16 Heritage

16. Heritage

16.1 Introduction

This chapter describes the Aboriginal and historic (non-Aboriginal) cultural heritage values of the study area, and discusses previously recorded or newly identified Aboriginal and historic heritage sites in the vicinity of the Nolans site. This chapter also addresses the potential impacts on Aboriginal and historic heritage arising from project activities, and provides mitigation measures to minimise the direct and indirect impact of proposed mine construction and operation.

A detailed Aboriginal and Historic Cultural Heritage Assessment has been completed for the project and is provided in Appendix U for review by the NT EPA. The report is not however, included in any public release of the EIS, for reason of respecting cultural sensitivity following consultation with traditional owners.

A Cultural Heritage Management Plan is included as a sub plan in the EMP, provided in Appendix X.

Section 5.10 of the TOR for the preparation of an environmental impact assessment issued by the NT EPA for the Project provided the following environmental objective in relation to cultural heritage:

> *Places and items with historic and/or cultural heritage values protected under the Heritage Act, the Northern Territory Aboriginal Sacred Sites Act or any other relevant Territory or Commonwealth legislation, will be identified and those values protected.*

The term 'cultural heritage' includes, very broadly, all places and values of archaeological, traditional, historical or contemporary significance. Cultural heritage assessments investigate the value or significance of particular items, sites and places to the whole or particular sections of society and are one of the steps in the process of management and conservation of cultural heritage values. The cultural heritage assessment process operates on the basis that Aboriginal and non-Aboriginal cultural heritage should be conserved and protected and that project proponents have a statutory responsibility to protect such values.

16.2 Methodology

16.2.1 Review of background data

A review of previous reports and assessments was undertaken including:

- Review of the current Aboriginal Areas Protection Authority (AAPA) Authority Certificate(s) for the subject land to identify known sacred sites
- Review of databases in May 2015 to identify known Indigenous and non-Indigenous historic sites, places or objects of heritage value. Databases included:
  - Northern Territory Heritage Register
  - National Native Title Tribunal Register
  - The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) National Heritage List and Commonwealth Heritage List.

16.2.2 Review of the environmental, ethnographic and archaeological context of the subject land

A review of the environmental, ethnographic and archaeological context of the subject land was undertaken to identify the potential for any unknown objects and/or places of significance. The following was reviewed:

- Environmental characteristics - such as drainage lines, topography and geology to provide insight into how people used land in the past, and establish a context for identifying the archaeological potential of the area. It also assists to explain why certain historical events may have occurred and why certain historical themes may apply or dominate in a particular area.
- Ethnographic and historical literature - to provide insight into history of use and occupation of the study area based on documentary evidence and early ethnographic records. It also identified factors that may have affected archaeological site survival and any historical archaeological relics that may survive in the study area.
- The archaeological context - including the previously documented known places and objects, locally and regionally, that have been recorded by other archaeologists.

16.2.3 Field survey

Cultural heritage survey was undertaken by Daryl Wesley and Ngaire Richards (Heritage Advisors) from 27 April to 5 May 2015 to:

- confirm the location of previously recorded sites (e.g. mine site survey in 2006, 2012)
- record any additional Aboriginal and historic sites, places or objects identified within the study area
- identify any additional areas of archaeological potential.

The survey comprised sampling within the footprint of proposed key infrastructure (processing site, accommodation village, borefield, access roads, water supply and power distribution lines).

Areas of ground exposure were examined for archaeological evidence such as stone artefacts, mature trees were examined for Aboriginal cultural scarring, and rock outcrops were examined for the presence of rockshelters and evidence of quarrying and rock art (pertroglyphs). Creek gullies were also examined to document soil profiles, soil disturbance, erosion and potential for sub-surface archaeological deposits.

The sampling program considered the various land system units of the study area such as geomorphology, landform and vegetation, as well as available access.

The combined length of the pedestrian and vehicular archaeological survey transects totalled 170 km. Vehicular transects consisted of 107 km of survey, with pedestrian survey transects covering 62.82 km. It is estimated that the archaeological survey sampled approximately 5 km^2 or approximately 12% of the study area. Survey transects are shown on Figure 16-1.

Ground surface visibility was generally high across the study area owing to the high levels of pastoral land use and grazing.

Aboriginal cultural heritage sites identified during the survey were documented, photographed and locations recorded using a handheld GPS unit.

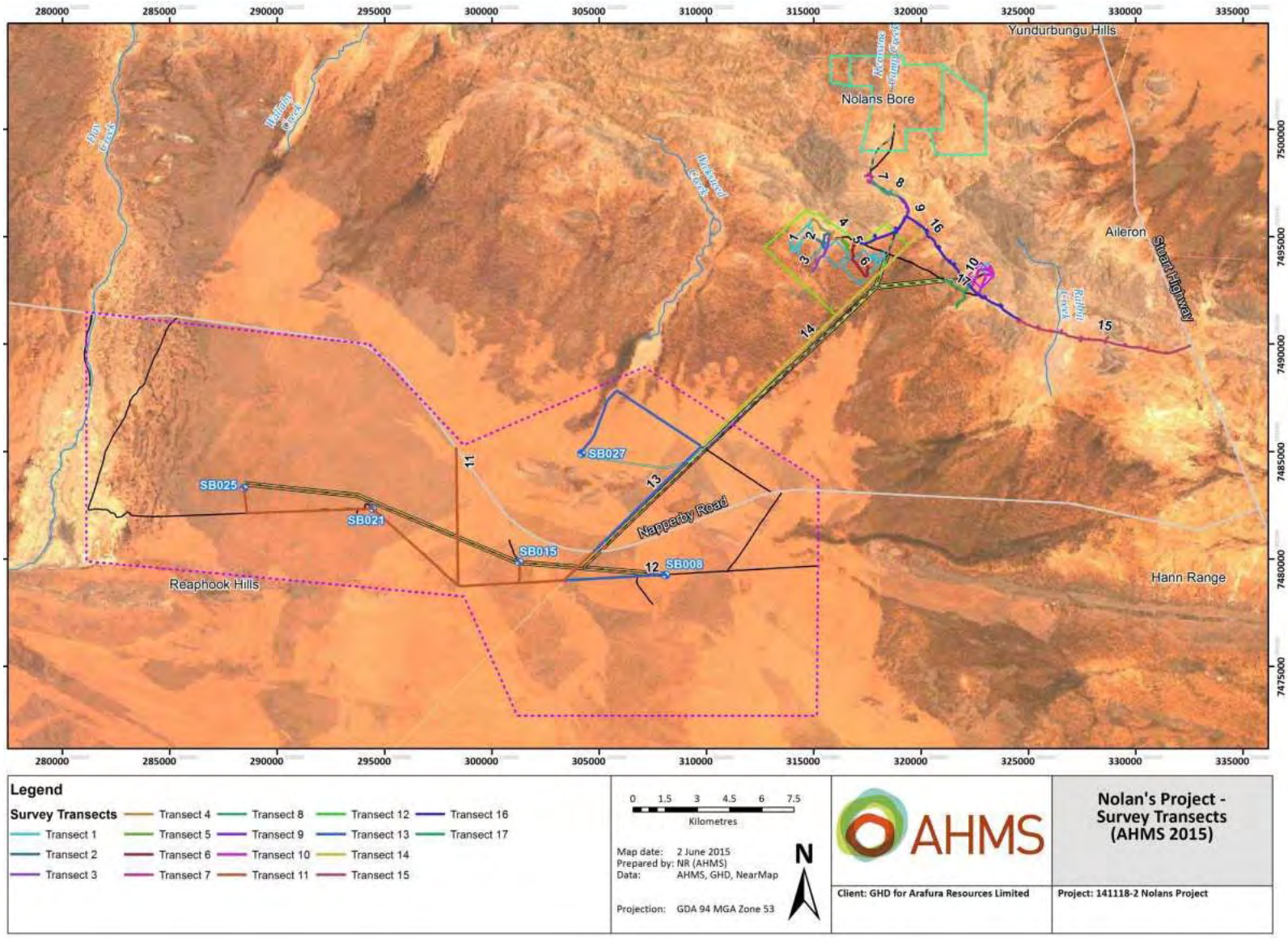

Figure 16-1 Survey transects

16.2.4 Aboriginal consultation

Traditional owners were unable to participate in the heritage survey. Efforts were made to arrange an on-site meeting however it was not possible to discuss the survey with the Anmatyerr traditional owners during the field investigation. Thus, it is possible that the heritage assessment provides an under-representation of cultural sites and/or values associated with the study area.

The heritage assessment (Appendix U), and the findings of previous archaeological reports for the Nolans Project, were provided to the Central Land Council prior to submission of the EIS, and will inform the negotiations between Arafura and the traditional owners.

16.3 The environmental, ethnographic and archaeological context

16.3.1 Environmental context

The study area is geologically part of the complex Aileron Province of the Arunta Region, with a high diversity of metamorphosed and igneous rock types. The major geological formation within the study area is the Napperby Gneiss, consisting of medium even-layered granitic gneiss, and minor porphyritic granite.

The study area is located to the north of the area known as the Ngalia Basin. Dolerite and basalt dykes occur within the basin. Chert concretions and nodules of grey, black and white chert also occur in areas of claystone.

The types of materials that occur within the Aileron Province and Ngalia Basin with properties suitable for the production of knapped tools include quartz, orthoquartzite, quartzite, siltstone, cherts (re-crystallised in calcretes), greywacke, and hornfels. Quartz was an important raw material used for stone tool production by Aboriginal people.

Gneiss is a foliated metamorphic rock, generally not suitable for the production of knapped stone tools owing to its structurally inherent fracture planes. In historic contexts, gneiss is known to have been used as a building material and is commonly referred to as granite.

Permanent soaks are known to occur in shallow alluvium along some major watercourses, including Napperby Creek to the west of the study area, and the Lander River to the north-west. These areas were important camping places for Aboriginal people in times of drought, and meeting places for large ceremonial gatherings. Surface drainage closer to the mine site is dominated by small ephemeral streams, with Kerosene Camp Creek in the north of the study area, w; and Rabbit Creek in the east, crossing the site access road from the Stuart Highway. There is no surface drainage on the sand plain within the borefield area.

16.3.2 Ethnographic and historical context

The study area is within the administrative boundary of the Central Land Council and is the traditional country of the Anmatyerr people.

Anmatyerr country is located several hundred kilometres north of Alice Springs and generally extends from Mt Allan in the west, to the Sandover outstation in the east, and from Stirling Range in the north to Native Gap in the south.

The Anmatyerr perceive the land as comprising more or less discrete countries. Each country is associated with one or more of the *Altyerrenge* beings (Dreaming) and contains sites marking the scenes of their travels and activities.

In the early twentieth century, the Anmatyerr were nearly wiped out as a result of drought and conflicts over land use in the 1870s, following construction of the Overland Telegraph Line, gold mining in the Tanami, and the establishment of pastoral interests. The Anmatyerr survived, but in depleted numbers.

A range of plant species and their traditional uses has been recorded by Anmatyerr women including fruit and vegetables, edible seeds, sweets, medicine, edible grubs, toys, tobacco, ashes and other plant uses. There is a high diversity of resources available in the arid zone and a depth of traditional ecological knowledge associated with complex plant use by Indigenous central Australians.

The early European settlement of the central Northern Territory was largely characterised by gold mining in the Tanami region (north-west of the study area); and the development of the pastoral industry between Alice Springs and Tennant Creek. These historical developments not only defined the European experience of central Australia but also had significant impacts on traditional Aboriginal life and occupation within the region.

The first Europeans to traverse the region were John McDouall Stuart in 1862, in an attempt to cross the Australian continent from south to north; and William Christie Gosse in 1873, on an expedition to find a route from central Australia to Perth.

The Australian Overland Telegraph Line, built between 1870 and 1872, opened up central Australia to European settlement. Overland Telegraph Line repeater stations offered safe havens to travellers, and its chain of wells formed a corridor for the movement of pastoral interests into the region. After gold was discovered at the start of the 20th century, miners on their way to the Tanami and Granites goldfields also passed through the area.

In 1876, the South Australian government began to issue pastoral leases in central Australia. The Barrow Creek Pastoral Company established a homestead in 1884 at Annas Reservoir, a waterhole to the north west of the study area described and named by Stuart and stocked cattle and breeding stock. This is also a sacred site locality known to the Anmatyerr as *Angkwerl* (McCarthy 2008b; Gunn 2004). The homestead was abandoned shortly after 1884 owing to escalating conflict with Aboriginal people arising from establishing the homestead at this location (*South Australian Register* 1891).

Wells were established further away from existing waterholes and rockholes, with Ryan Well built in 1889 to the east of the study area. The Glen Maggie Homestead was established in 1914 as a sheep and cattle station, as well as local area post office, which was later upgraded to the telegraph office in 1923. The station was eventually sold and renamed Aileron and continues to operate as a working pastoral station.

Glen Maggie Homestead also has significant cultural heritage values for the Anmatyerr, as Senior Anmatyerr traditional owner, Eric Penangk (or Panangke) was born at the station in 1927. Mr Penangk's father and mother worked at the station, and his father's job involved drawing water from Ryan Well (known in Anmatyerr as *Atnyem Kwaty*). The family would travel to the various wells and stay at each for a number of weeks (McCarthy 2008a). Indigenous workers lived in camps in the vicinity of the homestead and would receive rations and the occasional bullock from the station owners.

The Stuart Highway was established during World War II, with a hotel and service station later constructed at Aileron Station adjacent to the road. Following the Ti-Tree Land Claim in the 1980s, the local Aboriginal outstation settlement developed into the small community at Alyuen.

World War II saw developments concentrated along the Stuart Highway to the east of the study area. In central Australia, most military infrastructure related to the movement of materiel and troops to and from Darwin which was one of the central operating bases for the South West Pacific Area.

The study area is located on Aileron Station, which was established in 1929. Pastoral interests have been the major land use in the region, building infrastructure such as access roads and tracks, fences, water bores, and holding yards. Fibre optic cable is located along the Stuart Highway and the Alice Springs to Darwin Railway line.

Early Indigenous-settler conflicts

Several of the Northern Territory's most infamous Indigenous-settler conflicts occurred on Anmatyerr country. Conflict began at the beginning of pastoral settlement with Indigenous attacks occurring at Anna's Reservoir, where the homestead was established at a permanent waterhole. The conflict resulted in loss of cattle and damage to property, and the subsequent killings of the two principle leaders of the Indigenous resistance to the occupation of *Angkwerl*.

Aboriginal labour was also starting to be essential to the success of the growing pastoral industry, and the brand of violent frontier conflict that dominated the 1880s of central Australia started to change from one dominated by firearms to other coercive means.

Another infamous conflict arising between Europeans and Indigenous groups in central Australia was at a place called *Yurrkuru* or *Arrwek* (Brooks Soak), located to the west of Anmatyerr country (Olney 1992). It is the location where Fred Brooks, a dingo trapper, was killed by Aboriginal people in 1928, leading to reprisals culminating in the incident later known as the 'Conniston Massacre'. During the Conniston Massacre, local pastoralists under the leadership of Mounted Constable George Murray from Alice Springs were alleged to have shot in excess of 32 Aboriginal men, women and children.

The introduction of cattle to Aboriginal lands, coupled with competition for water resources due to drought conditions, has been given as reasons for the conflict.

A memorial was erected in 2003 by central Australian traditional owners, followed by an 80 year memorial built at Athimpelengkwe (Baxter's Well) to commemorate those killed during the Conniston raids (McCarthy 2008b).

Regional archaeological context

Archaeological research in central Australia came to critical attention in the late 1960s and early 1970s following Richard Gould's ethno-archaeological work at Puntutjarpa rockshelter in the central arid zone of Western Australia.

An important part of Gould's research alerted archaeological researchers to the diet of arid zone Indigenous groups with a low population density and high mobility in response to unpredictable and minimal rainfall; including a reliance on staple plant foods that varied with fluctuating environmental conditions, the use of grinders to process seeds, the gathering of small game, reptiles and other supplemental foods mostly by women, and frequent game hunting by men with minimal portable toolkits (Gould 1977).

Chronology of the population of the arid zone has been documented by the excavation of numerous rockshelter sites.

Pleistocene dates of 36,500 to 42,500 BP have been found from Puritjarra (Hiscock 2008). It is generally accepted that the current arid zones of Australia were significantly different during the Pleistocene, and Indigenous people occupied these areas early on after colonisation of the Australian continent.

Climate change occurred with worldwide interstadial glacial influences that had significant impacts on central Australian arid and semi-arid zones.

Three themes of particular relevance for interpreting the archaeological record within the study area are:

- Pleistocene and Holocene climate change
- The distribution, abundance and permanency of water sources and climate seasonality
- The species composition, distribution and abundance of economic plant species.

Owing to the close interdependency between desert ecology, climatic variation, and topography, these conditions would significantly influence the economic and social systems of the people that inhabited the arid zone.

Local archaeological context

Previous archaeological investigations for the Nolans Project include surveys of the proposed mine site by Gunn (2006), a proposed haul road corridor and parts of mineral lease EL 28473 by Earthsea Pty Ltd (2010), and additional parts of the mineral lease and proposed village site by Earthsea Pty Ltd (2012). There have also been several cultural heritage impact studies in the greater region of Anmatyerr country, mostly associated with the major transport and communications corridor of the Stuart Highway, Darwin to Alice Springs railway, and optic fibre cable assessments.

Anmatyerr country contains a number of sacred sites and places of past occupation. One place that has sacred, ceremonial, and archaeological significance is *Angkwerle* ('Angerle' in Gunn 2004) which is an important *Angkwerle* (Crow) dreaming site and rock art site located to the west of the study area. The site consists of a main waterhole, archaeological features and materials and a series of petroglyphs. Anmatyerr Custodians attributed the rock art formation to Crow and Porcupine dreaming. Gunn also suggests the site was used for general occupation and ceremonial purposes (Gunn 2004).

Gunn 2006

The Gunn 2006 archaeological survey of the Nolans Bore Prospect recorded a number of stone artefact scatters, several scarred trees and rock art sites, including two minor concentrations of stone artefacts (NB-1 & 2), six stone working areas associated with small quartz outcrops (NB-4 to 9), and a scarred tree (NB-3). According to Gunn (2006), a chalcedony quarry is located 10km to the north of the study area, explaining the presence of chalcedony artefacts in the area. A low granite/gneiss platform (AP-1) containing 29 grinding surfaces, petroglyphs (engravings) and a small amount of worked stone was also recorded.

An artefact scatter located along Kerosene Camp Creek reflects the importance of the watercourse for Aboriginal occupation in the area.

Earthsea Pty Ltd (2010)

Earthsea (2010) identified 12 archaeological sites in a survey to assess a proposed haul road corridor from Nolans Bore to the Alice Springs to Darwin Railway. These sites consist of three scarred trees, seven stone artefact scatters and quarry sites, one artefact scatter, and one engraving site. The report details eight isolated artefacts recorded during the study. It was concluded that the archaeology of the Nolans Bore area is highly localised and focussed on resource specific resource nodes which include raw material outcrop, localised areas of ecological resource abundance, and water supply.

Earthsea Pty Ltd (2012)

Further survey was conducted on areas within EL 28473 by Earthsea (2012) and eleven archaeological sites were recorded, in addition to a number of isolated artefacts. The sites

consisted of stone artefact scatters and quartz quarry sites, where quartz was being sourced as a raw material. Lesser quantities of chalcedony, quartzite, chert and silcrete artefacts were also recorded within these sites. Earthsea predicted that mulga woodland was unlikely to contain archaeological materials, and that the majority of archaeological features would be confined to areas of quartz outcrop on the lower gravel slopes and rises, and around outcrops of granite/gneiss.

16.3.3 Previously recorded Aboriginal sites

Thirty-four Aboriginal sites and/or objects have been recorded during previous archaeological surveys undertaken for the Nolans Project at the proposed mine site. The most common site features are quarries (exclusively in the vicinity of quartz outcrops) and artefact scatters, which are frequently recorded in association with the quarries; followed by scarred trees. A smaller number of petroglyphs, reduction areas and a grinding surface have also been identified (Table 16-1 and Figure 16-2).

No Aboriginal sites or places within the study area are currently subject to a Declaration under the Aboriginal and Torres Strait Islander Heritage Protection Act 1984, or listed on the National Heritage List or Commonwealth Heritage List.

Table 16-1 Types of previously recorded Aboriginal sites in the vicinity of the study area

Site feature	Site name	Site count	% of total
Quarry	NB-4, NB-5, NB-6, NB-7, NB-8, NB-9, Site 12, Site 13	8	23.53
Artefact scatter	NB-1, NB-2, Site 2, Site 10, Site 11, Site 15, Site 18, Site 19	8	23.53
Quarry; artefact scatter	Site 3, Site 4, Site, 5, Site 6, Site 7, Site 8, Site 14	7	20.59
Scarred tree	NB-3, SP-1, SP-2, Scar 1, Scar 2, Scar 3	6	17.65
Quarry; reduction area	Site 16, Site 16, Site 17	2	5.88
Petroglyph	AP-1, Site 9	2	5.88
Quarry; artefact scatter; grinding surface	Site 1	1	2.94
Total		**34**	**100**

This figure has been removed to respect and protect the cultural sensitivities of the area following consultation with the Central Land Council and Traditional Owners.

16.3.4 Sacred sites

Arafura has undertaken sacred site clearance in the study area, and Authority Certificates were issued by AAPA in 2008 (C2008/205) and 2013 (C2013/205). Copies of the AAPA Certificates are attached to the Indigenous and Historic Cultural Heritage Assessment (Appendix U).

There are a number of sacred sites in the study area. Sacred sites are usually associated with creeks, waterholes, and/or geological outcrops; which archaeological survey has also found to contain archaeological materials and features.

One Restricted Works Area 8 (RWA8), associated with sacred site 5552-30, has been recorded within the project footprint. The features of sacred site 5552-30 described in the Authority Certificate issued by the AAPA include stone arrangements, soakages and rockholes.

16.3.5 Native title

There is one native title determination covering part of the study area, and two registered claimant applications.

- National Native Title Register: DCD2013/001 – Napperby Perpetual Pastoral Lease and
- Register of Native Title Claims: DC2014/002 – Aileron Pastoral Lease and DC2007/002 – Aileron.

16.3.6 Historic sites

There have been a number of investigations of historic (non-Aboriginal) cultural heritage places in the surrounding region which have resulted in the declaration of several nearby properties on the Northern Territory Heritage Register (Table 16-2). These places are representative of the type of historic features that may survive within the study area.

Three places in the vicinity of the study area are declared heritage places (Table 16-2). Of these, Aileron Homestead and Ryan Well Historical Reserve are the closest, being located within 10 kilometres of the study area.

Table 16-2 Declared heritage places in the vicinity of the study area

Name	Type	Gazetted	Status	Location	Relationship to subject area
Aileron Homestead No 1	Place	16 November 2005	Declared	NT Portion 6057(A) Stuart Highway	5.5 km north of the proposed access road
Ryan Well Historical Reserve	Place	8 February 1995	Declared	NT Portion 1282 Stuart Highway	3.5 km south of the proposed access road
Annas Reservoir Conservation Reserve	Place	8 February 1995	Declared	NT Portion 1281 Aileron Station	10 km to the north-east of mine area

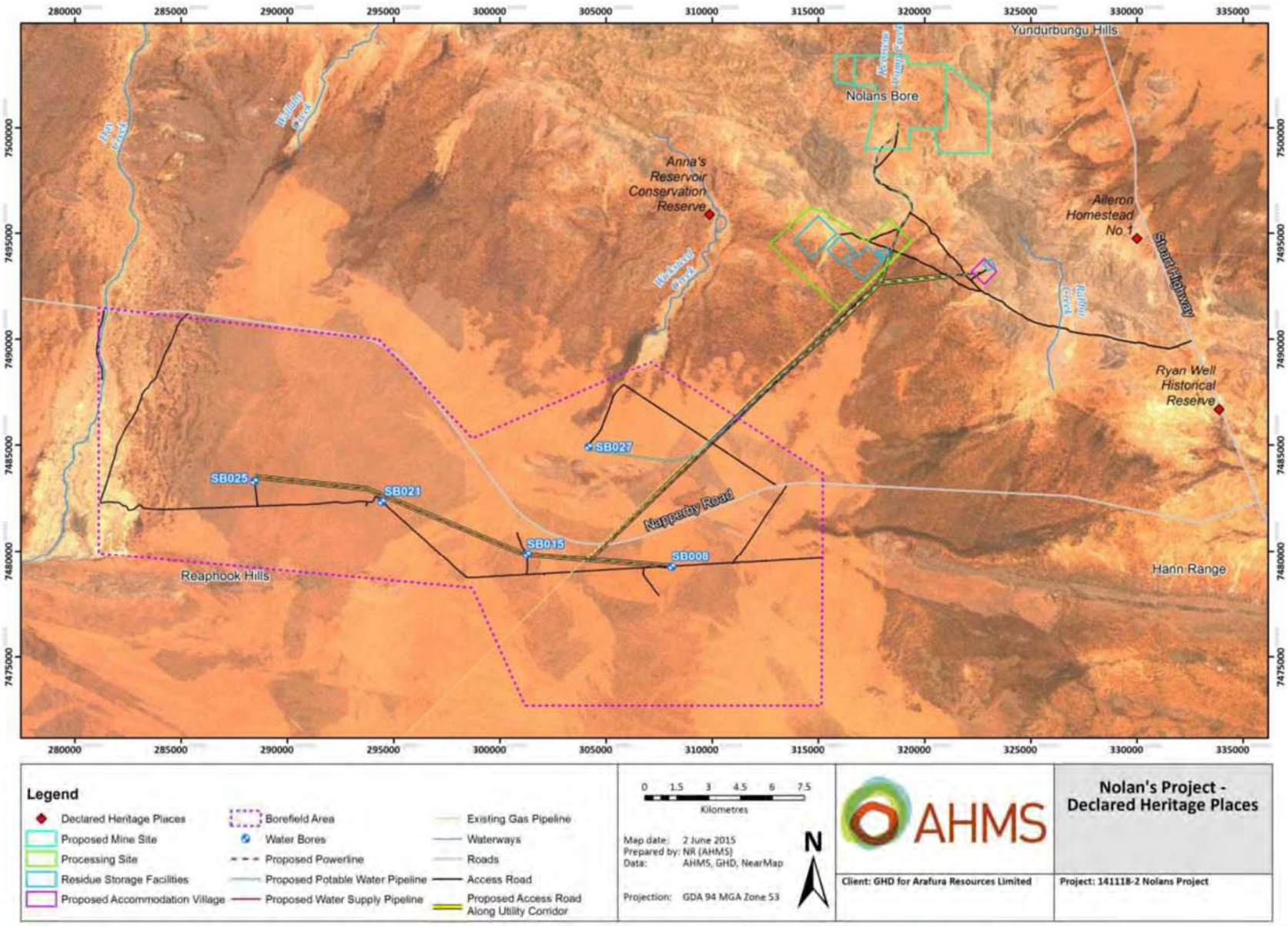

Figure 16-3 Declared heritage places in the vicinity of the study area

16.3.7 Results of field investigation

During field investigation 32 Aboriginal sites (Table 16-3) and 46 isolated artefacts (Table 16-4) were recorded. In addition, one potential historic site was identified (Table 16-5). Three of the Aboriginal sites are located within Restricted Works Area (RWA8), associated with sacred site 5552-30.

Archaeological sites were particularly dense near the Yalyirimbi Range in the vicinity of the proposed accommodation village, and the narrow valley between the processing site and the mine site where the access road and service corridor are proposed to be located. Archaeological sites and isolated artefacts were less frequent on the Quaternary deep red earths within the borefield area to the south. The study found the Yalyirimbi Range to be a particularly archaeologically sensitive zone, as many of the largest archaeological sites were identified in the vicinity of strike ridges and rock outcrops. The location of each archaeological site in relation to the proposed infrastructure is described in Table 16-6 and shown in Figure 16-4 to Figure 16-7.

Quartz was the main type of raw material found in the study area, owing to its association with the gneiss outcrops as a raw material source. A diversity of stone artefacts and raw materials were recorded in this study. This included utilised, retouched, pounding, and ground stone artefacts made of raw materials such as chalcedony, chert, silcrete, gneiss, quartzite, ortho-quartzite, basalt, and dolerite.

The archaeological site and artefact assemblage distribution documented here emphasises the importance of the Yalyirimbi Range to Aboriginal people in the past, based on the number of sites, and abundance and diversity of artefacts identified, compared to those recorded during previous archaeological surveys at Nolans Bore. However, a high proportion of the archaeological sites have been impacted by pastoral land use and erosion.

The 110 years of pastoral land use in the study area has significantly affected the structural integrity of the Quaternary alluvial and deep red earth soils. It is estimated that over 80% of the archaeological sites have had some form of significant erosion or disturbance from pastoral and other land uses. Several sites located on the lower slopes of the steep gneiss ridge generally had lower levels of impact as these areas are not heavily trafficked by cattle.

Sites located nearby existing tracks and on sloping alluvial plains were the most severely impacted from erosion and pastoral land use. Stone artefacts at many of the sites located on the alluvial plains had clearly been washed and eroded into their current locations.

Site NP-19 had 20% of the site area disrupted by a water bore drilling program.

The heritage significance of Aboriginal archaeological sites has been assessed using the four criteria outlined in the *Australia ICOMOS Burra Charter, 2013* (the Burra Charter); aesthetic, historic, scientific, and social or spiritual significance (Australia ICOMOS 2013). Aboriginal sites recorded during the field survey were ranked from low to high archaeological significance. The ranking of significance is as follows:

- **Low archaeological significance:** The site or object is common in the local area and/or the Northern Territory. The site has low excavation/research potential.
- **Moderate archaeological significance:** The site or object is rare in the local area, and/or has a high artefact density. The site has the potential to answer research questions that can add to our understanding of pre- or post-contact Aboriginal land use and occupation of the local area.

- **High archaeological significance:** The site or object is rare in the Northern Territory, or the site is a representative (and intact) example of a type of site that may be common elsewhere. The site has the potential to answer research questions that can add to our understanding of pre- or post-contact Aboriginal land use and occupation of central Australia or the Northern Territory.

Isolated artefacts recorded in this archaeological survey have low archaeological significance.

The location of each archaeological site in relation to the proposed infrastructure is described in Table 16-6. All archaeological sites identified during the field investigation are mapped in Figure 16-4 to Figure 16-7.

Table 16-3 Aboriginal sites identified during the survey

Site features	Site name	Archaeological significance
Artefact scatter	NP-3, NP-15	High
	NP-12, NP-13, NP-14, NP-19, NP-28,	Moderate
	NP-4, NP-5, NP-7, NP-8, NP-16, NP-17, NP-18, NP-20, NP-22, NP-24, NP-25, NP-30	Low
Artefact scatter; quarry	NP-6, NP-11, NP-26, NP-27, NP-31	High
	NP-21	Moderate
Artefact scatter; quarry; reduction area	NP-9, NP-10	High
Artefact scatter; engraving	NP-1	High
Artefact scatter; habitation structure; grinding surface	NP-2	High (within RWA 8)
Artefact scatter; quarry; grinding surface	NP-23	High
Rockshelter; artefact scatter	NP-29	High
Site complex; artefact scatter; quarry	NP-32	High

Table 16-4 Isolated artefacts recorded during the survey

Artefact type	Site name
Flake	NP-ISO-1-1, NP-ISO-7-2, NP-ISO-8, NP-ISO-10, NP-ISO-11-1, NP-ISO-18-1, NP-ISO-18-2, NP-ISO-19, NP-ISO-20, NP-ISO-22-2, NP-ISO-22-3
Grindstone	NP-ISO-1-2, NP-ISO-13-1, NP-ISO-25
Bifacial flaked artefact	NP-ISO-1-3, NP-ISO-23, NP-ISO-24
Retouched flake	NP-ISO-2, NP-ISO-3, NP-ISO-5-1, NP-ISO-29-1
Distal flake	NP-ISO-4

Artefact type	Site name
Distal retouched flake	NP-ISO-5-2
Core	NP-ISO-5-3, NP-ISO-6, NP-ISO-7-1, NP-ISO-9, NP-ISO-12-1, NP-ISO-12-2, NP-ISO-13-2, NP-ISO-14, NP-ISO-15, NP-ISO-16-1, NP-ISO-16-2, NP-ISO-17, NP-ISO-21-1, NP-ISO-22-1, NP-ISO-26, NP-ISO-28-1, NP-ISO-28-2, NP-ISO-29-1, NP-ISO-30-1, NP-ISO-30-2
Transverse broken flake	NP-ISO-11-2
Pounder	NP-ISO-21-2
Muller	NP-ISO-27

Table 16-5 Potential historic site identified during the survey

Site name	Site features
Old Albs Bore and Yard	Water tank, stock yards, Southern Cross windmill

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Table 16-6 Archaeological sites and isolated finds within the curtilage of proposed infrastructure

Proposed infrastructure	Archaeological sites
Confidential	NP-4; NP-5; NP-6; NP-7; NP-8; NP-9
	NP, NP-16, NP-17, NP-18
	NP-21; NP-22; NP-23; NP-24; NP-25; NP-26; NP-27; NP-28; NP-29;
	NP-1, NP-2, NP-3 NP-10; NP-11 NP-30, NP-32
	NP-19; NP-20
	NP-12, NP-13, NP-14, NP-15, NP-31

16.4 Potential impacts

The level of risk posed to cultural heritage values by each source of impact was assessed using standard qualitative risk assessment procedures, which have been described in Chapter 5 (Risk assessment). The risk associated with each potential impact is detailed in the risk matrix, which is contained in Appendix F.

Without some form of mitigation, archaeological resources recorded in this survey will be unknowingly impacted by the proposed infrastructure. In addition, given that the field survey covered approximately 12% of the study area, it is also likely that additional archaeological material is present. There is also potential for additional sub-surface archaeological materials, most notably in the creek banks of the Quaternary alluvial plains at NP-14.

A high proportion of the archaeological sites were located in association with specific features such as outcrops of gneiss domes and platforms, basalt outcrops, at the base of the steep ridges and over the lower gneiss foothills. Avoiding these types of landscape features, where possible, would reduce the risk of impacting unknown archaeological resources.

Whilst all Aboriginal archaeological places and objects are protected under NT legislation, destruction of sites may be necessary to allow other activities or development to proceed.

Consideration of the level of significance of cultural heritage places and objects (as shown in Table 16-3) is important for determining appropriate impact management measures for sites.

Table 16-7 lists the archaeological management measures for each site based on their level of significance.

A Cultural Heritage Management Plan (Appendix X) will be implemented during project construction and operation and includes:

- procedures to avoid significant sites and areas
- procedures to enable protection of key sites during construction, operation and decommissioning work
- measures to enable the Proponent to meet its duty of care to protect the cultural and heritage values of any places or items of significance

- procedures for the discovery of surface or sub-surface items during the course of the Project.

16.4.1 Risk assessment

- During site establishment (including excavation, earthworks, vegetation clearing and establishment of project infrastructure) there is a medium risk of physical disturbance to sites and/or objects of heritage significance that may result in damage or destruction. This level of risk is based on an understanding that some sites will be subject to direct impact a result of the project. Overall, 67 Aboriginal archaeological sites (including 34 isolated artefacts) would be subject to direct impact. Of note are artefact scatters and a quarry with potential subsurface archaeological deposit, which have research potential (NB-2, Site 19, NB-4); intact examples of artefact scatters and quarries; and scarred trees (Scar 3, SP-1, and SP-2) which are regionally rare. Permits will be sought from the regulatory authorities prior to site disturbance and in conjunction with communication with Anmatyerr traditional owners and their representatives.
- During site establishment there is a low level of risk, notwithstanding the implementation of the Cultural Heritage Management Plan, that inadvertent damage, destruction or removal of heritage items or sites will occur through discovery of, as yet unidentified sites. Site requirements will include pre-clearing survey and visual inspections to mitigate this risk.
- There is also a low level risk that during construction or operations, identified sites are inadvertently damaged by site personnel (i.e. non-compliance).
- There is an additional low level risk that construction or operational activities could also result in indirect impacts (e.g. vibration or dust related impacts, minor construction and vehicle impacts) that may alter the character of scared sites or heritage places. Overall, 62 Aboriginal archaeological sites (including 35 isolated artefacts) and one potential historical site would be subject to indirect impact. Of note are a rockshelter with potential subsurface archaeological deposit and an associated low density artefact scatter (NP-29) which is locally rare, and scarred trees (Scar 1, Scar 2) which are regionally rare.

The most significant area of potential heritage impact is the geographic bottleneck created by a saddle in the Yalyirimbi Range, through which the access road and proposed service corridor are routed to the mine from the processing site. This has the potential to directly impact archaeological objects that have high archaeological and cultural significance.

A high density of archaeological material has been recorded at Sites NP-1, NP-2, NP-3, and NP-32. Sites NP-1, NP-2, NP-3 are located within the AAPA Certificate Restricted Works Area RWA8. It is estimated that there is likely to be in excess of 25,000 stone artefacts located within this area.

The archaeological survey identified a more or less continuous scatter of archaeological materials along the proposed service corridor between the mine site and processing site, owing to a combination of factors significant to Aboriginal occupation of the area; including raw material resources, ecologically rich grassland resources on the alluvial plain, the presence of an incised creek system, and a major access route through the range to Kerosene Camp Creek.

Two Restricted Works Areas, RWA9 and RWA10, associated with sacred sites 5552-41 and 5552-44 respectively, are adjacent to the Project area and would be subject to potential indirect impact. RWA9 is located on the southwest boundary of the processing site. The features of sacred site 5552-41 include a hill and swamp. RWA10 is located to the west of an access track between the Napperby Road and borefield Area. The features of sacred site 5552-44 include a rocky ridge and sand dune.

An Authority Certificate was issued by the APAA in 2013 (Appendix U) identifying conditions covering mineral exploration activities inclusive of water drilling, reconnaissance visits in 4WD vehicles, access with drilling rig and support vehicles and minor vegetation clearing at discrete locations (C2013/205). The conditions specify that no work shall take place or no damage shall occur within RWA8, RWA9, and RWA10.

A new Authority Certificate from the APAA will be required prior to commencement of the construction phase of the Project.

16.5 Mitigation measures

The management and mitigation measures identified for cultural heritage items within the Project area are based on:

- Anticipated impacts to heritage items;
- Assessed scientific (archaeological) significance, and (where known) overall heritage significance;
- Legislative requirements and the planning approval framework;
- Recommendations in previous archaeological survey reports; and Heritage best practice in accordance with the principles of the Burra Charter.

Where possible, options to avoid adversely impacting identified heritage items will be considered. However, the construction phase of the Project cannot completely avoid harm to heritage items. Where items cannot be avoided, further works are recommended in order to mitigate impacts. A summary of archaeological management recommendations is presented in Table 16-7.

The following additional mitigation measures will be implemented for the project as part of a Cultural Heritage Management Plan:

- Consideration will be given to realigning the proposed access road and service corridor in order to avoid or reduce impact to RWA8. Once the design has been finalised, an archaeological mitigation program would be put in place to sample, collect and document a representative sample of archaeological materials between 318843E-7496897N to 317744E-7498669N which covers the area of possible alternative routes.
- A 50 m buffer will be maintained around sites to be avoided, to protect against inadvertent damage.
- Where proposed infrastructure is within 50 m of an archaeological site, temporary fencing will be erected during construction and/or sites appropriately signposted. Anmatyerr traditional owners and custodians will be engaged in the process of developing and installing appropriate fencing and signage.
- Infrastructure will be set back from the base of steep ridges and lower gneiss foothills to avoid archaeological sites associated with geological features such as outcrops of gneiss and basalt. Where impacts are unavoidable, archaeological mitigation will be required.
- Where there is an unavoidable impact to archaeological sites where archaeological mitigation has been recommended, a research plan for an appropriate recording and salvage program will be required. The research plan will be submitted to the Chief Executive Officer of the Department of Lands, Planning and the Environment as supporting documentation for an Application to Carry out Work on Heritage Place or Object (work approval application).

- Consultation with Anmatyerr traditional owners will be undertaken to determine whether they wish to collect artefacts of low archaeological significance prior to sites being impacted.
- The Anmatyerr traditional owners and custodians will be consulted regarding the proposed management recommendations, and their approval sought prior to submitting a work approval application for archaeological mitigation or permission to disturb Aboriginal archaeological places and objects within the study area.
- Anmatyerr traditional owners and custodians will be engaged in future archaeological work undertaken for the Nolans Project, including participation in future archaeological mitigation works.
- A Cultural Heritage Management Plan will be maintained that addresses the potential impacts of the project to the local Aboriginal community.
- Cultural heritage management issues will be incorporated into the environmental management plan for the construction phase of the Nolans Project.
- A copy of the heritage assessment will be submitted to the CEO of the Heritage Council, to fulfil the requirements of notification of the location of Aboriginal archaeological places and objects in accordance with the Heritage Act.

Table 16-7 Summary of archaeological management recommendations

Management recommendation	Proposed infrastructure	Archaeological significance	Site name
Impact avoidance	Confidential	High	NP-1, NP-2, NP-3
		High	NP-6
		Low	NP-7
		NA	Old Albs Bore and Yard
		High	NP-9
		High	NP-10, NP-11
		High	NP-15
		Moderate	NP-12, NP-13, NP-14
		Moderate	NP-19
		Low	NP-20
		High	NP-23, NP-27, NP-29, NP-31
		Moderate	NP-21, NP-28
		Low	NP-22, NP-24
		Low	NP-4, NP-5, NP-8

Management recommendation	Proposed infrastructure	Archaeological significance	Site name
Work approval application and archaeological mitigation		Low	NP-16, NP-17, NP-18
		High	NP-26
		Low	NP-25, NP-30
		High	NP-32
Work approval application		Low	NP-ISO-1-1, NP-ISO-1-2, NP-ISO-1-3, NP-ISO-2, NP-ISO-3, NP-ISO-4, NP-ISO-5-1, NP-ISO-5-2, NP-ISO-5-3, NP-ISO-6, NP-ISO-7-1, NP-ISO-7-2, NP-ISO-8, NP-ISO-9
		Low	NP-ISO-10, NP-ISO-11-1, NP-ISO-11-2, NP-ISO-12-1, NP-ISO-12-2, NP-ISO-13-1, NP-ISO-13-2, NP-ISO-14, NP-ISO-15, NP-ISO-16-1, NP-ISO-16-2
		Low	NP-ISO-17, NP-ISO-18-1, NP-ISO-18-2, NP-ISO-19, NP-ISO-20, NP-ISO-21-1, NP-ISO-21-2, NP-ISO-22-1, NP-ISO-22-2, NP-ISO-22-3, NP-ISO-23, NP-ISO-24, NP-ISO-25, NP-ISO-26, NP-ISO-27, NP-ISO-28-1, NP-ISO-28-2, NP-ISO-29-1, NP-ISO-29-1, NP-ISO-30-1, NP-ISO-30-2