GUNNEDAH SOLAR FARM

Aboriginal Heritage Assessment

Prepared for Photon Energy

Gunnedah Shire Council Local Government Area

March 2018

Ref. 1711.02

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Document Information

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Contents

Figures

Tables

Plates

1 Introduction

1.1 Project background

Photon Energy (Photon) proposes to construct and operate a 155 megawatt solar farm in Gunnedah, NSW. Proposed work is deemed as State Significant Development (SSD) and therefore an Environmental Impact Statement (EIS) is required for the development application. The EIS will have to comply with the Secretary's Environmental Assessment Requirements (SEARs) issued on 25 August 2017 (SSD 8658). The project SEARs required an assessment of the likely Aboriginal heritage (cultural and archaeological) impacts of the development and include adequate consultation with the local Aboriginal community.

The subject land, hereafter referred to as the study area, is located at 765 Orange Grove Road, Gunnedah, NSW. It is comprised of Lot 1 DP1202625, Lot 153 DP754954, Lot 264 DP754954, Lot 2 DP801762, Lot 151 DP754954 and part of Lot 1 DP186590, with a total area of 692 hectares. It is bounded by Orange Grove Road to the south and private properties to the east, north and west. Namoi River is approximately 800 metres to the south of the study area (Figure 1).

To inform the EIS and fulfil the SEARs, Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged to carry out an Aboriginal heritage archaeological assessment of the land. The assessment included background research and an archaeological field survey conducted in accordance with Office of Environment and Heritage (OEH) requirements including:

Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales

Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales

Consultation was undertaken with Red Chief Local Aboriginal Land Council (RCLALC), who has also participated in the field survey.

1.2 Summary of findings

Background research, desktop assessment and archaeological field survey did not identify any Aboriginal objects (artefacts) or Aboriginal archaeological sites within the study area. No significant Aboriginal cultural features were identified within the study area by the Red Chief Local Aboriginal Land Council. In general, the study area displayed low archaeological potential due to combinations of archaeologically unfavourable topography, flooding, agricultural activity and contemporary disturbance of the land.

1.3 Investigators and contributors

A list of investigators and contributors to the study is included in Table 1 below.

Table 1. Investigators and contributors

Investigator/Contributor	Affiliation	Role
Alison Nightingale	KNC	Advisor, reporting and review
Matthew Kelleher	KNC	Survey, advisor and review
Cristany Milicich	KNC	Reporting
Ana Jakovljevic	KNC	Reporting
Ben Anderson	KNC	GIS mapping
Karen Matthews	RCLALC	Survey, Cultural Heritage Advisor

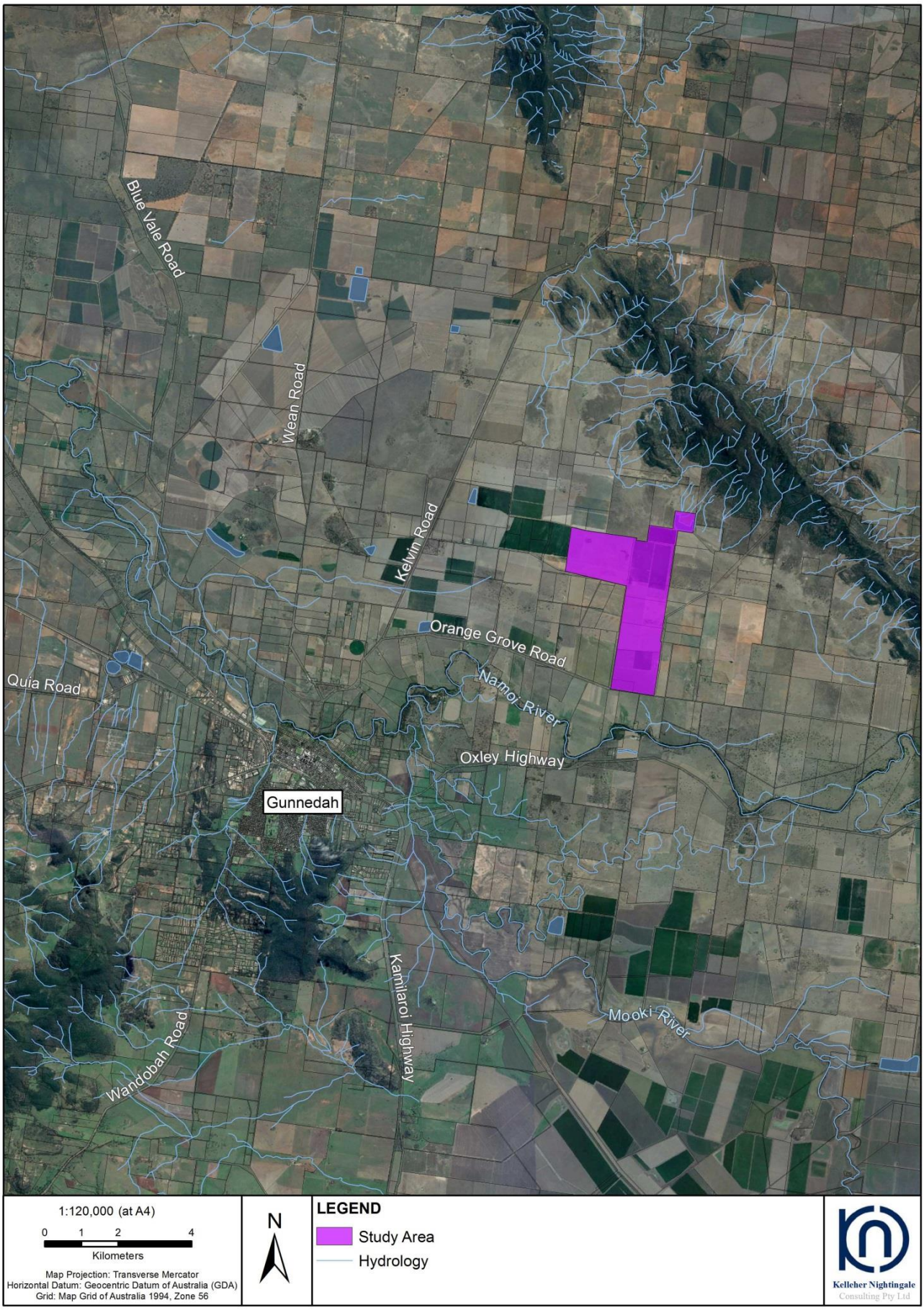

Figure 1. Location of the study area

2 Description of Development Proposal

Gunnedah Solar Project, located at 765 Orange Grove Road in Gunnedah, NSW, will include the construction and operation of a photovoltaic (PV) generation facility with an estimated capacity of 150 megawatt (MW), and associated infrastructure. The proposed development footprint is anticipated to cover only a section of the study area of approximately 40%. The preliminary design for the solar farm would therefore occupy approximately 304 hectares with the remaining land retaining to its existing agricultural use (Figure 2). It is proposed that the solar farm will be constructed in one hectare stages, with up to 10 stages in construction at one time.

The proposal includes the installation of the following:

- north facing PV modules on mounting structures approximately 4 metres in height; an estimated 460,000 PV panels, with a single axis tracking system, facing east west and tilted 60° along the north south axis; the PV mounting structure would comprise steel posts driven approximately 2.5 metres below ground using a pile driver; additional support structures would be attached to the steel mounting structures and the PV modules would then be attached to the support structures;
- electrical connections/inverters with footings located within the study area;
- underground cabling installed by trenching;
- a substation to connect to existing electrical infrastructure; it will be 60 metres x 80 metres and located on a well drained area clear of obstructions and away from any watercourses;
- two 40' shipping containers for storage of maintenance equipment, with footings for installation;
- security fencing to be approximately 3 metres high with concrete footings; and
- maintenance and access track to be on undisturbed ground remaining between panel installations; they have to be wide enough for maintenance vehicles to move through.

Minor earthworks will be required for the preparation of the site and in most cases a concrete slab would be required in order to support ancillary infrastructure, such as the substation. Most of the infrastructure required for the solar farm would be prefabricated off site, delivered and then assembled on site. Additional cabling will be required to connect the solar arrays to the new powerlines. Trenches up to 1100 millimetres deep would be required for the installation of cables.

The Proposal would require connection to electrical infrastructure within an existing TransGrid easement which is located to the south of the Site along Orange Grove Road. This enables the energy generated from the project to be transmitted via TransGrid's existing transmission network, ultimately making the electricity available to the National Electricity Market (NEM).

The connection will be made via new 132kV overhead transmission lines using towers or poles for a distance of approximately 1 kilometre. This connection is subject to TransGrid detailed design however it is expected that 6 towers or poles, distanced approximately 150-200 metres apart would be erected to suspend conductors from the substation to the existing 132kV transmission line.

The EIS for the Gunnedah Solar Project must comply with the requirements in Schedule 2 of the Environmental Planning and Assessment Regulation 2000, and with the SEARs. Specific issues that EIS has to address are as the following:

- land:
- water;
- biodiversity;
- heritage;
- visual;
- noise;
- transport;
- hazards and electromagnetic interference.

Aboriginal archaeological assessment in this report will be included in the EIS.

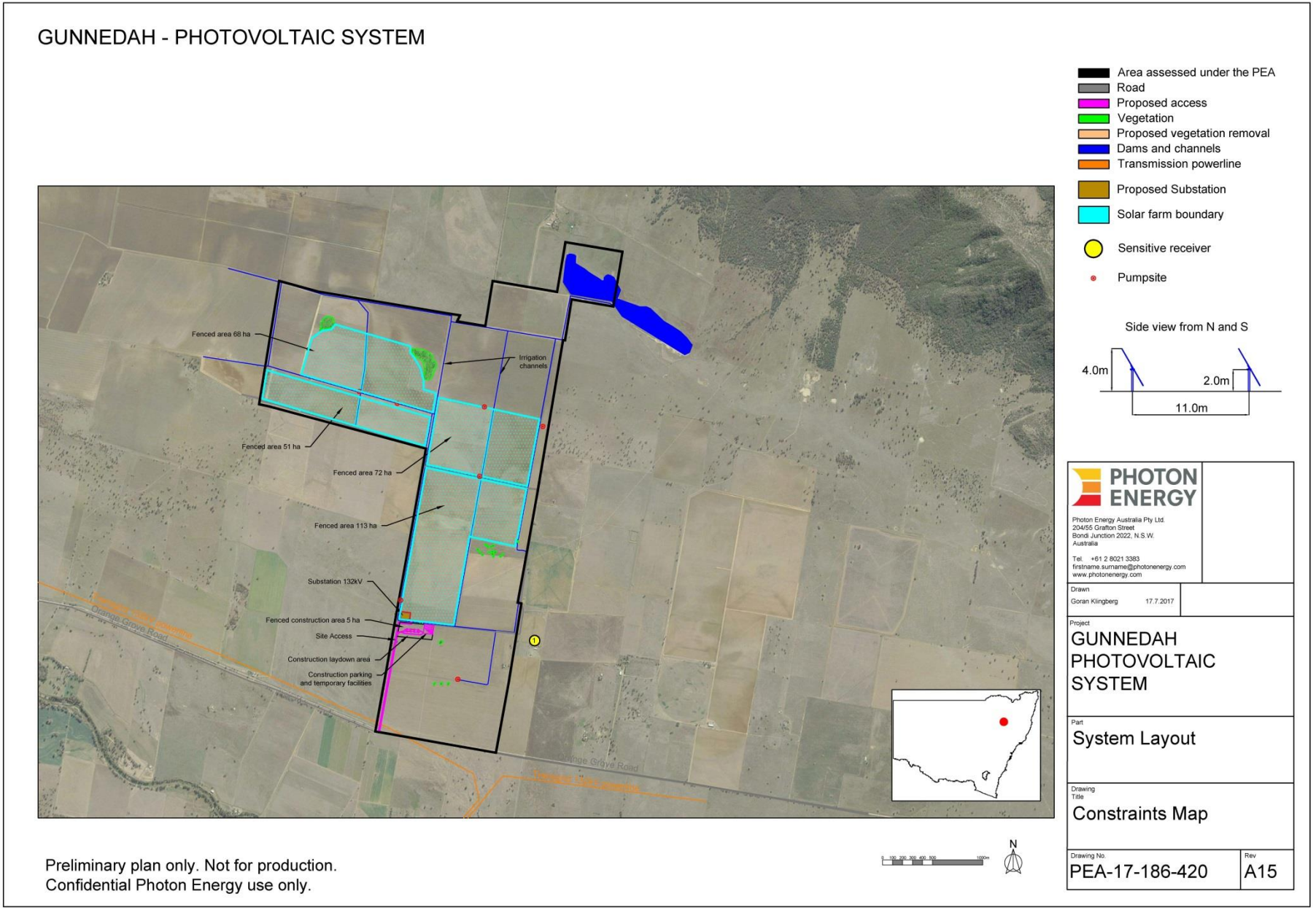

Figure 2. Constraints map

3 Aboriginal Community Involvement

The SEARs required that Aboriginal heritage assessment should include adequate consultation with the local Aboriginal community. The proponent sought to prepare the assessment in consultation with the relevant Local Aboriginal Land Council to identify any sites or issues of cultural significance.

The assessment was undertaken in consultation with Red Chief Local Aboriginal Land Council (RCLALC) whose boundaries covered the study area. RCLALC was contacted at the commencement of the project to discuss the development proposal and invited to participate in site survey. Land Council representative Karen Matthews participated in a site survey on Tuesday 30 January 2018. RCLALC did not identify any archaeological or cultural features within the study area.

RCLALC reviewed report and their comments were integrated into this report. A report provided by RCLALC, summarising the outcome of the site inspection and consultation is included as Appendix A.

4 Previous Archaeological Work

4.1 Database search (AHIMS) and known information sources

4.1.1 AHIMS web services

The Aboriginal Heritage Information Management System (AHIMS) is a database operated by the Office of Environment and Heritage (OEH) and regulated under section 90Q of the *National Parks and Wildlife Act 1974*. AHIMS contains information and records related to registered Aboriginal archaeological sites (Aboriginal objects, as defined under the Act) and declared Aboriginal places (as defined under the Act) in NSW.

A search of AHIMS was conducted on 1 February 2018 to identify registered (known) Aboriginal sites or declared Aboriginal places within or adjacent to the study area (AHIMS Client Service ID: 325400). Search area was wide due to small number of previous archaeological and cultural heritage surveys in the close proximity, and therefore, absence of recorded sites. Search results are attached as Appendix B.

The AHIMS Web Service database search was conducted with the following coordinates (GDA, Zone 56):

Eastings: 0230700 to 0253000
Northings: 6565500 to 6582500
Buffer: 1000 metres

The AHIMS search results showed:

52	**Aboriginal sites are recorded in or near the above location**
0	**Aboriginal places have been declared in or near the above location**

The distribution of recorded Aboriginal sites within these coordinates is shown on Figure 3. The frequencies of site types (site context/features) within the AHIMS database search area are listed in Table 2.

Table 2. Frequency of site types from OEH AHIMS database search

Site Context	Site Features	Number	%
Open Site	Artefact Scatter	16	*31*
	Modified Tree (Carved or Scarred)	15	*29*
	Grinding Groove; Burial	2	*4*
	Grinding Groove	7	*13*
	Artefact Scatter; Grinding Groove	1	*2*
	Aboriginal Ceremony and Dreaming; Grinding Groove	1	*2*
	Aboriginal Resource and Gathering	1	*2*
	Artefact Scatter; Modified Tree (Carved or Scarred)	3	*6*
	Isolated Artefact	4	*7*
	Potential Archaeological Deposit (PAD)	1	*2*
	'Restricted Site'	1	*2*
Total		52	*100*

4.1.2 Other heritage registers and databases

Other sources of information including heritage registers and lists were also searched for known Aboriginal heritage in the vicinity of the study area. These included:

- Gunnedah Local Environment Plan 2012
- Roads and Maritime s. 170 Heritage and Conservation Register
- State Heritage Register and State Heritage Inventory
- Commonwealth Heritage List
- National Heritage List
- Australian Heritage Places Inventory
- Register of the National Estate (non statutory list).

4.2 Discussion of AHIMS search results

As well as determining if there are any registered (known) sites within a given area, an AHIMS search also helps to characterise local archaeology by illustrating the distribution of known sites within the local landscape. This can aid in the development of predictive models used at the desktop stage of archaeological investigation and is integrated with known regional trends to help identify where archaeology may be present within a given area.

Archaeological sites listed on the AHIMS database often represent a record of archaeological survey effort, rather than a comprehensive or complete depiction of an area's archaeology, but provide a useful starting point for further investigation. Search results for the current study area and its surroundings indicated the predominance of open sites with artefacts (n=16, 31%) and modified (scarred) trees (n=15, 29%), followed by grinding grooves (n=7, 13%), isolated artefacts (n=4, 7%) and a range of other complex open sites including PADs and Aboriginal cultural sites. The open camp site is a common site type in the Liverpool Plain. Artefacts may be identified in isolation ('isolated finds') or in association with others in an artefact scatter, or in association with other site types, such as grinding grooves and scarred trees. According to the data retrieved from AHIMS, these are the most common manifestations of archaeological material in the local area.

Many of the registered sites on AHIMS are located in association with permanent waterways or are within areas with suitable geological formations, such as grinding grooves and Aboriginal ceremony sites. Location of scarred trees is also dependent on the preservation of native vegetation as the majority of the regional area has been previously cleared and cultivated.

There are four recorded Aboriginal sites within 6 kilometres of the study area. They consist of four artefact scatters and one scarred tree. Site recoding forms for three artefact scatters were not available on the AHIMS register and their detailed analysis could not be completed.

Gunnedah (AHIMS 20-4-0052)
This site is a modified, scarred tree located approximately 4.3 kilometres west of the study area, recorded by Brayshaw in 1987. One oval shaped scar is located on the Grey Box *(Eucalyptus microcarpa)* species with rounded bark regrowth and no axe marks visible. The tree is located 890 metres north of Mooki River tributary creek and 1.3 kilometres south of Namoi River within the alluvial plains landforms in an area with remnant native vegetation.

Nardoo (AHIMS 20-4-0040)
This site is an artefact scatter recorded by Leila Haglund in 1985. It is located 5.9 kilometres south west of the study area, 400 metres east of Mooki River.

Nardoo (AHIMS 20-4-0041)
This site is an artefact scatter recorded by Leila Haglund in 1985. It is located 6 kilometres south west of the study area, 200 metres east of Mooki River.

Mooki River Artefact Scatter 1 (AHIMS 29-1-0153)
This site is an artefact scatter, located 5.7 kilometres south west of the study area. It is south of Ruvegne Road, south of Oxley Highway. Artefact scatter is within 50 meters of a drainage line that runs into Mooki River, and within 600 metres east of Mooki River.

Previously recorded Aboriginal sites within 6 kilometres of the study area are located in close proximity to Namoi and Mooki River within the alluvial plain landform. This site occupation pattern can be also inferred from the location of previously recorded sites within wider area around Namoi River and its surroundings. Modified or scarred trees are mainly located along the Namoi River that still have remnants of mature native vegetation; grinding grooves are within areas that have suitable geological formation, i.e. sandstone platforms within waterways, and Aboriginal ceremony sites are within areas known as having cultural significance to local Aboriginal people.

There were no previously recorded Aboriginal sites located within the study area.

The presence of recorded sites in the vicinity of the study area demonstrates that the local landscape was used by Aboriginal people in the past and that material traces of this landscape use have survived in the form of Aboriginal objects.

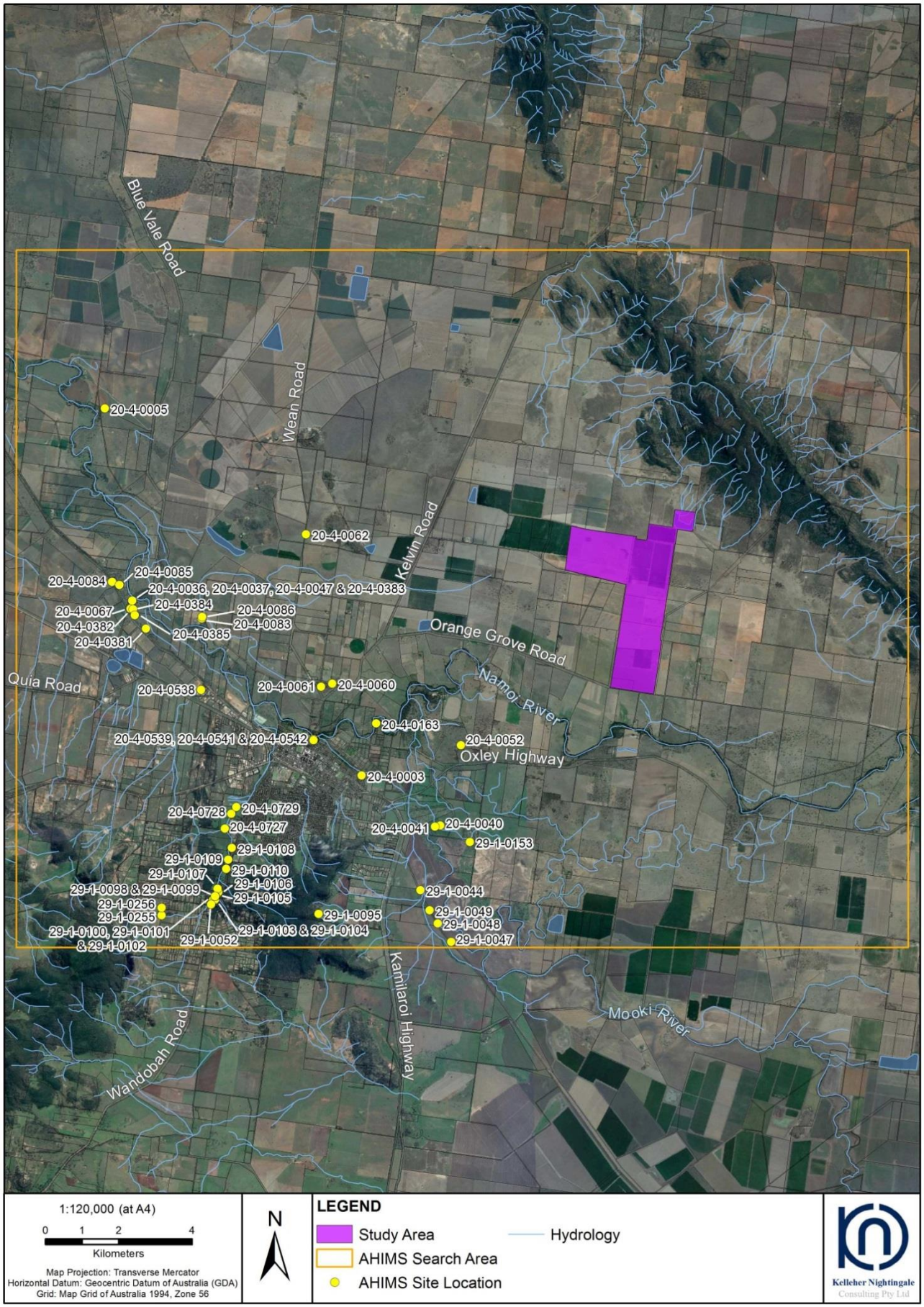

Figure 3. Previously recorded Aboriginal sites

4.3 Previous archaeological investigations and recorded sites

Several archaeological surveys and test excavation programs have been carried out across the local landscape surrounding the study area. This section summarises what is known from existing and available data. Majority of the previous assessments were associated with the coal mining or rock quarry activities in the wider area.

Thompson carried out archaeological assessment of the Vickery Mining Lease in 1981 between Gunnedah and Boggabri, to the north of the study area. Several Aboriginal sites were recorded including grinding grooves, two extensive open camp sites on the banks of Namoi River, Greenwood Creek and Top and Bottom Rocks; smaller open site near intermittent streams, and isolated artefacts located near minor drainage channels, on slopes and ridge crests.

Haglund completed two Aboriginal cultural heritage studies in 1984 to the immediate south of Gunnedah for the purposes of coal mining. Particular attention was given to the 20 axe grinding grooves and an extensive artefact scatter. Grinding grooves were identified within the sandstone country in the vicinity of the water. Within the rest of the study area located within cleared and cultivated land no archaeological deposits were identified (Haglund 1984a, b).

Another survey was conducted by Haglund in 1985 north of Namoi River and Gunnedah for proposed mining development by Vickery Joint Venture. Results of this survey indicated that the majority of the archaeology is present along the river and other permanent waterways. Such locations were considered as favourable camping places, and the historical land use activities that caused limited disturbance to these landforms.

Brayshaw (1987) has conducted an archaeological survey for a proposed quarry at 'The Knobbs' on Oxley Highway, approximately 3 kilometres east of Gunnedah. One possible scarred tree was recorded and no other areas of Aboriginal archaeological potential. This scarred tree is the closest previously recorded Aboriginal site to the current study area (*Gunnedah*, AHIMS 20-4-0052), and is located 4.3 kilometres west of the study area (Figure 3).

NSW National Parks and Wildlife Service (NSW NPWS 2002) has undertaken an Aboriginal cultural heritage assessment within the entire Brigalow Belt South Bioregion, covering an area of 52409 square kilometres. The assessment included Aboriginal cultural heritage consultation from a wide range of Aboriginal communities; oral history and archival investigation; and Aboriginal cultural heritage survey. Field survey also included landform mapping and cultural plant recording.

Four landforms were identified within the entire BSSB bioregion: alluvial landform, deep stable sand landform, landform with higher contour and terrace group landforms. Each landform group has been combined with information about Aboriginal site location to show likelihood of where Aboriginal sites have the higher occurrence. Alluvial landforms were further divided into alluvium and floodplain. Floodplain were differentiated from alluvium by the size of channels, permanence of water, in channel features and abundance of floodplain features including flood channels, meander scrolls and palaeochannels. Generally they comprised fine grained soils (clays) that are poorly drained, susceptible to flooding and stay wet for long periods after rain or flooding events. Total of 668 sites were recorded within the entire alluvial landform group. Some sites were poorly represented due to the inadequate coverage during the survey, previous land use activities such as land clearing and irrigation.

Information about the average distance of recorded Aboriginal sites from water was used to assist in understanding the patterns of site distribution among landforms. Of all the sites recorded (a total of 1110 sites), 50% were recorded within 200 metres of water. Within Liverpool Plains subregion, Aboriginal sites were identified up to 4 kilometres distance from water with an average distance of 410 meters. The wide variety of Aboriginal sites within alluvium landforms were influenced by the features that occur on floodplain and alluvium landforms, such as river frontage locations, creek tributaries, swamps, chain of ponds, gilgai (waterhole) and billabongs (oxbow lakes). The most common site types were surface artefact scatters which predominantly comprised flakes made of quartz, chert, silcrete, quartzite and fine grained sedimentary rocks. Aboriginal scarred trees were also well represented within the areas that had native mature vegetation.

The assessment concluded that some landforms would have greater cultural potential than others with proximity to water being the common element influencing the occurrence of sites. Oral history and archival investigation also demonstrated that many of the historic, social and spiritual aspects of Aboriginal culture shared a common theme with rivers, creeks and waterholes.

Suzanne Hudson (2004) completed an archaeological assessment for Red Chief Local Aboriginal Land Council. The assessment was of 'Porky's Cave' at Porcupine Hill, in Gunnedah, approximately 10 kilometres south west of the current study area. The cave contained rock engravings, a bat population and an ironstone cobble. The site was

recorded as Porcupine Hill Site, an Aboriginal Ceremony and Dreaming site (AHIMS 29-1-0095). Restricted access was recommended for the site considering a very high cultural significance of the site to the local Aboriginal community.

John Appleton (2007) conducted a survey for a proposed residential development at Lincoln Road, in Gunnedah, approximately 10 kilometres south west of the current study area. No artefacts were identified during this survey. Appleton however refers to an isolated artefact and nine grinding grooves located in the vicinity of Wandobah Road, and concluded that the area was used as a transitional area between camping places. Red Chief LALC considered the area of a very high cultural significance as the nearby Porcupine Hill was closely associated with the legendary figure, Red Chief (Appleton 2007).

Insite Heritage (2010) conducted Aboriginal cultural heritage assessment for the continuation of Boggabri Coal Mine located 56 kilometres north of Gunnedah, within the Liverpool Plains subregion. The study area covered the Namoi River flood plains and the Leard State Forest. Scarred trees as opposed to stone tool assemblages were the dominant Aboriginal site type within the Namoi River plains landform. The majority of the sites were identified within lower slopes, particularly at the base of slopes.

OzArk (2013) has prepared the Aboriginal heritage assessment for an over rail bridge in Gunnedah, approximately 9 kilometres west of the study area. No Aboriginal sites or objects were identified during the survey due to the levels of previous ground disturbance within the entire study area. No further Aboriginal heritage assessments were recommended for the proposed development.

4.4 Implications for the study area

These previous archaeological investigations described above have been undertaken in landscapes comparable to that of the study area. Archaeological sites in the vicinity of the study area are located in proximity to the numerous watercourses that traverse this part of the Liverpool Plain. The sites identified close to Namoi River, and its major tributary in the area, Mooki River, appear to represent more frequent or long term occupation by Aboriginal people. The average distance of the Aboriginal sites from waterways within Liverpool Plain is 400 metres (NSW NPWS 2002). Location and preservation of these sites are influenced by the landforms and soil types. Aboriginal sites are known to occur on level and elevated landforms in the vicinity of waterways that are suitable for camping and also close to a variety of resources. Soil type would determine the state of preservation of cultural material with the higher preservation rate in deep alluvial deposits and in areas with limited previous surface and ground disturbance. Sites located in other parts of the landscape have been interpreted as representing more casual or sporadic use of these areas. Aboriginal sites also occur in areas that have suitable geological formations for particular site types. Grinding grooves and engraving sites are located within sandstone country that have water source for grinding purposes. Quarry sites would be in locations that have suitable stone raw material that was used for flaking or sources of ochre. Scarred trees would be located within areas that were not affected by recent land use modifications primarily land clearing. Aboriginal Ceremony and Dreaming sites are known to occur in the area. They are mainly associated with initiation ceremonies and/or activities of ancestral beings during the Dreamtime.

Archaeological potential in the local area has been affected by various factors, primarily the extent of historical disturbances to the land surface and the effect that natural flooding processes have on sites located on the low lying flats that are periodically or frequently affected by flooding. Very low lying and flood affected areas within the study area suggest very low likelihood that the area was used for camping purposes in the past. However, complex networks of drainage channels and the presence of a permanent water source in the vicinity of the study area suggest that the environmental resources offered in the past may have encouraged Aboriginal landscape use. Considering frequent flooding events, it is most likely that they would remove/displace any possible isolated cultural material.

5 Landscape Context

The study area is located within Brigalow Belt South Bioregion (BBSB) extending from south of Dubbo in central western NSW to the mid Queensland coast. It borders Sydney Basin to the south and Darling Riverine Plains Bioregion Several major rivers flow through this bioregion including Namoi River with their catchments forming an integral part of the Murray Darling River System. The Liverpool Ranges located within the south eastern corner of the bioregion feeds the headquarters of the Hunter and Namoi Rivers.

Geologically the BBSB comprises of horizontally bedded Jurassic and Triassic quartz, sandstone and shale that have minor basalt caps (OEH 2013). The study area is within the sedimentary Gunnedah Basin (part of Sydney-Gunnedah-Bowen Basin) with Permian Triassic strata, that is overlain by Tertiary volcanics and lavas derived from shield volcanoes that have intruded. Quaternary sediments that are derived from the older fold beds, sedimentary basin sequences and Tertiary volcanics blanket majority of the area.

Study area is within the Liverpool Plain subregion. It is bounded to the south by Liverpool Ranges, to the east by the Melville Ranges and to the west by the Warrumbungle Ranges and Pilliga Plateau. Liverpool Plains are characterised by Quaternary alluvial plains and outwash fans derived from Tertiary basalts. Landscape consists of undulating hills and sloping plains with alluvial channels and floodplains. Erosion of the basaltic Liverpool Ranges began in the Miocene, and as the climate dried in the Pleistocene the depositional environment changed from braided streams, depositing interbedded clays with sand and gravel layers (Gunnedah Formation) to lower energy meandering streams depositing finer grained black, grey and brown clays (Narrabri Formation). The Liverpool Plains are drained by the Mooki River and Coxs Creek. Morphostratigraphic units were mapped for Quaternary sediments occurring on BBSB by the Geological Survey of New South Wales (2002: 86). They are identified by broad depositional systems and further divided by a distinctive morphology and then grouped by relative age. These morphostratigraphic landscapes are mapped according to the underlying rock type, climate, weathering and topographic settings which influence the degree of weathering and erosion. The study area lies within the alluvial plain morphostratigraphic landscape and Current Floodplain morphostratigrafic feature (Geological Survey of New South Wales 2002: 89). Alluvial Plains are formed by deposition and erosion along rivers and streams. It is a landform pattern with extremely low relief and frequently active erosion or aggradation from channelled or overbank stream flow, or landform may be relict from these processes (Speight 2008: 48). Deposits comprising alluvial system can be divided into a number of features, including: channel, meander plain, flood basin, terraced valleys and backplain deposits. Current Floodplain (Qap-1) that occurs extensively in the Liverpool Plains region of BBSB has level to gently incline with extensive drainage plains on the floodplains and is derived from basaltic alluvium. Sediments consist of clays mainly derived from the Tertiary basalts of the adjacent Liverpool Ranges.

The study area is located one kilometre south west of the southern extent of Kelvin Ranges that have elevations to approximately 880 metres. The highest point within this hill is Nobby's Rock, located approximately two kilometres north of the study area. Kelvin State Forest is located within the southern tip of the northern extent of Kelvin Ranges, approximately 12 kilometres north west of the study area.

The study area is located in the Namoi subregion within the Northern Inland Catchments bioregion. The major channels in the Namoi subregion are the Namoi River, Pian Creek, Gunidgera Creek and Turragulla Creek. Moving westward the channels form a single, main channel, approximately 10 kilometres east of Walgett. Namoi River is located approximately 800 metres to the south of the study area. It flows to the north west and joins the Barwon River at Walgett, approximately 300 kilometres from the study area, which joins the Darling River beyond the boundaries of the bioregion. One of the major tributaries to Namoi River, Mooki River, is entering the Namoi River approximately six kilometres to the west of the study area. The palaeo channels of the Namoi River system provide evidence of a dynamic and continually changing river system. The Namoi River has migrated widely across its floodplain and has moved progressively southwards. This southward migration of the Namoi River is recorded by many remnants of palaeochannels that are distinguishable across the surface of the alluvial plain. To the east the floodplain yields to the elevated area of the hills of Kelvin. Several drainage lines that originate from the ridgeline within the Kelvin Ranges run down into the valley floor with at least four of them entering the dam located at the northern part of the study area.

Soils within the study area comprise of two soil landscapes as mapped by NSW Soil and Land Information System: Burburgate (bul) and Tulcumba (tcv). Burburgate soil landscape located within the majority of the study area is an alluvial landscape occurring within extensive, broad, level mixed stagnant alluvial plains and floodplains, with a local relief of <3 metres, slopes of <1% and elevation range 230-300 metres. Soils are complex and determined by alluvial processes operating in an often relatively flat landscape. Floodplains are a dynamic environment and are subject to inundation and severe erosion. The soils within floodplains tend to be dominated by imperfectly drained Black Dermosols that are clayey soils with well structured B2 horizon containing low levels of free iron. Dermosols are found in imperfectly drained locations.

Tulcumba soil landscape located within northern portions of Lot 1 of the study area is a transferral landscape within extensive, long almost level to gently inclined footslopes with slopes ranging from 0.5-8%, local relief <150 metres and elevation ranging from 270-690 metres. Soil patterns are complex and dependent on the parent material

combinations which feed the footslopes from adjacent landscapes. In general, open depressions at the toe of the slope are often dominated by very poorly drained Grey Vertosols, with poorly drained Black Vertosols occurring on some lower slopes. Vertosols are called cracking clay soils; they have a clay texture throughout the profile, display strong cracking when dry and shrink and swell considerably during wetting and drying phases. Surface soils of Vertolos are usually light clay and subsoils vary from light to medium and heavy clay.

Both soil landscapes located within the study area are very clayey and prone to frequent flooding events. As such they would not be suitable for human occupation and do not preserve archaeological material.

Sources of lithic raw materials suitable for artefact manufacture occur close to the study area, from river and creek beds, and pebbles eroded from sandstone landforms, particularly in the forests. Materials that were commonly used for making stone tools include quartzite, quartz, chert and silcrete that were obtained from the exposed sedimentary formation or picked up as loose rock on the surface. Volcanic rock outcrops that are known to occur in the vicinity of the study area also provided the raw material for ground stone tools such as stone axes.

Vegetation within the study area is highly varied and often controlled by return period of inundation. It is also highly influenced by the previous land use activities. Native vegetation could occur along channels, oxbow and other drainage features, but has been otherwise cleared elsewhere. Lower floodplains used to be dominated by River Red Gum *(Eucalyptus camaldulensis)* occurring either as an open forest or a woodland, with Native Willow *(Acacia stenophylla)* and River Oak (*Casuarina cunninghamiana*) occurring along the main stream banks. Ground cover would include Slender Bamboo Grass *(Austrostipa verticillata)* and Lesser Joyweed *(Altermanthera denticulata)*. Low lying areas on extremely heavy clay might still have stands of Belah (*Casuarina cristata*), Myall (*Acacia pendula*) and Westyern Rosewood *(Alectryon oleifolius)*. Ground cover in these areas would include Wallaby Grass *(Austrodanthonia bipartite)*, Windmill Grass *(Chloris truncate)* and Bindweed *(Convolvulus erubescens)*. In addition to these plant species within the study area itself, surrounding area would have sustained larger number and greater variety of floral and faunal resources that were utilised based on their seasonal availability. Some of these species are known to have been sources of food and raw material for Aboriginal people.

In very fertile areas of Liverpool Plains, by the late 1970's about 60% of land was used for cropping and another 30% for grazing. These resulted in majority of the area being cleared of native vegetation including the study area. Only very small remnants of native mature vegetation can be still found closer to Namoi River and other permanent waterways. Previous land use modifications within the study area include informal vehicle tracks, installation of levee banks and channels, ploughing, construction of dams, water tanks and fences. The study area is currently being used for agricultural purposes with cotton and wheat plantations. All of these land use practices would have displaced any possible Aboriginal cultural material and removed modified or scarred trees.

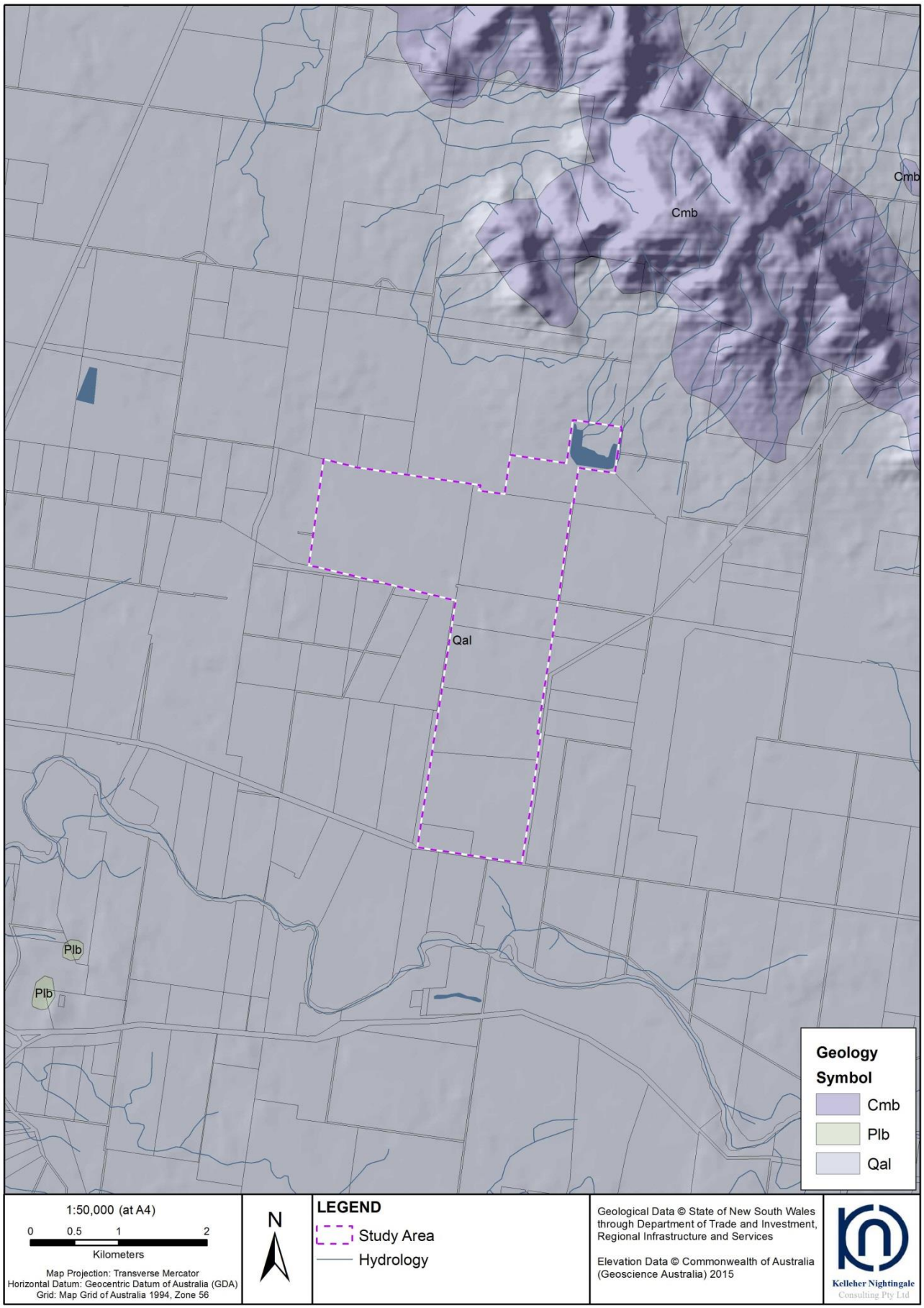

Figure 4. Geology of the study area

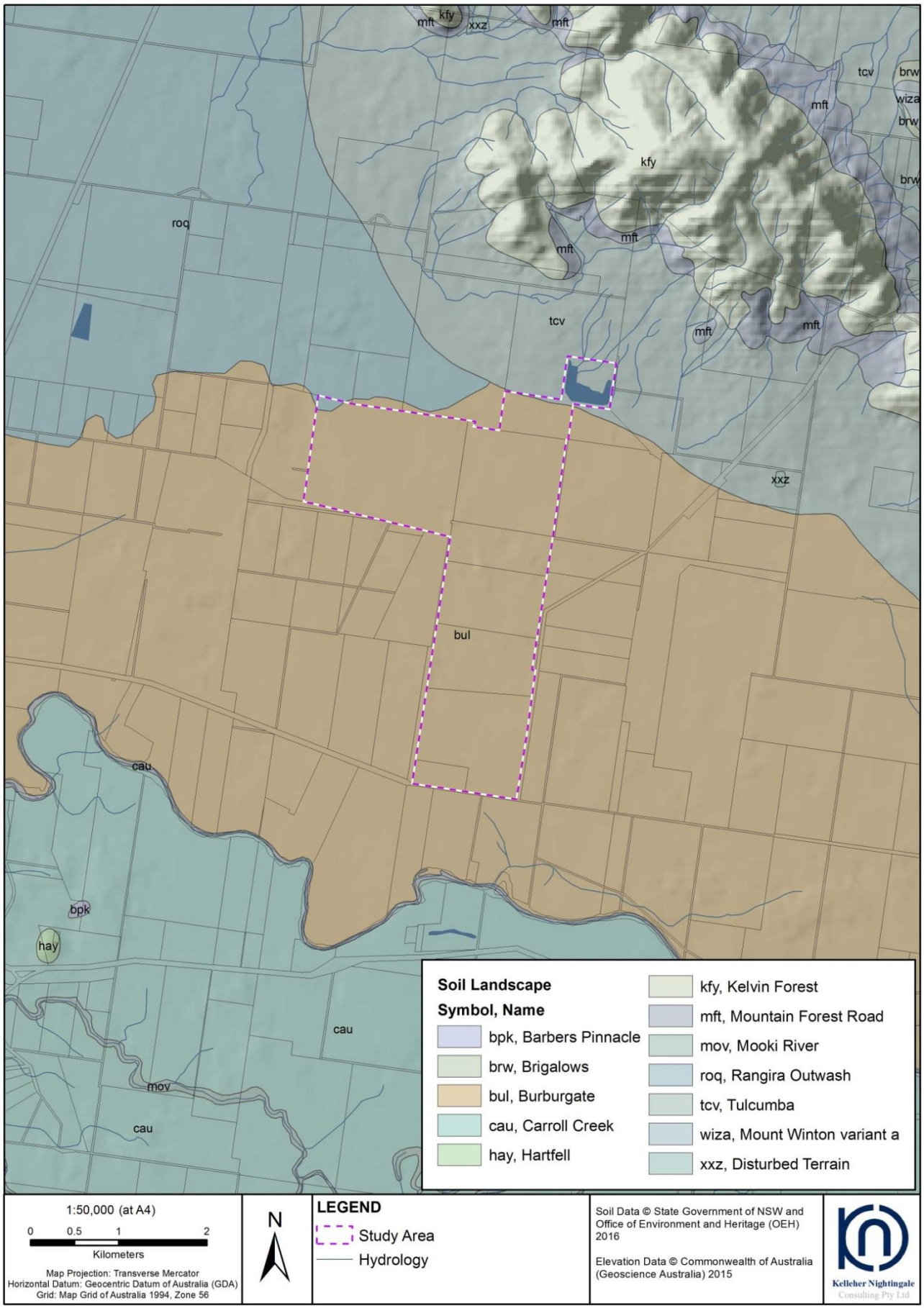

Figure 5. Soil landscapes of the study area

6 Regional Character

Previous archaeological field surveys and excavations within Liverpool Plain have provided data on variable use of the local landforms as known sites indicate ephemeral, casual or limited use, and other sites indicate more intensive or repeated use. Artefact distribution and lithic raw material use aid in assessing the archaeological character of the wider region.

Investigations in the Liverpool Plain have revealed a rich settlement history. The archaeological signature of this settlement history is varied and numerous studies have demonstrated that surface artefact distribution is not always a reliable indicator of the density or composition of subsurface archaeological deposits. Site frequency and density can be related to key landscape factors and assessing the combination of these present in a particular area, based on what is known for the region, allows for an assessment of the likely archaeology in a given area. For the Liverpool Plain, the chief landscape factors include geological formation, distance to water, landform and proximity to environmental resources. Additionally, historical land use practices and disturbance must be taken into account.

Archaeological sites in the region generally occur as open camp sites or surface scatters and as isolated finds on the alluvium geologies. Rock shelters and grinding grooves are present at the margins of the Plain, to the Gunnedah township eastern extent. In the Plain proper, relatively elevated landforms along the margins of creeks, especially those offering permanent water and associated environmental resources would have been favourable for occupation by Aboriginal people. This is reflected in the archaeological record by higher artefact densities recorded at these sites, especially along the major rivers and creek lines, potentially reflecting repeated or more intensive use of these locations. Elevated locations on hilltops and ridge crests tend to display a different archaeological signature, chiefly a sparser artefact distribution and less evidence for 'everyday' or utilitarian activities, suggesting that these areas were often used differently. Stratification of open sites is rare but has been documented and appears to be strongly linked to the presence of alluvial soils conducive to layering and/or the presence of a substantial raw material source.

Numerous raw material sources have been documented in the wider region and are known to have been utilised by Aboriginal people in the past. The prevalence of silcrete, chert, quartz, quartzite and volcanics in regional artefact assemblages is related to the availability of these raw materials in regional geologies and their wide distribution across the Liverpool Plain. Variety of trees and grasses previously abundant within the vicinity of the study area was extensively used by Aboriginal people for food and raw material. Animal food resources used to be plentiful particularly in or near the Namoi River and its numerous tributaries and billabongs. Large game, such as kangaroos and wallabies would have been present within open plains and woodland surrounding the study area, mainly the Kelvin Ranges hills to the north.

Aboriginal Ceremony and Dreaming sites can be found within prominent features across the landscape or are associated with initiation ceremonies, meetings and other important social activities. Some areas form an important part of cultural landscapes for local Aboriginal people. There are at least two areas within the vicinity of the study area that possess very high cultural significance including spiritual, social, historical and educational value. Porcupine Hill site located approximately 10 kilometres south of the study area holds strong cultural and historical significance as it is associated with the historical figure Red Chief and contains an engraving. Kelvin State Forest is located approximately 12 kilometres north west of the study area within the northern extent of the Kelvin Ranges. In 2005 it was transferred to the Brigalow and Nandewar Community Conservation Area and is managed in partnership with the local Aboriginal community and was renamed to its traditional name "Boonalla". It is located within the lands of the Gomeroi (also written as Kamilaroi) and is culturally significant to local Aboriginal people. Scarred trees, artefact scatters, shelters with art and engraving sites are found within the Boonalla Aboriginal Area along with 121 animal and 197 plant species, many of them listed as endangered. The presence of areas that are culturally significant to Aboriginal people point out that the regional area was extensively occupied and used in the past and holds and/or contains traces of local Aboriginal people's connections to the country and culture.

Regional archaeology has been variably impacted by historical and current land use practices as well as by natural processes. Preservation of archaeological sites in open contexts is difficult because of the adverse effects of erosion, flooding and disturbance from various human activities. Conversely, ground surface visibility is often increased by these processes, leading to increased identification of artefacts in these areas, primarily on the banks of minor creeks. Some site types are poorly represented among the site data from the previous archaeological assessments in the wider region, such as shelters with art, quarries and tone arrangements. This is most likely due to the previous survey coverage and not necessarily due to the lack of these site types in the region.

7 Predictions

The information outlined in previous sections allows several predictions to be made about the nature of the archaeology that may be expected in the study area:

- Archaeological sites are likely to consist of open artefact scatters and/or isolated finds on the elevated, well drained landform units, and scarred trees within areas of remnant mature vegetation.
- It can be expected that silcrete, quartz, quartzite, chert and volcanics will be the most commonly encountered artefact raw material.
- Clearance of the majority of original vegetation lessens the likelihood of identifying culturally modified trees, but old growth trees may be present in the study area and have the potential to display scars of Aboriginal origin.
- Grinding grooves and shelters can be found in areas with appropriate geological formations.
- Archaeological sites are more likely to be identified in areas that have been subject to less intensive disturbance.
- The identification of archaeological sites is likely to be affected by differential visibility of the ground surface, but successful assessment of areas of potential archaeological deposit can be made based on landform and other environmental factors such as distance to water.

8 Methods and Survey Coverage

8.1 Sampling strategy

The aim of the survey was to conduct an archaeological inspection of the study area and identify any Aboriginal archaeological sites and/or areas of potential archaeological deposit.

Based on the archaeological background and landform context, the entire study area was subject to regular and frequent flooding events. Close inspection was carried out in areas that were covered in trees in order to assess their possibility to contain evidence of cultural modifications by Aboriginal people. In particular, exposed areas around two dams and levees, as well as trees located in the eastern section of Lot 1 DP186590 were closely inspected for areas of exposure and possible scars.

8.2 Field methods

Field survey of the study area was completed out on 30th January 2018 by KNC archaeologist Dr Matthew Kelleher and Red Chief Local Aboriginal Land Council representative Karen Matthews.

The entire area was surveyed as one survey unit. However, notes were made during the survey about different levels of ground surface visibility and exposures within these disturbed, drainage depression areas. The study area was traversed by pedestrian survey in a series of transects. High resolution colour aerial photographs, topographic maps and geological maps were used for reference in the field. Site locations were plotted using handheld GPS units, mapped and photographed, including landform context and site contents. Notes were taken during the survey of landform, exposures, nearest water, vegetation, current land use, aspect, previous ground disturbance and areas of potential for intact subsurface archaeological deposit or PAD.

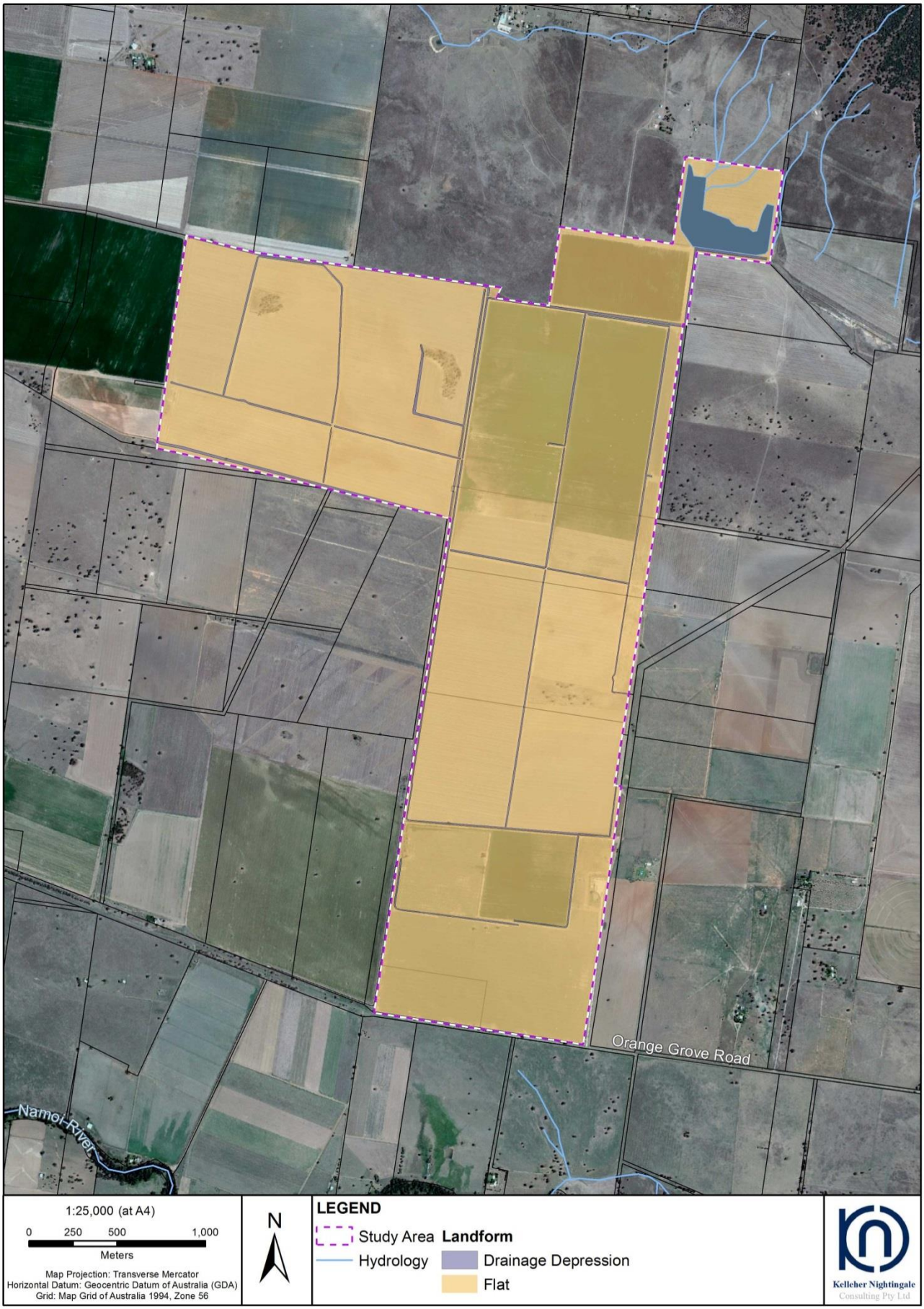

Figure 6. Landforms and survey unit of the study area

8.3 Survey coverage

Field survey commenced at the northern part of the study area, within Lot 1 along a large dam embankment. The dam has channels that drain the water runoff from the Kelvin Ranges to the north (Plate 1). The dam did not contain any water at the time of site inspection (Plate 2). It was overgrown with short grass with areas of erosion and exposure. The embankment is higher at its southern end and gradually levels to the north in order to receive the water draining from the elevated area of the hills. Ground surface visibility within this part of the study area varied, with higher percentage within the dirt vehicle track. Exposures were visible on the embankment walls due to the water runoff during rainy spells. Construction of the dam would have involved significant ground disturbances with the soils removed or displaced. All exposure areas were closely inspected for soil conditions and Aboriginal cultural material. Soils were noted to be heavy clays prone to cracking when dry. No Aboriginal cultural material was observed and the area was assessed as having low potential for containing any archaeological deposits.

Plate 1. Vehicle track on the southern side of the large dam at the north of the study area, facing north

Plate 2. Conditions within the dam, visibility and exposures

The survey team moved from east to west along the irrigation channels towards the western extents of the study area. Channels revealed limited amount of water at the time of the site inspection. Ground surface visibility in these channels and surrounding parcels of lands were good, with areas of exposures visible (Plate 3). Channel banks revealed very heavy dry cracking clays. Eastern extent of the study area is within the heavily ploughed and planted paddock (Plate 4). Soils observed were clays, very poorly drained. These land use practices would have caused disturbances to the limited ground levels and would have displaced and/or removed any cultural material present.

Plate 3. Conditions within irrigation channels (drainage depression), facing south.

Plate 4. Paddock used for agriculture, western extent of the study area, facing north east towards the group of trees and Kelvin Ranges

The survey continued across the western extent of the study area, around two groups of trees within Lot 1 DP186590. Both areas had very limited ground surface visibility and were mainly overgrown with short grass (Plate 5). A small group of trees located at the westernmost part of the study area was situated around a small dam overgrown with vegetation (Plate 6). Areas of exposure were observed on the banks of the small dam, vehicle track and irrigation channels to the east and south. Trees were closely inspected for their age and possible Aboriginal cultural

modifications. It was noted that all the trees were very young in age and most likely recently replanted. Areas of exposure were inspected for any possible Aboriginal cultural material but none was identified.

Plate 5. Group of trees located at the eastern part of the Lot 1 DP186590, facing south west

Plate 6. Conditions within a small dam at the westernmost part of the study area, facing south

Other parts of Lot 1 DP186590 is within area that is extensively ploughed (Plate 7) and intersected with irrigation channels to the north, west and south. These land modifications would have directly impacted on the soils as they would mix and displace them. To the south of this parcel of land there are three water tanks and a windmill used for water storage and pumping (Plate 8). Area around the tanks is covered partially in wheat and in short to high grass and some debris of agricultural machinery. Visibility varied from very good to nil, with areas of exposures around tanks and a tree. No Aboriginal cultural material was identified. The area was deemed as having very low potential to contain archaeological deposits.

Plate 7. Lot 1 DP186590, extensively ploughed, facing north east

Plate 8. Water tanks and a windmill within the south west of the study area, facing south

Survey continued towards the south across the study area and into Lot 2 DP801762. Northern parts were covered in short grass with variable surface ground visibility and occasional areas of exposure (Plate 9). Soils were cracking dry clays with occasional gravel on surface. Southern end of the Lot 2 was planted with wheat, had a low ground surface visibility (Plate 10) and very limited areas of exposure, mainly around trees and within tracks. Small number of trees were observed, all of them revealing very young age and therefore, not containing any traces of Aboriginal cultural modifications. To the south east of the study area there is a farm building with the associated infrastructure. Construction of the house and landscaping works would have caused significant ground disturbances that would have removed soils that would have possibly contained cultural material.

Plate 9. Central part of the study area, general ground surface visibility and areas of exposure, facing south

Plate 10. Lot 2 DP754954 planted with wheat, general ground surface visibility, facing north east

The entire study area revealed very similar conditions throughout with slight variations. It was all cleared of vegetation and heavily ploughed. Previous land use practices included construction of two dams and irrigation channels across the entire study area. The study area has been used for agricultural purposes for many years; currently majority of the study area is planted with cotton and wheat. Very limited number of trees is still present that consist of replanted or regrown young specimens of native vegetation species. Ground surface visibility and areas of exposure were consistent throughout the study area and confined to areas cleared of vegetation, within tracks, dams and channels. Soils observed were cracking dry clays that have shrink/swell properties (Plate 11). The entire area was considered to be prone to frequent flooding events.

Plate 11. General soil conditions within the study area, facing north

Plate 12. Looking across the study area, floodplain, facing Kelvin Ranges to the north

A tabulated summary of survey coverage by survey unit and landform is presented in Tables 3 and 4.

Table 3. Survey coverage

Survey Unit	Landform	Survey Unit Area (m^2)	Visibility %	Exposure %	Effective Coverage Area (m^2)	Effective Coverage %
1	Floodplain	7,389,208	50	20	738,920	10
2	Drainage depression	217,172	70	50	76,010	35

The survey coverage table above demonstrates the limitations imposed on the effectiveness of the survey by infrequent exposures but generally moderate to good visibility of the ground surface. Floodplains exhibited moderate levels of ground surface visibility with approximately half of the area being within the ploughed and cleared, and half within planted areas (Table 3). Exposures were limited to dirt tracks, around trees and eroded areas within ploughed paddocks. The rest of the floodplain was grassed or replanted with trees or wheat. Drainage depression, consisting of artificially made dams and irrigation channels exhibited higher level of both ground surface visibility and areas of exposure (Table 3). Exposures were observed within dam and channels as well as their banks. Two dams did not contain any water during the site inspection with some overgrown grass within their base.

A summary of effective coverage and results by landform is presented in Table 4.

Table 4. Landform summary

Landform	Landform Area (m^2)	Area Effectively Surveyed (m^2)	% of landform effectively surveyed	Number of sites	Number of artefacts or features
Floodplain	7,389,208	738,920	10	nil	nil
Drainage depression	217,172	76,010	35	nil	nil

9 Results and Discussion

Field inspection did not locate any Aboriginal archaeological sites or areas of Aboriginal cultural heritage potential within the study area. No significant Aboriginal cultural heritage features were identified within the study area by the Red Chief Local Aboriginal Land Council representative.

An assessment of archaeological potential within the study area was conducted during the archaeological survey. The characterisation of archaeological potential was based on several factors known to influence both the location and preservation of archaeological sites within the study area. These factors included landform context, gradient, erosion, distance to water and integrity of the ground surface / assessment of disturbance. The entire study area was assessed as having low archaeological potential.

Previous Aboriginal cultural and archaeological assessments within the wider region recorded very sparse evidence of past human occupation within floodplains landforms. According to site predictive model for the Liverpool Plains, density and complexity of sites were directly related to the landforms, soils present and their distance to waterways, geological formations, as well as the levels of recent land use modifications (NSW NPSW 2001). Overall, higher number of Aboriginal sites was recorded within alluvial and higher contour landforms (NSW NPSW 2002: 47). Elevated terrace group of landforms are suitable camp locations compared with floodplain soils that are generally heavy clays that remain wet for long period of time after the rain or flooding. Site prediction models pointed out that distance of water was one of the determining factors for site locations. Highest number of sites occurs within 50 metres of reliable water source, with 50% located within 200 metres. Geological formations are determinants for particular site types. Shelters that may or may not contain art, grinding grooves and stone arrangements are located within areas that have suitable sandstone outcrops. Raw material and ochre quarries would be located in areas where natural sources of stone and ochre occur. Higher density artefacts scatters as well as more complex sites occur on the banks major waterways such as Namoi and Mooki River; smaller open sites along intermittent creeks; and isolated artefacts along minor drainage lines, on slopes and ridge crests. The closest previously recorded Aboriginal sites to the study area are artefact scatters and a scarred tree. They were located on elevated landforms in the vicinity of Namoi and Mooki River. Scarred tree is located within the alluvial plains in the proximity to Namoi River where there are remnants of native mature vegetation.

In assessing the preservation of archaeological deposits, depth of topsoil and its nature should be considered. Some soils are subject to erosion and are not prone to preserving subsurface deposits. Previous land use practices can also influence preservation of archaeological material. Land clearance that included removal of trees would have impacted on the topsoil and would have mixed the deposits, therefore possibly exposing any possible subsurface cultural material and causing a loss of archaeological context. This practice often resulted in removal of big native trees that had been possibly culturally modified. Land that was or being used for agricultural purposes has been also gone through some levels of previous disturbance. Although these levels often cannot be determined by the surface survey, it is considered that topsoil has been displaced and mixed and although any possible subsoil archaeological material would not be removed, it would not be in its primary context. Where significant ground disturbance has occurred associated with the construction of houses and roads, it is most likely that any possible archaeological deposits would have been removed and/or displaced.

The study area is located within the floodplain approximately 800 metres north of Namoi River and within 1 kilometre of the hills of Kelvin Ranges. Floodplain is a very flat, dynamic landform that is prone to frequent flooding events with poor drainage. As such they do not provide suitable camping locations for human occupation. Due to abundance of resources within the surrounding landscapes including the alluvial flats around Namoi River and woodlands on the Kelvin Ranges, it is most likely that Aboriginal people had used the study area as a transient corridor. Soils present within the study area are heavy clays that have shrink/swell properties and are not prone to conserve any deep archaeological deposits. Frequent flooding events would also have displaced any lost or discarded Aboriginal cultural material. Previous land use practices including extensive land clearings would have removed mature native vegetation including any mature trees that could have contained traces of Aboriginal cultural modifications.

The study area was assessed as having low archaeological potential. Its past use by Aboriginal people would have been transient and occasional with no suitable locations for long term occupation. It is most likely that surrounding landforms were extensively used in the past by Aboriginal people and therefore the study area was a passing corridor in the dry spells. Any possible discarded or lost cultural material would have been displaced or removed due to the nature of soils and frequent flooding events.

10 Impact Assessment

No Aboriginal objects (artefacts) or Aboriginal archaeological sites were identified within the study area. No significant Aboriginal cultural features were identified within the study area by the Red Chief Local Aboriginal Land Council representative (Appendix A). The entire study area was assessed as exhibiting nil to low archaeological potential. The proposed construction and operation of a proposed solar power facility and associated infrastructure in Gunnedah, NSW, would not impact on Aboriginal archaeological heritage objects or sites.

11 Conclusions and Recommendations

No Aboriginal objects/sites or areas of Aboriginal archaeological potential were identified within the study area. No significant Aboriginal cultural features were identified within the study area by the Red Chief Local Aboriginal Land Council.

No further Aboriginal cultural heritage assessment is warranted for the proposed solar power facility and associated infrastructure in Gunnedah, NSW.

Procedure for unexpected Aboriginal heritage finds

1) stop work, protect the item
2) contact specialist (archaeologist) to assess
    a. If the status of the object as an Aboriginal heritage item is confirmed, seek appropriate approvals
    b. If item is not an Aboriginal heritage item, work may recommence

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Appendix A Red Chief Local Aboriginal Land Council Report

RED CHIEF LOCAL ABORIGINAL LAND COUNCIL
ABN 11 825 966 870
PO Box 745
GUNNEDAH NSW 2380
Phone: (02) 6742 3602
Email: ceo@redchieflalc.com.au

Wednesday, 21 March 2018
Kelleher Nightingale Consulting Pty Ltd
Level 10, 25 Bligh Street
Sydney NSW

Aboriginal Heritage Assessment

CUNNEDAH SOLAR FARM

On the 30th January 2018 Red Chief LALC organised Karen Mathews (an experienced sites worker) to take part in a field survey, as part of an Aboriginal Heritage Assessment with Dr Mathew Kelleher from Kelleher Nightingale Consulting at 765 Orange Grove Road, Gunnedah, being the site for the proposed Gunnedah Solar Farm.

Following an extensive walk over inspection of the site Karen was not able to identify any evidence that indicated a presence of Aboriginal artefacts in the project area.

She did pass comment that the grass cover at the site made it difficult to get e thorough view of the ground surface, so it was not possible to develop a view that there was absolutely no materiel of relevance on the site,

If additional site surveillance is required to assess the site when ground cover is removed from the site, Red Chief LALC would again be keen to provide sites officers to review the area as the Gunnedah area has a history of a significant presence of Aboriginal people occupying the area prior to European settlement, and there may well be evidence of former habitation when ground disturbance occurs.

Should you have any further questions relating to this report please contact this office.

:. Regards

John Magner
Chief Executive Officer

Appendix B AHIMS Search Results

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1711.02
Client Service ID : 325400

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
20-4-0060	BBS; Red Chief LALC; Wean Rd ST 3	AGD	56	238203	6571499	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0061	BBS; Red Cheif LALC; Wean Rd ST 2	AGD	56	237891	6571412	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0062	BBS; Red Chief LALC; Wean Rd ST 1	AGD	56	237483	6575567	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0067	BBS; Red Chief LALC; 4 Mile TSR ST 1-7	AGD	56	232693	6573548	Open site	Valid	Modified Tree (Carved or Scarred) : 7		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0083	BBS; Red Chief LALC; Bluevale Rd ST 1	AGD	56	234645	6573276	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0084	BBS; Red Chief LALC; 4 Mile TSR (West Paddock) ST 2	AGD	56	232200	6574270	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0085	BBS; Red Chief LALC; 4 Mile TSR (West Paddock) ST 1	AGD	56	232396	6574191	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
20-4-0086	BBS; Red Chief LALC; Bluevale Rd ST 2	AGD	56	234658	6573320	Open site	Valid	Modified Tree (Carved or Scarred) : 1		99031
	Contact	Recorders	Archaeological Surveys & Salvage ,Red Cheif LALC - BBS Survey Team					Permits		
29-1-0104	Wondobah 7	AGD	56	235006	6565608	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0105	Wondobah 8	AGD	56	235065	6565772	Open site	Valid	Artefact : 50		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0106	wondobah 9	AGD	56	235099	6565818	Open site	Valid	Artefact : 5		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0107	Wondobah 10	AGD	56	235077	6565912	Open site	Valid	Artefact : 50		

Report generated by AHIMS Web Service on 01/02/2018 for Kristen Taylor for the following area at Datum :GDA, Zone : 56, Eastings : 230700 - 253000, Northings : 6565500 - 6582500 with a Buffer of 1000 meters. Additional Info : to help with determining archaeological potential. Number of Aboriginal sites and Aboriginal objects found is 52

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 4

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1711.02
Client Service ID : 325400

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0108	Wondobah 11	AGD	56	235461	6567018	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0109	Wondobah 12	AGD	56	235362	6566699	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0110	Wondobah 13	AGD	56	235308	6566448	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Mr.John Shipp					Permits		
20-4-0163	Cushions Old Tamworth Rd 1	AGD	56	239397	6570411	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Mr.John Shipp					Permits		
20-4-0164	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0100	Wandobah 3	AGD	56	234950	6565608	Open site	Valid	Grinding Groove : -		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0101	wondobah 4	AGD	56	234950	6565602	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0102	wondobah 5	AGD	56	234950	6565602	Open site	Valid	Grinding Groove : 3		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0103	Wondobah 6	AGD	56	235006	6565608	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	Mr.John Shipp					Permits		
29-1-0153	MOOKI RIVER ARTEFACT SCATTER 1	GDA	56	242056	6567372	Open site	Valid	Artefact : 8		
	Contact	Recorders	Mr.Kirwan Williams					Permits		
29-1-0047	DTG/IF21 - Mooki River 6	AGD	56	241440	6564460	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Mr.Mark Rawson					Permits		
29-1-0048	DTG/IF22 - Mooki River 7	AGD	56	241070	6564960	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Stephanie Garling					Permits		
29-1-0049	DTG/IF23 - Mooki River 8	AGD	56	240850	6565320	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Mr.Mark Rawson					Permits		
20-4-0381	NR-OS-001	GDA	56	233225	6573191	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Lance Syme					Permits		
20-4-0382	NR-OS-004	GDA	56	232807	6573729	Open site	Valid	Artefact : 1		

Report generated by AHIMS Web Service on 01/02/2018 for Kristen Taylor for the following area at Datum :GDA, Zone : 56, Eastings : 230700 - 253000, Northings : 6565500 - 6582500 with a Buffer of 1000 meters. Additional Info : to help with determining archaeological potential. Number of Aboriginal sites and Aboriginal objects found is 52

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Page 2 of 4

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1711.02

Client Service ID : 325400

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Kayandel Archaeological Services,Ms.Caroline Hubschmann					Permits		
20-4-0383	NR-OS-006	GDA	56	232854	6573952	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Ms.Caroline Hubschmann					Permits		
20-4-0384	NR-OS-003	GDA	56	232874	6573717	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Lance Syme					Permits		
20-4-0385	NR-OS-002	GDA	56	232919	6573555	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Tom Knight					Permits		
20-4-0541	White Gum Scarred Shield Tree Woodshed Reserve Gunnedah	GDA	56	237795	6570150	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Ms.Jane Delaney-John					Permits		
20-4-0542	Woodshed Reserve Gunnedah	GDA	56	237796	6570166	Open site	Valid	Aboriginal Resource and Gathering : -		
	Contact	Recorders	Ms.Jane Delaney-John					Permits		
20-4-0539	White Gum Scarred Shield Tree	GDA	56	237795	6570150	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Ms.Jane Delaney-John					Permits		
29-1-0255	Marshmead2	AGD	56	233550	6565188	Open site	Valid	Artefact : -		
	Contact Ms.Tammy Bush	Recorders	Mr.Patrick Gaynor					Permits		
29-1-0256	Marshmead3	AGD	56	233547	6565389	Open site	Valid	Artefact : -		
	Contact Ms.Tammy Bush	Recorders	Mr.Patrick Gaynor					Permits		
20-4-0538	Torrens Road ST2	GDA	56	234731	6571520	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact Ms.Tammy Bush	Recorders	Mr.Patrick Gaynor					Permits		
29-1-0044	DTG/IF1 - Mooki River 1	AGD	56	240600	6565870	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Stephanie Garling					Permits		
20-4-0036	Naomi River/CWR;	AGD	56	232750	6573750	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	1169
	Contact	Recorders	Ms.Laila Haglund					Permits		
20-4-0037	Naomi River/ CWR;	AGD	56	232750	6573750	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	1169
	Contact	Recorders	Ms.Laila Haglund					Permits		
20-4-0040	Nardoo;	AGD	56	241140	6567630	Open site	Valid	Artefact : -	Open Camp Site	1169
	Contact	Recorders	Ms.Laila Haglund					Permits		

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Page 3 of 4

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1711.02
Client Service ID : 325400

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
20-4-0041	Nardoo;	AGD	56	241000	6567600	Open site	Valid	Artefact : -	Open Camp Site	1169
	Contact	**Recorders**	Ms.Laila Haglund					**Permits**		
20-4-0047	Namoi River/CWR;	AGD	56	232750	6573750	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	1169
	Contact	**Recorders**	Ms.Laila Haglund					**Permits**		
20-4-0052	Gunnedah;	AGD	56	241710	6569820	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1258
	Contact	**Recorders**	Helen Brayshaw					**Permits**		
20-4-0003	Gunnedah	AGD	56	239000	6569000	Open site	Valid	Modified Tree (Carved or Scarred) : -, Burial : -	Burial/s,Carved Tree	
	Contact	**Recorders**	NPWS - Blackheath Office,R Etheridge,Fred McCarthy					**Permits**		
20-4-0005	Burburgate	AGD	56	232000	6579000	Open site	Valid	Burial : -, Modified Tree (Carved or Scarred) : -	Burial/s,Carved Tree	
	Contact	**Recorders**	David Bell,M.L Florian,Glen Morris,Glen Morris,NPWS - Blackheath Office,M.L Ravel					**Permits**		
29-1-0052	Black Jacks Complex	AGD	56	234900	6565485	Open site	Valid	Artefact : 4, Grinding Groove : 2		
	Contact	**Recorders**	Allen Hutchins					**Permits**		
29-1-0095	Porcupine Hill Sites	AGD	56	237823	6565225	Open site	Valid	Aboriginal Ceremony and Dreaming : -, Grinding Groove : -		
	Contact T Russell	**Recorders**	Ms.Suzanne Hudson					**Permits**		
29-1-0098	Wandabah 1	AGD	56	235016	6565704	Open site	Valid	Grinding Groove : 1		
	Contact	**Recorders**	Mr.John Shipp					**Permits**		
29-1-0099	Wandobah 2	AGD	56	235007	6565704	Open site	Valid	Grinding Groove : 5		
	Contact	**Recorders**	Mr.John Shipp					**Permits**		
20-4-0727	BJC01	GDA	56	235374	6567734	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Leigh Bate,Apex Archaeology					**Permits**		
20-4-0728	BJC02	GDA	56	235556	6568142	Open site	Destroyed	Artefact : 1		103767
	Contact	**Recorders**	OzArk Environmental and Heritage Management,Mr.Leigh Bate,Apex Archaeology,I					**Permits**	4091	
20-4-0729	BJC03	GDA	56	235690	6568321	Open site	Destroyed	Potential Archaeological Deposit (PAD) : -, Artefact : 1		103767
	Contact	**Recorders**	OzArk Environmental and Heritage Management,Mr.Leigh Bate,Apex Archaeology,I					**Permits**	4091	

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Page 4 of 4