includes landscape areas of low terrain integrity, where geomorphic processes or human action may have redistributed artefacts from their deposited locations, such as stripping of soil to create levees or excavation to create culverts, dams or bridges, resulting in site disturbance or destruction.
Moderate	Landforms that are predicted to have been utilised by Aboriginal people in the past, but not intensively or repeatedly. There is therefore potential for artefactual deposition, but at a lower frequency and density than in areas of high archaeological potential. This category may also refer to landforms known to be sensitive for higher levels of Aboriginal occupation but where prior ground surface disturbances has decreased the archaeological integrity and potential of finding evidence of Aboriginal occupation (for example, creek confluences, alluvial terraces where stratigraphic integrity may have decreased due to previous land use).
High	Landscape areas predicted to have been intensively or repeatedly utilised by Aboriginal people in the past, such as creek confluences, Pleistocene terraces, floodplains or elevated landforms above major watercourses or floodplains. In these areas, site and artefact density are expected to be higher than the surrounding landscape, and sites in these areas may possibly be more complex. Terrain integrity in these areas may be variable although prior ground surface disturbance should be low or non-existent. An important characteristic of areas

	of high archaeological potential is the research potential or the capacity of sites to provide valuable information on past Aboriginal land use.

4.1 Summary

The project area has been entirely cleared of its original vegetation, making the location of modified trees impossible. It is unlikely to have been a favoured campsite or location of repeated use, due to its distance from a permanent water source.

Disturbance to the project area including: clearing, grazing, ploughing and erosion have greatly reduced the likelihood of any evidence of past Aboriginal occupation being preserved within the site. None of the site types previously recorded in the region is considered to be likely to occur within the project area boundaries.

5 SITE INSPECTION AND RESULTS

The site inspection was undertaken on the 16 March 2020 within lands in the Cummeragunja LALC. The inspection was carried out by the archaeologist, Vanessa Hardy in collaboration with Brett Hamilton (Sites Officer) and Roland Atkinson of the Cummeragunja LALC. The survey team walked sample sections of the area spaced approximately 5-8 metres apart. The northern boundary of the study area was estimated on the ground as it was not clearly demarcated. Photographs of the area are included in **Appendix D**.

5.1 Survey Results

The project area has been entirely cleared of original vegetation. The entire area has clearly been ploughed and short vegetation is present with plough rows clearly visible. The visibility across the area was generally fair to good (approximately 30-70%). Exposures included access roads and excavated drains/canals on the southern and eastern boundaries of the project area. The canal/drainage areas are highly disturbed as the have been excavated and likely re-excavated when silted up as they are gravity fed.

There is also some evidence of foreign material being brought into the project area. The former track/fence line located along the western boundary contains road stabilising material and metal fragments. A general background scatter of historic material was observed across the project area. This included: glass, brick fragments, tile and pipe fragments and freshwater mussel shell. The shell observed was deposited recently as evidenced by the presence of intact shells that still contained some remains of the mussel flesh. Therefore, the observed shell was not part of a midden deposit. This scatter of material was present across the project area but focused on the southern boundary and of highest density near the canal water gate. The area surrounding the canal water gate included concrete blocks. Fragments of quartz were also located, predominantly in association with the other historic materials and shell. None of the quartz showed signs of flaking. Some pieces of burnt clay were found but there was no context to suggest that these were cultural.

It is evident that non local material is being introduced into the project area in recent times from modern land use practices. It was concluded that this either was washed down the canal during flow events or was distributed during the excavation of the canal channel.

No Aboriginal objects or sites were observed in the project area and no areas of potential deposit were identified.

Based on the distance from a known natural fresh water source, the land use history and disturbance observed during the site survey the project area was determined to have low potential for intact sub-surface archaeological deposits or Aboriginal objects. Erosion is likely to have removed substantial quantities of topsoil in recent times during intensive use of the subject site.

5.2 Summary of Site Inspection

There are no previously recorded sites in the project area based on heritage searches and background research of previous archaeological investigations to date. No Aboriginal objects or sites were observed in the project area and no areas of potential deposit were identified. The area has been entirely cleared of natural vegetation.

Due to the distance from water, previous land use history and high level of disturbance observed during the site inspection, the project area has low potential for in-situ Aboriginal objects or intact cultural deposits to occur.

6 RECOMMENDATIONS

The following recommendations have been made based on the information provided on project impacts, consultation to date, relevant archaeological and environmental background research, and the results of the site inspection.

1) There is no impediment to the proposed development in the project area on Aboriginal archaeological grounds and it is recommended that development can 'proceed with caution' as outlined in the Code of Practice.
2) As detailed in the Code of Practice, the proponent should retain this report as a record of actions taken and decisions made according to the due diligence process.
3) The Cummeragunja LALCs have reviewed a draft version of this report and have no objections to the proposed development on cultural heritage grounds. They recommend that appropriate efforts be made to identify and protect any unexpected finds during ground surface disturbing works.
4) All site workers and personnel involved in site impact works associated with the proposal site should be inducted and briefed on the possible identification of Aboriginal sites and objects during construction and their responsibilities according to the provisions of the *NPW Act, 1974,* in case any additional unknown objects or items are uncovered during excavation.
    a. As part of this induction, the contact telephone numbers of DPIE regional archaeologist and EnviroLine 131 555, the relevant Providence Asset Group or delegate's Environmental Officer responsible for this project should also be given to all site workers and personnel, in case unknown objects or items are uncovered during excavation.
    b. As part of this induction, workers should be made aware that in the event that any suspected human remains are uncovered on site, the area of these suspected remains should be secured and cordoned off and the NSW Police notified. No further works can be undertaken until the NSW Police provide written advice. If these remains are deemed to require archaeological investigation by the NSW Police or NSW Coroner, then the DPIE and the relevant Aboriginal parties must be notified. A plan of management for the preservation of any identified Aboriginal human remains or for their salvage must be put in place or conducted under an AHIP application developed in consultation with all Aboriginal stakeholders and the DPIE.
    c. KDC on behalf of Providence Asset Group may wish to consider the input and engagement of interested Aboriginal stakeholders in the development of inductions and tool box talks for this project.

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APPENDIX A
COMMENTS FROM LALC

Summary of Comments Received via Phone – Cummeragunja LALC

The archaeologist, Vanessa Hardy held a phone discussion with Roland Atkinson on 29/4/2020. The following summarises the key points of the discussion.

As discussed on site there were no areas of cultural significance identified. The Cummeragunja LALC is confident that no areas of high cultural significance or highly significant sites remain in the project area. They did comment that it is difficult to gather information relating to low density sites and landscape types where little research has been undertaken. This is in large part due to the inflexible nature of the NSW legislation protecting objects. They note that in Victoria it is possible to monitor land with low or unknown potential to gather information relating to the presence or absence of Aboriginal objects. While this is not practical in NSW, where possible, the Cummeragunja LALC, where possible, would like to see safeguards implemented to ensure any unexpected finds are dealt with appropriately. This could be in the form of an unexpected finds protocol and engagement of Cummeragunja LALC members to assist in the development and delivery of inductions and tool box talks for Aboriginal heritage for this project.

They would also appreciate consideration of employment opportunities for Aboriginal community members.

It was noted that:

- there are no known sites in the project area listed on the AHIMS database;
- no community knowledge of sites in the project area or its vicinity was found during discussions; and
- no Aboriginal objects or areas of cultural significance or potential significance were located during the site survey.

On this basis the Cummeragunja LALC members and board have no objections to the proposed development on Aboriginal cultural heritage grounds.

APPENDIX B

NATIONAL NATIVE TITLE TRIBUNAL SEARCH

APPENDIX C

AHIMS SEARCH

APPENDIX D

PLATES

Plate 1: F SE corner of project area, facing north along eastern boundary

Plate 2: Near southern boundary of project area (fence line) facing west

Plate 3: Access road at western boundary – facing north

Plate 4: From western boundary of project area facing east

Plate 5: Water control gate on canal at southern boundary of project area facing southeast