

Aboriginal Cultural Heritage Due Diligence Assessment

for

**Proposed Solar Farm,
710 Murrumbidgee River Road, Hay NSW 2711**

Prepared for
Green Gold Energy

Version 1

24/4/24

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Executive Summary

Red-Gum Environmental Consulting Pty Ltd has been commissioned by Chris Smith and Associates to undertake an Aboriginal Cultural Heritage Due Diligence Assessment (ACH DDA) for a proposed Solar Farm at 710 Murrumbidgee River Road, Hay NSW 2711 ('the project') for Green Gold Energy ('the Proponent').

Previous archaeological studies within the region have found that land overlooking fresh water sources have the potential to contain Aboriginal objects or Aboriginal places, which would include the Murrumbidgee River (approximately 800 metres to the south of the project at its nearest point).

A survey of the study area was undertaken on the 2nd of November 2023 and again on 5th April 2024 by Damian Wall of Red-Gum Environmental Consulting Pty Ltd. During the site survey, areas of previous disturbance were noted and recorded. Areas of ground surface exposure were targeted in order to identify any Aboriginal objects within the study area. The Solar Farm area exhibited limited levels of visibility and exposure and no (zero) Aboriginal objects, nor trees with cultural modifications or any undisturbed areas of potential (PADs) within the Solar Farm area.

However, six (6) new sites were recorded in the mapped 'High Aboriginal Cultural Heritage Risk Zone' within the road corridor. The main site access to the Solar Farm must cross this zone. The new sites consisted of four (4) hearths and two (2) isolated stone artefacts.

Red-Gum has mapped and inspected an alternate alignment to facilitate site access that avoids the recorded sites (710_MRR_Artefact 1, 710_MRR_Artefact 2, 710_MRR_Hearth 1, 710_MRR_Hearth 2, 710_MRR_Hearth 3 & 710_MRR_Hearth 4). In order to avoid harm to these places, Red-Gum has developed ten (10) recommendations (**Section 10**) to be implemented by the proponent. An Aboriginal Heritage Impact Permit (AHIP) is recommended *if any of the recommendations cannot be implemented or the alternate alignment is modified in any way or the site access is to remain in it's originally proposed alignment*.

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW, 2010a) (due diligence code) provides a flowchart with the steps of the due diligence process outlined. This flowchart is provided in **Appendix A** in order to demonstrate that each step of the process has been addressed. There is no legal obligation for further assessment to be undertaken if the recommended alternate alignment is agreed to and the recommendations made by this Due Diligence are implemented. The purpose of the due diligence code is to provide a defence against prosecution if the process is followed. The due diligence code sets out penalties for impacting on Aboriginal objects, defining two types of offences as follows:

- an offence of harming or desecrating an object which a person knows is an Aboriginal object (a 'knowing offence'); and
- an offence of harming an object whether or not a person knows it is an Aboriginal object (a 'strict liability offence').

The maximum penalty for the knowing offence is \$550,000 or \$275,000 (depending on whether there are aggravating circumstances) and one to two years' jail for an individual. For a corporation, the maximum penalty for the knowing offence is \$1.1 million. The maximum penalty for the strict liability offence is \$110,000 or \$55,000 (depending on whether there are aggravating circumstances) for an individual or \$220,000 for a corporation.

As this assessment has identified and avoided any and all areas of archaeological sensitivity, it will provide a defence against prosecution if Aboriginal sites are unintentionally impacted by the development, provided that its recommendations are followed.

The following contingencies are to be adhered to during the project implementation stage:

Contingency 1: Discovery of unanticipated Aboriginal objects within areas of low potential.

All Aboriginal objects and places are protected under the National Parks and Wildlife Act 1974 (NPW Act). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Department of Planning & Environment (DPE).

Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the DPE and Aboriginal stakeholders.

Contingency 2: Discovery of Aboriginal ancestral remains.

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and DPE's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by DPE.

Regards



Mr Damian Wall
BAppSc, MEnvMgt, MAACAI
Managing Director

24/4/24

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1 INTRODUCTION

Chris Smith and Associates are proposing to construct a solar farm at 710 Murrumbidgee River Road, Hay NSW 2711. The proposed works (while still at concept/design stage) will likely consist of the construction of a 4.95 MW PV Export System and BESS system encompassing 390 strings (rows) of solar panels (modules), 10530 modules total, one inverter station, infrastructure to link into existing transmission network, a security fence, access track and access gate off Murrumbidgee River Rd.

This Due Diligence Assessment has been prepared to consider the potential impact of the project to Aboriginal cultural heritage and archaeologically sensitive landscapes. The advice and reporting provided here follows the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW, 2010a). In following these requirements, it has been issued to Green Gold Energy via Chris Smith and Associates and should be retained for five (5) years as it may provide for a defence against prosecution in the event of unanticipated harm.

The study area is within the Griffith Local Aboriginal Land Council (Griffith LALC) area and this work has been prepared by Damian Wall (Red-Gum Environmental Consulting Pty Ltd). Damian holds the relevant qualifications for undertaking formal archaeological assessment in New South Wales (as set out in the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010b) and is a full member of the Australian Association of Consulting Archaeologists Inc (ACCAI).

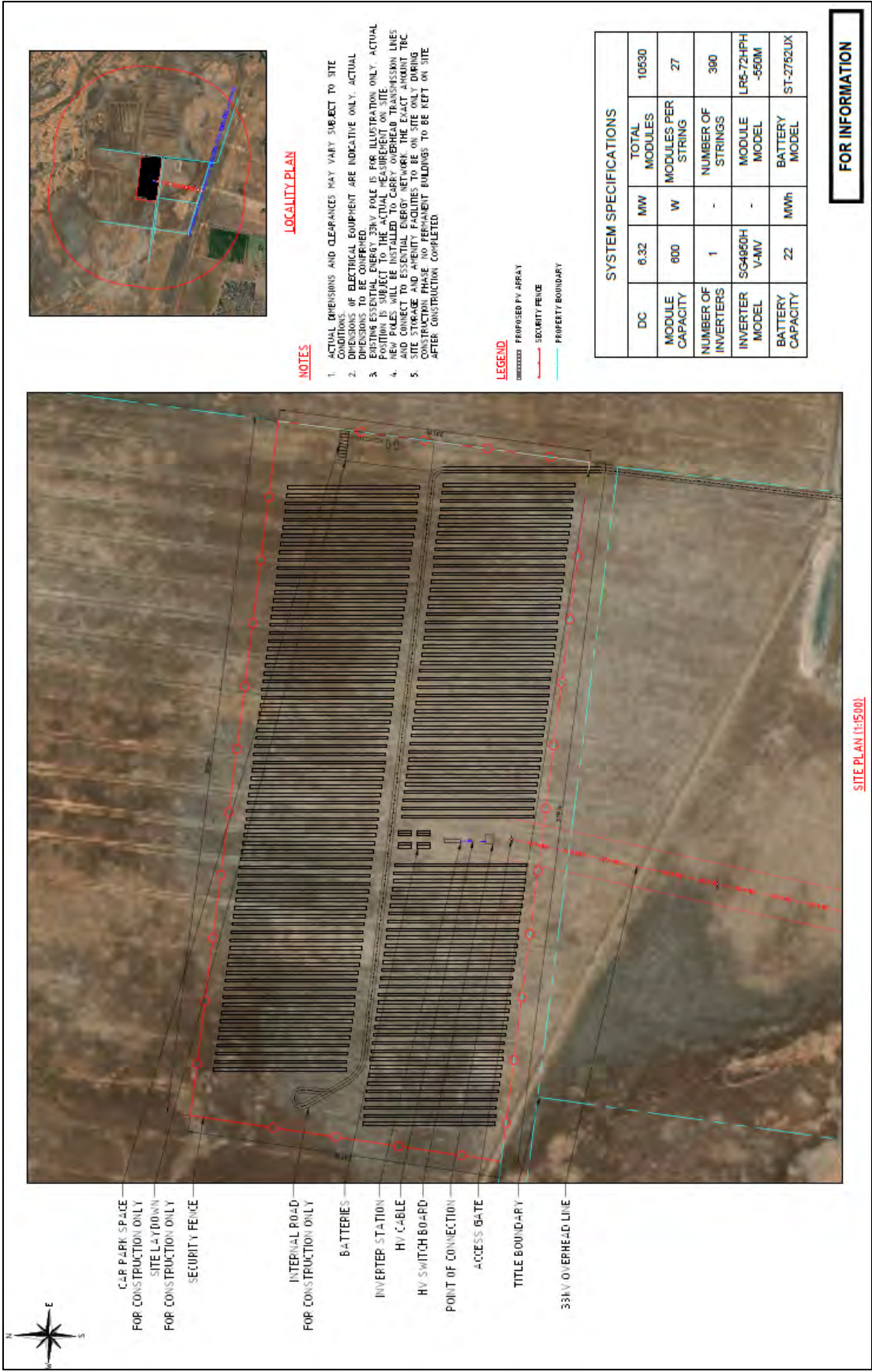
2 BACKGROUND

Green Gold Energy are proposing to construct a solar farm at 710 Murrumbidgee River Road, Hay NSW 2711. The solar farm will be installed with a two metre high array system where the arrays are spaced approximately five to six metres apart to prevent shading at the start and at the end of day. The wide distance apart significantly reduces the amount of shade impacting the areas between the panels. There are no anticipated vegetation losses along proposed fences or for fire breaks as the entire property will be under a cultivation regime (not dissimilar to how the site is already being managed) **(Map 1 & 2)**.

The proposed works (while still at concept/design stage) will likely consist of the construction of a 4.95 MW PV Export System & BESS system encompassing 390 strings (rows) of solar panels (modules), 10530 modules total, one inverter station, infrastructure to link into existing transmission network, a security fence, access track and access gate off Murrumbidgee River Rd.



Map 1: Site locality, 710 Murrumbidgee River Road, Hay NSW 2711. Scale: 1:3,800. Source: ESRI, 2024.



3 PLANNING APPROVALS

The proposed development will be assessed against Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) (NSW). Other relevant legislation and planning instruments that will inform the assessment include:

- *National Parks and Wildlife Act (NPW Act) 1974 (NSW)*
- *National Parks and Wildlife Amendment Act 2010 (NSW)*
- *National Parks and Wildlife Amendment Bill 2021 (NSW)*
- *Native Title Act 1993*
- *Heritage Act 1977*
- *Environment Protection and Biodiversity Act 1999*
- *Hay Local Environmental Plan 2011*

4 SCOPE OF THE ASSESSMENT

The following is a summary of the major objectives of the assessment:

1. Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the Aboriginal Heritage Information Management System (AHIMS).
2. Undertake archaeological survey as per requirement 5 of the code, with particular focus on landforms with high potential for heritage places within the study area, as identified through background research.
3. Record and assess sites identified during the survey in compliance with the guidelines endorsed by Heritage NSW (formally NSW Department of Planning, Industry and Environment).
4. Determine levels of archaeological and cultural significance of the study area.
5. Make recommendations to mitigate and manage any cultural heritage values identified within the study area.

5 DESCRIPTION OF PROPOSED WORK

The proposed works (while still at concept/design stage) will likely consist of the construction of a 4.95 MW PV Export System & BESS system encompassing 390 strings (rows) of solar panels (modules), 10530 modules total, one inverter station, infrastructure to link into existing transmission network, a security fence, access track and access gate off Murrumbidgee River Rd.

The solar farm will be installed with a two metre high array system, where the arrays are spaced approximately five to six metres apart, to prevent shading at the start and at the end of day. This wide distance apart significantly reduces the amount of shade impacting the areas between the panels.

The solar farm will be installed with 'bifacial PV modules' mounted on a single axis tracker system. Single-axis trackers are used to increase the performance (output) of the system by allowing the PV modules to rotate on a single axis, following the sun's path throughout the day, reducing the amount of shade impacting the areas between the panels (**Figure 1 & Figure 2**).

The 'agrivoltaic' industry is expanding worldwide based on the principles of integrating agriculture (grazing) and solar PV projects which, like this project, are essentially designed to take advantage of continued vegetation (grass) cover beneath the panels. From approximately 8 am until 1 pm (exact times depend on the time of the year) the shaded area will continually move and decrease in size as the trackers move from an east facing angle of 60° to a horizontal position of 0°. From approximately 1 pm until 6 pm, the trackers will move from the horizontal position of 0° to a west facing angle of 60°. During this time, the shaded area between tracker rows will move and increase in size. This rotation of the tracker axis and associated travel of the PV modules allows for direct irradiance to reach all areas of the ground below the PV system during the day, hence allowing the native grasses to persist on site (not unlike a part shade environment in a grassy woodland).

The panels are 'bi-facial' which means they can capture light on the rear face of the module, reducing the need for more panels on site and allowing for a greater level of 'diffused & reflected light' to reach the surface under the panels (**Figure 2**). This level of reflected and diffused light allows vegetation below the PV modules to continue to grow even when the tracker is in a position that would shade the ground below from direct irradiance (**Figure 3**).

All solar array lines are 2.25 metres wide (this is the 'shade loss' area by varying lengths across the site) with the actual spacing between the tracker rows (pitch) being 5.4 metres. This results in a minimum clear space between two arrays of approximately 3.3 metres when the trackers are in the horizontal plane (0°); this is the trackers' position during the middle of the day when the sun is at its maximum elevation angle (**Figure 4**). At this time, the ground between the tracker rows will receive direct irradiance, with zero shading. The 3.3 metre gap between array lines will also allow for construction vehicles. The full suite of ground disturbance is attributable to storage shed/s, site offices, passing bays, internal access tracks, cabling, fencing and assembly area/s. Road widths for internal access will be four metres. These areas will be cleared, grubbed and dressed with imported road materials.

The following strategies are to be implemented to minimise the impacts of the operation:

- Construction of the array layout by small (4t excavator), mini-piling rigs and soft tyred vehicles.
- Designation of lay down areas and site amenities (temporary or permanent).
- The site extent, including construction limits and exclusions zones, will be clearly defined prior to the construction period commencing.
- Vehicle movements around the site will be restricted to the site borders.
- Soil disturbance by vehicle and pedestrian access is to be kept to a minimum outside the construction footprint.
- No soil will be removed from site and low impact measures utilised to install the solar array.

Preparation of a Construction Environment Management Plan (CEMP) or equivalent, post approval by the determining authority. The CEMP is to highlight all the above harm minimisation strategies and provide clear and measurable environmental objectives that can be audited to ensure losses do not exceed those already anticipated.

Earthworks will be carried out in accordance with The Blue Book – Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and AS2436:1981– Guide to noise control on construction, maintenance and

demolition sites. Construction waste management will be in accordance with the Environmental Guidelines: Assessment, Classification and Management of Liquid and Non Liquid Wastes (EPA, 1999).

The extent of works will be considered in an Erosion and Sediment Control Plan (ESCP) as part of the construction process and machinery to be used during construction may include a grader, roller, water cart, tipper trucks, excavator, loader and various other light support vehicles.

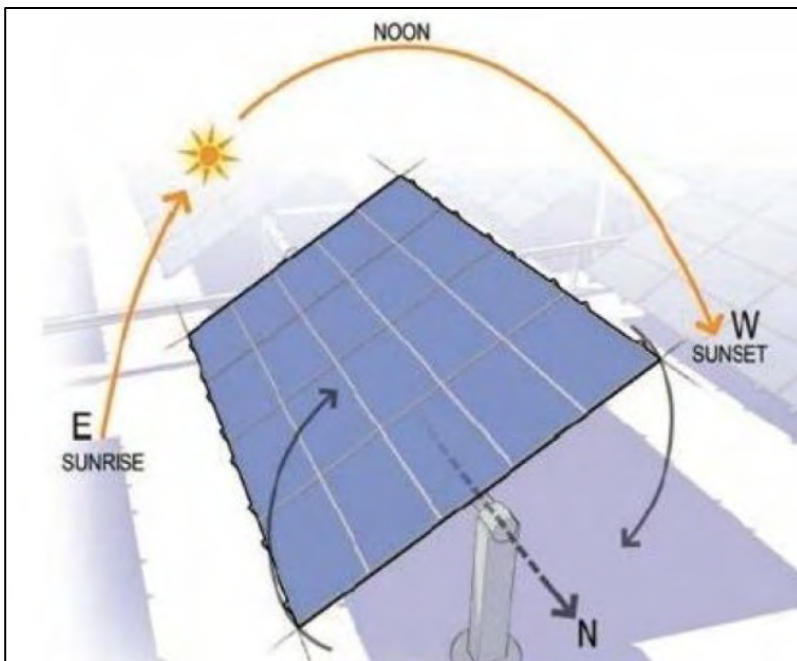


Figure 1: Example of a Single Axis Tracker PV System showing shading polygon that moves through day.

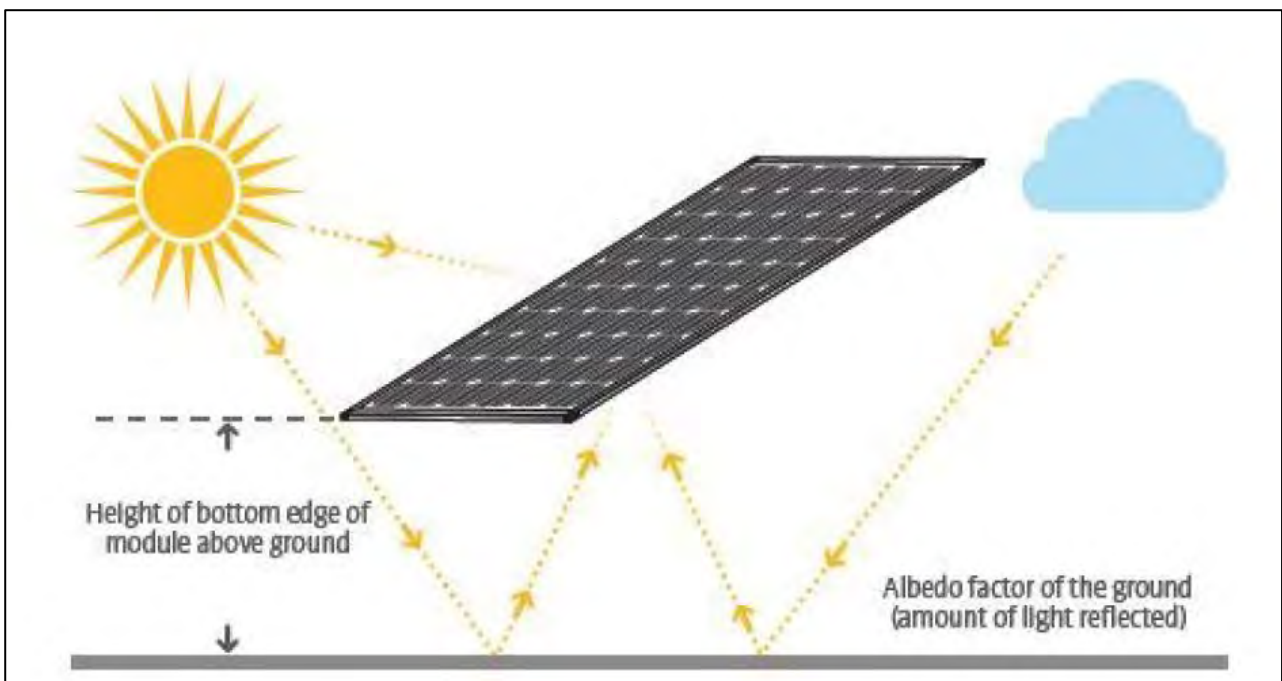


Figure 2: Example of diffused and reflected irradiance below a PV module.

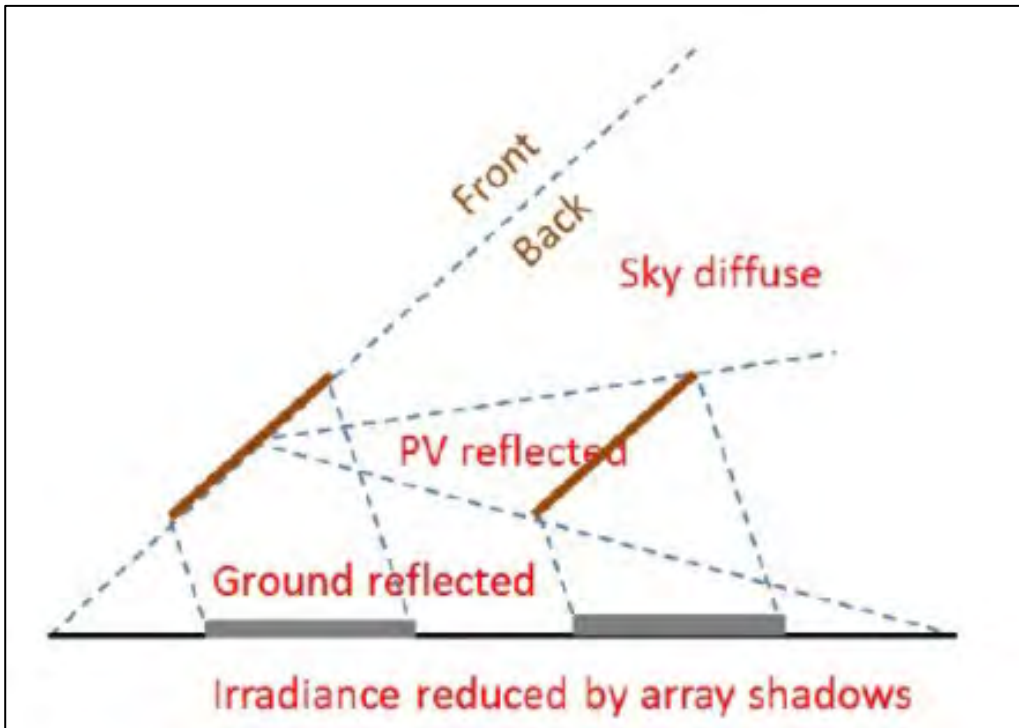


Figure 3: Example of the irradiance components behind and below a ground-mounted PV system.

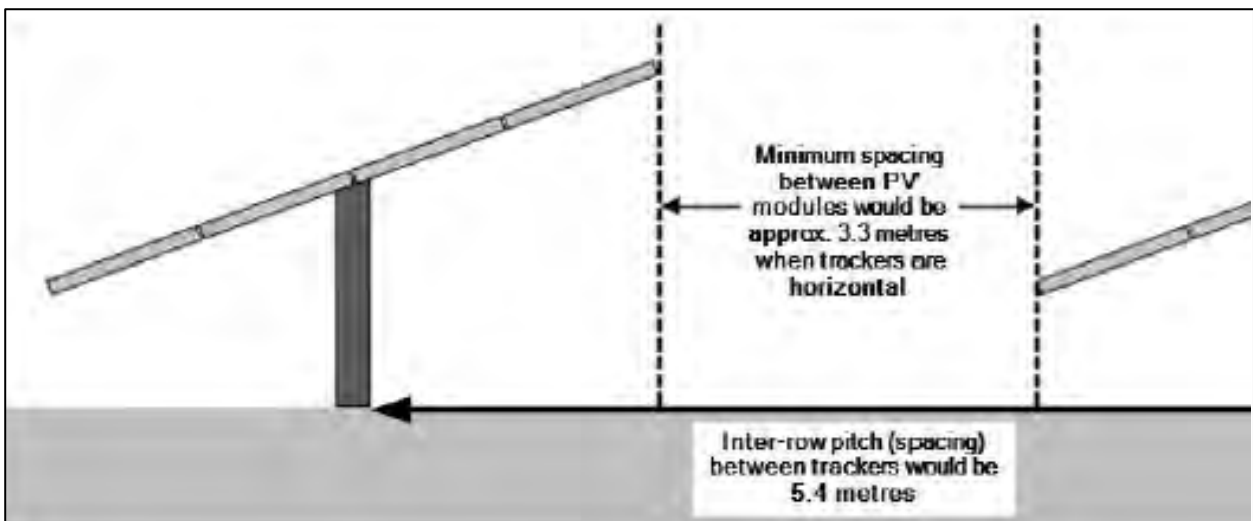


Figure 4: Illustration showing the difference between the inter-row spacing (pitch) and the minimum spacing between PV modules.

6 THE DUE DILIGENCE SYSTEM

The DPE's Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW provides a step-wise process to help determine whether an activity is likely to cause 'harm' to 'Aboriginal objects' (both as defined in the *National Parks and Wildlife Act 1974*). If it is determined that the work may 'proceed with caution' and harm later occurs, the documentation of due diligence may provide a defence against prosecution. The following report sections address the questions set out in the generic due diligence system as shown in **Figure 5**. Following this schematic version of the due diligence system, clearance for the work to go ahead without an Aboriginal Heritage Impact Permit (AHIP) occurs variously at:

- Step 1 – will the activity disturb ground surface;
- Step 2 – where there are no relevant indicators of Aboriginal cultural heritage potential;
- Step 3 – where potential harm can be avoided;
- Step 4 – where desktop assessment and archaeological survey determine that Aboriginal objects are unlikely to be present.

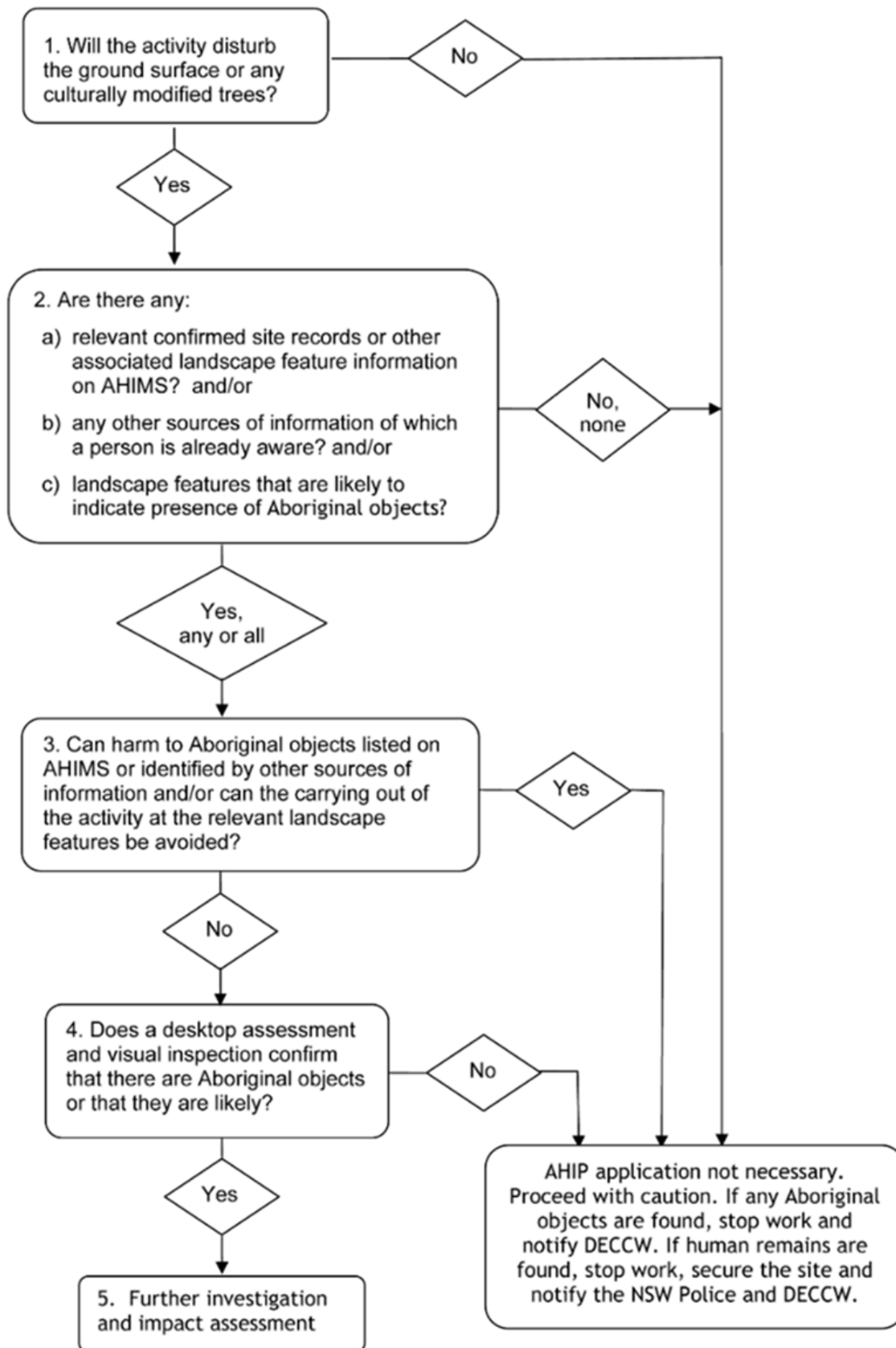


Figure 5: Generic Due Diligence process in NSW. Source: NSW DPE

7 DESK-TOP ASSESSMENT

A desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and to identify known Aboriginal sites and/or places recorded in the study area. This desktop assessment has been prepared in accordance with requirements one to four of the code.

7.1 SOIL & GEOLOGICAL LANDSCAPES

7.1.1 SOILS

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential and are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The study area is located within the Riverina IBRA bioregion and Murrumbidgee Scalded Plains Mitchell Landscapes (Mitchell, 2002). The NSW Riverina bioregion (RIV) covers a total area of 9,576,964 ha, with 7,090,008 ha or 74.03% of it lying in NSW (NSW Department of Planning, Industry and Environment). The Riverina covers the alluvial fans of the Lachlan, Murrumbidgee and Murray Rivers west of the Great Dividing Range and extends down the Murray. The upper catchment landscape is a series of overlapping, low gradient alluvial fans. The lower tract of the river is a floodplain with overflow lakes. Discharge from past and present streams control patterns of sediment deposition, soils, landscapes and vegetation. (NSW Department of Planning, Industry and Environment).

This bioregion is dominated by river channels, floodplains, backplains, swamps, lakes and lunettes that are all of Quaternary age. Modern river channels consist mostly of sandy soils and more saline heavy grey and brown clays towards the outer perimeter of the floodplains on the higher rarely flooded terraces (Eardley 1999). Sandy soils also form levees, old channels, dunes and lunettes.

As soil and water salinity increase downstream on the Murrumbidgee, saline clays become evident on lake floors. The red-brown and grey clays in the bioregion support grassland communities that are nationally significant. Calcareous, sandy soils, that tend to be feature of adjacent bioregions are also present in the Riverina and support mallee communities (Semple 1990, Porteners 1993, cited in Eardley 1999).

Murrumbidgee Scalded Plains can be described as Quaternary alluvial plains with extensive scalding interpreted as relic floodplains or terraces. Primarily grey, brown and red cracking clays, red brown texture-contrast soils with scalds. Levee traces evident, relief generally <1m, up to 5m on associated pans, swamps and lunettes.

7.2 GEOLOGY

Geologically, the Murray Darling Basin is considered to be a 'shallow crustal depression' and has a layer of marine and terrestrial sediments, which have been deposited over the last 50-60 million years. There is evidence to suggest that the coast reached as far inland as Balranald, approximately 130 km to the west of the study area (NPWS 2003a). The NSW 1500k simplified surface geology (available via the seed online portal) indicated that the activity area was one type of surface geology.

- Cenozoic Shepparton Formation (Czss) - Shepparton formation deposits are mainly derived from rivers and streams but also include aeolian (i.e. windblown) deposits, consisting of poorly consolidated clay, silt, sand and gravel.

7.3 FLORA & FAUNA

The wider Hay region and area surrounding the Murrumbidgee River would have generally provided a number of resources used by Aboriginal inhabitants. In a semi-arid environment, the Murrumbidgee River and heavily wooded Black Box creek lines provided shelter, abundant food and a focal point for social interaction. Indigenous communities procured Murray Cod, fruit, mussels, wood, Murray Crayfish, yabbies, reeds and medicines from the river system. Evidence for the processing of food stuff and the working of wood can be found throughout the landscape in the form of lithic artefact scatters, mounds, hearths and midden material. Burial grounds are present within this environment and several studies have located these sacred places within the Hay district. In addition, the local communities have used the bark from the surrounding trees to make canoes, coolamons and shields which can be seen throughout the landscape (Attenbrow, 2002).

Animals including kangaroo, emu, and wallaby would also have provided abundant sources of food, with brush-tailed possums being highly prized for their fur, which were worn as cloaks over one shoulder. Kangaroo teeth were incorporated into decorative items, such as head bands (Attenbrow, 2002). As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', which would have functioned as awls or piercers, are often an abundant part of the archaeological record (Attenbrow, 2002).

The study area is in the majority cleared of native vegetation in all forms, with non-native plants dominating much of the ground cover with the exception of the access road and power pole sites. NSW Vegetation mapping suggests that the bulk of study area is mapped as being non-native. The closest mapped Plant Community Types (PCTs) exist within the proposed access road footprint, and new power pole footprint (**Map 3**).

These include:

- PCT 164 Cotton Bush open shrubland of the semi-arid (warm) zone
- PCT 46 Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion
- PCT 160 Nitre Goosefoot shrubland wetland on clays of the inland floodplains



Map 3: NSW Plant Community Types (PCT) mapped as occurring within the site. Source: NSW Government (SEED Map Portal)

7.4 EUROPEAN LAND USE

Large tracts of land were taken up by squatters following the establishment of the first stock routes after the crossing of the Blue Mountains in 1813 by Blaxland, Wentworth and Lawson (Cameron & Spooner, 2010, p. 341). Following this, John Oxley explored the Riverina followed by Thomas Mitchell in 1836 and Charles Sturt in the years between 1828 and 1831 (Sahukar, Gallery, Smart, & Mitchell, 2003). The squatters following the explorers introduced cattle and sheep to the country and were followed by further settlers after the introduction of the *Free Selection Act* in 1861 (McInnes, 1990). 'Illiliwa' station, established in the 1840s, contained the land on which northern Hay would later be built and where the development site is located.

Hay is located in the western Riverina region of New South Wales. The township began as a crossing-place on the Murrumbidgee River, for stock being driven south to markets in Victoria during the gold-rushes of the 1850s. The site was eventually surveyed in 1859 and Hay quickly developed as an important hub for the surrounding pastoral holdings, with their fat-stock and wool production (Hay Historical Society Inc).

During its earliest days, Hay's economy was linked to the navigation by steam-boats of the Murrumbidgee, and it became an important port. The town and district was also extensively serviced by horse- and bullock-driven wagons. In 1882, the railway was extended to Hay, linking the town directly with regions to the east, including Sydney (Hay Historical Society Inc).

At this time, areas near the river appeared to attract large gatherings of Aboriginal people. Lang (1865, cited in Kabaila 2013) recorded a spear-fight between young men at one such gathering. Subsequently he employed Aboriginal people to cut bark and timber for settlers' huts. In the 1860s, with the introduction of wire fencing, the properties began to be fenced. At the same time, rabbits, introduced some years earlier in Victoria, became a significant pest and competitor for pasture. By c.1900, following over-grazing major drought years, carrying capacity of properties in the region were diminished.

The major land-use that has affected the exposure and potential survival of Aboriginal cultural heritage material has been pastoralism. Nineteenth century over-grazing and rabbit infestations depleted ground cover, forming extensive scalds, eroding deposits and exposing archaeological remains. The location of the proposed development is surrounded by pastoral and agricultural fields, roads and utilities; and therefore, has been subject to considerable impacts for many decades.

7.5 SITE RECORDS

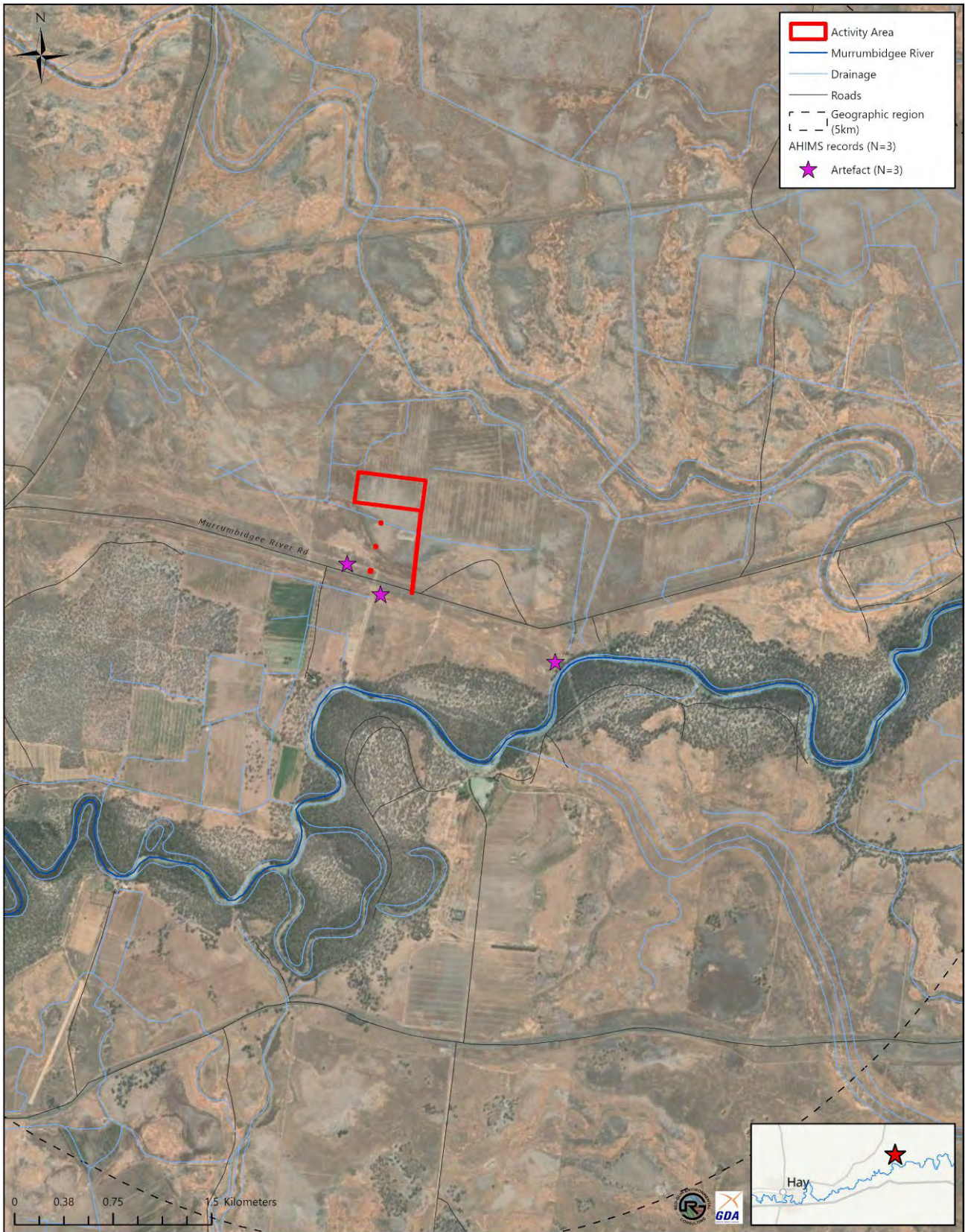
An AHIMS search conducted on the 3rd of April 2024 returned **zero (0)** records within the site development boundary, and three (3) records within a five (5) kilometre buffer of the site (**Map 4**). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied on where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area.

Based on previous archaeological investigation in the region and knowledge of the Wiradjuri cultural practices and traditional activities, the study area has the possibility of containing archaeological sites, especially given that Aboriginal people have lived in the region for tens of thousands of years. This would most likely be in the form of artefact scatters, isolated artefacts and scarred trees in remnant old growth vegetation areas bordering water sources and/or as isolated paddock trees.

Previous surveys in the local region demonstrate that there is a strong, complex and varied pattern of human use and movement throughout the landscape. This is apparent from the range of artefacts and site types distributed and concentrated in specific landforms across the region. There appears to be a strong association between the presence of potential resources for Aboriginal use and the presence of archaeological sites. Areas directly associated with water and elevated ground appear to have the greatest potential for identification for Aboriginal cultural material.

Background research undertaken for this report has indicated that there has been a lack of coordinated research into Aboriginal archaeology in the areas between the larger city centres, and that a larger variety of site types across the wider region may exist. As such, these results do not necessarily represent the full range of archaeological sites which may potentially be identified within the study area.



Map 4: AHIMS recorded sites within five (5) kilometres of the site. Scale: 1:35,000. Source: ESRI 2024.

7.6 LANDSCAPE FEATURES

The Due Diligence Code (DECCW, 2010a) specifies a number of landscape features which are most associated with the likely presence of Aboriginal objects and which therefore require further assessment if present. These are areas that are: within 200 metres of waters; located within a sand dune system; located on a ridge top, ridge line or headland; or located within 200 metres below or above a cliff face; within 20 metres of, or in, a cave, rock shelter, or a cave mouth.

Of these, proximity to mapped waterways (prior streams) is the only relevant factor. However, all areas were subject to archaeological survey regardless.

7.7 ABORIGINAL PEOPLE IN THE REGION¹

The land associated with the Murrumbidgee River has been occupied for more than 40,000 years (Sahukar, Gallery, Smart, & Mitchell, 2003) with some of the earliest evidence of people in Australia being found at Lake Mungo and the Willandra Lakes area (Bowler, et al., 2003). The activity area is situated near the boundaries of Wiradjuri and Nari Nari, hence both will be broadly discussed below.

The Nari Nari inhabited the lower Murrumbidgee River region, from the junction with the Lachlan River to the approximate vicinity of the Hay township, south to about Boorooban. The Wiradjuri inhabited a vast region in the central-western inland of NSW, with one edge of their range located north and east of the Nari Nari and Yitha Yitha people, stretching approximately to the township of Hay.

Language/tribal borders were not fixed. These boundaries ebbed and flowed through contact with neighbours, the seasons and periods of drought and abundance. The close proximity to each other also meant that people likely spoke multiple languages and dialects.

First Nations people in the Hay area were adept at identifying and utilising local resources. During the natural flooding of the rivers, swamps and river flats were inundated and billabongs filled. Large groups of people then netted and trapped fish. With shellfish and waterfowl, fish provided a significant part of the diet and relatively small areas of land were able to support large groups of people. Canoes were made from a single sheet of Red Gum or Black Box bark. As flood waters began to subside, people began to fish in the broader reaches of the rivers using short, stout spears. Women made weirs from wooden stakes to trap larger fish in pools as the waters receded.

Aboriginal life on the Hay Plains had to adapt to past changes of climate and aridity. After millions of years of drought, a wet climate and abundant landscape emerged on the Hay Plains about 60,000 years ago. Ephemeral lakes on the plain were filled by the ancestral Murrumbidgee River, fed by rainfall originating in the Great Dividing Range. Full lakes, a stable climate and plentiful natural resources lasted for 20,000 years. Aboriginal sites on the Hay Plain appear in the archaeological record for the first time during this wet period, characterised by extensive woodlands and abundant resources.

¹ Section 7.7 has been abbreviated from: Hay Shire Council. 2022. About our region, Aboriginal Heritage. <https://www.hay.nsw.gov.au/About-Our-Region/Aboriginal-Heritage>

Around 20,000 years ago the Hay landscape changed with average temperatures several degrees lower than today. Plant and animal life was significantly diminished as a result. Grasslands and shrublands expanded as the woodland ecosystems contracted. Many ephemeral lakes and creeks dried out as the Hay Plains became more barren.

Aboriginal mounds of the Hay Plains show that people returned to the same places years after the climate became arid, first to cook and later to bury their dead. The majority of mounds appear to derive from the operation of earth ovens, as they are made up of burnt materials such as ash, charcoal and baked clay heat. Mounds were continually dug over as each day's oven was used. Mounds are fairly recent in the long-term history of Australia, generally dating to the last few thousand years.

Mounds of the Hay Plains to the west are among the largest in the continent. Developing from one ground oven, after repeated use, generation after generation, some mounds on the Hay Plain were small, while others grew as large as a hundred metres long and two metres high. Mounds may contain by-products of habitation such as food debris, tools both worn out and lost, and most commonly baked clay heat retainers. Burials are occasionally found in mounds. Thousands of years after cooking at these mounds, later generations of people returned to them to bury their dead in the soft ground. Large burial mounds on the Hay Plains include Jeraly and Toogimbie with approximately one thousand burials.

7.8 PREVIOUS ARCHAEOLOGICAL STUDIES

The majority of archaeological investigations in the wider Hay region have been undertaken as a result of residential, industrial or other infrastructure developments. Only a small number of these have been conducted within the immediate vicinity of the study area itself. This ACH DDA summarises reports most relevant to the study area below:

Biosis (2017) prepared an Aboriginal cultural heritage assessment report (ACHAR) for the proposed Hay solar farm. A survey of the study area located/recorded 42 Aboriginal sites, including artefacts scatters, hearths, earth mounds and modified trees. Two of the Aboriginal sites also had historical objects indicating that they are post-contact sites. The study area was modified to avoid the majority of impacts to Aboriginal sites.

Gollan (1982) undertook an assessment of a proposed electricity line between Hay and Darlington point. 8 open camp sites (low density artefact scatters), 5 scar trees and 3 isolated finds were discovered.

Kelly (1979) undertook an Archaeological survey of the proposed Murrumbidgee River Weir site, north of Hay. Cultural heritage was located during the survey and consisted of 4 scar trees, 1 burial and 8 middens.

The following study summaries were obtained from Summary from: Biosis 2017. Hay Sun Farm, NSW Aboriginal cultural heritage assessment report. Report for Plains SF No1. Pty LTD. Authors: A. Atkinson and R. Morris, Biosis Pty Ltd, Wollongong. Project no. 23050.

Biosis (2016) undertook an assessment of a proposed water pipeline between Maude and Hay in NSW. The study area assessed a 65 kilometre pipeline route and located 21 Aboriginal heritage sites which included artefact scatters, hearths, earth mound and midden sites as well as a post contact site. Archaeological test excavation was undertaken at four locations within the study area and the subsurface assessment revealed archaeological deposits dating to 49,200 BP.

Klaver (1987, 1995, 1998) has completed a number of studies focusing on the central Murrumbidgee and surrounds, primarily the area between Narrandera and Hay, to the east of the current study area. Klaver's work includes large scale survey to identify Aboriginal sites, and the excavation and dating of mound sites. As with Martin (2006, 2010), a major focus of Klaver's work was earth mounds. The excavations conducted by Klaver identified the mounds as the result of the *in situ* use of baked clay heat retainer ovens. Dates obtained from the Cooley Point Lagoon excavations, around 100 kilometres east of the study area, identify a range of dates between 400 to 2660 years BP. However, Klaver noted that the date of 2660 BP comes from the 'core' of the mound, and that the overlying material was dated to 2000 years later.

Witter (2004) undertook a large scale assessment of Aboriginal sites in NSW, looking at regional variation on site types and distributions to develop a better understanding of how sites are preserved, and what natural processes impact on site preservation, with a focus on open camp sites. Witter divided the state into eight regions, the current study area fell under the Riverine Plain Region. Witter (2004) noted that owing to a lack of raw material in the region, stone artefacts are relatively scarce and small, although the presence of hearths can assist in identifying camp sites. Mounds are a notable feature of this region, particularly on the Hay Plain, where they reach a larger size than elsewhere, and tend to contain larger numbers of stone artefacts. Witter (2004) notes that in the past 200 years, a large part of the region had been cultivated, which has led to the destruction of archaeological traces through the flattening of mounds and ploughing of the ground surface. Witter (2004) describes the mound settlements as significant as they suggest the region to be a major population centre of Aboriginal Australia (Witter 2004, p. 142). It is concluded that although the factors impacting on the preservation of open campsites in NSW vary, there are a number of main ones, including the erosion of soil profiles, hill slope erosion, gullying and rilling, blowouts, and clay pan expansion. He also notes that the introduction of domestic grazing animals has had a large impact on the archaeological record, as they accelerate the natural factors mentioned above (Witter 2004, p. 146).

Pardoe (1995) attempted to develop a regional model relating biological and cultural change in south-eastern Australia, with a focus on societies in the Murray-Darling River system. The biological discussion undertaken is closely linked with recovered skeletal remains, discussing the gradual changes seen in these remains and their potential links to changes in environment and cultural change. Explanations included a predator-prey model, stating the predator (human) size evolves alongside prey (animal) size, and that with the decrease in prey size after megafaunal extinction, predator size decreased too. A biocultural model is also put forward, relating skull size to various factors including warfare, famine, and disease.

Pardoe (2003) undertook a study of the Menindee Lakes, around 150 – 200 kilometre north-west of the current study area. The study area covered for the project was largely constricted to lake margins, river edges, floodplains, feeder creeks, and lakebeds, generally not extending more than 900 metres away from water sources. As the study was centred on the Menindee Lakes, a part of it utilised spatial data to determine site distance from water source. It observed that almost all sites were found within 1,500 metres of water, with the average distance being 368 metres from water. The study reported 90 per cent of sites were found within 500 metres of water, and 11 per cent at water's edge. The predominant site types identified by Pardoe were oven (55%) and artefact (15%) sites, although there were a large number of site types identified throughout the course of the survey, with a total of 4,978 sites identified in 2,432 areas.

Brown, O., Dortch, J. & Wall, D., (2015) prepared an Aboriginal Cultural Heritage Assessment and Archaeological Report for the Mungadal Water Efficiency Scheme at Hay for the Department of Trade and Investment, Regional Infrastructure and Services, NSW. This survey enabled construction of an Aboriginal artefact distribution model around 12 identified Aboriginal sites. Following the survey and delineation of sites, the alignment has been redesigned to avoid impact to all surface-visible Aboriginal cultural material. Consequently, harm was being avoided as much as is possible. Nonetheless, some harm to subsurface material is considered likely in red soil areas. It is considered that no redesign of route or methods could avoid all potential for harm because landscape features with some archaeological potential would still have to be crossed in any layout. It is noted that the harm would involve the disturbance rather than destruction of Aboriginal objects as deposits will be excavated and replaced over the top of the pipe.

7.8.1 PREVIOUS ARCHAEOLOGICAL STUDIES SUMMARY

Based on the studies discussed above it is possible to suggest that while Aboriginal sites may be expected through all landscapes there does appear to be a pattern of sites that relate to the presence of potential resources for Aboriginal use.

Sites tend to be concentrated on elevated level ground associated with a water source and are noted to consistently occur on raised terrace landforms within 50m of peripheral or seasonal creeks (Border Archaeology 2007). Additionally, the presence of scarred trees on black box and river red gums is relatively common and can occur in all landscapes.

Based on site modelling and the prevalence of sites in the surrounding area the site types most likely to be encountered within the activity area are artefact scatters, midden sites, hearth sites, isolated artefacts and scarred trees where remnant old growth vegetation remain.

7.9 SITE TYPES IN THE GEOGRAPHIC REGION

The NSW Murrumbidgee region, like all regions of NSW, has an Aboriginal archaeological record derived from Aboriginal occupation and land use that was concentrated on drainage lines but includes dispersed evidence throughout the landscape (Brown & Wall 2018). Regionally occurring sites such as human burials and faunal deposits are essentially confined to areas above the active floodplain on larger rivers and/or their source bordering sandy deposits.

Cultural material is dominated by flaked stone tools (lithics) and lithic sites in NSW are listed by the features of either 'Artefact' or 'PAD' (potential archaeological deposit) in the AHIMS register. While not as significant as human burials, stone artefacts have variable distribution that can largely be correlated with different landform types.

Many authors have stressed the importance of proximity to water as well as relatively common-sense amenity factors such as level, well-drained areas with useful views of resource use areas or a watercourse (Brown O., 2008). Stone artefacts may be found as occasional pieces (background scatter) or in concentrations typically described as 'Open Camp Sites' (even if not interpreted as having been a site where people camped). At these sites, the presence of large numbers of stone tools and the debitage from making and maintaining them provide evidence about the nature of the human use of the location.

Scarred trees are also found relatively commonly along the Murrumbidgee River and its major tributaries. Mature trees may bear evidence of the removal of bark for the making of implements such as coolamons (bowls), shields and sometimes pieces large enough to have potentially provided for a canoe (Brown 2008). Elsewhere, midden deposits and hearth sites can occasionally be found that contain valuable evidence about the types of resources used by Aboriginal people based on the identification of the bones and shells found within them.

Elsewhere, midden deposits and hearth sites can occasionally be found that contain valuable evidence about the types of resources used by Aboriginal people based on the identification of the bones and shells found within them. Hearth sites, other than vaguely fired patches of clay subsoil, are unlikely to still occur due to the history of relatively intensive land use; and significant disturbance across the site.

There are no Aboriginal Places (locations nominated and listed as having special significance to the Aboriginal community) in the subject area.

7.10 PREDICTIVE STATEMENTS

A series of statements been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located. This model is based on:

- Local and regional site distribution in relation to landform features identified within the study area;
- Previous investigations within the region, which have demonstrated that scarred trees are likely to occur along waterways and their surrounding plains, generally above the floodplain and waterlogged land;
- Consideration of site type, raw material types and site densities likely to be present within the study area;
- Findings of the ethnohistorical research on the potential for material traces to present within the study area;
- Potential Aboriginal use of natural resources present or once present within the study area; and
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Previous survey results within the region allow some predictions to be made about local site distribution:

- Prior streams (or palaeo-channels) in the survey area would have been have used by Aboriginal people and are likely to be fringed by archaeological sites consisting of concentrations of flaked stone artefacts and hearths, depending on the extent of topsoil disturbance from former land uses (e.g. ploughing for pasture improvement);
- Within the former stream areas, adjacent raised red soil areas are predicted to be the most likely to contain sites; identification of these was considered most likely in areas of scalded soil exposure.
- Sites in red soil areas are often eroding out of scalds, so that some stone artefacts are likely to be a lag from deposits that have been blown away. Hearths, on the other hand, can only survive in their original stratigraphic positions, and so indicate less disturbed deposits.
- The contents of former occupation sites may include hearths, stone artefacts, mussel shell, or animal bone.
- Across black soil areas and in depressions in black soil, it is predicted that Aboriginal cultural heritage material would be very sparse or consist of isolated finds.
- Scarred trees in the region are concentrated not only along present waterways, but also along the paths of prior streams and historical lakes and soaks. These are the areas with the highest focus of Aboriginal land use and where a number of suitable tree species (Black Box) are found (Aboriginal Victoria, 2008).
- Burial sites are most typically associated with prominent raised sand hills ('source bordering dunes') near the river but may also be found in or nearby culturally scarred trees.

- There is a tendency for concentrations of stone artefacts to be found within 200-250m of permanent and ephemeral water sources, particularly on raised areas such as sand hills by the river and elevations (commonly aeolian sand or red soil) adjacent to ephemerally flooded areas or billabongs. These sites may also contain burnt clay balls that were used as heat retainers for cooking.
- Lithic sites are however rarely recorded along the lower alluvial floodplains of the major river margins – in part because of the favoured use of raised areas by Aboriginal people, but also because these are dynamic depositional environments where potential sites are rarely preserved or exposed.
- Shell midden deposits dominated by freshwater mussel (*Velesunio* sp.) occur along river margins, typically also associated with flaked stone artefacts; these are rarely evident as surface deposits and are usually found as exposed sections in eroded river banks.
- Clay heat retainers, artefacts and faunal material are also found in association with raised earth mound sites where ephemeral water may have led to seasonal availability of cumbungi (*Typha* sp.); these earth mound sites are a distinctive archaeological feature of the Hay Plains and other parts of the Riverina, although many have been destroyed over the last century.

8 ARCHAEOLOGICAL SURVEY

8.1 SURVEY AIMS

A site survey was undertaken on the 2nd of November 2023 and again on 5th April 2024 by Damian Wall of Red-Gum Environmental Consulting Pty Ltd. The principle aims of the survey were to:

1. Undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
2. Identify and record Aboriginal archaeological sites visible on the ground surface.
3. Identify and record areas of Aboriginal archaeological and cultural sensitivity.

8.2 SURVEY METHODS

The survey was conducted on foot. Recording during the survey followed the archaeological survey requirements of the code and industry best practice methodology. Information recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey;
- Survey coverage;
- Any resources that may have potentially been exploited by Aboriginal people;
- Landform elements, distinguishable areas of land approximately 40 metres across or with a 20 metre radius;
- Photographs of the site indicating landform;
- Ground surface visibility (GSV) and areas of exposure;
- Observable past or present disturbances to the landscape from human or animal activities; and
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the identification of natural soil deposits within the study area was undertaken and photographs of survey units, landform, vegetation coverage, GSV etc, were incorporated into the survey. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

In addition, a predictive assessment of the likelihood of the occurrence of undetected and/or subsurface Aboriginal cultural heritage material was conducted. This is an intuitive assessment using generalised contextual information rather than a geostatistical assessment using digitised (raster) map data of landforms and known locations of other sites.

Brown (2008) notes that although intuitive assessments are rarely afforded much written favour by archaeologists, they are in fact used by almost all. The term 'modelling' may be frequently inserted to infer statistical rigour that is usually not present. A modelled predictive assessment typically combines rule-based definitions of known site distribution factors with available mapped data that lacks the full range of detail that would affect human choices and behaviour - or the map data may quite simply be wrong (Brown O, 2008).

Archaeological survey used an exposure-based approach. This investigative method has been developed and refined by the author over the last eight years. It relies on seeking out all areas of exposure, measuring their extent and undertaking intense (full coverage) search for flaked stone artefacts.

With finds thus expressible in terms of density in precisely mapped sample units, the data are then used in the same way that test excavation data are for the purposes of artefact distribution modelling. Given sufficient areas of suitable soil exposure, it has been found to more reliably construct an artefact distribution model than anything but very extensive archaeological test excavation.

8.3 GROUND SURFACE VISIBILITY

Archaeological visibility refers to the amount of ground surface that is clearly visible for inspection. The greater the ground surface visibility, the more effective the surface survey. Examples of high surface visibility are vehicular and pedestrian tracks and dune blow outs (100% per m²). Examples of poor visibility are areas of heavy vegetation cover (0-10% per m²) (Murphy & Thomson, 2016).

Unfortunately, it is often the case that highly visible Aboriginal cultural heritage places are also often highly disturbed. High GSV is therefore often related to the amount of disturbance that has occurred. This disturbance may be manmade (such as drainage lines, vehicle tracks), by stock (overgrazing, tracks) or due to natural processes (erosion by wind or water). The level of GSV is typically assessed as follows:

Table 1: Ground Surface Visibility (GSV) ratings vs ranges

%	0%	0 – 10%	10 – 30%	30 – 50%	50 – 70%	70 – 90%	90 – 100%
Rating	No visible ground surface	Very poor	Poor	Fair	Good	Very good	Excellent



Photo 1: Example of fair (30-50%) GSV in the project area. Photo: D. Wall, 2024.

9 RESULTS

9.1 SURVEY COVERAGE & EFFECTIVENESS

The purpose of compiling survey coverage data is to measure the limitations of site detectability at the time of the survey. For example, a survey transect across a heavily grassed paddock has little likelihood of finding lithic material on the surface regardless of the survey effort spent.

The quantification of survey coverage data also usually relies on an assessment of the soil surface visibility in relation to other variables, principally the different landforms included in the survey and the amount of survey effort spent on each. For the current investigation, the GSV was generally fair (30-50%) owing to patchy grass cover and areas of exposure (**Photo 1**).

Six (6) new Aboriginal places (**Table 3**) were recorded during the exposure survey and, in this case, the results emphasise the importance of landform, as all were recorded in areas of exposure on red sandy soils. The sites are recorded in areas that would have been the margins/banks of an ancient lake/tributary of the old course of the Murrumbidgee River, a significant landscape feature and resource to the Wiradjuri and Nari Nari.

Survey coverage, being the quantum of observable surface relative to the total study area, has been calculated following the requirements of the Code. Overall, it is considered to have been moderate for a pastured landscape (which is typically low) and has good coverage for the key areas predicted to be the most archaeologically sensitive. One hundred percent of the activity area was surveyed along with a significant portion of all zones/landforms (**Table 2 and Map 5**).

Table 2: Survey Coverage.

Zone	Area of Zone (square metres)	Survey Coverage (square metres)	Survey Coverage %
High	77,097	42,392	55%
Moderate	101,618	21,267	21%
Low	309,524	153,037	49%
Activity area	123,060	123,060	100%



Photo 2: Example of poor (0-10%) GSV in the Activity area. Photo: D. Wall, 2024.



Map 5: Survey Coverage of the Activity area and immediate surrounds.

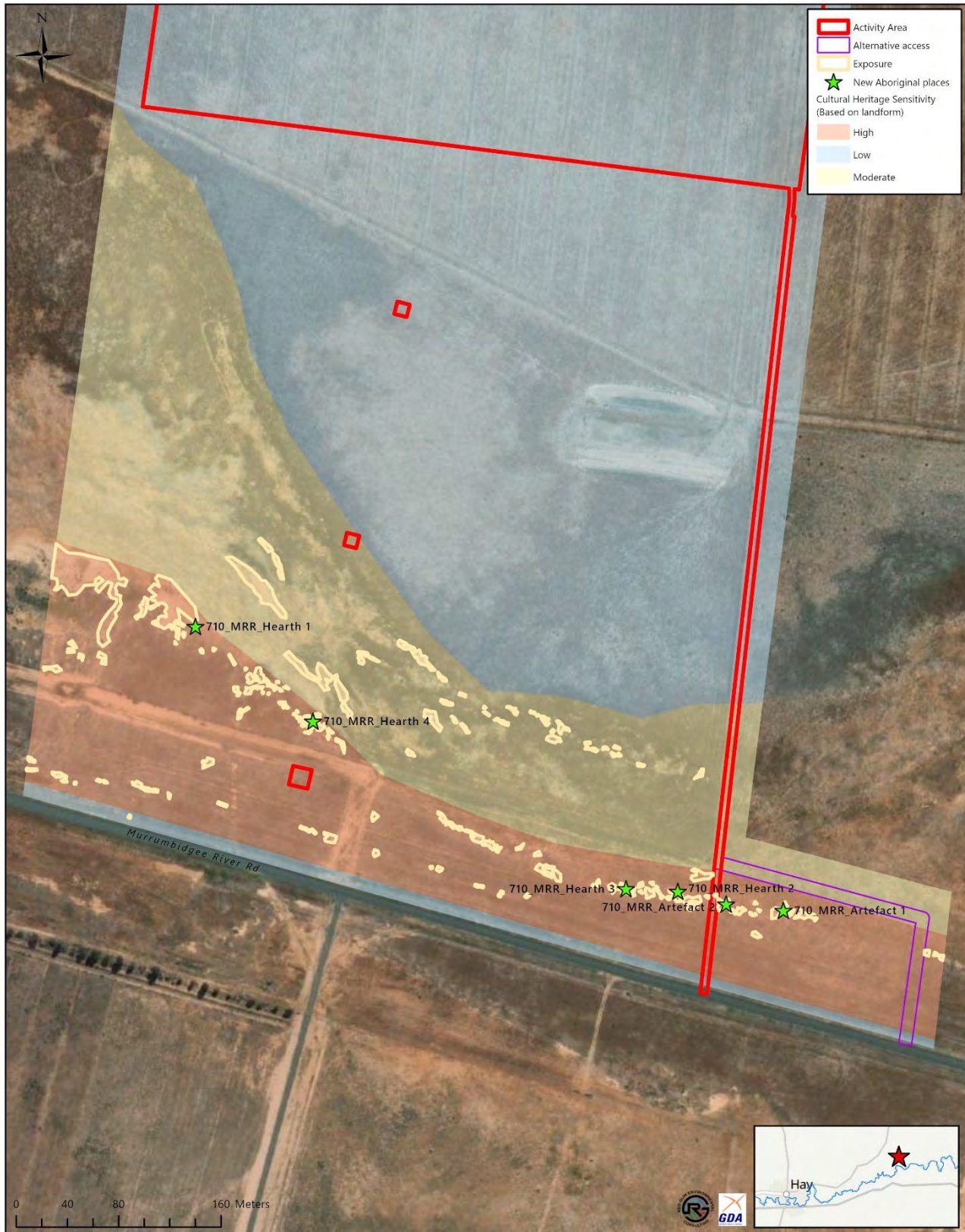
9.2 EXPOSURE

Exposure refers to the geomorphic conditions of the local landform being surveyed and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (DECCW, 2010). Overall, the study area displayed numerous small areas of exposure. Areas of exposure occurred where the topsoil had eroded away due to wind and other natural processes (**Photo 3**).

Six (6) new Aboriginal Places were recorded during the exposure survey. A total of 5,669 m² of exposures were assessed (**Map 6**).



Photo 3: Example of exposure in the study area. Photo: D. Wall, 2024.



Map 6: Areas of exposure within the Activity area and immediate surrounds.

9.3 DISTURBANCE

Disturbance in the study area is associated with existing and past land use. A large portion of the development area is highly disturbed as a result of a long history of past and current agricultural use, including grazing, pasture improvement and cropping and silage. The area is dominated by exotic pasture with small areas of regenerated native grasses/herbs. Vehicle tracks covered with imported fill and other informal vehicle tracks occur on the study area.



Photo 4: Existing power line infrastructure within the study area and immediate surrounds. Photo: D. Wall, 2024.



Photo 5: Evidence of disturbance, dam building/excavation. Photo: D. Wall, 2024.

9.4 LANDFORM FEATURES

The Solar Farm site is a flat floodplain, draining to the Murrumbidgee River system. The area is currently utilised for agricultural activities, historically grazed and has been land formed.

The slope of the site is flat (land formed) with a westerly aspect and the study area is regarded as part of a single 'plain' landform, however closer analysis of aerial imagery and soil types indicate that this landform can be further separated into three (3) zones. The Activity area is situated on what would have been the margins/banks of an ancient lake/tributary of the old course of the Murrumbidgee River, a significant landscape feature and resource to the Wiradjuri and Nari Nari. The survey split the Activity area and surrounds into three (3) different sensitivity/risk levels based on landform: red/sandy soils (High), margins of the ancient lake (Moderate) and grey/black soils & disturbed areas (Low) (**Map 7**).

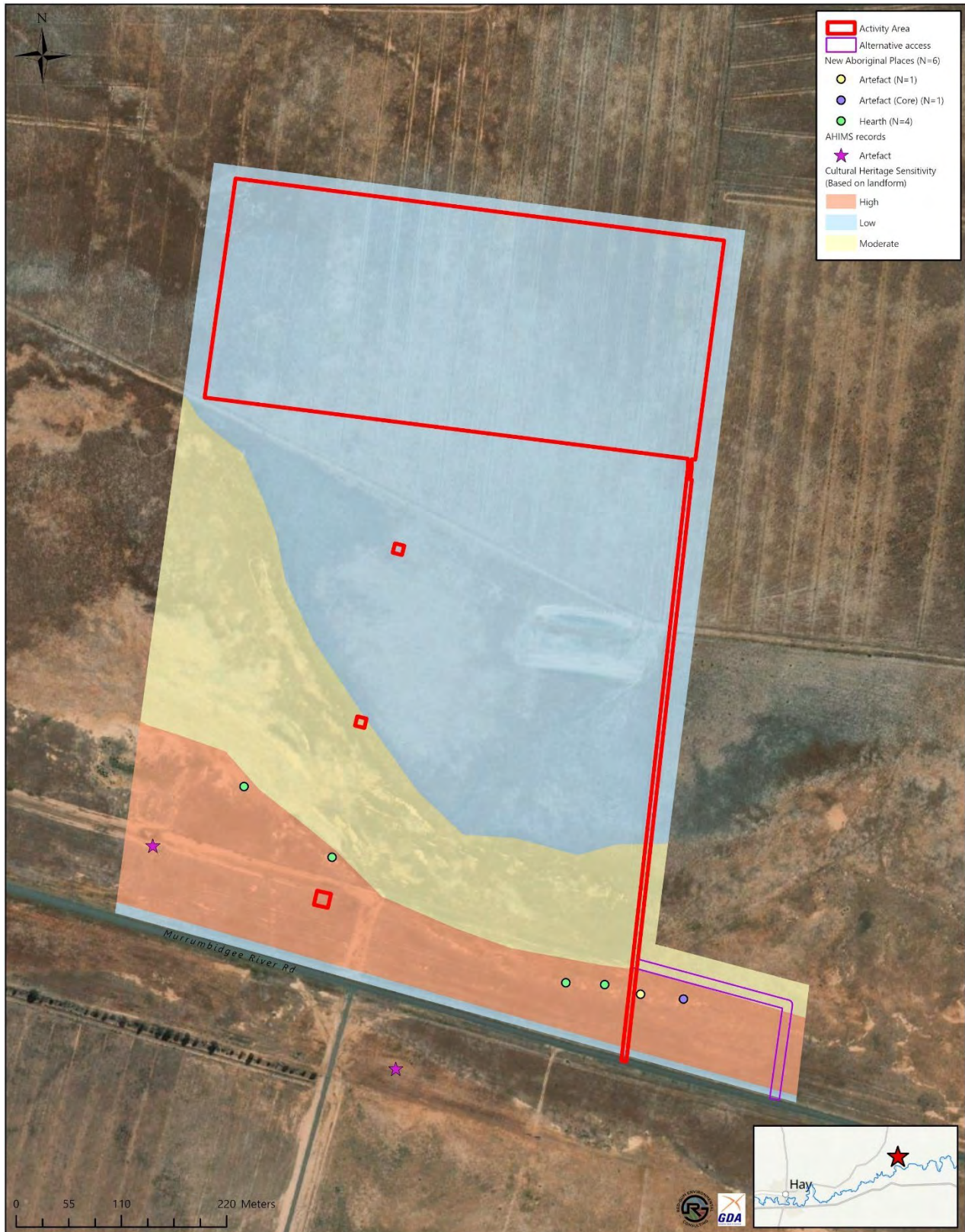
The Solar Farm area does not possess scar age trees, rock shelters or caves but the Murrumbidgee River Road corridor does contain 'prior stream soils' with exposure on red sandy soils. All natural surfaces were inspected and no (zero) cultural features, places or PADs were identified within the bounds of the Solar Farm area.



Photo 6: Example of low sensitivity landform, grey/black soils. D. Wall 2024



Photo 7: Example of high sensitivity landform, red sandy soils. D. Wall 2024

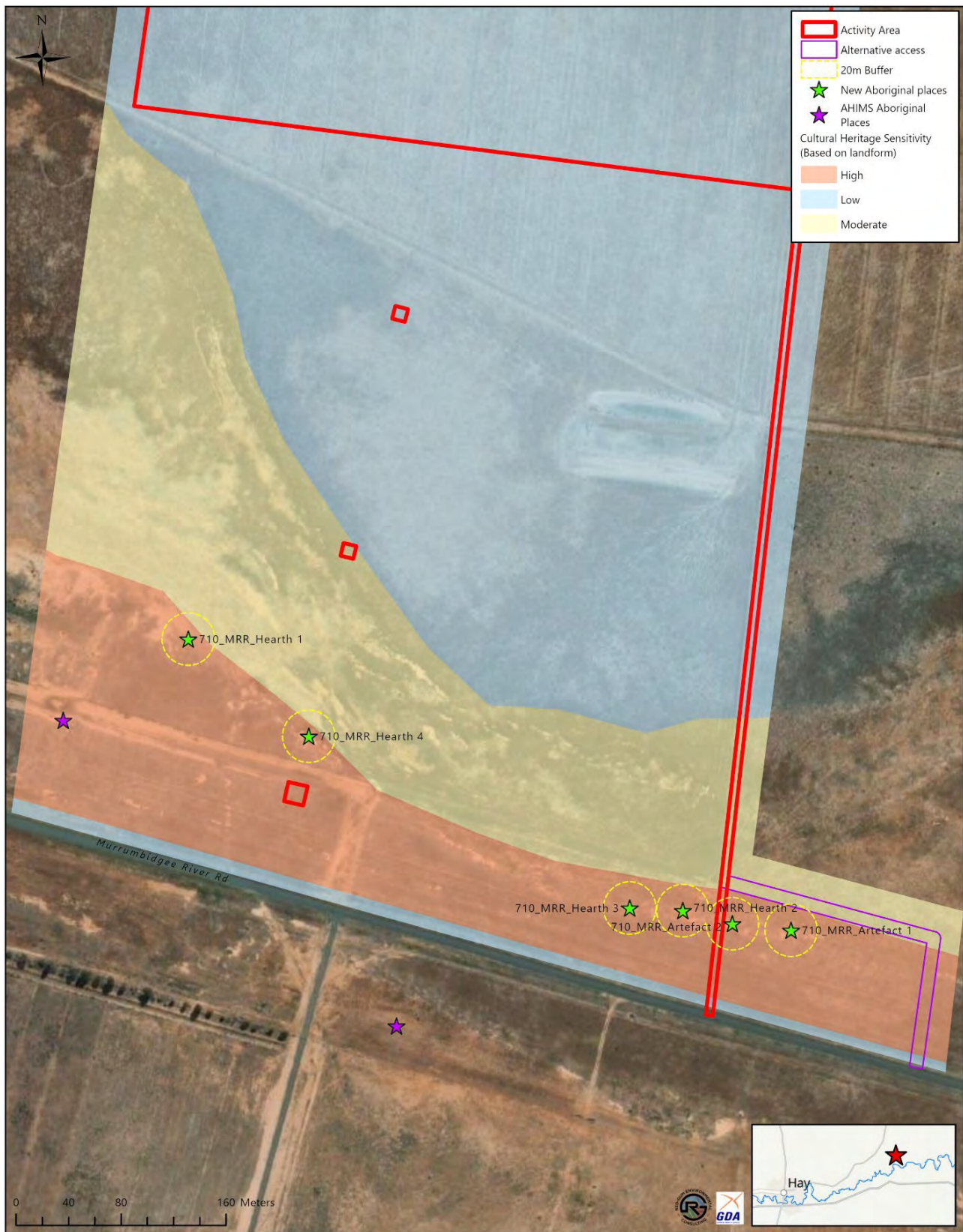


Map 7: Cultural heritage sensitivity/risk based on landform.

9.5 SITE LISTING INFORMATION

Table 3: Site listing information

Site Name	710_MRR_Artefact 1	Site Name	710_MRR_Artefact 2
Site ID:	48-3-0250	Site ID:	48-3-0249
GDA94 Zone 55 Easting	317606	GDA94 Zone 55 Easting	317561
GDA94 Zone 55 Northing	6184524	GDA94 Zone 55 Northing	6184529
Context	Flat	Context	Flat
Landform	Plain	Landform	Plain
Vegetation	Grasslands	Vegetation	Grasslands
Land use	Pastoral/Grazing	Land use	Pastoral/Grazing
Distance to water	880m	Distance to water	880m
Features	1 x Basalt core	Features	1 x Red Sicrete Whole flake
Dimensions	0.015 m x 0.017 m	Dimensions	0.01 m x 0.01 m
Site Name	710_MRR_Hearth 1	Site Name	710_MRR_Hearth 2
Site ID:	48-3-0251	Site ID:	48-3-0252
GDA94 Zone 55 Easting	317146	GDA94 Zone 55 Easting	317523
GDA94 Zone 55 Northing	6184746	GDA94 Zone 55 Northing	6184539
Context	Flat	Context	Flat
Landform	Plain	Landform	Plain
Vegetation	Grasslands	Vegetation	Grasslands
Land use	Pastoral/Grazing	Land use	Pastoral/Grazing
Distance to water	980m	Distance to water	880m
Features	Exposed Hearth, fired clay balls.	Features	Exposed Hearth, fired clay balls.
Dimensions	1 m x 1 m	Dimensions	0.7 m x 0.7 m
Site Name	710_MRR_Hearth 3	Site Name	710_MRR_Hearth 4
Site ID:	48-3-0253	Site ID:	48-3-0254
GDA94 Zone 55 Easting	317483	GDA94 Zone 55 Easting	317238
GDA94 Zone 55 Northing	6184541	GDA94 Zone 55 Northing	6184672
Context	Flat	Context	Flat
Landform	Plain	Landform	Plain
Vegetation	Grasslands	Vegetation	Grasslands
Land use	Pastoral/Grazing	Land use	Pastoral/Grazing
Distance to water	880m	Distance to water	880m
Features	Exposed Hearth, fired clay balls.	Features	Exposed Hearth, fired clay balls.
Dimensions	0.5 m x 0.5 m	Dimensions	1 m x 1 m



Map 8: Six (6) new AHIMS recorded sites.



Photo 8: Artefact 1, Basalt Core. D. Wall 2024



Photo 9: Artefact 1, Basalt Core. D. Wall 2024



Photo 10: Artefact 2, Red Silcrete Whole flake. D. Wall 2024



Photo 11: Hearth 1 in situ. D. Wall 2024



Photo 12: Hearth 2 in situ. D. Wall 2024



Photo 13: Hearth 3 in situ. D. Wall 2024



Photo 14: Hearth 3 in situ. D. Wall 2024



Photo 15: Hearth 4 in situ. D. Wall 2024

10 SURVEY OUTCOMES

- Red-Gum concluded that the entire study area exhibited reasonable visibility and exposure.
- The majority of the study area is characterised by a largely flat plain landform, approximately 900m north of the current course of the Murrumbidgee River and was likely historically at least formed part of an ancient lake/tributary of the old course of the Murrumbidgee River.
- No trees with cultural modifications were identified within the study area.
- No Aboriginal cultural heritage objects were identified within the Solar Farm boundary.
- The field inspection split the activity area and surrounds into 3 different sensitivity/ archaeological risk levels based on landform.
- Six (6) new Aboriginal Places were discovered in the 'high Aboriginal cultural heritage' risk zone. The new places consisted of 4 hearths and 2 isolated artefacts.
- The entirety of the Solar Farm site is in a disturbed low risk zone in a cropping and land formed context.
- The only section that intersects high/moderate risk zones is the Murrumbidgee River Road corridor through which the site access must cross.
- While it is acknowledged that in the context of the ubiquitous 'background scatter' of artefacts that exists in almost any Australian landscape, undetected Aboriginal objects may be present in the fill and topsoil material (within the access road alignment) that is to be returned to its original location post works. However, in the absence of an artefact scatter (i.e. a high density distribution of artefact) upon which to base the targeting of subsurface testing, there is no reasonable trigger by which to seek an AHIP for this portion of the work (which is relatively minor compared to the overall scale of the project).

10.1 DISCUSSION AND RECOMMENDATIONS

There is a substantial potential for impact to Aboriginal objects associated with the proposed development. The proposal is to install infrastructure such as an internal road, solar arrays, connection to utility infrastructure, etc. Within the proposed footprint, topsoil deposits are likely to be disturbed, inclusive of subsequent construction impacts. If an Alternative alignment for the access road is implemented, harm to cultural heritage will be avoided (Map 9).

Table 4: Potential for harm

Site	Type of Harm	Degree of Harm	Consequence
710_MRR_Artefact 1	Harm Avoided	Nil	Nil
710_MRR_Artefact 2	Harm Avoided	Nil	Nil
710_MRR_Hearth 1	Harm Avoided	Nil	Nil
710_MRR_Hearth 2	Harm Avoided	Nil	Nil
710_MRR_Hearth 3	Harm Avoided	Nil	Nil
710_MRR_Hearth 4	Harm Avoided	Nil	Nil

10.1.1 STATUTORY CONTEXT

The legal context requiring that an AHIP be in place prior to the proposed works is centred on Section 86 of the *National Parks and Wildlife Act 1974*. Under S86:

- 1) A person must not harm or desecrate an object that the person knows is an Aboriginal object; and
- 2) A person must not harm an Aboriginal object.

The first is the 'knowing offence' with penalties of up to \$1,100,000 and the second is known as a 'strict liability offence' which may happen in a way that was unanticipated with penalties of up to \$550,000. In the NPW Act, the relevant legal definitions within the harm provisions are:

- "Aboriginal object" means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.
- "harm" an object or place includes any act or omission that: (a) destroys, defaces or damages the object or place, or (b) in relation to an object-moves the object from the land on which it had been situated, or (c) is specified by the regulations, or (d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c), but does not include any act or omission that: (e) desecrates the object or place, or (f) is trivial or negligible, or (g) is excluded from this definition by the regulations.

There are two key exemptions or defences from prosecution that are being addressed through this assessment:

- Harm may occur if authorised by an Aboriginal Heritage Impact Permit (AHIP); and
- Unanticipated (strict liability) harm may be defended from prosecution if it can be demonstrated that due diligence had been exercised in determining that the harm was reasonably considered unlikely to happen (DECCW, 2010a).

There have been no previous AHIPs applied for, issued or refused within the activity area.

10.1.2 RECOMMENDATIONS

As a result of the site inspection, a cultural heritage probability/risk map (**Map 7**) has been prepared to provide a spatial reference for those involved in the works stage. The following recommendations have been prepared to ensure the protection of unknown/undiscovered cultural heritage as well as previously registered sites and sensitive landforms within the works zone as it has been described to Red-Gum:

Recommendation 1: The alternative access alignment as shown on **Map 9**, indicates a recommended alternative alignment for the access road as proposed and surveyed by Red-gum. It is recommended that this alternative alignment be implemented to prevent harm caused by ground disturbing works to unknown/undiscovered cultural heritage as well as registered sites and sensitive landforms.



- Recommendation 2:** In Site Protection buffers shown on **Map 8 & 9**. “No-Go” zones should be established by clearly identifying site protection buffers with hi-visibility flagging tape and or signs installed at/around each site to prevent harm caused by ground disturbing works to unknown/undiscovered cultural heritage as well as previously registered sites and sensitive landforms.
- Recommendation 3:** In High Risk Areas shown on **Map 7**, start and end points of the high risk zone within the development footprint should be established with hi-visibility signs and or flagging tape installed at 50m intervals on the edge of the development footprint to prevent harm caused by ground disturbing works to unknown/undiscovered cultural heritage as well as previously registered sites and sensitive landforms.
- Recommendation 4:** If Lay Down/Ancillary works areas need to be established, it is recommended that they are located within Low Risk Areas and/or in areas that have obviously been previously disturbed, i.e. cropped/cleared paddock.
- Recommendation 5:** If during the course of the works stage, ground disturbing works are proposed for areas outside of the currently proposed development footprint within the High or Moderate Risk Areas, further assessment by a suitably qualified **Heritage professional IS required and MAY trigger the requirement for an AHIP.**
- Recommendation 6:** As per Recommendation 5, any ground disturbing works outside the proposed existing footprint (following the alternative alignment) and within 20m of registered sites, further assessment by suitably qualified **Heritage professional IS required and MAY trigger the requirement for an AHIP.**
- Recommendation 7:** If cultural material is exposed during the works that are suspected to be Aboriginal or of historic significance, the procedures in Contingencies (**Section 10.2**) must be followed.
- Recommendation 8:** Cultural awareness induction is considered appropriate at this site before any works commences. An invitation to be sent to the Aboriginal community, requesting their involvement in the induction process, is also considered appropriate. The induction is to be undertaken by employees who are supervising works during the activity in relation to earthmoving or ground disturbance works. All ground disturbance works must be supervised by a person who has undertaken the cultural awareness training. It is the responsibility of the client to:
- o Ensure that the training be undertaken prior to the commencement of works to familiarise employees and contractors with local Aboriginal traditions and culture;
 - o Familiarise employees and contractors with Aboriginal places and objects (particularly stone artefacts and features such as hearths and shell midden lenses) so that they may recognise Aboriginal cultural heritage that may be exposed during works. Information sheets to assist in the identification of Aboriginal cultural heritage should be provided during this training;
 - o Promote a knowledge and understanding of and respect for Aboriginal tradition and culture;
 - o Assist with compliance with relevant Commonwealth and State cultural heritage legislation; and
 - o Foster good relationships between the client and all relevant Aboriginal stakeholders.

Recommendation 9: The information presented above meets the requirements of the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. It should be retained as 'shelf documentation' for five years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects.

Recommendation 10: All Aboriginal Places shown on Map 8 & Map 9 are to be marked on all construction drawings.

The key takeaways are as follows:

1. An Aboriginal Heritage Impact Permit (AHIP) IS required if the alternative access alignment recommended by Red-Gum (**Map 9**) cannot be implemented, or the access road is to stay as originally proposed.
2. An Aboriginal Heritage Impact Permit (AHIP) is **NOT** required if the alternative access alignment recommended by Red-Gum (**Map 9**) can be implemented, avoiding a large portion of the highest culturally sensitive landform AND all of the Recommendations in this ACH DDA are implemented.

10.2 CONTINGENCIES

Contingency 1: Discovery of unanticipated Aboriginal objects within areas of low potential.

All Aboriginal objects and places are protected under the *National Parks and Wildlife Act 1974*. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the NSW DPE. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the DPE and Aboriginal stakeholders.

Contingency 2: Discovery of Aboriginal ancestral remains.

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and DPE's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by DPE.

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12 APPENDIX

This Appendix is not to be made public.

APPENDIX A: FLOW CHART OF THE DUE DILIGENCE PROCESS FOR THE PROJECT

