



Appendix B

Historical heritage assessment



Historical Heritage Assessment

Lightning Ridge Area 1

Prepared for DRNSW
March 2022

EMM Sydney
Ground floor, 20 Chandos Street
St Leonards NSW 2065

T 02 9493 9500
E info@emmconsulting.com.au

www.emmconsulting.com.au

Historical Heritage Assessment

Lightning Ridge Area 1

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Prepared by**Approved by**



Kerryn Armstrong
Senior Archaeologist
11 August 2023



Pamela Kottaras
National Technical Lead - Historical Heritage
11 August 2023

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Executive Summary

ES1 Overview

The *Department of Regional NSW* (DRNSW) commissioned *EMM Consulting Pty Limited* (EMM) to prepare this *historical heritage assessment* (HHA) as part of the *Review of Environmental Factors* (REF) as an internal assessment tool for activities associated with opal prospecting and opal mining in REF Area 1 (the project area) of the *Narran-Warrambool Reserve* (NWR). This HHA has been prepared to support the REF. It documents the historical development of the project area and surrounding region and proposes recommendations for the management of those values into the future.

This report does not have a field inspection portion and therefore all of the information presented in Sections 5.6, 6, 7 and 0 are indicative and require a field inspection to verify.

ES2 Site description

The project area (REF Area 1) refers to the southern portion of the Narran–Warrambool Reserve (NWR). The project area comprises of approximately 1,972 km² and is broadly bounded by the Barwon River and Narran River to the south-east and north-west respectively. The project area lies between Walgett to the east and Brewarrina to the west. The project area is located within the Australia’s *Great Artesian Basin* (GAB), which is amongst the Narran River System. During flood season, the Narran River fills a series of lakes in the Narran Lakes (previously known as the Terewah Swamp) ecosystem. The project area includes numerous tanks and water reserves along the travelling stock routes (discussed further in Section 4.2.6), the ample water supply, no doubt making an attractive place to camp.

ES3 Impact assessment

This report is based on a desktop analysis only, therefore all impacts are indicative as the historical sites have not yet been verified. If opal prospecting and mining were to occur within the project area, at least 50 historical sites will be impacted across the project area. Below and Table ES2 list the sites identified by desktop research across the project area; however this list could change upon a field investigation.

Table ES1 **Indicative impact to registered sites**

Item number	Name	Impact from opal prospecting and mining within Area 1
114941	Site of Homestead; Terewah – DEMOLISHED	Works at this site would impact heritage values
12426	Shearing Shed – Terewah – Demolished	Works at this site would impact heritage values
12423	East Mullane Shearing Shed	Works at this site would impact heritage values
13126	Stockyard: Snake Hut Tank	Works at this site would impact heritage values
12424	Snake Hut Tank	Works at this site would impact heritage values
12427	Bundah Shearing Shed	Works at this site would impact heritage values
13127	Stockyard: Bundah	Works at this site would impact heritage values
12428	Bundah Quarters	Works at this site would impact heritage values

Item number	Name	Impact from opal prospecting and mining within Area 1
12423	Lumeah Shearing Shed	Works at this site would impact heritage values
11492	Cattle Yards: Terewah DEMOLISHED	Works at this site would impact heritage values
LEP Register		
I42 (WLEP)	Earth Walled Buildings	Works at this site would impact heritage values
I40 (WLEP)	Anglican Church	Works at this site would impact heritage values
I22 (BLEP)	Narran Lake	Works at this site would impact heritage values
SHR		
5062951	Moordale Wells (Aboriginal Place)	Works at this site would impact heritage values
RNE		
513	Narran Lakes Area	Works at this site would impact heritage values

Table ES2 **Indicative impact to newly identified**

Item number	Impact from opal prospecting and mining within Area 1
B-1	Works at this site would impact heritage values
B-2	Works at this site would impact heritage values
B-3	Works at this site would impact heritage values
B-4	Works at this site would impact heritage values
B-5	Works at this site would impact heritage values
B-6	Works at this site would impact heritage values
B-7	Works at this site would impact heritage values
B-8	Works at this site would impact heritage values
B-9	Works at this site would impact heritage values
B-10	Works at this site would impact heritage values
B-11	Works at this site would impact heritage values
B-12	Works at this site would impact heritage values
B-13	Works at this site would impact heritage values
B-14	Works at this site would impact heritage values
B-15	Works at this site would impact heritage values
B-16	Works at this site would impact heritage values
B-17	Works at this site would impact heritage values
B-22	Works at this site would impact heritage values
B-23	Works at this site would impact heritage values
B-24	Works at this site would impact heritage values

Item number	Impact from opal prospecting and mining within Area 1
B-25	Works at this site would impact heritage values
B-26	Works at this site would impact heritage values
B-27	Works at this site would impact heritage values
B-28	Works at this site would impact heritage values
B-29	Works at this site would impact heritage values
B-30	Works at this site would impact heritage values
B-31	Works at this site would impact heritage values
B-32	Works at this site would impact heritage values
B-33	Works at this site would impact heritage values
B-34	Works at this site would impact heritage values
L-1	Works at this site would impact heritage values
WP-1	Works at this site would impact heritage values
WP-2	Works at this site would impact heritage values
WP-3	Works at this site would impact heritage values
WP-4	Works at this site would impact heritage values
WP-5	Works at this site would impact heritage values
Cumborah Town	Works within the township would impact heritage values
Cumborah Cemetery	Works at this site would impact heritage values
Travelling Stock Routes	Works within the TSR's would impact heritage values
Water Reserves	Works within WRs would impact heritage values

ES4 Management and mitigation measures

The overriding objective in managing heritage significance is the avoidance of impacts. Avoidance removes the need for mitigation or amelioration and is in keeping with the philosophy of the *Burra Charter 2013* (Australia ICOMOS 2013).

Where avoidance is not possible, a field program is recommended to ground truth the sites noted in section 2.2 and 5.5, assess the condition, re-assess significance and identify any additional sites not identified during the desktop survey. Once this has occurred an amended assessment of significance and impacts in accordance with the relevant government assessment requirements (noted in section 0) is recommended.

Following project approval and prior to any work commencing, a historic heritage management plan (HHMP) will be prepared to guide the conservation of heritage items, unexpected finds and human remains including skeletal material, for the duration of the project. The HHMP will also identify where additional investigation is required. The relevant measures in the HHMP will be incorporated into the project construction environmental management plan (CEMP) to avoid accidental impacts during the construction and operational phase of the project.

Table of Contents

Executive Summary	ES.1
1 Introduction	1
1.1 Background to the project	1
1.1.1 Opal prospectivity in the project area	1
1.1.2 Description of the activity	1
1.2 Project location	1
1.2.1 Project definitions	4
1.3 Purpose of this report	4
1.4 Assessment methods	4
1.4.1 Assessment guidelines and requirements	4
1.4.2 Research sources	5
1.5 Limitations	5
1.6 Authorship	5
2 Statutory framework	6
2.1 Legislation	6
2.1.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)	6
2.1.2 Environmental Planning and Assessment Act 1979	6
2.1.3 Heritage Act 1977	7
2.2 Identifying listed heritage items	7
3 Existing environment	11
3.1 Introduction	11
3.2 Landscape overview	11
4 Historical analysis	12
4.1 Historic themes	12
4.2 Historical Context	12
4.2.1 Summary	12
4.2.2 The environment of pre and early contact	13
4.2.3 Exploration and displacement of Aboriginal people	13
4.2.4 Land Acts	13
4.2.5 Squatters and pastoralists	14

4.2.6	Travelling Stock Routes (TSR)	15
4.2.7	Opal	16
4.2.8	Cumborah	16
4.2.9	Pastoral runs	19
5	Site evaluation	33
5.1	Introduction	33
5.2	Key findings	33
5.3	Land use summary	33
5.4	Predictive model	38
5.5	Results of the desktop assessment	40
5.5.1	Boorooma run	40
5.5.2	Llanillo run	52
5.5.3	Wilkie Plains run	52
5.5.4	Cumborah Town	54
5.6	Summary of archaeological potential and sensitivity	57
5.6.1	Homesteads, huts and houses	57
5.6.2	Wells and outhouses	57
5.6.3	Travelling Stock Camp sites	57
5.6.4	The Travellers' Rest Inn and surrounding village	58
5.6.5	Woolshed, wash and scouring facilities	58
5.6.6	Archaeological sensitivity	58
6	Assessment of significance	59
6.1	The significance framework	59
6.2	Significant cultural landscapes	59
6.3	Indicative significance of pastoral runs	60
6.3.1	Boorooma run	60
6.3.2	Llanillo run	61
6.3.3	Wilkie Plains run	62
6.4	Summary statements of significance	62
6.4.1	Boorooma Run	62
6.4.2	Llanillo Run	64
6.4.3	Wilkie Plains Run	64
6.4.4	Cumborah	64

7	Indicative impacts	66
7.1	Background to assessing impacts	66
7.1.1	Introduction	66
7.2	Sources of impact	66
7.2.1	Opal prospecting	66
7.2.2	Underground mining	67
7.3	Indicative impact to registered sites	68
7.4	Indicative impact to newly identified sites	68
8	Mitigation measures and management recommendations	71
8.1	Heritage management objectives	71
8.2	Recommendations	71
	References	73

Tables

Table ES1	Indicative impact to registered sites	1
Table ES2	Indicative impact to newly identified	2
Table 2.1	Listed and potential heritage items within the project area	8
Table 4.1	Historic themes	12
Table 5.1	Boorooma run	40
Table 5.2	Llanillo run	52
Table 5.3	Wilkie Plains run	52
Table 5.4	Cumborah Town	54
Table 6.1	NSW heritage assessment criteria	59
Table 6.2	Boorooma run	60
Table 6.3	Llanillo run	61
Table 6.4	Wilkie Plains run	62
Table 6.5	Boorooma Run Indicative significance	62
Table 6.6	Llanillo Run Indicative significance	64
Table 6.7	Indicative significance	64
Table 6.8	Cumborah Indicative significance	64
Table 7.1	Indicative impact to registered sites	68
Table 7.2	Indicative impact to newly identified sites	68

Figures

Figure 1.1	Regional setting	2
Figure 1.2	Local setting	3
Figure 2.1	Registered items within the project area	10
Figure 4.1	Pastoral Run Maps	27
Figure 5.1	Additional heritage items identified in the project area	56
Figure 7.1	Registered and newly identified heritage items	70

Plates

Plate 4.1	Town of Cumborah, with the Public School reserve highlighted pink (Source: HLRV)	17
Plate 4.2	A photograph from the Cumborah School in 1907 (Source: <i>Old Mud School Cumborah. Teacher Harold Chapman - Walgett, NSW, 1619</i>)	17
Plate 4.3	Aerial imagery showing the approximate location of Cumborah Public School	18
Plate 4.4	The General Cemetery noted in the top left corner, showing a dedication date of 5 June 1897 (Source: HLRV)	18
Plate 4.5	St Peter's In The Pines (source: Churches Australia)	19
Plate 4.6	Wool specimen, stud ram, bred by J. Simpson, Boorooma, Brewarrina, NSW, 1892 (source: Museum Applied Arts and Sciences, object 229142)	20
Plate 4.7	Shearing shed at Boorooma, c. 1930 (Source: <i>Item 10: Outback Scenes New South Wales / Sydney Smith, 1925</i>)	21
Plate 4.8	Small village located on the Barwon River in Boorooma run (Source: HLRV)	22
Plate 4.9	Boorooma homestead c.1930 (Source: <i>Item 10: Outback Scenes New South Wales / Sydney Smith, 1925</i>)	23
Plate 4.10	Boorooma homestead c.1930 (Source: <i>Item 10: Outback Scenes New South Wales / Sydney Smith, 1925</i>)	24
Plate 4.11	Sheep are driven to new pastures on 'Boorooma' sheep and cattle station in the north-west of New South Wales, 1965 (Source: National Archives of Australia, ID 11865538)	25
Plate 4.12	Llanillo homestead with Mr R Chase in 1915 (Source: Kempe, 1915)	26
Plate 5.1	A sketch of a sheep washing facility in Australia (location unknown) (Walsh 2017)	34
Plate 5.2	Lot 1, Boorooma Run, showing the stockyards, head station, kitchen, store and house (NSW LSR Crown Plan 45-1970)	35
Plate 5.3	Lot 12, Boorooma Run, showing the woolshed by the Barwon River (NSW LSR Crown Plan 145-1970).	36
Plate 5.4	Lot 13, Boorooma Run, showing three houses, a stockyard and fencing near the east bend of the Barwon River (NSW LSR Crown Plan 146-1970).	37
Plate 5.5	Lot 6, Llanillo Run, showing a homestead, store and kitchen (NSW LSR Crown Plan 296-1970).	38

1 Introduction

1.1 Background to the project

The Department of Regional NSW (DRNSW) is a determining authority under section 5.5 of the EP&A Act, due to the role of DRNSW as the issuer of licences and leases for opal prospecting and mining. This historical heritage assessment (HHA) forms a section of the Review of Environmental Factors (REF) that assesses the likely environmental impacts of commonly used 'standard methods' for opal prospecting and opal mining and considers those methods if applied in REF Area 1 (the project area) of the Narran-Warrambool Reserve (NWR). The details regarding the assumed standard methods are provided below and in Section 7.2. For detailed information regarding opal mining and prospecting methods, reference to the REF should be made.

DRNSW commissioned EMM Consulting Pty Limited (EMM) to prepare this HHA to support the REF. It documents the historical development of the project area and surrounding study area (Figure 1.1) and proposes recommendations for the mitigation of impacts to sites and areas of historical value and recommends management measures for the preservation of heritage values into the future.

1.1.1 Opal prospectivity in the project area

Opals in the Narran-Warrambool Reserve are found in two forms: rounded nodules, termed 'nobbies'; or in seams. The opal bearing material is a soft greyish claystone often referred to as 'opal dirt'. Opal is generally extracted by underground mining and a typical mining operation involves sinking a vertical shaft and driving horizontal shafts, or 'levels', to obtain opal dirt. Some open cut mining is also undertaken in the area. In areas where opals are found in seams, gemstones are usually recovered at the working face of the mine.

Mining generally occurs along defined low ridgelines (known as 'ridge country') where the opal bearing material is closer to the surface.

1.1.2 Description of the activity

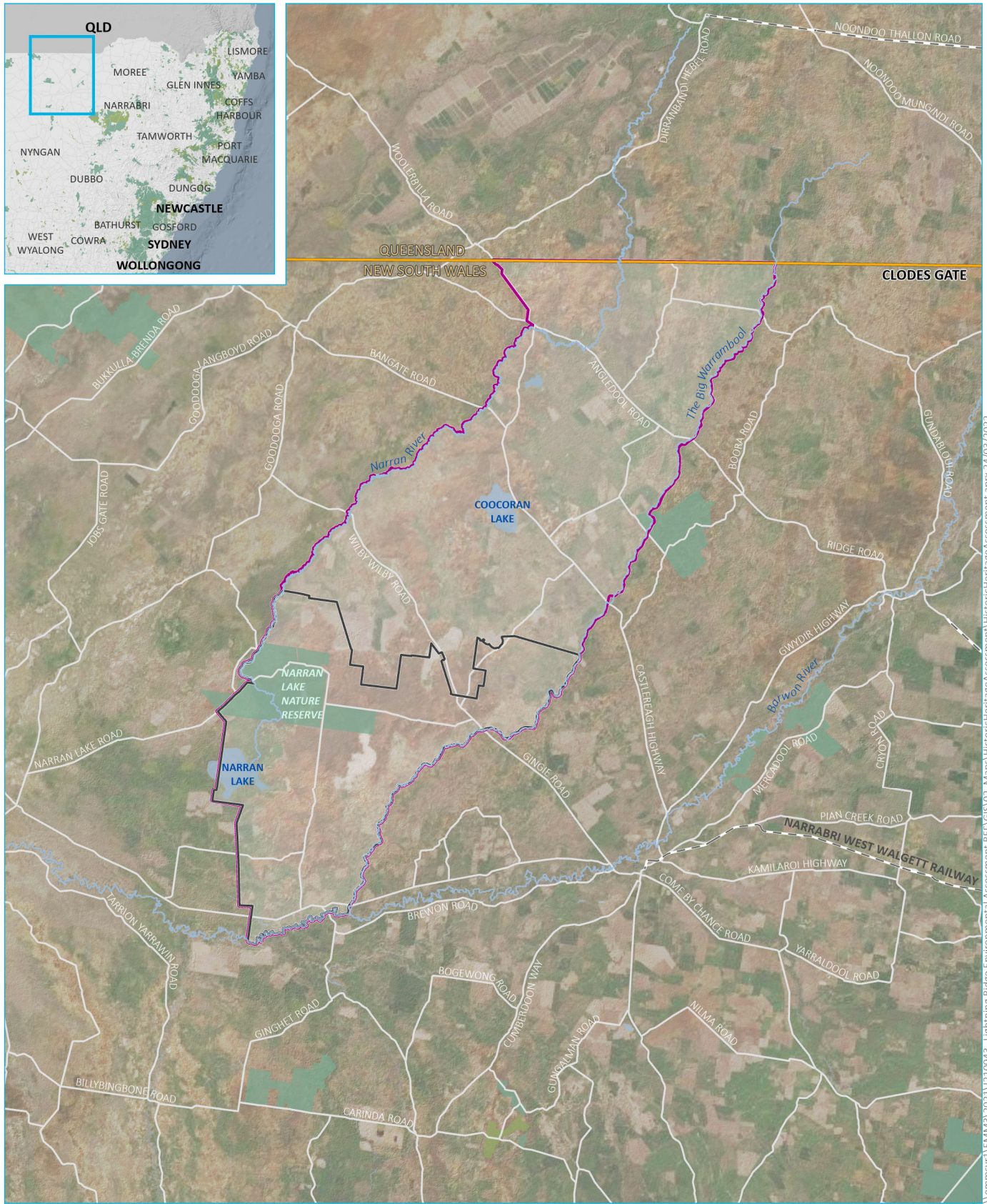
Mineral exploration for opals is generally referred to as *opal prospecting*. It is conducted under an Opal Prospecting Licence or Mineral Claim. Opal Prospecting Licences are granted over much larger areas than those granted under a Mineral Claim but are purely for prospecting and do not authorise mining.

An Opal Prospecting Licence can only be granted over lands defined as an Opal Prospecting Block within an area designated as an Opal Prospecting Area under the *Mining Act*. An opal prospecting block may not exceed an area of 500 hectares.

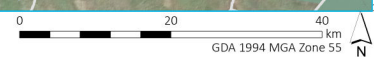
Opal mining within the NWR currently takes place within Opal Prospecting Areas (OPAs). There are four OPAs currently designated within the NWR. Notably, certain land is not to be included in an opal prospecting area (refer to section 233 of the Mining Act) such as land which forms part of a reserve or if the land has been determined to be *agricultural land* – which is a defined term under Schedule 2 of the Mining Act.

1.2 Project location

This HHA considers the potential impact of opal prospecting and mining within the southern portion of the NWR known as Area 1 and referred to within this HHA as the project area (Figure 1.2). The project area comprises of approximately 1,972 km² and is broadly bounded by the Barwon River and Narran River to the south-east and north-west respectively. The project area lies between Walgett to the east and Brewarrina to the west.



- KEY**
- Area 1
 - Narran- Warrambool Reserve
 - QLD/NSW state boundary
 - Existing environment
 - Rail line
 - Major road
 - Named watercourse
 - Named waterbody
 - NPWS reserve
 - State forest

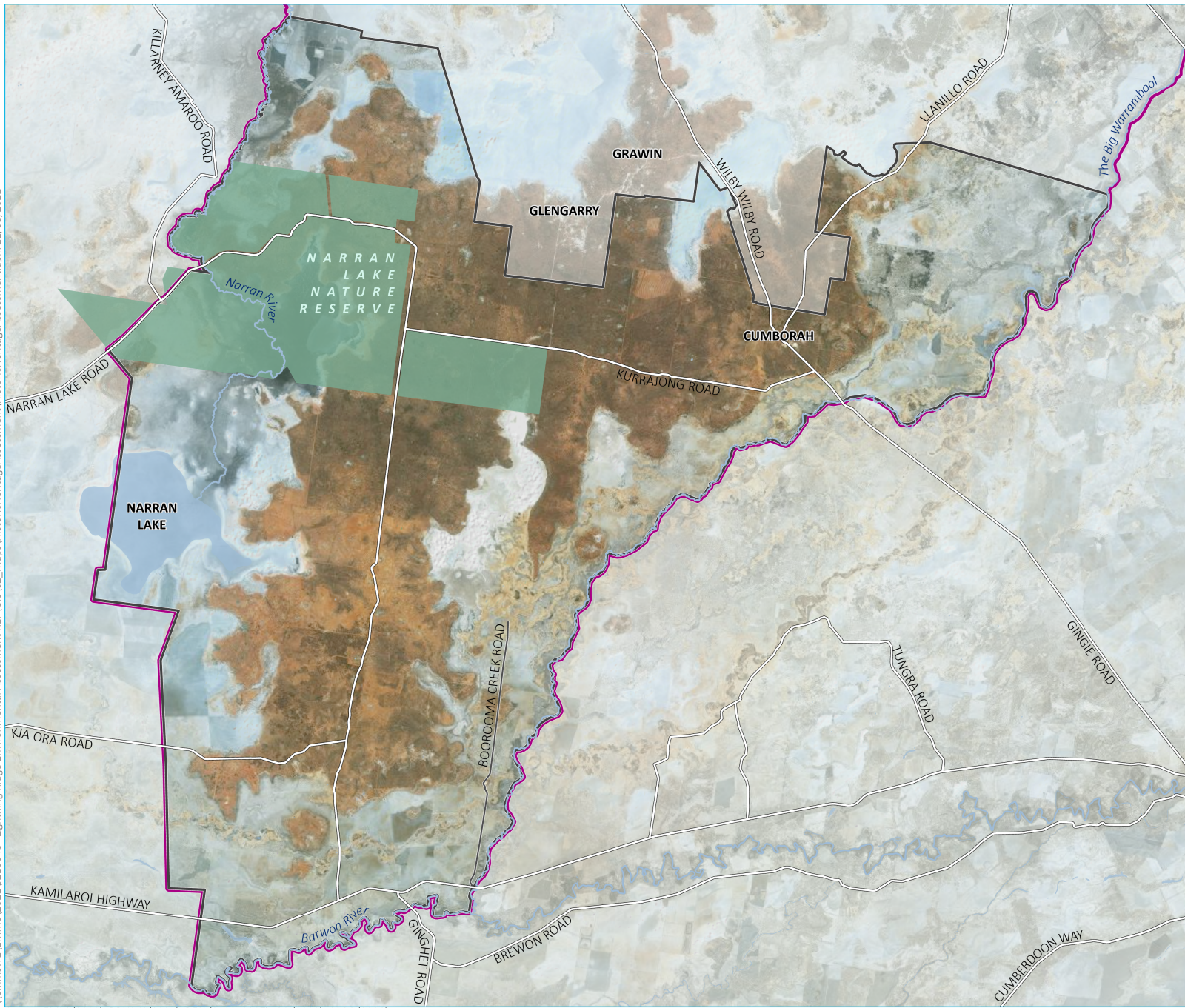


Regional setting

Lightning Ridge Area 1:
Historic heritage assessment
Figure 1.1

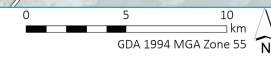


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- KEY**
- ▭ Area 1
 - ▭ Narran- Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse
 - Named waterbody
 - NPWS reserve

Source: EMM (2022); DRNSW (2021); DFSI (2020, 2017); GA (2011); ASGC (2006)



Local setting

Lightning Ridge Area 1:
Historic heritage assessment
Figure 1.2



1.2.1 Project definitions

In outlining the project, key areas have been described to facilitate the assessment of direct and indirect impacts during construction and operation. The project areas to be considered include:

- Project area: The project area is Area 1 of the NWR. This HHA considers the potential impacts which may occur from opal prospecting or mining within Area 1 and proposes mitigation and management measures to preserve heritage values.
- Study area: The study area is not a specifically defined area, when referring to the study area this generally means regionally.

1.3 Purpose of this report

This HHA supports the REF for the activities associated with opal prospecting and opal mining within Area 1. It documents the historical development of the project area and surrounding study area over time and allows DRNSW to understand the possible heritage constraints prior to opening up Area 1 to opal prospecting and mining activities, in a bid to avoid impacts to historical heritage values.

The specific objectives of this assessment are to:

- describe the existing environment including currently identified heritage items, and the built and natural landscape as it currently exists;
- understand the historical development of the project area, what the drivers were and more recent changes;
- achieve an understanding of surviving and potential heritage values, including built, archaeological and significant landscapes, in the project area;
- identify historical heritage constraints in the project area, and indicative impacts arising from the project; and
- assess preliminary heritage sources to the best of ability from a desktop perspective.

This HHA has been prepared in accordance with the legislation set out in Section 2.

1.4 Assessment methods

1.4.1 Assessment guidelines and requirements

This HHA has been prepared in accordance with the relevant government assessment requirements, guidelines and policies. The report was undertaken using the principles of *The Australian International Council on Monuments and Sites, Charter for Places of Cultural Significance* (also known as the *Burra Charter*, Australia ICOMOS 2013) and the New South Wales (NSW) *Heritage Manual* (Heritage Office 1996 with regular additions).

The *Burra Charter* defines the concept of cultural significance as 'aesthetic, historic, scientific, social or spiritual value for past, present or future generations' (Australia ICOMOS 2013, Article 1.2). It identifies that conservation of an item of cultural significance should be guided by the item's level of significance.

The *Heritage Manual* comprises the following guidance documents:

- *Statements of Heritage Impact Guidelines* (Heritage Office 2006);

- *Investigating Heritage Significance* (Heritage Office 2004);
- *Assessing Heritage Significance* (Heritage Office 2001); and
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Branch Department of Planning 2009).

These documents have been used to guide this HHA.

1.4.2 Research sources

Research for this report was conducted using various sources including online archives available for the State Library of NSW, online library for the State Archives and the National Library of Australia. The Historic Lands Records Viewer, trove, Australian Dictionary of Biography, and the Heritage NSW website were also referred to. A complete list of sources can be found in the reference section at the end of this report.

1.5 Limitations

This report does not include a field investigation component, therefore no ground truthing has been conducted. It is recommended that the predictive model below be examined in further detail before the completion of a statement of heritage impact. Due to current restrictions with COVID-19 it was not possible to access the State Archives or the State Library of NSW. As not all documents are digitalised this meant some background research was unable to be completed.

1.6 Authorship

This report was prepared by Kerry Armstrong (Senior Archaeologist – EMM), with assistance from Amelia O'Donnell (Researcher – EMM) and quality assurance has been given by Pamela Kottaras (National Technical Lead – Historic Heritage – EMM).

2 Statutory framework

2.1 Legislation

In NSW, heritage items and relics, that is archaeological sites assessed to be of local or State significance, are protected by two main pieces of legislation: the EP&A Act and the NSW *Heritage Act 1977*. An additional layer of protection is added, in certain circumstances, by the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*.

2.1.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act provides a legal framework to protect the environment. The EPBC Act definition of environment includes places of natural, Indigenous and historic heritage value. Under the EPBC Act, heritage places can be listed on:

- *World Heritage List* (WHL) – places inscribed on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List;
- *National Heritage List* (NHL) -places of significance to the nation; and
- *Commonwealth Heritage List* (CHL) - items belonging to the Commonwealth or its agencies.

The EPBC Act requires actions on Commonwealth land (Section 26) and actions undertaken by a Commonwealth agency (Section 28) to be assessed to determine whether they are likely to have a significant impact on the environment. Heritage places may be listed on a statutory register, such as the WHL, NHL, CHL or State-based registers, or may be an unlisted item identified by a Commonwealth agency.

Additionally, actions that may impact on *Matters of National Environmental Significance* (MNES) must also be assessed for impacts. MNES that relate to heritage include identification on the WHL or NHL. Under the EPBC Act, an action that may have a significant impact on a MNES is deemed to be a ‘controlled action’ and can only proceed with the approval of the Commonwealth Minister for the Environment. An action that may potentially have a significant impact on a MNES is to be referred to the *Department of Agriculture, Water and the Environment* (DAWE) for determination as to whether or not it is a controlled action. If deemed a controlled action the project is assessed under the EPBC Act for approval.

The project is unlikely to have a significant impact on any world heritage properties or places listed on the National Heritage Register, and the EPBC Act is not discussed further.

2.1.2 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the framework for development assessment within NSW, with one of the objects of the Act being to promote the sustainable management of built and cultural heritage, including Aboriginal cultural heritage.

Under section 4.1 of the EP&A Act, an environmental planning instrument can provide for specified development to be carried out without development consent.

The State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the Mining SEPP) includes a provision at clause 6 that development permissible without consent includes mineral exploration and mining within a mineral claims district. The definition of mineral exploration includes opal prospecting. Opal is classified as a mineral under Schedule 1 to the Mining Regulation 2016.

The provisions of Part 5 of the EP&A Act however place an obligation on a public authority, if it is required to authorise (via licence, lease, permit etc) an activity that is otherwise permitted without consent. That obligation is to consider, to the fullest extent possible, the factors of the activity which are likely to impact the environment.

The purpose of all assessment processes is to consider impacts to, among other things, cultural heritage items and places as well as archaeological sites and deposits associated with the proposal and to identify measures to avoid, mitigate or ameliorate impacts.

2.1.3 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) serves to conserve the heritage places, items and objects of NSW. Under the Heritage Act, items of significance to the State can be recognised on the State Heritage Register (SHR). Items on the SHR cannot be demolished, damaged, developed, altered or excavation undertaken without approval from the Heritage Council of NSW (or its delegate) under Section 59 of the Act.

Archaeological relics, defined as “any deposit, artefact, object or material evidence that relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and is of State or local significance”, are protected under Section 139 of the Heritage Act. A person cannot knowingly disturb or excavate land when they suspect a relic to be present without holding an excavation permit or an exemption. Section 139 applies to all land in NSW not listed on the SHR. Section 146 requires persons to notify the Heritage Council of NSW within a reasonable time if an unanticipated relic is discovered. The Heritage Act identifies the category of ‘works’, which refers to historical infrastructure, and is viewed as separate to that of archaeological ‘relics’ under the Heritage Act. ‘Works’ may be buried, and are therefore archaeological in nature, but exposing a ‘work’ does not trigger reporting obligations under the Heritage Act unless it is of demonstrable significance.

Section 170 of the Heritage Act requires State government agencies establish and maintain a register of heritage items, to be known as a Heritage and Conservation Register. State agencies are required to undertake due diligence with regard to the care, control and management of items listed on their Section 170 Heritage and Conservation Register. Additionally, State agencies must notify the Heritage Council of NSW 14 days in advance if they intend to remove an item from their register, transfer ownership, cease occupation, demolish. Section 170 does not place statutory requirements on individuals or non-State government entities.

2.2 Identifying listed heritage items

Listing on statutory registers provides a basis under which the item or place is protected, and change is managed through project approval. Statutory listings provide legal protection for heritage items under the legislation outlined above.

Statutory registers reviewed as a part of this assessment include:

- NHL - the register is made under the EPBC Act.
- CHL - the register is made under the EPBC Act.
- SHR - this register is made under Part 3A of the Heritage Act. Items on the SHR undergo a rigorous assessment process and must reach a high significance threshold to be included. Inclusion on the SHR is directed by the Minister for Heritage.
- s170 register - this register is made under Section 170 of the Heritage Act. It is a register of heritage items that are owned or managed by state government authorities. Items on the s170 register may also be listed on other registers. Demolition, change to fabric, and change of ownership require notification to the Heritage Council of NSW.

- Schedule 5 of the *Brewarrina Local Environmental Plan 2012* (BLEP) and the *Walgett Local Environmental Plan 2013* (WLEP). The EP&A Act sets the provisions for the making of LEPs. Most LEPs are prepared to a standard template, which includes environmental heritage in Schedule 5 (the heritage schedule). Where an item is included in the heritage schedule, development applications must include an assessment of impacts to the item.
- State Heritage Inventory (SHI), which was cross-checked with Schedule 5 of the LEPs and the s170 register. The SHI is not a single statutory register, but a central collection of state listed statutory heritage items maintained by Heritage NSW.

Non-statutory listing is an acknowledgment of a site's, or place's importance to sections of the community. Listings on such registers do not place legal requirements on development but nevertheless influence the future of such listed items. Non-statutory registers reviewed as a part of this assessment include:

- National Trust of Australia, NSW (NT) - the NT is made up of autonomous state chapters. Each chapter is a community-based and non-government organisation, with a mandate to conserve and promote Australia's natural and cultural heritage. Classification by NT is a strong acknowledgment of heritage significance and while statutory constraints are not applicable, classification offers protection through visibility and community action.
- Register of the National Estate (RNE) - the RNE is an archived list of heritage items that were protected under the now repealed Commonwealth *Heritage Commission Act 1975*, which was replaced by the EPBC Act. While many items were transferred from the RNE to the NHL or CHL, those that were not remain on the RNE as an indication of their heritage value.

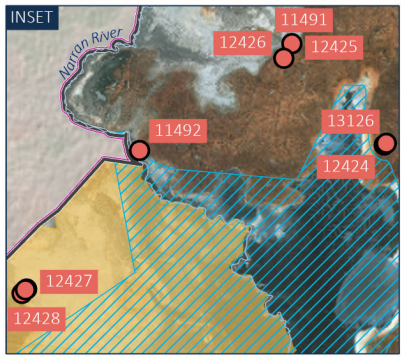
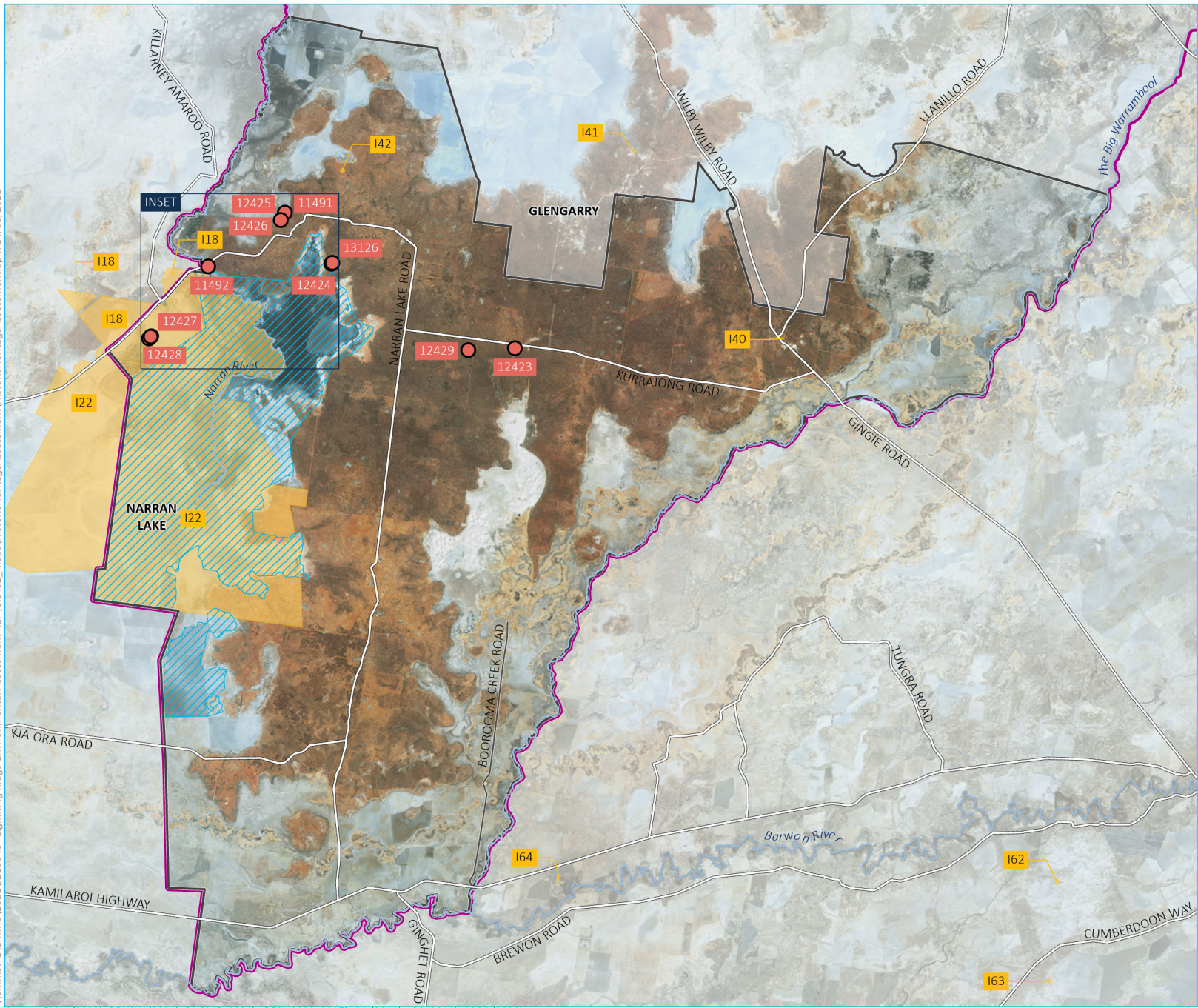
A desktop assessment of the heritage constraints within the project area identified 16 heritage items. Table 2.1 identifies the heritage items within the project area with their approximate location displayed in Figure 2.1. The National Trust was contacted regarding heritage within the project area; however no response was received during the writing of this report.

Table 2.1 Listed and potential heritage items within the project area

Item	Location	Register	Item ID
Site of Homestead; Terewah - DEMOLISHED	Located in the north-west section of the project area	S170 NPWS	11491
Shearing Shed – Terewah - Demolished	Located in the north-west section of the project area	S170 NPWS	12426
Stockyard: Snake Hut Tank	Located in the north-west section of the project area	S170 NPWS	13126
Snake Hut Tank	Located in the north-west section of the project area	S170 NPWS	12424
Bundah Shearing Shed	Located on the western boundary of the project area	S170 NPWS	12427
Stockyard: Bundah	Located on the western boundary of the project area	S170 NPWS	13127
Bundah Quarters	Located on the western boundary of the project area	S170 NPWS	12428
Lumeah Shearing Shed	Located in the central portion of the project area to the north.	S170 NPWS	12429
East Mullane Shearing Shed	Located in the central portion of the project area to the north.	S170 NPWS	12423

Item	Location	Register	Item ID
Cattle Yards – Terewah DEMOLISHED	Located on the western boundary of the project area	S170 NPWS	11492
Earth Walled Buildings	In the north-west section of the project area.	Walgett LEP 2013	142
Anglican Church	In the north-east section of the project area.	Walgett LEP 2013	140
Narran Lake (Archaeological and mythological site)	The Narran Lakes is located on the western border of the project area.	Brewarrina LEP 2012	118
Narran Lake	The Narran Lakes is located on the western border of the project area.	Brewarrina LEP 2012	122
Moordale Wells	In the north-west section of the project area.	Aboriginal Place	5062951
Narran Lakes Area	The Narran Lakes Area is located on the western border of the project area.	RNE	513

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- KEY**
- Area 1
 - ▭ Narran- Warrambool Reserve
 - Heritage Act
 - Section 170 Heritage Register
 - LEP listing
 - Item- general
 - Non-statutory listing
 - ▨ Register of the National Estate
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

Registered items within the project area

Lightning Ridge Area 1:
Historic heritage assessment
Figure 2.1



Source: EMM (2022); DRNSW (2021); DNRME (2021); DFSI (2020, 2017); GA (2011); LRS (2011); ASGC (2006)



3 Existing environment

3.1 Introduction

The environmental characteristics of any area influenced the way people have historically used the landscape. In the past, the availability of resources such as water, flora, fauna, stone material and topography played a substantial role in the choice of camping, transitory movement and ceremonial areas used by Aboriginal people. Migrants to the early colony looked for the same landscape characteristics but manipulated their environment in ways that left more obvious marks. Potable water, level or gently sloping ground, and suitable soils to grow crops and animals was sought after. Therefore, understanding environmental factors assists with predicting where sites are likely to occur. Additionally, natural and cultural (human-made) site formation processes that occur after the deposition of archaeological material influence the way archaeological material is distributed and preserved across a landscape.

3.2 Landscape overview

The project area falls within the southern portion of the Surat Basin, with opal-bearing geology associated with deeply weathered Cretaceous era sedimentary sandstones, mudstones and siltstones. Opal is primarily recovered in discontinuous clay beds (Finch Clay Facies, otherwise known as 'opal dirt') within or immediately below the Wallangulla Sandstone Member.

The project area is located within Australia's Great Artesian Basin (GAB) and amongst the Narran River system. The Narran River is an ephemeral eighth-order watercourse which drains along the western border of Area 1 and has a catchment area of approximately 14,000 km². The Narran River is a terminating branch of the Balonne River, which is part of the Condamine-Balonne catchment. During flood season, the Narran River fills a series of lakes in the Narran Lakes (previously known as the Terewah Swamp) ecosystem. Narran Lake is the terminal basin of the Narran River. When full, Narran Lake is one of the largest freshwater lakes in NSW.

The Narran Lakes system includes portions of the Narran Lake Nature Reserve, which is listed as a site under the *Brewarrina Local Environmental Plan 2012* and on the Register of the National Estate. The strong water supply has benefited the traditional custodians of the land, the Kamilaroi, and then the who followed. The project area includes numerous tanks and water reserves along the travelling stock routes (discussed further in section 4.2.6), the ample water supply, no doubt making an attractive place to camp.

4 Historical analysis

4.1 Historic themes

The Australian and NSW heritage systems employ a series of historic themes to guide the understanding of history and historical investigation in the nation and state. As part of any historic heritage assessment, it is important to review the historic themes when undertaking research on an area or place to provide proper context. The state and national themes are complementary to enable the historian to present a unified understanding of how an area fits into Australian history. The historic themes are also an important guide when assessing an item's heritage significance. They provide information on how an item may be historically significant at the local, state or national level.

Finally, historic themes help to develop interpretation and management strategies for items of heritage significance. A full list of these themes can be found on the Heritage NSW website (Heritage Council of New South Wales 2001). Historic themes in the study area were identified based on the historical background (as described below) and the results of the historical survey (Section 1.1). The Australian and NSW historic themes relevant to the project boundary that have been used in this report are listed in Table 4.1.

Table 4.1 Historic themes

Australian historic themes	NSW historic themes
2. Peopling Australia	2. Migration
3. Developing local, regional and national economies	3. Environment; cultural landscape; exploration; pastoralism and mining.
4. Building settlements, towns and cities	4. Land tenure
5. Working	5. Labour
8. Developing Australia's cultural life	6. Domestic life

4.2 Historical Context

4.2.1 Summary

The project area is located within both the Brewarrina local Government area (LGA) and the Walgett LGA, County of Finch, and crosses over both the Parish of Boorooma and Parish of Cumborah. The project area extends through four pastoral runs, *Boorooma*, *Llanillo*, *Milrea* and *Wilkie Plains*, and encompasses Cumborah Town. Due to ample supply of water from Narran River, The Big Warrambool River and Narran Lake the four pastoral runs were criss-crossed with travelling stock routes (TSR), water reserves (WR) and cattle reserves (CR). Although the region has a history of mining and sheep, cattle also tended to do well throughout the runs. *Boorooma* was one of the largest and earliest stations in the region. Outstations, huts, woolsheds, wells and homesteads are peppered throughout the project area, showing evidence of a strong and continuous agricultural history.

4.2.2 The environment of pre and early contact

The project area lies within the Kamilaroi language group. The Kamilaroi (also known as Gamilaraay, Gamilaroi and Goomilaroi) is one of the largest language groups in Australia. The Kamilaroi Peoples rely on the resources provided by the Barwon, Namoi, Peel and Darling rivers. The Narran Lake is also of significant value to the local mobs, as it includes both tangible and intangible cultural connections throughout the generations, and is part of a dreaming path (NSW National Parks and Wildlife Service 2000).

Evidence of occupation throughout the project area includes fish traps, rock art sites, shelters, quarry sites, modified trees, scatters, hearths, and burials (AHIMS 2021). The Kamilaroi have been caring for the land around Brewarrina and Walgett for over 40,000 years and was home to at least 15,000 people.

4.2.3 Exploration and displacement of Aboriginal people

Settlement of the New South Wales interior began soon after Blaxland, Lawson and Wentworth's crossing of the Blue Mountains in 1813, but it took some time before Europeans passed into the Walgett region. In 1818 John Oxley led an expedition along the Castlereagh and Macquarie Rivers opening land south of the district (AMBS 2011, 22). Similarly, Charles Sturt's 1829 expedition to discover a fabled inland sea passed 32 km south of the current town of Walgett (Terry Kass 2003, 13). Oxley and Sturt's expedition encouraged squatters and pastoralists to spread into the region and by 1839 squatters from the east and south had established stock runs in the area (Terry Kass 2003, 13).

During this time numerous massacres were carried out on the Aboriginal Peoples throughout the area. The most well-known is the Myall Creek massacre which occurred in 1838 and resulted in the slaughter of 28 unarmed people from the Wirrayaraay mob (Tedeschi 2016, 1192). Within 100 kms of the project area three other (publicised) massacres occurred; the first in 1841 known as the Butcher Creek massacre, which killed 30 of the Pooncarie mob. 10 years later, in the same area another 20 of the Pooncarie were killed. In 1870 an additional 400 Pooncarie were killed over a 12 month period. All three of these massacres included the death of men, women and children (Univeristy of Newcastle 2019).

4.2.4 Land Acts

From 1787, Governor Phillip had the ability to grant land to convicts who had severed their time (or been pardoned). In 1790 the Governor had power to grand land to settlers (larger plots to those who were married), by 1794, women were entitled to receive land grants; as was the military by 1789 (NSW State Archives, 2021). Following this, a variety of Acts have influenced the transition of land ownership in Australia, the following is just a few of the most influential since the 1800s.

In 1831 the *British Imperial Land Act* (BIL act) (2 Wm IV 1831) changed how land was handled throughout Eastern Australia. The BIL act abolished land grants in replace of auction sales. This was introduced by first Viscount Goderich (Australian National University 2021) and known colloquially as the Rippon regulations.

The *Crown Land Protection Act* (CLP Act) (4 William IV c 10 1833) prevented unauthorised occupation of crown land; the Act stayed in place until 1836 when the *Crown Lands Unauthorised Occupation Act* came into force. This allowed squatters to graze land which was outside the nineteen counties for an annual licence fee. The Act was further amended in 1839 to adjust for tax and stock details (Terry, 2014 p. 315).

It was not until 1842 that all land had to be surveyed prior to sale; a consequence of the *Sale of Waste Lands Act* (2 Victoria c 27, 1842). This act was further refined in 1846 and informally known as the 'The Squatters Act', which allowed for seven- or fourteen-year leases to be taken out on land outside the nineteen counties (Terry, 2014 p. 315) (Terry Kass 2019, 19).

The 1860s saw a flurry of Acts come to legislation, the prominent Acts included the *Crown Lands (Alienation of) Act* (24 Victoria c 15, 1860). This ACT set aside land for agricultural pursuits known as ‘pastoral leases’, plus began the process of gazetting land for public purposes. During this time improvement purchases were granted, allowing up to 640 acres to be purchased on squatting lands, where infrastructure and homesteads were built. In 1862 the Torrens Title Certificates became common place, replacing common law titles (now known as ‘Old System’ titles). The *Pastoral Occupation Act* (26 Victoria c 8, 1862) gave more structure to applying for a pastoral run, while the *Crown Lands (Pastoral Leases) Act* (27 Victoria c 17, 1863) started to identify ‘settled’ vs ‘unsettled’ areas. Throughout the 1860s Britain was slowly removing their troops from the colony, which paved the way for the Australian military. At this time the *Volunteer Force Regulation Act* (5 Victoria c 31, 1867) allowed every person who freely volunteered for five or more years, 50 acres (Terry, 2014 pp 316-317) (Kass, 2019, p. 20).

The *Crown Lands Act* (40 Victoria c 16, 1884) saw large amounts of pastoral runs resumed for Crown Land, which was then offered for lease with a maximum of 2280 acres (922 ha) for up to 50 years. This Act was attempting to reframe pastoral holdings, partially due to a large fire that tore through the Garden Palace in the Sydney botanical gardens. The fire destroyed records from the Forest Conservancy Department, geological and mining information was destroyed alongside the Railway Survey Department and many land surveyors and pastoral run information (“Garden Palace Fire.” 1882), resulting in a loss of information (Kass, 2019, p. 22).

4.2.5 Squatters and pastoralists

The rights of squatters were tenuous in theory but, in reality, their occupation of land paid off. “Squatting” was a method of pastoral landholding that occurred from the 1820s, whereby sheep and cattle farming was established on Crown land outside the limits of location. The limits of location in NSW were defined by Governor Darling in 1826 and were restricted to nineteen counties within which settlers were permitted to take up land. They were contained within a semicircular line roughly 400 km from the centre of Sydney (SLM 2017). Stuart (1999) argues that while the main driving force of squatting was the economics of the wool industry, it was the Colonial Government’s land policy that produced the phenomenon of illegal occupation of Crown land.

Governor Thomas Brisbane (from 1821-1825) instituted the “ticket of occupancy” to give graziers already occupying land some security (Starr and Nicholas 1978, pp.9-10). This new system of pastoral ‘licences’ allowed squatters to occupy lands outside the settled districts provided they did so for pastoral purposes. The squatters paid an annual fee to the Crown.

Off the back of the depression of the 1830s, Governor Gipps tried, unsuccessfully, to control government lands more effectively. Squatters who had weathered the storm of the broken economy were demanding secure title to their vast runs. By 1847, the squatters had succeeded in their campaign to obtain leases with rights to pre-emptive purchase and compensation for their improvement of the land (Stuart 1999, p.2). An Order in Council provided for ‘pastoralists’ (squatters) to hold land on eight- or fourteen-year leases for an annual rent. The Crown continued to hold a right of resumption. This new form of Australian tenure, the pastoral lease, had not existed in England and was a result of the 1847 Order in Council rather than common law (Esmaeili and Grigg 2016, p.184).

Land within the Walgett Shire was quickly claimed in the 1840s (Terry Kass 2003, 13). Drought from 1838 to 1840, and the British financial crisis of 1839 meant the first few years of the 1840s were a time of depression in the New South Wales colony, as such much of the land of the region was taken up by wealthy pioneering families (Fitz-Gibbon and Gizycki 2001). The wealthy families did not settle the runs themselves but employed managers to oversee the daily business of their investment (Terry Kass, 2003, p. 13). Sheep were believed to be too delicate to survive the arid conditions of the north-western plains and so cattle was initially the main focus of pastoral pursuits in the region (Terry Kass, 2003, p. 13).

In 1861, land ownership in New South Wales was transformed. John Robertson, Premier of NSW, in order to break the long-established monopoly of the squatter-pastoralists, forced two Acts through Parliament to open up free selection of Crown Land; the *Crown Lands Alienation Act 1861* and the *Crown Lands Occupation Act 1861* colloquially known as the 'Robertson Land Acts'. The Acts permitted any person (free selectors) to select up to 320 acres on the condition of payment of a deposit of one quarter of the purchase price after survey and living on the land for three years. As a result, conflict between squatters and selectors increased, corruption and scheming in acquiring land became rife, and the close settlement of pastoral lands still available for use by Aboriginal people, further restricted their access to land (MoAD n.d.).

This process of creating squatting landscapes had been driven by the settlers' desires to claim their land, the Lands Acts and regulations around improvement, and the environment itself. Settlers built huts, erected fencing, ringbarked trees and cleared the land.

Huts were improved or abandoned, and larger, more modern, dwellings and farm infrastructure was built, trees were planted and grew tall, fences were replaced, and dry-stone walls were built and dismantled. The resulting landscapes were shaped by both broader economic and political processes and by the responses of the individuals (Stuart 1999, p. v). The very process of clearing and developing the land was seen as virtuous, productive and contributing to the progress of the colony. Moreover, the Robertson Lands Acts (1861) required settlers to improve the landscape. This was largely done by ringbarking to open up the land, promote grass coverage and fulfil their obligation to improve (Stuart 1999, p.320).

4.2.6 Travelling Stock Routes (TSR)

As pastoral holdings spread over New South Wales, interconnected parcels of land were reserved for the transport of stock from farms to markets. Travelling stock routes (TSRs), also known as long paddocks, are specially designated sections of Crown Land which form a continuous network of droving tracks, and include fenced areas and water sources allowing for drovers and their stock to camp overnight (Lennon, 2014, p. 47).

Two major travelling stock routes were established through the region running through the township of Walgett; the Lightning Ridge track; and the Wilby Wilby route (Terry Kass, 2003, p. 28). In 1888, a Travelling Stock and Camping Reserve (TS&CR) was proclaimed at the Cumborah Springs on the Wilby Wilby to Walgett route, drawing settlers to the area to take advantage of the TSR and travelling trade (Terry Kass, 2003, p. 28). From 1888, the Public Works Department began constructing water tanks along the routes and in 1889 the springs were fenced and established as Public Watering Places for the newly formed settlement of Cumborah. The township of Cumborah was proclaimed in 1896 and the settlement continued to be solely supplied by the spring into the 1920s (Walgett Shire Council, n.d.).

A significant north/south TSR is marked on the *Boorooma* plan. The route was proclaimed on 31 December 1883 and is numbered 1066, 1070, 1071 and 1072.

A TSR camp No.20 (C & TSR 678) was also established on the southeast boundary of *Boorooma* on the Barwon River in 1883. The camp offered a blacksmith shop, travellers' rest, store, kitchen, and stables. Stock yards and water tanks and wells are present along the route. An earlier camp reserve (No. 613), proclaimed in 1881, is present in the north of the property at the termination of the marked sections of the stock route and an outstation cottage and hut sits on the northern border of *Boorooma*, which likely also served a function in the TSR (HLRV *Boorooma Pastoral Run*).

The numerous Water Reserves (WR) in the project area are likely due to the artesian basin, which means a consistent supply of water all year round; an extremely attractive addition when considering Australia's harsh climate.

4.2.7 Opal

Opal had first been discovered at Lightning Ridge in the 1880s, but did not start being mined until the twentieth century (Kass, 2003, P. 26). Jack Murray established a shaft at Lightning Ridge in around 1901 and by 1903 local mining warden, T A Ridley, recorded a number of mine shafts and 18 men prospecting for opal (Terry Kass, 2003, p. 28). By 1906 the Lightning Ridge opal boom was well under way and 2,000 acres (809 ha) within Western Lands Lease 544 had been reserved for opal mining (Terry Kass, 2003, p. 26). The opal mining activity was considered a significant enterprise and the miners camp, which included places of leisure and businesses, was declared the *Wallangulla* village.

A second opal field was discovered in the district at Grawin, northwest of Cumborah, in 1926 (Terry Kass, 2003, p. 27). Opal mining activity in the region decreased over the middle of the twentieth century and the in 1959 Lightning Ridge Township was declared as “almost ‘dead” (Terry Kass, 2003, p. 28). Electricity, piped water and the construction of paved roads brought new life to the town in the 1960s and the discovery of major opal finds in the region over the 1980s made Lightning Ridge a tourist destination (Kass 2003, p.28).

4.2.8 Cumborah

In 1861 *Cumborah Springs* run was leased by Thomas Gordon Dangar (Member of Parliament) for £ 3 and 5 / (“Advertising” 1861) after the enactment of the *Crown Lands (Alienation of) Act* (24 Victoria c 15, 1860). Dangar was born in 1829 to Charlotte Selena Gibbons nee Hutchinson and Matthew John Gibbons. Matthew Gibbons died in 1832 and Charlotte married Thomas Dangar the same year; Thomas was raised by Dangar as his own (Martha Rutledge 1972). The Dangar family was well known throughout the colony, Thomas Dangar’s brother, Henry was a well-known surveyor employed by the Australian Agricultural Company and owned Gostwyck Station, outside Uralla (Gray 1966). Although it does not appear Dangar continued the lease of the run for many years, he did live locally and was even present for a bridge naming ceremony in 1877, Dangar Bridge (“WALGETT.” 1877).

By 1862, *Cumborah Springs* was advertised as “...first-class sheep country...” and available for sale through the Squatters Exchange in Sydney (“Advertising” 1862). W.B Walford and W. Sparke are shown as the lessees of *Cumborah Springs* by 1866 (“APPRAISEMENT OF RUNS.” 1866). The succession is unclear from this point though, and it appears that neither W.B Walford, or W. Sparke spent time at the run. *Cumborah Springs* does not appear on run maps, nor is there any further records relating to *Cumborah Springs* available on NSW Land Registry Services, Historical Land Viewer. It does appear though that *Llanillo* Run is located over the town of Cumborah and encompasses *Cumborah Springs* within its boundary.

The town of Cumborah was gazetted in 1896, which is the same year a portion of land within the town of Cumborah was reserved from sale for use as a public school (“RESERVE FROM SALE FOR PUBLIC SCHOOL PURPOSES.” 1896). The Cumborah public school was of mud brick build as seen in Plate 4.2. It is unclear whether the school still exists, but aerial imagery identifies buildings in the vicinity of the school block (Plate 4.3). As the town was becoming established, a general cemetery at Cumborah (Plate 4.4) was dedicated on 5 June 1897, with a section for both the church of England and the Roman Catholic Church (“Lands Department Notices.” 1907). In 1915 a small timber church (WLEP item I40) was built in town, known as St Peter’s In The Pines.



Plate 4.1 Town of Cumborah, with the Public School reserve highlighted pink (Source: HLRV)



Plate 4.2 A photograph from the Cumborah School in 1907 (Source: Old Mud School Cumborah. Teacher Harold Chapman - Walgett, NSW, 1619)



Plate 4.3 Aerial imagery showing the approximate location of Cumborah Public School



Plate 4.4 The General Cemetery noted in the top left corner, showing a dedication date of 5 June 1897 (Source: HLRV)



Plate 4.5 St Peter's In The Pines (source: Churches Australia)

4.2.9 Pastoral runs

i Boorooma run

Boorooma was one of the earliest runs taken up on the Barwon River (Terry Kass, 2003, P.13) (Figure 4.1a-c). The 80,000 acre (32374.8 ha) property was claimed in 1839 on behalf of James White (snr), a wealthy pastoralist from Muswellbrook (M. Rutledge, n.d.; Bailliere 1866) (Barker, n.d.). White died in 1842 and the run passed to his thirteen-year-old son, also named James White; the White's remained living at their Muswellbrook property *Edinglassie* (M. Rutledge, n.d.). At this time the Barwon River was the sole water source for the run which had an estimated grazing capability for 2000 head of cattle (New South Wales Government Gazette 1848). In 1857 the trustees appointed Henry Charles White, James' brother, to act as absentee overseer of *Boorooma* (White 2003, 8).

The property along with 7000 head of "mixed cattle" was sold to pastoralist brothers Dr George Augustus Mein and Pulteney Mien in 1873 (The Sydney Morning Herald 1873, 8). As the Mein brothers resided in St Kilda, Victoria, (*The Australian Star* 1893), John Simpson was employed as the superintendent of *Boorooma* to oversee the daily workings of the station. Under the guidance of Simpson the focus of the run shifted from cattle to sheep and wool production and by 1889 *Boorooma* was well known as a high-quality wool producer in both the Australian and London markets (Mercury and Advertiser 1889). In 1894 the station is recorded as employing 81 shearers and 89 shed and scour hands (*Evening News*, 23 August 1894, p.7). The Museum of Applied Arts and Sciences (Powerhouse Museum) collection contains a fleece specimen produced by Simpson on *Boorooma* in 1892 (Plate 4.6). A TSR was established running north/south through the property and Water Reserves were resumed along the stock routes and around outstations between 1874 and 1884.



Plate 4.6 Wool specimen, stud ram, bred by J. Simpson, Boorooma, Brewarrina, NSW, 1892 (source: Museum Applied Arts and Sciences, object 229142)

Approximately 277,000 acres (109,265 ha) of the 297,000 acres (120, 191.6 ha) *Boorooma* leasehold was resumed in the early 1880s (New South Wales Government Gazette 1882, 57). Lots were subdivided around the waterways and wells and the large *Boorooma* run was divided into 29 smaller areas at this time—*Boorooma* (which was retained by the Mein family), *Yamby*, *Briery*, *Kurragong/ Boorooma North*, *Booroomundi*, *Thulama/ Boorooma Back*, *Gilgie/Gillgi*, *Wilkie/Boorooma Back no2*, *Terewah/Narran no.6*, *Terewah Swamp*, *Buddah/ Wilkie West*, *Womborah/Narranwater*, *Boomangabar South*, *Manning*, *Corona/Kigwigil East*, *Lorah/Kigwigil*, *Kigwigil West*, *Kigwright*, *Pine/Lower Narran Back East*, *Curral/Kigwigil North*, *Ninmegate*, *Lower Narran Back West*, *Narran Back East*, *Coobah/Mureabun*, *Narran Back West*, *Mien*, *Akolia/Collyco*, *Burrell*, *Gurilly*, and *Wilby/Bogira*. The c.1886 plan of the *Boorooma* run only records one landholder within the subdivided lots, a B. Burrell, who was granted a conditional purchase of Lot 1 and Additional Conditional Purchase of Lot 2 within the “Burrell” area. The *Boorooma* homestead and much of the subdivided land along the Barwon River was selected by the Mien family between 1881 and 1900 (Vol.1320 Fol.146). The present boundaries of *Boorooma* parish reflect the original holdings of the Mein family before the subdivision.

The *Boorooma* station was often visited by travelers as they made their way through the countryside, especially during shearing time. *The Bulletin* (and Australian magazine) which was established in 1880, ran stories about travelers and *Boorooma* is often mentioned. One such story in the “*Time means tucker*” section on December 17 1958 (*The Bulletin*, p. 19) the author (Herbert Holman) is writing about his experience travelling through Australia in 1905. During this time, Holman took the steam barge down the Barwon River and stopped over *Boorooma* station. He and his friend (Dutchy) were offered a position taking the sheep for classification before shearing season and, thinking it might be easy work, Holman agreed. He noted there were over 100,000 head of sheep at *Boorooma* (Plate 4.7) at the time, and although they only stayed long enough for 20,000 sheep to be classified, it was some of the hardest work he had ever done.

Holman went on to describe the conditions at the time; the huts, he said had earthen floors, and the walls were lined with newspaper. He met a family of eight who lived in one of these huts, the father received £ 1 per week in wages (which was higher than a single man's wage) and rations. Holman noted the rations were generous at *Boorooma* compared to many stations. The rations included 1/2 lb of tea, 4 lb of sugar, 20 lb each of meat and flour.

The land along the Barwon River also housed the Boorooma Hotel, otherwise known as the *Travellers Inn Rest*. Surrounding the inn, a small village formed, called the 'Travellers Inn Village', which included a blacksmiths shop, stables, store and kitchen. Plate 4.8 identifies the small village layout from a map with the date of 28 November 83 written across it; this is the earliest mention of the inn. The inn closed in 1926 (T Kass 2003, 270), which is largely attributed to nearby town growth drawing in clientele with larger social centres.



Plate 4.7 **Shearing shed at Boorooma, c. 1930** (Source: *Item 10: Outback Scenes New South Wales / Sydney Smith, 1925*)

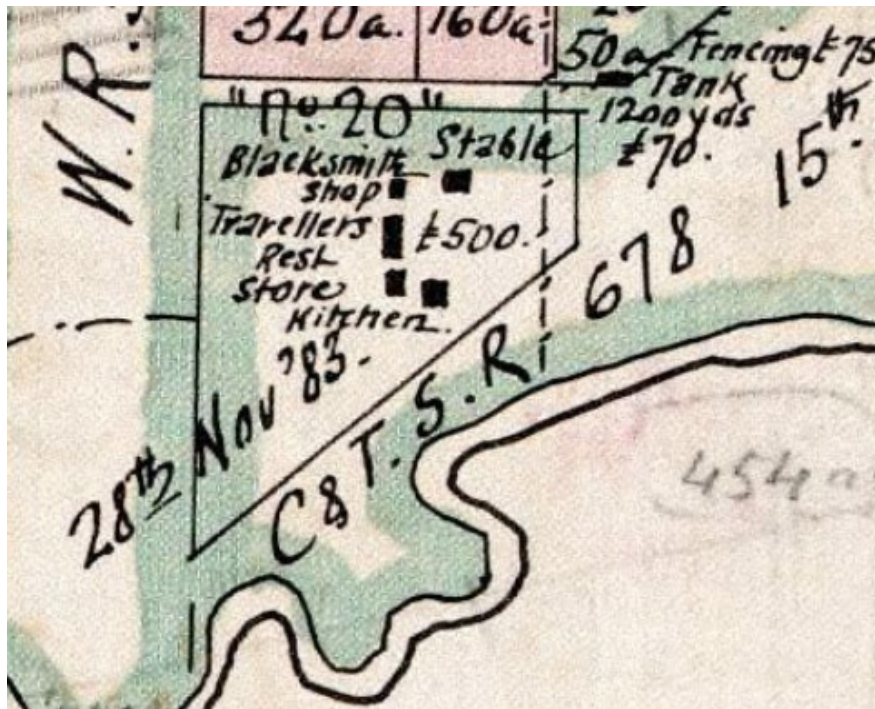


Plate 4.8 Small village located on the Barwon River in Boorooma run (Source: HLRV)

George Augustus Mein died in 1893 and the trustees of his estate dissolved the business partnership between the brothers in 1897, instigating the sale of the Mein brothers' holdings (*The Australian Star* 1893, 6). The sale advertisement for *Boorooma* describes the property as:

Consisting of 46,550 acres of freehold land

268,772 acres held under lease from the Crown for 21 years from July last.

The property is abundantly watered, having a frontage of about 22 miles to the Upper Darling or Barwon River, three miles to the Narran River, and large frontage to the Narran Lake, several waterholes, also many tanks (principally 10,000 yards), wells, lagoons and dams.

The fencing is substantial and in good repair and about 100 miles is wire netted. There is a comfortable homestead with all necessary outbuildings; also outstation; yards at the shed and throughout the run are modern and sufficient for working the property.

The woolshed of wood and iron, accommodates 81 shearers, and close to it on the river there is a steam wool-scouring plant with all necessary pumps, drying floors, &c., station plant complete.

The Argus, 21 August 1897, Advertising, p.3.

Additionally, the advertisement recorded the station had 110,000 sheep which “for many years been bred chiefly from Tasmanian flocks and have been carefully culled each year”, 80 cattle and 440 horses (*The Argus*, n.d., 3). Despite the station’s fencing, rabbits were a persistent pest on *Boorooma*; it is said that during drought conditions in 1906 the station was so infested with rabbits that over 100,000 rabbits were killed every night (Hobden 1954, 14).

Pulteney Mien purchased the total share of *Boorooma* for £110,000 in 1897 (*Australian Town and Country Journal*, 30 October 1897, p.13) and formed the P. Mein and Son Company with his son William Pulteney Mien, who resided *Moolpa Station* northwest of Deniliquin, NSW (n/a 1908, p. 679; *The Argus*, 25 November 1905, p.11). Pulteney Mien died in 1908 and the *Boorooma* holdings were passed down to his wife Agnes and son William (*Evening News*, 3 May 1909, p.5). By the 1940s the c.1880 subdivisions of *Boorooma* had been reintegrated to larger plots of land. These parcels were held by a number of individuals, the majority of whom hold a perpetual agricultural lease. The Mein family retained *Boorooma* homestead (Plate 4.9 and Plate 4.10), and holdings along the Barwon River, until August 1967. Photographs from 1965 show the property's continued use as a sheep and cattle station (HLRV Vol.1493 Fol.204). In 1967 the property was purchased by the Australian agricultural firm Goldsborough Mort & Co Ltd. (later Elders Ltd.) (HLRV Vol.1493 Fol.204).



Plate 4.9 Boorooma homestead c.1930 (Source: *Item 10: Outback Scenes New South Wales / Sydney Smith*, 1925)



Plate 4.10 Boorooma homestead c.1930 (Source: *Item 10: Outback Scenes New South Wales / Sydney Smith, 1925*)



Plate 4.11 Sheep are driven to new pastures on 'Boorooma' sheep and cattle station in the north-west of New South Wales, 1965 (Source: National Archives of Australia, ID11865538)

ii Llanillo run

Llanillo (Figure 4.1f) is located northeast of *Boorooma*. The station covered an area of 41,600 acres (16,834.9 ha) and was estimated to have grazing capabilities for 4,000 sheep (Bailliere, 1866, p. 319). By 1866 the property was occupied by H.S. Hamilton and in 1873 D.M. Rose was the superintendent of the run (Bailliere, 1866; *The Maitland Mercury and Hunter River General Advertiser*, 1873, p. 1). It appears free selection had an impact on some of the properties in the region as, in 1874, the leaseholders of *Llanillo* advertised their concerns and intention to purchase landholdings to ensure they could continue to use their land (*The Maitland Mercury and Hunter River General Advertiser* 1874, 1). In the early 1880s *Llanillo* was subdivided into 13 smaller runs.

The main homestead (Plate 4.12) was managed by Richard William Chase from 1880 until his death in 1922. He was well thought of in the area for bringing *Llanillo* through one of the worst droughts of the century, known as the federation drought (1902-1903) (Pastoral Review 1922).



Plate 4.12 Llanillo homestead with Mr R Chase in 1915 (Source: Kempe, 1915)

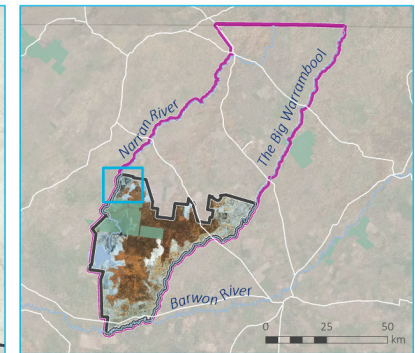
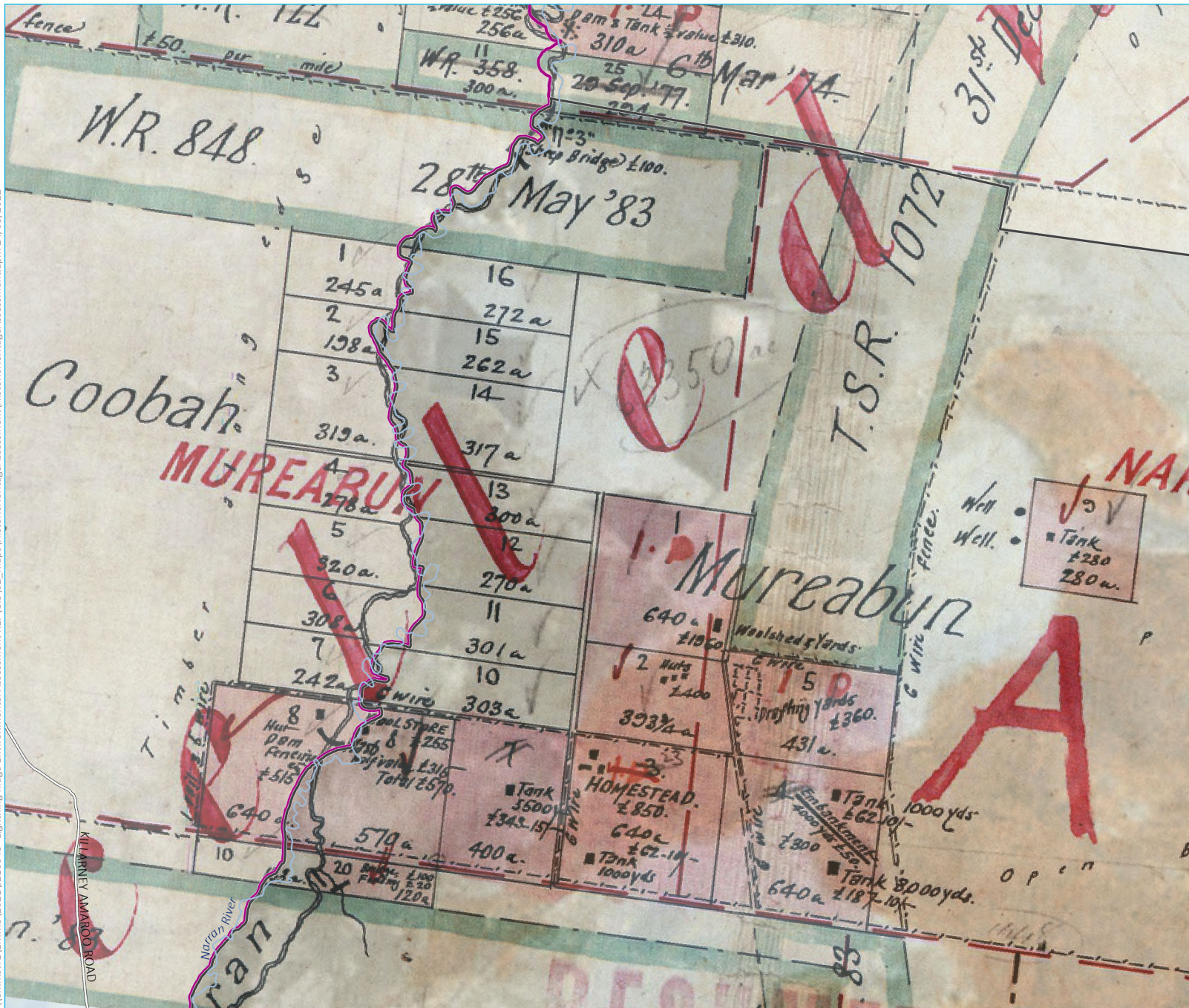
iii Milrea run

Milrea run (Figure 4.1d) is located east of *Boorooma* on the Barwon River. The pastoral lease for the 51,200 acres of the *Milrea* run was claimed by Campbell and Smith in 1848 (*New South Wales Government Gazette*, 1848, p. 1229).

The brewery firm Tooth and co. purchased *Milrea*, *Toallgeth*, and *Walma* stations along with 3,000 head of cattle in 1852 (*The Moreton Bay Courier* 1852, 3). The property was put up for sale in 1855 and by 1866 the run had been subdivided into *Milrea* and *Milrea Minor* stations, both of which were occupied by John Eales (Bailliere, 1866; *Empire*, 1855, p. 3).

iv Wilkie Plains run

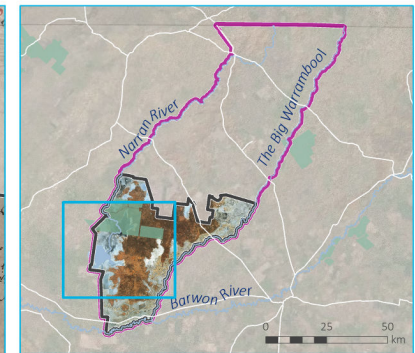
The *Wilkie Plains* run (Figure 4.1e) is located east of *Boorooma* and north of *Milrea*. The pastoral lease for *Wilkie Plains* was not claimed in 1848 so it is not clear when the property was taken up. In May of 1866 George Mathews registered a horse brand for *Wilkie Plains* and the property appears in an appraisalment of runs in the same year but J. Glass and J. Corrigan are noted as landholders (*"APPRAISEMENT OF RUNS," 1866; New South Wales Government Gazette*, 1868, p. 3). The property was subdivided into north and south portions in the early 1880s and the subdivided areas were incorporated into the subdivided runs of neighbouring properties.



- KEY
- Area 1
 - ▭ Narran- Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

Pastoral run maps-
Boorooma section 1

Lightning Ridge Area 1:
Historic heritage assessment
Figure 4.1a

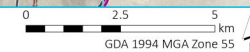


- KEY**
- Area 1
 - ▭ Narran-Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

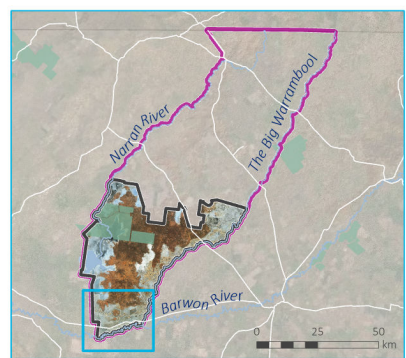
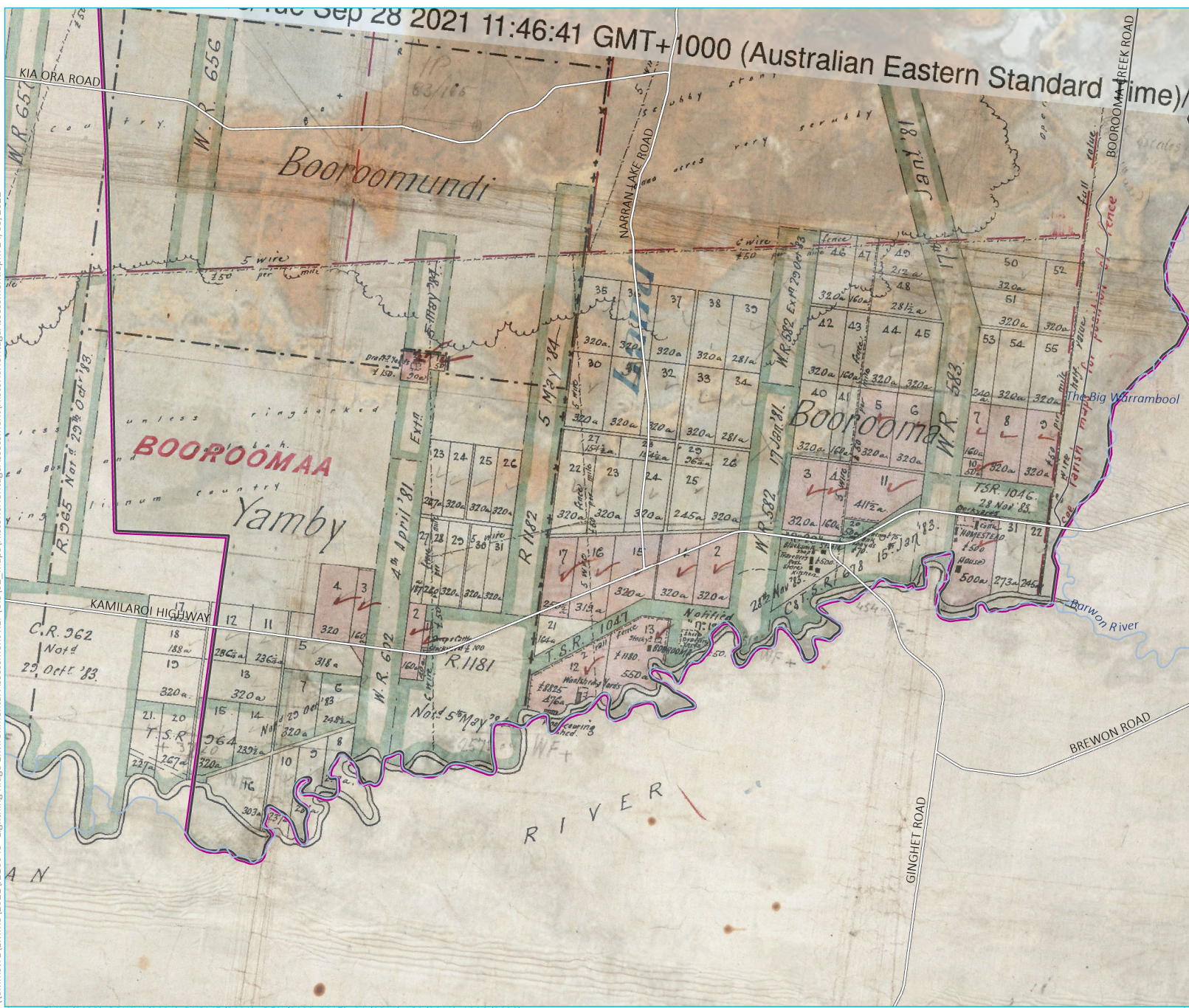
Pastoral run maps-
Boorooma section 2

Lightning Ridge Area 1:
Historic heritage assessment
Figure 4.1b

Source: EMM (2022); DRNSW (2021); DNRME (2021); DFSI (2020, 2017); GA (2011); LRS (2011); ASGC (2006)



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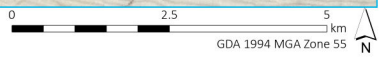


- KEY**
- Area 1
 - ▭ Narran- Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

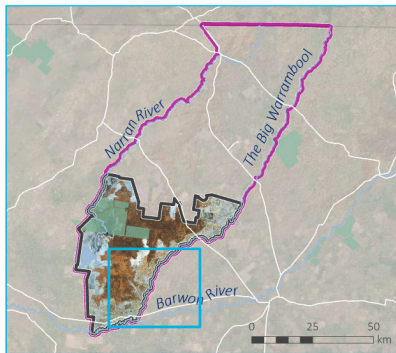
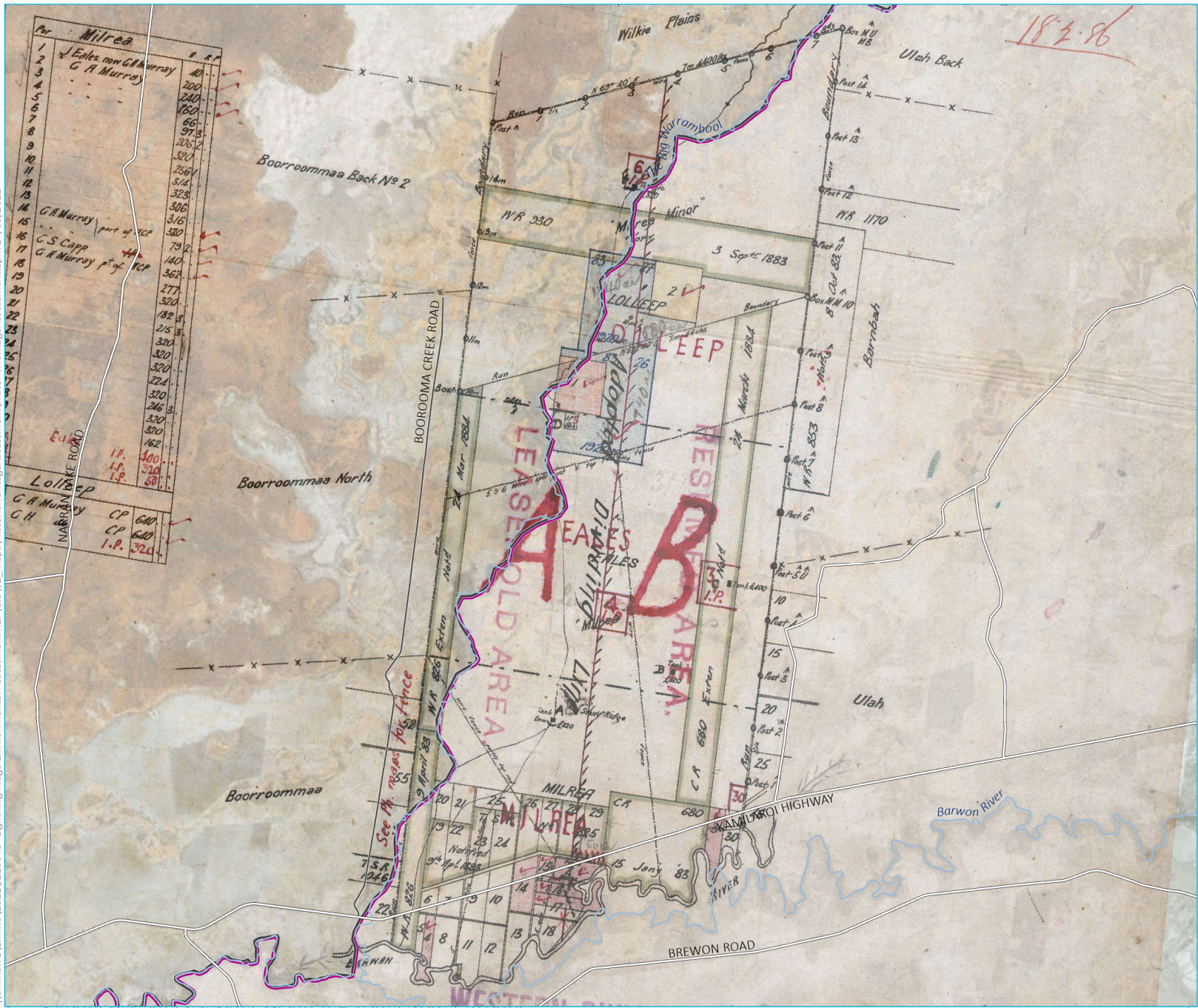
Pastoral run maps-
Boorooma section 3

Lightning Ridge Area 1:
Historic heritage assessment
Figure 4.1c

Source: EMM (2022); DRNSW (2021); DNRME (2021); DFSI (2020, 2017); GA (2011); LRS (2011); ASGC (2006)



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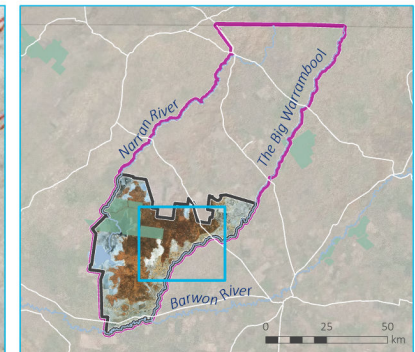
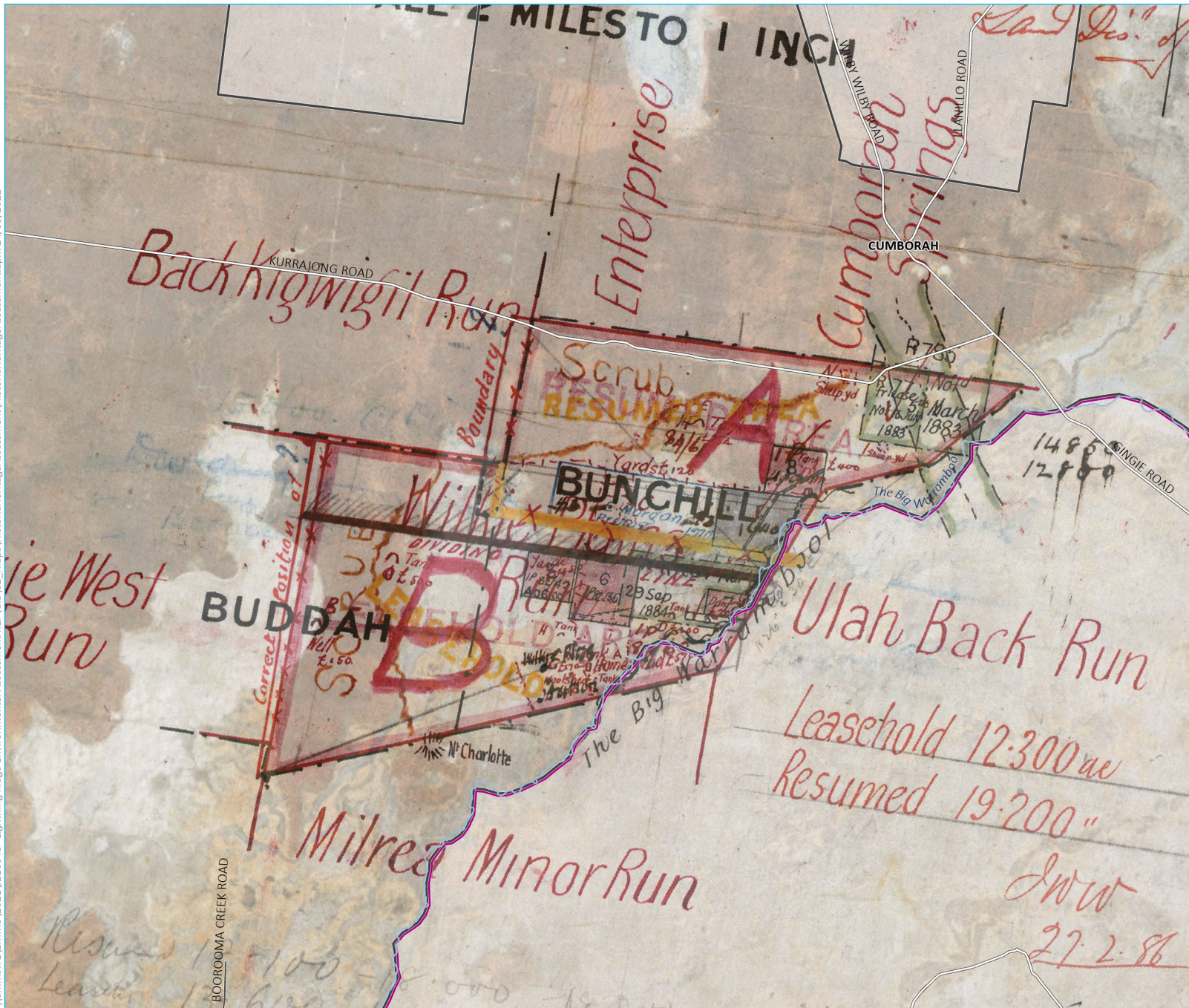
- KEY**
- Area 1
 - ▭ Narran- Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

Pastoral run maps-
Milrea

Lightning Ridge Area 1:
Historic heritage assessment
Figure 4.1d

Source: EMM (2022); DRNSW (2021); DNRME (2021); DFSI (2020, 2017); GA (2011); LRS (2011); ASGC (2006)



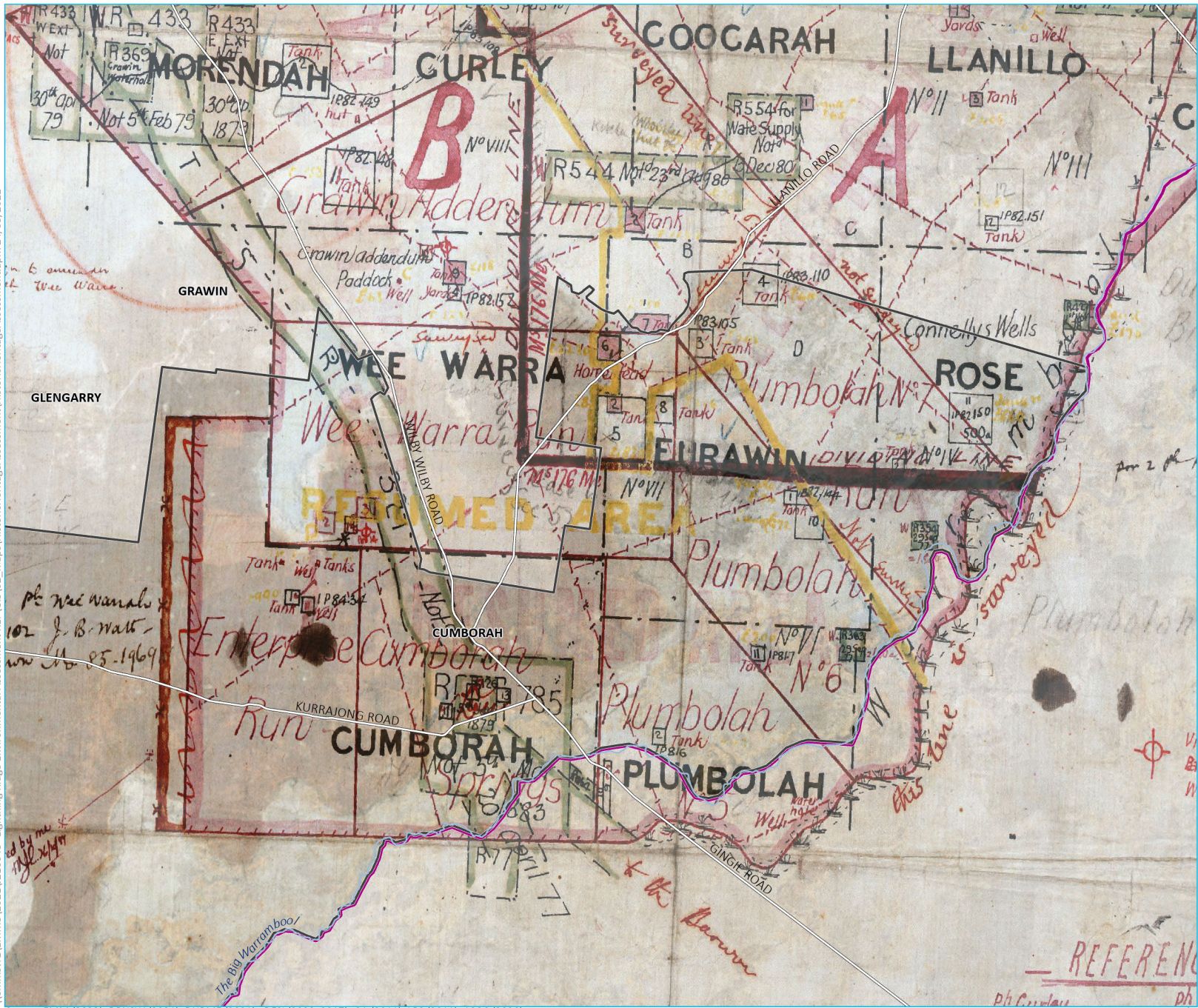


- KEY**
- Area 1
 - ▭ Narran- Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

Pastoral run maps- Wilkie Plains

Lightning Ridge Area 1: Historic heritage assessment
Figure 4.1e

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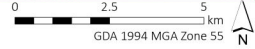


- KEY**
- Area 1
 - Narran- Warrambool Reserve
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

Pastoral run maps- Llanillo

Lightning Ridge Area 1: Historic heritage assessment Figure 4.1f

Source: EMM (2022); DRNSW (2021); DNRME (2021); DFSI (2020, 2017); GA (2011); LRS (2011); ASGC (2006)



5 Site evaluation

5.1 Introduction

The site evaluation is derived from the desktop findings alone as a field investigation has yet to be carried out.

5.2 Key findings

The project area has predominately been used for agricultural purposes throughout the last 180 years. Notable figures such as John Oxley, Thomas Gordon Dangar and pastoralist brothers Dr George Augustus Mein and Pulteney Mien have explored and/or purchased land in the project area.

Due to the GAB, the area became popular as a camp site along the TSRs. The numerous Water Reserves (WR) and stock yards would have made the journey through this part of Australia much less arduous than if water had to be carried. The project area is part of a larger landscape that has been favoured by pastoralists for its availability of water year-round, leading to extensive station complexes being built throughout the landscape. Huts, houses, outstations, woolsheds and homestead were situated throughout the property.

Although extensive mining has taken place north and west of the project area; the project area itself has not been disrupted in the same way. The primary land use of agriculture within the project area creates ground disturbance at the upper levels of the soil profile, while the lower levels remain relatively intact.

5.3 Land use summary

The original boundaries of *Boorooma* run makes up over half of the project area, the rest includes the eastern runs, *Llinillo*, *Milrea* and *Wilkie Plains*. Each of these runs produced cattle initially in the 1840s and then sheep; many of these properties still run stock today.

The runs, as shown in early parish maps Figure 4.1a-f) consisted of stock yards, woolsheds, homesteads, outstations, huts, wells, tanks and dams. Each of the properties appears to use the available TSRs to move the stock (likely encouraged by different seasons) around the runs freely.

Boorooma run includes two homesteads. One was located within Lot 1, on the Barwon River (Plate 5.2) and was built by brothers George Augustus and Pulteney Mein. Further to the west on lots 12 (Plate 5.3) and 13 (Plate 5.4) additional infrastructure was built including a woolshed (and according to the parish maps, a wool wash/scouring section), three houses and stockyards all by the 1880s when the survey of the crown plans was completed. The second of the homesteads is located on Lot 13 and was likely built by the White family.

As the original *Boorooma* run was sub-divided into smaller sections additional homesteads and stations due to the *Crown Lands (Alienation of) Act (24 Victoria c 15, 1860)*, more homesteads began to crop up throughout the landscape. Stockyards and an outstation with three huts were built north of WR 655 in *Terewah Swamp*. In *Wilkie West* to the north-east of *Boorooma*, another hut, tank and yards were built. In *Narran Water* north of WR 562 and west of TSR 107 an additional two huts, tank, and two wells were constructed. *Kigwigil*, *Kigwigil East* and *Kigwigil North*, almost rivalled *Boorooma* in infrastructure; it included *Boran Sheep Station* located on TSR 1070, additional huts and yards to the north-west, plus a further three huts to the west on the Narran River along with stockyards. Further to the north (bordering *Narran Back East*) there was an additional homestead, woolshed and yards, numerous huts, a woolstore and wash on the Narran River. Washing facilities for sheep started to become common place throughout Australia as 'dusty' wool did not fetch as high a price on the London market as washed wool. For that reason, many of the woolsheds were built close to rivers, using the river as a wash before shearing. Pens were set up in such a way that sheep could be moved straight into the middle of the stream (Plate 5.1) to scour them and send them to the drying pen when they were done (Wood 2009, 4).

To the east of *Boorooma* lies *Wilkie Plains*, which was quite small in comparison to its neighbour. *Wilkie Plains* was a complete station, with a homestead located in the lower east corner, yards, wells and a woolshed on The Big Warrambool River.

To the east of *Wilkie Plains*, and the edge of the project area, *Llianillo* also held a homestead located in Lot 6 (Plate 5.5), the homestead included a store and kitchen.

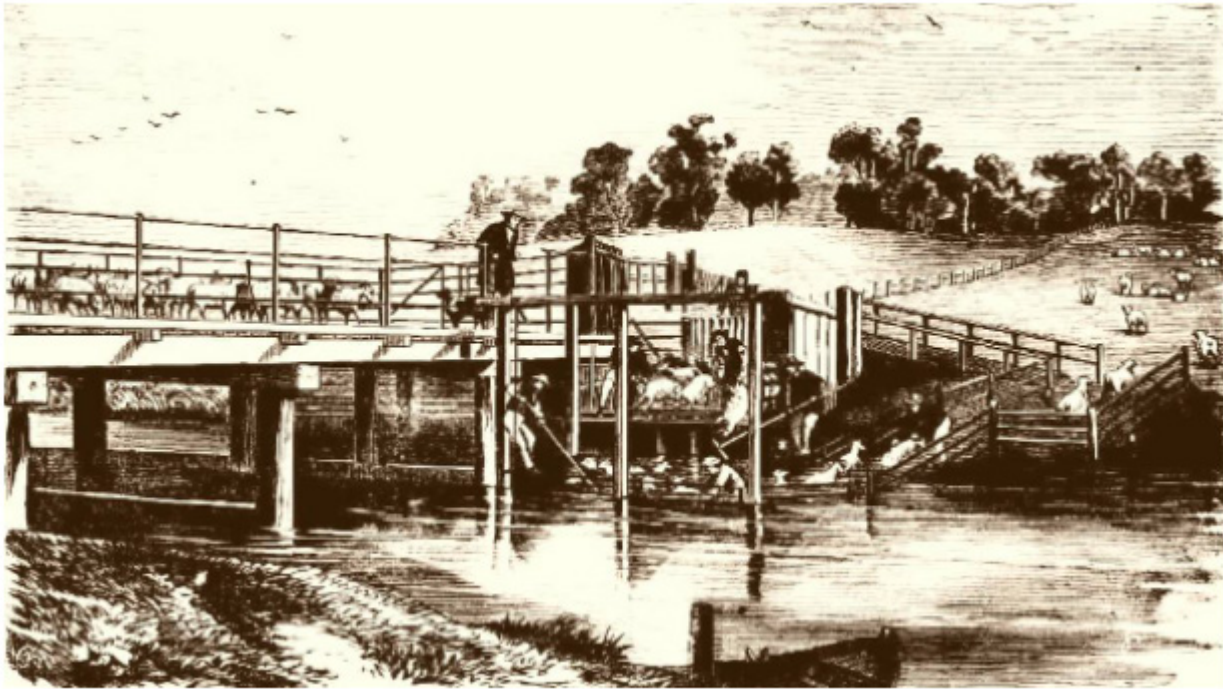


Plate 5.1 A sketch of a sheep washing facility in Australia (location unknown) (Walsh 2017)



Plate 5.2 Lot 1, Boorooma Run, showing the stockyards, head station, kitchen, store and house (NSW LSR Crown Plan 45-1970)

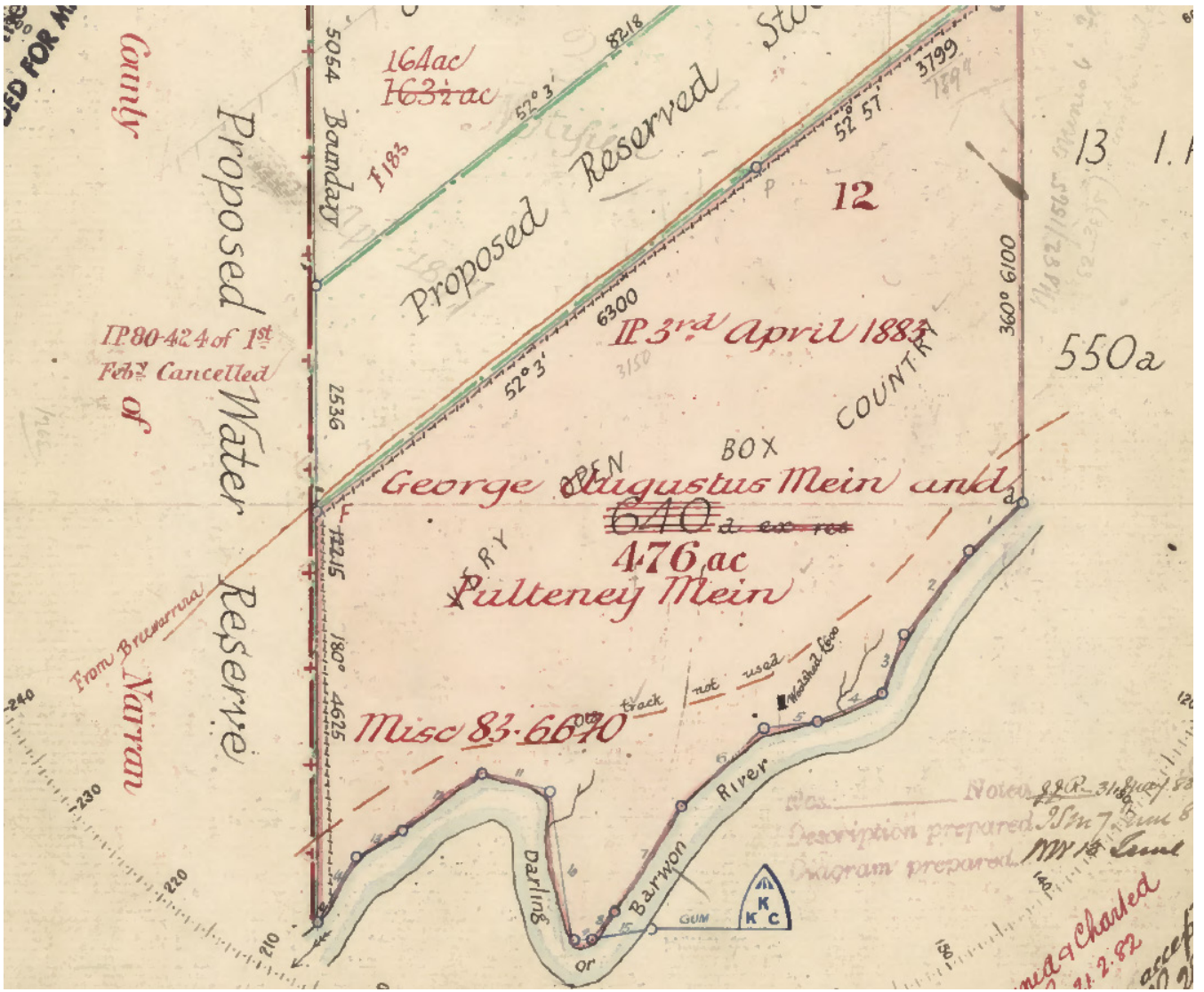


Plate 5.3 Lot 12, Boorooma Run, showing the woolshed by the Barwon River (NSW LSR Crown Plan 145-1970).

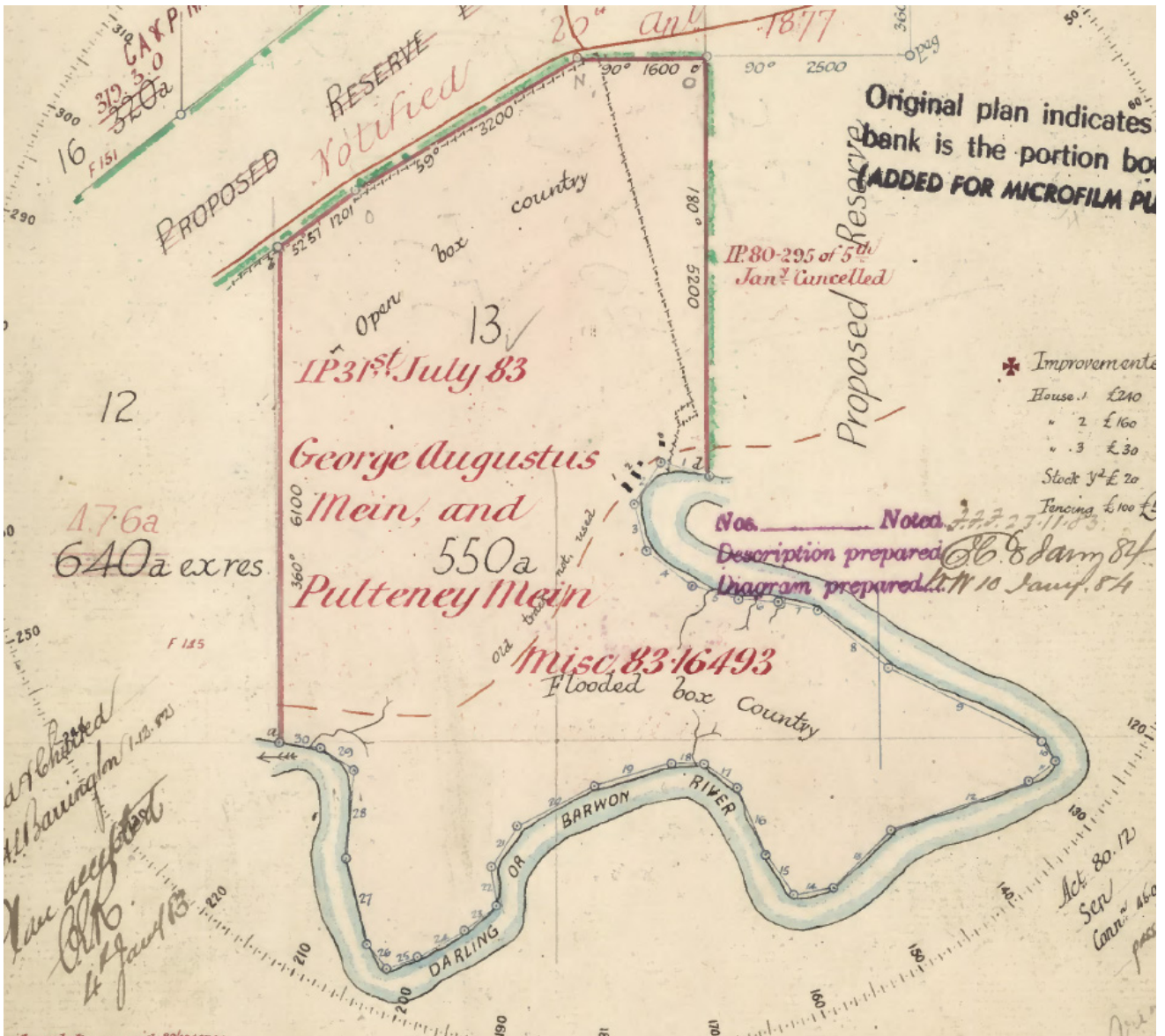


Plate 5.4 Lot 13, Boorooma Run, showing three houses, a stockyard and fencing near the east bend of the Barwon River (NSW LSR Crown Plan 146-1970).



Plate 5.5 Lot 6, Llanillo Run, showing a homestead, store and kitchen (NSW LSR Crown Plan 296-1970).

5.4 Predictive model

Development of a predictive model for the survey is based on background research, which includes documentary sources, maps and plans, and where possible, landholder discussions and field observations. Further, the data used to inform predictive models for Aboriginal sites are useful for planning historical survey. Access to water, soil landscapes, geomorphology and land disturbance are characteristics that would have been valuable to Aboriginal people and squatters alike.

The historical summary has provided information that suggests that archaeological sites that may exist in the project area include:

- mud or slab huts and a stockyards;
- detached kitchen areas, privies and other associated buildings;
- stockyards from later periods constructed in timber or stone;
- stone flooring or flagging for domestic or pastoral purposes;
- sheep washes and scouring sheds;
- modifications in the landscape to manage water flows such as flooding and to create pens etc;

- bridges and other river crossings;
- historically modified trees;
- roads;
- camps in the stock reserve (indicated by fire and rubbish pits) and;
- possible grave sites outside the current boundary of Cumborah cemetery.

5.5 Results of the desktop assessment


Table 5.1 to Table 5.4 list all the sites identified via desktop assessment. The results and current condition of each site is currently unknown and will need to be verified during a field inspection. In addition to this, additional sites may be present which have not been captured through mapping. The spatial layout of the sites can be seen in Figure 5.1.

The aerial imagery attached to each site is the approximate location according to historical mapping. However, it cannot be said with any certainty that a site still exists or has been removed. However, sites which appear to be demolished, may hold sub-surface resources of value in the form of archaeological sites (relics).

Four sites listed in Table 5.1 (B-18, 19, 20 and 21) lay outside the project area, these have been included for context of the larger site itself. These four sites have been greyed to show they are outside the project area.

5.5.1 Boorooma run

Table 5.1 Boorooma run

Site identifier	Description	Current aerial imagery
B-1	The site is located on Lot 1, and includes the original Boorooma head station with kitchen, store, house and stock yards. The current aerial imagery does not show any structures; however footings and sub-surface deposits may still be present. It is possible that this area is now an archaeological site.	 An aerial photograph showing a rural landscape with a mix of brown and green vegetation. A yellow line is drawn on the image, tracing a path or boundary. In the lower-left corner, a river is visible, labeled 'Bawgon River'.

Site identifier **Description**

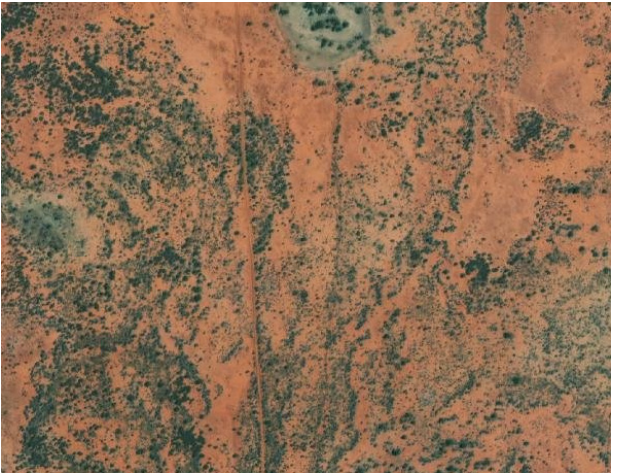

Current aerial imagery



B-2 The location of this site is to the east of Water Reserve 582 along the Cattle Reserve (and TSR) 678. The site includes the *Travellers' Rest Inn* (or Boorooma Hotel), blacksmiths shop, stable, store and kitchen. Current aerial imagery does not appear to show any structures still present, however there is a high possibility that sub-surface deposits are still present. It is possible that this area is now an archaeological site.






B-3 The pastoral map indicates another station present on lots 12 and 13 that includes stockyards, the woolshed and wool washing and scouring facilities. Both of these locations indicate standing structures (of unknown date). It is possible that this area is now an archaeological site.









Site identifier	Description	Current aerial imagery
B-4	An outstation with three huts, stockyards and wells are marked to the east of Narran Lake (Terewah Swamp). Current aerial imagery does not appear to show any structures still present, however there is a likelihood that sub-surface deposits are still present. It is possible that this area is now an archaeological site.	
B-5	A tank and hut located on the border of the <i>Boorooma</i> run. The location now appears to be a flood plain. Visual inspection would need to be conducted to understand the likelihood of sub-surface deposits surviving. It is possible that this area is now an archaeological site.	




Site identifier	Description	Current aerial imagery
B-6	<p>A fenced well is located on the <i>Boorooma</i> run, north of Narran Lake. However, based on the image to the right, the water levels are high, and the well is probably submerged. It is possible the well was a seasonal water access solution.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-7	<p>Two huts, fencing, two wells and a tank are shown in the <i>Boorooma</i> run plan between a section of the TSR 1070 and a Water Reserve 562. These structures represent the location of a camping reserve along the TSR. It is unclear from aerial imagery if any structures remain.</p> <p>It is possible that this area is now an archaeological site.</p>	




Site identifier	Description	Current aerial imagery
B-8	<p>Stockyards and two huts are shown in the <i>Boorooma</i> run plan on the eastern edge of the Narran River located south of Water Reserve 540 are noted. It is unclear from aerial imagery if any structures remain.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-9	<p>A hut and yards are recorded on <i>Boorooma</i> run plan south of Water Reserve 540 and to the west of TSR 1070. Aerial imagery indicates structures may still be present within the area.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-10	<p>A well is recorded in Water Reserve 540, it is unclear from aerial imagery where the well is still present.</p> <p>It is possible that this area is now an archaeological site.</p>	


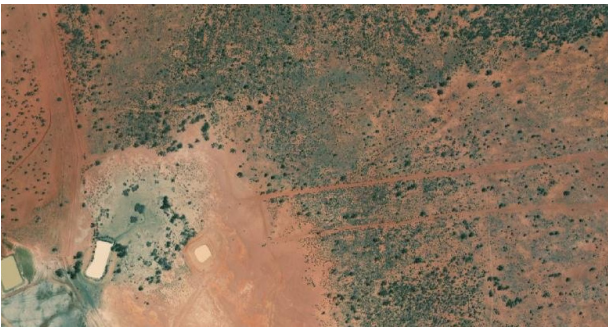

Site identifier	Description	Current aerial imagery
B-11	Two wells are noted, in addition to a hut and tank in the north-east of Water Reserve 540. It is unclear from aerial imagery where the well is still present. It is possible that this area is now an archaeological site.	
B-12	A well is located to the north-east of Water Reserve 540. It is unclear from aerial imagery where the well is still present. It is possible that this area is now an archaeological site.	
B-13	A homestead complex with at least three huts, a woolshed, drafting yards is located north of Water Reserve 540 to the west (and along) TSR 1072. It does not appear any structures are still present within the area; however it is likely sub-surface deposits remain. It is possible that this area is now an archaeological site.	

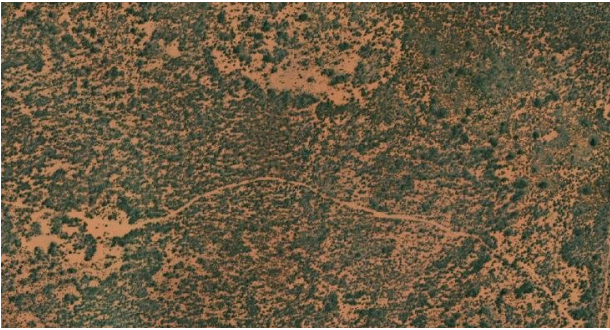

Site identifier	Description	Current aerial imagery
B-14	<p>These items were located to the west of B-13 and includes a wool store and sheep wash. The location connects with a hut on the western side of Narran River, located outside the project area. Land modification is present within the landscape, a visual inspection needs to be undertaken to assess what further evidence remains.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-15	<p>Fencing and tanks indicate this area may have been used as a camp site, prior to the inn being built. It is located to the west of B-2 and within the Cattle Reserve 678. Structures do not seem to be present in aerial imagery, however it is likely sub-surface deposits survive.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-16	<p>Sheep and drafting yards were identified along TSR 1047 to the east of site B-3, which appears to be located on a flood plain. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand whether any evidence remains of this site.</p> <p>It is possible that this area is now an archaeological site.</p>	

Site identifier	Description	Current aerial imagery
B-17	<p>Sheep and cattle yards are located between Water Reserve 602 and TSR 1047. It appears to be located on a flood plain near Yambie Lagoon. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand whether any evidence remains of this site.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-22	<p>Drafting yards (similar to stock yards, but generally having more access points for moving cattle) are located in the northern section of Water Reserve 602. Aerial imagery indicates land modification consistent with some form of penning near dam. A visual inspection should be undertaken to determine age, condition and whether sub-surface deposits are likely.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-23	<p>Located to the east of TSR 1066 are drafting yards, a hut and tank. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand whether any evidence remains of this site.</p> <p>It is possible that this area is now an archaeological site.</p>	

Site identifier	Description	Current aerial imagery
B-24	<p>Located to the east of TSR 1066 are drafting yards, a hut and tank. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-25	<p>Located to the east of TSR 1066 and south of Water Reserve 656 is fencing, a well and tank. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-26	<p>Located to the west of TSR 1066 is fencing, a well and tank. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	


Site identifier	Description	Current aerial imagery
B-27	<p>Located to the west of TSR 1066 a tank is indicated. It is unclear from aerial imagery as to whether any structures remain. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-28	<p>Located along Water Reserve 655 a tank is indicated. It is unclear from aerial imagery as to whether any structures survive. It appears the area is now inundated. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-29	<p>Located north of Water Reserve 655 a tank is indicated. It is unclear from aerial imagery as to whether any structures remain, it does appear the area is now a flood plain for Narran Lake. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	

Site identifier	Description	Current aerial imagery
B-30	<p>Yards have been identified along TSR 1070, north of Water Reserve 563. Aerial imagery does not appear to show any structures, A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-31	<p>Yards have been identified to the west of TSR 1070, north of Water Reserve 563. Aerial imagery does not appear to show any structures. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
B-32	<p>A well and tank are located to the east of TSR 1070, recent structures appear to be present in the area indicated, it is unclear from aerial imagery as to whether the tank and well still exists. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	

Site identifier	Description	Current aerial imagery
B-33	Located along TSR 1070, south of Water Reserve 540 is Boran Sheep Station. A visual inspection will need to be completed to understand if any evidence of these features survives, however there is a high possibility that sub-surface deposits are still present It is possible that this area is now an archaeological site.	
B-34	On the eastern side of Water Reserve 848 a sheep bridge is indicated to cross the Narran River. A bridge is present in aerial imagery, though a visual inspection will need to be completed to understand if any evidence of the original features survives. It is possible that this area is now an archaeological site.	


5.5.2 Llanillo run



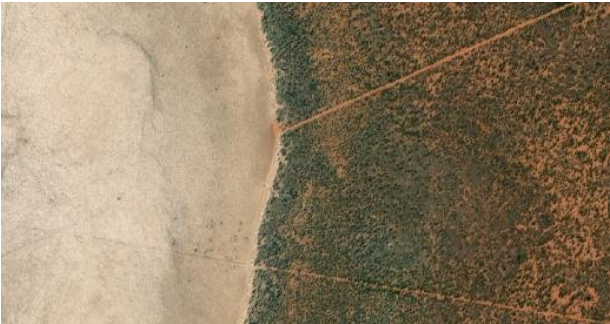
Table 5.2 Llanillo run

Site identifier	Description	Current aerial imagery
L-1	<p>The Llanillo homestead is located in Lot 6 of Llanillo run. Structures are still present with in the lot, but earlier structures may not have survived.</p> <p>It is possible that this area is now an archaeological site.</p>	

5.5.3 Wilkie Plains run

Table 5.3 Wilkie Plains run

Site identifier	Description	Current aerial imagery
WP-1	<p>This site is located in north-east portion of the Wilkie Plains run. It located along a TSR (number not available) and consists of sheep yards, a tank and dam. It is possible this was used as a camp site along the TSR. Aerial imagery does not appear to show any structures. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	

Site identifier	Description	Current aerial imagery
WP-2	<p>This site is located in the northern central section of Wilkie Plains run. It includes yards and a possible structure. Aerial imagery does not appear to show any structures, a visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
WP-3	<p>Located in the southern portion of Wilkie Plains run is a homestead, woolshed and tanks along the Big Warrambool River. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	
WP-4	<p>Located along the western boundary of Wilkie Plains run a well is indicated. It is unclear from aerial imagery as to whether any structures remain, it does appear the area is now a flood plain for Narran Lake. A visual inspection will need to be completed to understand if any evidence of these features survives.</p> <p>It is possible that this area is now an archaeological site.</p>	

Site identifier

Description

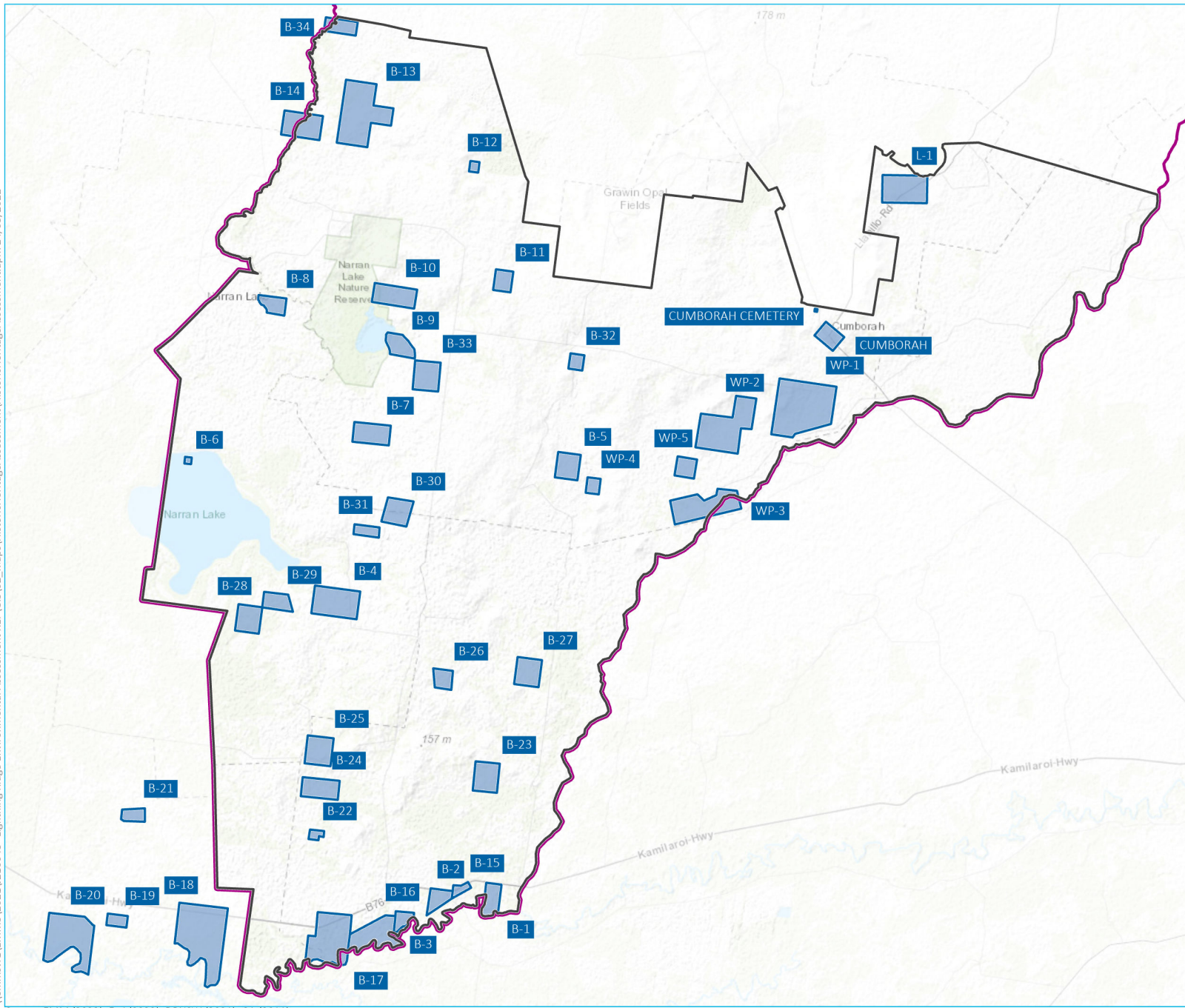
Current aerial imagery

Cumbarah
Cemetery

Cemetery in use since the 1880s.



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- KEY**
- Area 1
 - Narran-Warrambool Reserve
 - Additional heritage items identified through desktop research

Additional heritage items identified through desktop research

Lightning Ridge Area 1:
Historic heritage assessment
Figure 5.1

Source: EMM (2022); Esri (2022); DRNSW (2021); GA (2011)



5.6 Summary of archaeological potential and sensitivity

This section provides a summary of the archaeological potential and sensitivity of the study area. The consistent agricultural use throughout the last 180 years has shaped the project area into a historical working landscape. Aerial imagery suggests that many of the structures recorded on the early run plans (Figure 4.1a-f) may not survive; but in many locations, archaeological resources may be present.

The project area has been subject to ground disturbance in the form of inundation and pastoral uses throughout the years. This disturbance is unlikely to have removed all evidence of early occupation of the runs as these uses are low impact and usually only affect the top of the soil profile.

5.6.1 Homesteads, huts and houses

Relatively few archaeological investigations have taken place within large pastoral runs within NSW, but built investigations tend to be more common. A relatively in depth investigation was undertaken in Kinchega, NSW, in 2000 by the Kinchega Archaeological Research Project team (KARP team). The aims for this research was to gain information surrounding early Australian gender roles, the divisions of labour, as well as production and consumption habits on pastoral land (Allison 2003). During this investigation the KARP team was able to determine the layout of the homestead and its surroundings, including the flooring material (wood and packed earth) and the area dedicated to a vegetable garden. Investigations such as these provide context for archaeological potential on historic homesteads, huts and houses in NSW.

Some of the historical areas noted above such as B-1, include a homestead, kitchen, store, house and yard (Plate 4.9). It may be possible through archaeological investigation to determine the layout of these complexes, including surrounding gardens and pathways.

Certainly, with the presence of timber floorboards (and prior to tongue and groove flooring which was introduced in the mid-1880s) there is high chance that domestic items slipped through the cracks and into the dirt below. These items could include glass and ceramics, coins, writing materials, medicines, children's toys, and other household items. In addition to everyday items, evidence of footings and floorplans could remain along with the building materials

5.6.2 Wells and outhouses

Wells and outhouses often provide research information in the form of both domestic and commercial data. Outhouses regularly double as rubbish pits, while wells are filled using as much 'waste' material as can be found when they are closed. This can include food remains (bones, shells etc), broken goods such as glass, ceramics or items unable to be repaired. Many of these objects could be useful for dating as well as help determine the type of occupation within the site.

5.6.3 Travelling Stock Camp sites

Camp sites and the small village located along TSRs may hold resources which speak to the journey many took across Australia. This was a chance for the stock to rest and water, while allowing the riders an opportunity to repair any equipment that was failing, plus shoe horses, and recover themselves.

The archaeological potential in camp sites is likely to include covered over fire pits that may include travelling equipment, food scraps, empty/broken jars, bottles and ceramics and material used for blacksmithing. These items may have been brought from their hometown or picked up in villages and town along the way, helping to provide context clues on who used the camp sites, where they came from and when.

5.6.4 The Travellers' Rest Inn and surrounding village

The archaeological potential in this area is likely to include covered-over fire pits that may include travelling equipment, food scraps, empty/broken jars, bottles and ceramics and material used for blacksmithing. These items may have been brought from their hometown or picked up in the village itself, possibly indicating the type of wares available in this small village.

In addition to this, like the homesteads it may be possible to work out the topographic layout of the village through the remaining sub-surface deposits.

5.6.5 Woolshed, wash and scouring facilities

Archaeological potential for the woolshed, wash and scouring facilities include the commercial tools and fittings used in cleaning, prepping and shearing the stock. Foundations of the buildings and pens may remain, indicating the topographic layout of the site. It may be possible that the commercial use of the area could be determined through an examination of sub-surface deposits in the form of an archaeological excavation. Shearing teams worked extremely long hours which meant kitchen facilities or permanent camp sites were located near the sheds for the workers to use. Remnants of these cooking areas could indicate what was being prepared and the size of the workforce expected.

Woolsheds tend to be lifted off the ground for ease of cleaning, plus sheep are able to be penned below in some cases. As many woolsheds are near a water supply, the height, also reduces the risk of flooding. The additional height causes these sheds to hold considerably weight on the pillars which means extremely sturdy material tends to be utilised, which has a better chance of surviving the years.

5.6.6 Archaeological sensitivity

Until a complete field inspection can be undertaken, archaeological sites cannot be separated from built sites (as it is unclear what remains and what does not). Therefore, it is assumed that all sites listed in section 5.5 are both built and archaeological sites.

The project area has a high level of archaeological sensitivity with discrete areas of archaeological potential.

6 Assessment of significance

6.1 The significance framework

In NSW, historical value is ascribed to buildings, places, archaeological sites and landscapes modified in the Australian historical period for purposes other than traditional Aboriginal use. The assessment of heritage significance is based on the Burra Charter (Australia ICOMOS 2013) and further expanded upon in *Assessing Heritage Significance* (NSW Heritage Manual Heritage Office 2001). The heritage manual lists seven criteria to identify and assess heritage values that apply when considering if an item is of state or local heritage significance, which are set out in Table 6.1. It also identifies the heritage gradings for which items (or features or components) that were recorded on site have been assessed against, and which provide context for each individual item's contribution to the cultural landscape. The result of the assessments of significance may determine that an individual component does not meet the threshold for local or State significance as an individual item, but that it does contribute to the significance of the cultural landscape.

The focus of the research remained on the items in, or close to, the development footprint and the assessment of significance is primarily concerned with items within the project footprint.

The assessment of relics is hypothetical as their existence as intact and substantial sites is predicted and not confirmed.

Table 6.1 NSW heritage assessment criteria

Criterion	Explanation
a)	An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).
b)	An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).
c)	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).
d)	An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).
e)	An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).
f)	An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).
g)	An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places or environments (Representativeness).

Source: *Assessing heritage significance* (NSW Heritage Office 2001, p.9).

6.2 Significant cultural landscapes

Cultural landscapes come in different forms, from having the appearance of wilderness to countryside to urban areas. The common factor that all cultural landscapes possess is they are a moment in time in a continuum of change created by human action (Meinig 1979).

Cultural landscapes can be broadly defined as designed, evolved or associative (Australia ICOMOS nd), with designed landscapes being largely represented by gardens; evolved landscapes by development; and associative landscapes being more indebted to the intangible, the religious or sacred. Cultural landscapes are also dynamic (Stuart 1997, p.28), regardless of the pace of change.

The significance of a landscape is dependent on how it reflects values of the heritage standards in Australia and the *Burra Charter*, which was developed to reflect the values of the community. Interpretability is an important factor, ie the ability of a landscape to tell a story is a socially and scientifically valuable attribute. So, while all human interactions with nature result in the formation of cultural landscapes, significance varies depending on what can be identified and interpreted and considered to be valuable to the community.

The project area includes some of the earliest pastoral runs in the western division, there is a high likelihood given the use of the properties have not changed that the landscape remains like it was in the mid-1800s. Significance cannot be assessed until the project area has been inspected.

6.3 Indicative significance of pastoral runs

The following assessment are noted to be indicative; this is because a field assessment has not been conducted, and it is unclear what items are still standing, what condition each site is in, or if sub-surface artefacts are likely. It is important that each site (and any additional sites identified during a field survey) are re-assessed against the NSW Heritage assessment criteria.

6.3.1 Boorooma run

Table 6.2 Boorooma run

Criterion	Assessment
a) Historical	<p><i>Boorooma</i> run is one of the earliest and largest runs in the western division. The property originally consisted of 277,000 acres and has consistently run stock since the 1840s. The property includes a variety of huts, outstations, yards, woolsheds and related infrastructure that paint a complete picture of stock work in the 1800s and 1900s.</p> <p>Although <i>Boorooma</i> run has since been subdivided, use of the run has not been altered dramatically. It is still evident, even from aerial imagery that the subdivided lots within <i>Boorooma</i> continue to run stock. <i>Boorooma</i> demonstrates how the landscape and natural resources were manipulated by earlier pastoralist to create an enduring legacy around stock in the western division of NSW.</p> <p><i>Boorooma</i> run is of local and possibly State significance.</p>
b) Associative	<p><i>Boorooma</i> run was originally owned by James White, a member of both the upper and lower houses of parliament. The property then passed over to George Augustus Mein and his brother Pulteney Mein who together owned the pastoralist company, G.A and P. Mein. Although all three men were well thought of in the region, they did not bring any specific associative significance to the property.</p> <p><i>Boorooma</i> run is of local and possibly State significance.</p>
c) Aesthetic	<p>Inspection will need to be undertaken to assess this criterion.</p>
d) Social	<p><i>Boorooma</i> run included at least 100,000 head of sheep at one stage which would have meant a considerable number of hands would need to be present throughout the year to care for and shear the sheep. It appears many travellers were able to pick up work when needed at <i>Boorooma</i>, and the culture seemed such then anyone passing through was welcome to set up camp. <i>Boorooma</i> appears to have been a central location between Walgett and Brewarrina, which is why the small village was established.</p> <p><i>Boorooma</i> run is of local and possibly State significance.</p>

Criterion	Assessment
e) Research	Research potential exists through documentary and archaeological investigation; however a field inspection is required to understand the level of above-ground survival of features. Boorooma run is of local and possibly State significance.
f) Rarity	Inspection will need to be undertaken to assess this criterion.
g) Representativeness	<i>Boorooma</i> run represents an historically established sheep station in an unusually well-watered part of the western division of NSW. It's success through the years allowed for growth and subdivision and which is proven through the many structures which were present throughout the landscape. Boorooma run is of local and possibly State significance

6.3.2 Llanillo run

Table 6.3 Llanillo run

Criterion	Assessment
a) Historical	Llanillo run covered an area of 41,600 acres (16,834.9 ha) along The Big Warrambool River. The property has been running stock since the mid 1800s and there is evidence of stock yards, huts, woolsheds, wells and stations. Aerial imagery indicates the landscape is still being used for agricultural purposes and would provide historical knowledge relating to early squatting and pastoral runs in western division of NSW. Llanillo run is of local and possibly State significance.
b) Associative	It is unlikely that <i>Llanillo</i> run meets this criterion, however an inspection will need to be undertaken to determine this
c) Aesthetic	Inspection will need to be undertaken to determine this
d) Social	It is unlikely that <i>Llanillo</i> run meets this criterion, however an inspection will need to be undertaken to determine this.
e) Research	Research potential exists through documentary and archaeological investigation; however a field inspection is required to understand the level of above-ground survival of features. Llanillo run is of local and possibly State significance.
f) Rarity	Inspection will need to be undertaken to determine this
g) Representativeness	<i>Llanillo</i> run represents an historically established sheep station on the edge of a well-watered part of the western division of NSW. Although the property was subdivided the establishment of a woolshed, homestead and related infrastructure demonstrates the function of an early sheep station in the western division of NSW. Llanillo run is of local and possibly State significance.

6.3.3 Wilkie Plains run

Table 6.4 Wilkie Plains run

Criterion	Assessment
a) Historical	The pastoral lease for Wilkie Plains was taken up in the mid 1800s and was outfitted with stock yards, huts, woolsheds, wells and stations. Aerial imagery indicates the landscape is still being used for agricultural purposes and would provide historical knowledge relating to early squatting and pastoral runs in western division of NSW. Wilkie Plains run is of local and possibly State significance.
b) Associative	It is unlikely that <i>Wilkie Plains</i> run meets this criterion, however an inspection will need to be undertaken to determine this.
c) Aesthetic	Inspection will need to be undertaken to determine this
d) Social	It is unlikely that <i>Wilkie Plains</i> run meets this criterion, however an inspection will need to be undertaken to determine this.
e) Research	Research potential exists through documentary and archaeological investigation; however a field inspection is required to understand the level of above-ground survival of features. Wilkie Plains run is of local and possibly State significance.
f) Rarity	Inspection will need to be undertaken to determine this
g) Representativeness	<i>Wilkie Plains</i> run represents an historically established sheep station on the edge of a well-watered part of the western division of NSW. Although the property was subdivided the establishment of a woolshed, homestead and related infrastructure demonstrates the function of an early sheep station in the western division of NSW. Wilkie Plains run is of local and possibly State significance.

6.4 Summary statements of significance

As a field assessment has not yet been conducted it is unclear which items are still standing, what condition each site is in, or if sub-surface artefacts are likely. Therefore, the following five tables (Table 6.5 - Table 6.7) will identify indicative potential of the type of sites present, that will need to be re-assessed against the criteria after a ground truthing.

6.4.1 Boorooma Run

Table 6.5 Boorooma Run Indicative significance

Site	Description of site	Indicative significance
Tanks, yards and dams and fencing	<i>Boorooma</i> was a functioning sheep station which included all necessary infrastructure such as tanks, yards, dams and fencing peppered across the landscape. Individually each of these items do not contribute greatly to the body of knowledge we have for homestead holdings in NSW. With that being said, the items as a whole will contribute to the body of knowledge on how the property ran. The context of all these items contributes to its local significance.	Local significance

Site	Description of site	Indicative significance
Traveling stock route (TSR) and water reserves	<p><i>Boorooma</i> run includes a TSR that runs south to north and another that follows the Barwon River east to west. Numerous WRs located predominately on the west side of the property are also present, specifically around Narran Lake. Archaeologically speaking, information tends to be extracted from the camp sites next to the TSR's, as opposed to along the TSRs themselves.</p> <p>However, information can still be drawn from visually observing TSRs and water reserves as they are traditionally linked to Aboriginal travel lines, as well documenting the European travel paths. These routes are unique as they show the movement and networking from a historical perspective 180+ years ago, but additionally, some are still managed and utilised today for similar purposes.</p>	Local significance
No. 3 Sheep bridge	The sheep bridge appears to still be present within the project area, however it is unclear whether it has been replaced or is original. As with the tanks and yards and so forth it does contribute to the larger scale of <i>Boorooma</i> .	Local significance
Wells	A variety of wells are located throughout <i>Boorooma</i> , from aerial imagery it appears some of these have been removed from the surface, but not all. Wells, like cisterns are often used as a rubbish dump after they have served their purpose. It can provide a record of slaughtered animals for food (bone pit), ceramics and glass and other indicators of occupation. Some of the 'well' sites indicated on the map are shown close to huts; it is possible if the hut was destroyed much of the debris was pushed into, or over the well preserving a record of materials used in construction.	Local significance
Houses and huts	Structures and huts help connect the topography of a pastoral station. The location can help demonstrate the development of the settlement and how different parts interacted with each other. It is unclear from the desktop assessment what type of huts are mapped, although it is indicated they are likely to be shepherding huts due to the use of the land. It is also unclear from aerial imagery what has survived, and what has not. A visual inspection is necessary to confirm whether any of these structures still stand, regardless there is likely sub-surface deposits located at some of the hut sites.	Local, possibly State significance
Travellers' inn and Village	The site that includes the Travelers Inn Rest (or <i>Boorooma</i> Hotel), blacksmiths shop, stable, store and kitchen was introduced due to the frequency of travellers through the area. It is unusual to find a small village such as this within a pastoral run and therefore if sub-surface deposits are still present it could provide a unique viewpoint from early, rural Australia.	Local, possibly State significance
Woolshed, wash and scouring facilities	The woolsheds and washing facilities in both the north and south sections of <i>Boorooma</i> are often the heart of a sheep operation. Although sheep are brought in annually for shearing, other essential health checks tend to be done on a quarterly basis requiring the sheds to be in use all year round. Woolsheds tend to be well cared for through the years due to the fact they must be well made from the start to take the weight of the sheep, shearers and equipment.	Local significance

6.4.2 Llanillo Run

Table 6.6 Llanillo Run Indicative significance

Site	Description of site	Significance
L-1 (homestead site)	The original homestead as pictured in Plate 4.12 appears to be of weatherboard, or slab construction, and built prior to 1880s. The placement of the homestead and the surrounding context can add to the body of knowledge regarding homesteads and pastoral runs in central western NSW.	Local significance

6.4.3 Wilkie Plains Run

Table 6.7 Indicative significance

Site	Description of site	Significance
WP-1 (Possible TSR campsite)	A possible campsite exists along the TSR. It is possible that this site holds archaeological resources and may be of local significance.	Local significance
WP-2 (Yards and possible structure)	<i>Wilkie Plains</i> was a considerably smaller operation than its neighbour, <i>Boorooma</i> , with fewer structures. As with the tanks and yards and so forth it does contribute to the larger scale of pastoral runs within the region.	Local significance
WP-3 (Homestead, woolshed and tanks)	Located in the southern portion of <i>Wilkie Plains</i> is a homestead, woolshed and tanks along the Big Warrambool River. The placement of the homestead and the surrounding infrastructure will add to the body of knowledge regarding homesteads and pastoral runs in central western NSW. If it can be demonstrated that this complex survives structurally or archaeologically, it is possible that it will meet the threshold of State significance.	Local significance, possible State significance
WP-4 (Well)	Located along the western boundary of <i>Wilkie Plains</i> a well is indicated, though it does appear the area is now a flood plain. As with the tanks and yards and so forth it does contribute to the larger scale of pastoral runs within the region.	Local significance
WP-5 (Yards)	<i>Wilkie Plains</i> was a considerably smaller operation than its neighbour, <i>Boorooma</i> , with fewer structures. As with the tanks and yards and so forth it does contribute to the larger scale of pastoral runs within the region.	Local significance

6.4.4 Cumborah

Table 6.8 Cumborah Indicative significance

Site	Description of site	Significance
Cumborah town	The town of Cumborah was gazetted in 1896, during which a plot of land was set aside of the public school. The town continued to grow, and in 1915 a small timber church was built (St Peter's in the Pines). A field assessment is required to note what evidence remains from the early town, and what its significance is.	Portions likely to be of local significance

Site	Description of site	Significance
Cumborah Cemetery	The Cumborah Cemetery has been in use since the 1880s and in 2017 included at least 60 known grave sites. Many of those buried in the cemetery would have been locals and more than likely have living relatives. The Cumborah Cemetery is of local significance.	Local significance

7 Indicative impacts

7.1 Background to assessing impacts

7.1.1 Introduction

The assessment of a project's impacts to the heritage significance of a place or an item is to understand change, if it is beneficial to the place or item, and how changes can be managed to best retain significance. The historical landscape in Australia, be it rural or urban, is by social agreement, a significant aspect of our identity. That agreement is codified in legislation, the intent of which is to encourage the conservation of cultural heritage by incorporating it into development where feasible. In many situations avoiding impacts is impossible, but the aim is to reduce those impacts by either project re-design or managing the loss of information through methods that reduce and/or record significance before it is removed.

The framework around assessing significance and therefore suitable levels of impact is to understand how the place or item came to be, how important it was (and may be still) in the development of the local area or the state (the colony at the time) and providing guidance on its management.

This report is based on a desktop analysis only, therefore all impacts are indicative as the sites have not yet been verified.

7.2 Sources of impact

The proposed activity includes opal prospecting and opal mining. Four standard methods of opal prospecting (section 7.2.1) and one method of mining – underground mining have been assessed (section 7.2.2).

7.2.1 Opal prospecting

Mineral exploration for opals is termed prospecting, conducted under an Opal Prospecting Licence or Mineral Claim. Opal Prospecting Licences are granted over much larger areas than those granted under mineral claims but are purely for prospecting and do not authorise mining.

An Opal Prospecting Licence can only be granted over lands defined as an "Opal Prospecting Block" within an area designated under the *Mining Act 1992* as an "Opal Prospecting Area". There is one Opal Prospecting Area in REF Area 1 which is referred to as OPA 4.

Opal is found by working underground from shafts, by auger/percussion drilling, by geophysical method, or re-mining old workings. Prospecting methods used are extremely variable and includes:

- Shaft sinking – this method includes sinking a shaft to intersect the claystone, then developing drives horizontally to test the value of the opal dirt. The shafts were traditionally sunk by hand or by Caldwell drill. This process is relatively slow and costly.
- Auger drilling – this method includes the introduction of the 230 mm diameter auger drill. This technology redirected the emphasis in prospecting away from shaft-sinking to gain access to the opal clays toward testing for the existence of the necessary overlying sandstone and looking for colour in the small sample of clays that the auger drill produces. In most cases, the use of auger drills to assess the opal-bearing potential of an area is quicker and more cost-effective than shaft-sinking.

- Percussion drilling – Smaller-diameter (>120 mm) percussion drilling rigs have also been used in recent years with some success. Although they create a smaller hole, with smaller samples than auger drills, they are quicker and readily penetrate silcrete. Prospectors are required to backfill percussion drilling holes in accordance with department's standards.
- SIROTEM – a geophysical method – this method uses electrical current to measure the varying resistance of the underlying rocks, and in doing so, provides information that can be readily interpreted to indicate where sandstone, claystone and faults are likely to exist. The benefits of this method are that large areas of ground can be tested quickly to provide a comparative assessment of the areas before drilling. These geophysical techniques remain in their infancy as far as the opal fields are concerned but have the potential to become an important tool for the opal prospector.

In areas of multiple existing or proposed opal prospecting/mining claims it is important to be aware of the combined effects, or cumulative impacts of multiple activities on the environment. Generally mineral claims adjoin so whilst one mineral claim is small in size (generally 50 m x 50 m), the majority of mining takes place in clusters which increases the impact footprint. These clusters have the potential to create cumulative environmental impacts on the surrounding environment and should be considered when assessing any new mining activity. The Minerals Council of Australia *'Cumulative Environmental Impact Assessment Industry Guide, 2015'* can assist when assessing cumulative impacts of opal prospecting/mining clusters.

7.2.2 Underground mining

Underground mining using the method of shaft sinking to gain access to underground operations is assessed within the REF.

This method involves sinking a shaft through the sandstone and conglomerate layers, either by hand or with a one metre Caldwell drill, to reach the claystone or 'opal dirt', where 'drives' or 'levels' are then dug horizontally through potential opal bearing material. These 'levels' are dug either by hand or using power tools such as jackhammers or underground hydraulic digging machines.

The claystone mined from the 'levels' is brought to the surface by motorised hoist or winch where it is transferred to a truck for transport to a wet puddling facility to process the opal dirt. Larger operators use a 'blower' that works like a large vacuum-cleaner, drawing the claystone to the surface through a series of pipes.

All underground operations require pillars to be retained and timber props to support the roof. If the pillars are mined out a 'ballroom' (vast unsupported areas) is created underground which over time can result in catastrophic cave-ins. Timber props are the most common type of support used and are commonly constructed from Cypress Pine (*Callitris glaucophylla*).

Please refer to the REF for further information on potential impacts associated with opal prospecting or opal mining for specific environmental aspects.

7.3 Indicative impact to registered sites

Table 7.1 Indicative impact to registered sites

Item number	Name	Impact from opal prospecting and mining within Area 1
S170 Register		
114941	Site of Homestead; Terewah – DEMOLISHED	Works at this site would impact heritage values
12426	Shearing Shed – Terewah – Demolished	Works at this site would impact heritage values
12423	East Mullane Shearing Shed	Works at this site would impact heritage values
13126	Stockyard: Snake Hut Tank	Works at this site would impact heritage values
12424	Snake Hut Tank	Works at this site would impact heritage values
12427	Bundah Shearing Shed	Works at this site would impact heritage values
13127	Stockyard: Bundah	Works at this site would impact heritage values
12428	Bundah Quarters	Works at this site would impact heritage values
12423	Lumeah Shearing Shed	Works at this site would impact heritage values
11492	Cattle Yards: Terewah DEMOLISHED	Works at this site would impact heritage values
LEP Register		
I42 (WLEP)	Earth Walled Buildings	Works at this site would impact heritage values
I40 (WLEP)	Anglican Church	Works at this site would impact heritage values
I22 (BLEP)	Narran Lake	Works at this site would impact heritage values
SHR		
5062951	Moordale Wells (Aboriginal Place)	Works at this site would impact heritage values
RNE		
513	Narran Lakes Area	Works at this site would impact heritage values

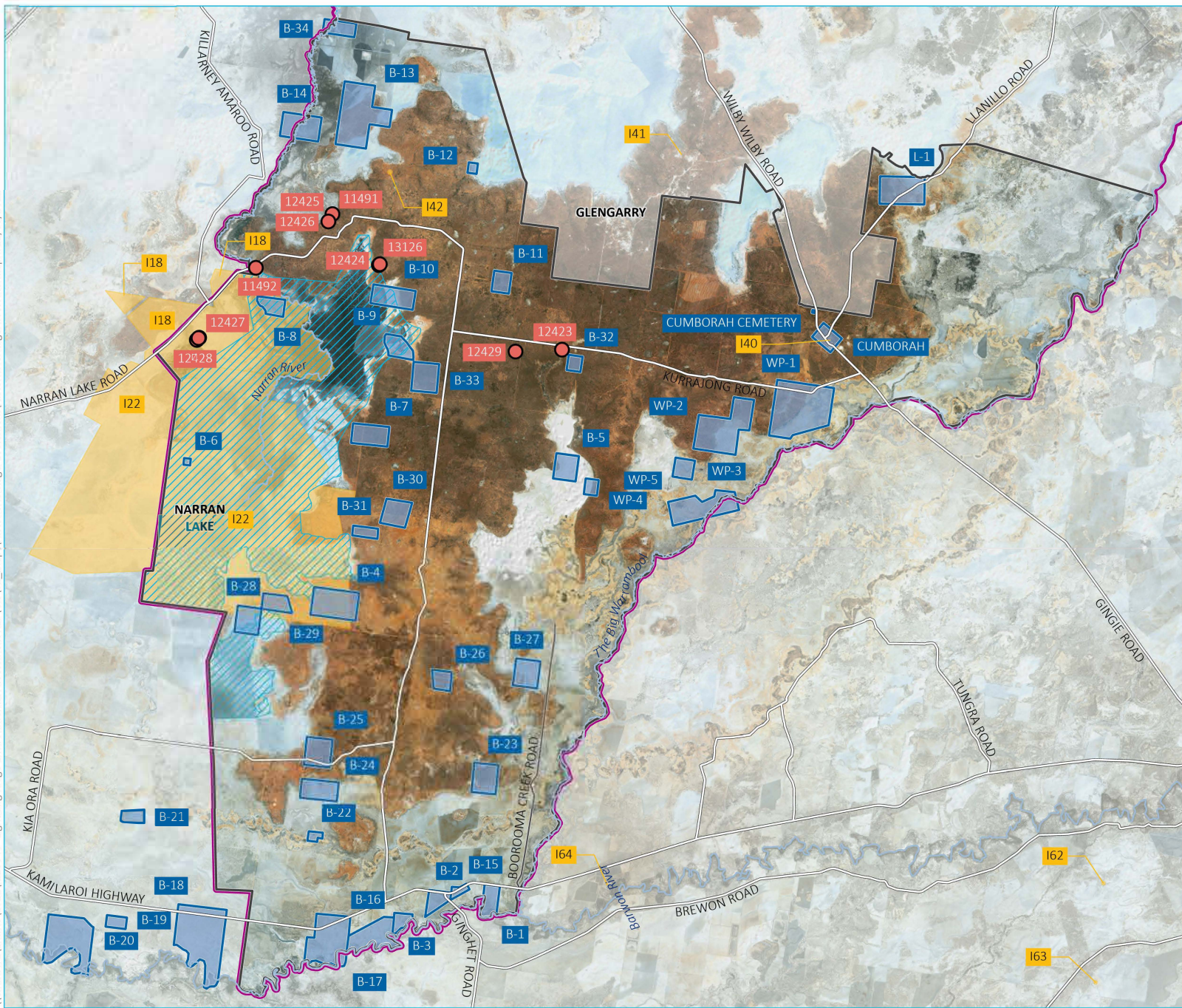
7.4 Indicative impact to newly identified sites

Table 7.2 Indicative impact to newly identified sites

Item number	Impact from opal prospecting and mining within Area 1
B-1	Works at this site would impact heritage values
B-2	Works at this site would impact heritage values
B-3	Works at this site would impact heritage values
B-4	Works at this site would impact heritage values
B-5	Works at this site would impact heritage values
B-6	Works at this site would impact heritage values

Item number	Impact from opal prospecting and mining within Area 1
B-7	Works at this site would impact heritage values
B-8	Works at this site would impact heritage values
B-9	Works at this site would impact heritage values
B-10	Works at this site would impact heritage values
B-11	Works at this site would impact heritage values
B-12	Works at this site would impact heritage values
B-13	Works at this site would impact heritage values
B-14	Works at this site would impact heritage values
B-15	Works at this site would impact heritage values
B-16	Works at this site would impact heritage values
B-17	Works at this site would impact heritage values
B-22	Works at this site would impact heritage values
B-23	Works at this site would impact heritage values
B-24	Works at this site would impact heritage values
B-25	Works at this site would impact heritage values
B-26	Works at this site would impact heritage values
B-27	Works at this site would impact heritage values
B-28	Works at this site would impact heritage values
B-29	Works at this site would impact heritage values
B-30	Works at this site would impact heritage values
B-31	Works at this site would impact heritage values
B-32	Works at this site would impact heritage values
B-33	Works at this site would impact heritage values
B-34	Works at this site would impact heritage values
L-1	Works at this site would impact heritage values
WP-1	Works at this site would impact heritage values
WP-2	Works at this site would impact heritage values
WP-3	Works at this site would impact heritage values
WP-4	Works at this site would impact heritage values
WP-5	Works at this site would impact heritage values
Cumborah Town	Works within the township would impact heritage values
Cumborah Cemetery	Works at this site would impact heritage values
Travelling Stock Routes	Works within the TSR's would impact heritage values
Water Reserves	Works within WRs would impact heritage values

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- KEY**
- ▭ Area 1
 - ▭ Narran-Warrambool Reserve
 - ▭ Additional heritage items identified through desktop research
 - Heritage Act
 - Section 170 Heritage Register
 - LEP listing
 - ▭ Item - general
 - ▭ Non-statutory listing
 - ▭ Register of the National Estate
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse

Heritage items

Lightning Ridge Area 1:
Historic heritage assessment
Figure 7.1



Source: EMM (2022); DRNSW (2021); DFSI (2020, 2017); GA (2011)

8 Mitigation measures and management recommendations

8.1 Heritage management objectives

The overriding objective in managing heritage significance is the avoidance of impacts. Avoidance removes the need for mitigation or amelioration and is in keeping with the philosophy of the *Burra Charter 2013* (Australia ICOMOS 2013). In all cases where significant heritage values may be affected by a project, it is prudent to take a precautionary approach by excising the construction disturbance footprint where it intersects with heritage items or with areas that have been identified as having potential to contain relics.

8.2 Recommendations

- A field program will be devised in order to ground truth the sites noted in Section 2.2 and 5.5, to assess the condition, re-assess significance and identify any additional sites not identified during the desktop survey;
- An amended assessment of significance and impacts will be undertaken in accordance with the relevant government assessment requirements, guidelines and policies including:

The principal articles of the *Burra Charter*:

- conservation is based on significance;
- a cautious approach is required – changing as much as necessary, but as little as possible; and
- maintenance is fundamental to conservation.

The *Heritage Manual* comprises the following guidance documents:

- *Statements of Heritage Impact Guidelines* (Heritage Office 2006);
 - *Investigating Heritage Significance* (Heritage Office 2004);
 - *Assessing Heritage Significance* (Heritage Office 2001);
 - *Assessing Significance for Historical Archaeological Sites and ‘Relics’* (Heritage Branch Department of Planning 2009);
 - *Photographic recording of heritage items using film or digital capture* (Heritage Office 2006); and
 - *How to prepare archival records of heritage items* (Heritage Office 1998).
- Prior to the opening up of Area 1 of the NWR to opal prospecting and mining activities, and prior to any work commencing, a historic heritage management plan (HHMP) will be prepared to guide the conservation of heritage items, unexpected finds and human remains including skeletal material, for the duration of the project. The HHMP will also identify where additional investigation is required. The relevant measures in the HHMP will be incorporated into the project construction environmental management plan (CEMP) to avoid accidental impacts during the construction and operational phase of the project.

- The HHMP will include, as a minimum, the following:
 - all sites will be listed, along with their significance, approved actions and level of protection;
 - a table listing all management measures for each site;
 - figures to accompany and support the text;
 - a detailed unanticipated finds protocol – including information on when to enact it, potential timeframes and a contacts protocol;
 - a detailed archaeological research design for each potential archaeological site;
 - a detailed procedure for preparing the digital photographic archival record; and
 - a detailed procedure in the event that suspected human remains or burials are encountered.

The HHMP will be prepared in accordance with the NSW Heritage Manual and the project conditions of consent.

The HHMP should include (as an appendix), this report, along with the updated assessment of significance and impacts.

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