



ULAN COAL

CONTINUED OPERATIONS
environmental assessment



VOLUME 5
Appendices 10 and 11



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1

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**European and Natural
Heritage Assessment**



Ulan Coal Mines Limited

Ulan Coal - Continued Operations European and Natural Heritage Assessment

August 2009



Ulan Coal – Continued Operations European and Natural Heritage Assessment

Prepared by
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on behalf of
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1.0 Introduction

This report examines the European and natural heritage issues associated with the Ulan Coal - Continued Operations project area (herein referred to as 'the Project'). (The Project has been classified as a 'Major Project' as defined by the State Environment Planning Policy (SEPP) (Major Development) 2005, and therefore requires approval from the NSW Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Umwelt (Australia) Pty Limited (Umwelt) has been engaged to assess and evaluate the potential heritage impacts associated with the Project. As such this heritage assessment accompanies a broader Environmental Assessment (EA) of the Project prepared by Umwelt.

This assessment has been undertaken to comply with the Department of Planning (DoP) Director-General's Requirements (DGRs) for the Project. This assessment has also been undertaken in accordance with guidelines set out in the *NSW Heritage Manual 1996*, produced by the Heritage Branch, DoP, including *Archaeological Assessments* and *Assessing Heritage Significance* and with consideration of the principles contained in the *Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance*.

This report identifies the European and natural heritage sites contained within the project area and assesses the significance of any impacts on these sites potentially resulting from the Project.

This report does not include an assessment or consideration of any Aboriginal heritage issues of the project area. Aboriginal heritage issues are discussed in a separate report prepared by South East Archaeology (SEA 2009).

1.1 Background

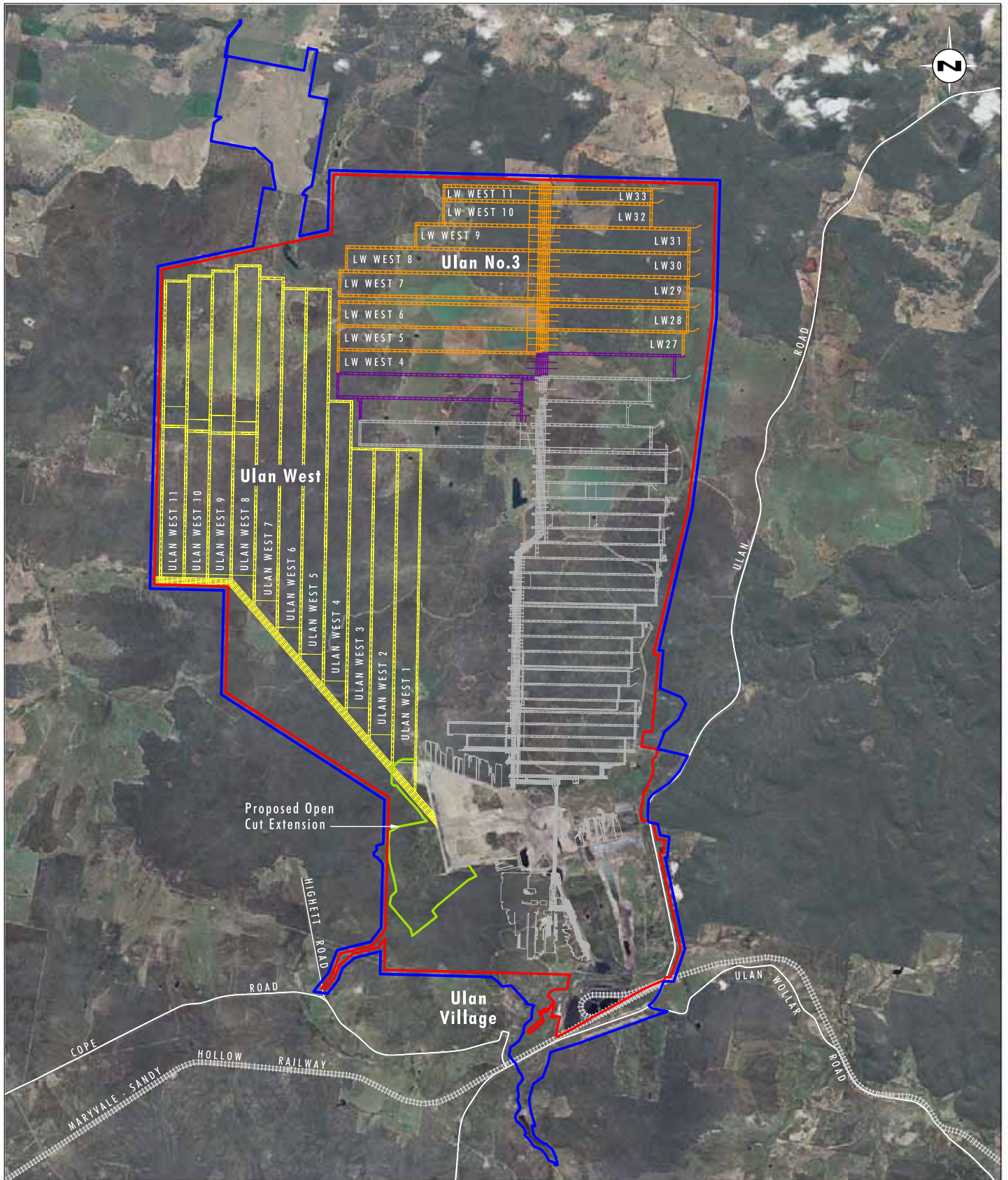
Ulan Coal Mines Limited (UCML) is located approximately 1.5 kilometres from the village of Ulan, within the Mid Western Regional Council Local Government Area (LGA). The site is located approximately 38 kilometres north-north-east of the township of Mudgee, 19 kilometres north-east of the historic town of Gulgong, 65 kilometres north-west of the township of Kandos and 60 kilometres north-west of the township of Rylstone (refer to **Figure 1.1**). The UCML landholdings are comprised of 17,959 hectares and are located at the headwaters of the Goulburn and Talbragar River catchments.

Mining at UCML has been undertaken since the early 1920s, with the open cut and underground mining operations as we know them today commencing in 1982 and 1986 respectively. Since the commencement of mining UCML has sought and been granted various modifications to its existing approvals and received new approvals for continued mining operations and associated infrastructure. As such, UCML currently operates under 34 planning approvals. To ensure the longevity of the mine, UCML is seeking one consolidated Major Project Approval to cover current and proposed operations for the next 21 years. The new approval will seek an increase to the amount of product coal that is produced by UCML from 10 million tonnes per annum (Mtpa) to 20 Mtpa.

The existing mining operations at UCML consist of Ulan No. 3 underground and associated surface operations. Open cut mining ceased in mid 2008 as the approved resource had been exhausted. To assist in maintaining coal production across the Xstrata coal group, UCML is proposing an extension of the open cut operations, as well as concurrently mining the approved Ulan No. 3 underground and an approved area now referred to as Ulan West under a modified mine plan. The 21 year conceptual mine plan involves open cut and longwall mining of the Ulan seam. The current mine plan of Ulan No. 3, proposed extension of the open cut operation and modified mine plan of Ulan West are shown in **Figure 1.2**.



FIGURE 1.1
Locality Plan



Source: Ulan Coal, Aerial Photo December 2007

0 1.0 2.5 5.0 km
1:100 000

Legend

- ▬ Colliery Holding Boundary
- ▬ Project Boundary
- ▬ Proposed Open Cut Extension
- ▬ Proposed Ulan West Mine Plan
- ▬ Ulan No.3 Underground Mine Plan
- ▬ Previous Underground Mining Operations
- ▬ Current Mining and SMP Approved Area

File Name (A4): R09_V1/2423_159.dgn

FIGURE 1.2
Ulan Coal
Continued Operations

Both existing infrastructure, some of which may be modified, and new infrastructure will be required to support the mining operations. The new infrastructure is primarily associated with the operation of the Ulan West mine and includes conveyors, and support services such as dewatering bores, ventilation fans and service boreholes, etc.

1.2 Statutory Overview

The *Heritage Act 1977* (NSW) and the EP&A Act are the primary statutory controls protecting historic heritage within New South Wales. As the Project is defined as a 'Major Project', the Minister for Planning will be the determining authority and the provisions of the *Heritage Act 1977* (NSW) and local planning instruments established under the EP&A Act do not apply.

However, this does not exempt the Project from requiring a heritage assessment, which may identify heritage sites and provide recommendations for their management. Approval conditions relating to heritage may be issued by DoP in consultation with the Heritage Council of NSW and delegate officer of the Heritage Branch, DoP. As such, the Project will still be influenced by the approval requirements of the *Heritage Act 1977* (NSW) and local planning instruments established under the EP&A Act.

National heritage places are recognised as a matter of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Consequently, any action that is likely to have a significant impact on heritage properties and places that are protected by the EPBC Act must be referred to the Commonwealth Minister for the Environment, Heritage and the Arts for approval.

1.3 Heritage Listings

A review was undertaken of:

- the Australian Heritage Database maintained by the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA);
- the State Heritage Register (SHR) and State Heritage Inventory maintained by the NSW Heritage Council;
- the Register of the National Trust (NSW);
- the Mid-Western Regional Interim Local Environmental Plan (LEP) 2008 (note the Mid-Western Regional Council area consists of 100% of the former Mudgee Shire Council, 70% of the former Rylstone Shire Council and 10% of the former Merriwa Shire Council. The Mudgee LEP 1998 has been repealed);
- the Merriwa LEP 1992; and
- the Register of the National Estate (RNE).

The review identified the following natural heritage listings within the project area:

- Mid-Western Regional Interim Local Environmental Plan 2008 (LEP) Schedule 5 Environmental Heritage, Additional Items—rural areas – Talbragar Reserve.
- Register of the National Estate (RNE), Class: Natural, Place ID: 465 - Talbragar Reserve, Wonga Roo Road, Ulan, NSW, Australia. Registered 1982.

In addition, both the Goulburn River National Park and Munghorn Gap Nature Reserve are located in the vicinity of the project area and are listed in the Mid-Western Regional Interim LEP Schedule 5 Environmental Heritage and on the Register of the National Estate. Goulburn River National Park is located immediately east of the project area. The Munghorn Gap Nature Reserve is located 20 kilometres to the south-east of the project area.

2.0 Project Overview

2.1 Description of Proposed Development

2.1.1 Open Cut and Underground Mining

The conceptual mine plan for the open cut mine is shown on **Figure 1.2**. Mining will progress to the west of the current open cut. Mining in the open cut is scheduled to commence soon after approval is granted, nominally 2010, for a period of approximately 11 years.

The current conceptual mine plan for the Ulan West and Ulan No. 3 mines is also shown on **Figure 1.2**. Underground mining within the Ulan West and Ulan No. 3 mines will utilise the retreat longwall method of mining with a panel width of approximately 400 metres. Mining within Ulan No. 3 will continue to progress to the north with alternate panels being mined either side of the main headings, for a period of up to 18 years. Mining of the Ulan West resource is scheduled to commence soon after approval is granted, nominally 2010, and continue for a period of approximately 21 years.

2.1.2 Ancillary Mine Support Infrastructure

A number of surface infrastructure facilities will be required to support the operation of the open cut and underground mines, which include but are not limited to:

- coal handling infrastructure (conveyors, stockpiles and crushers, etc.);
- rail infrastructure/facilities;
- administration, workshop and staff facilities;
- ventilation systems including upcast and downcast shafts;
- service/distribution boreholes - cable drops, ballast and concrete drop holes, etc.;
- dewatering bores;
- surface water management infrastructure;
- water treatment facilities for potable water supply production and water discharge requirements;
- power supply infrastructure – aerial and underground power lines, substations and switch yards;
- piped services - potable water supply, mine waste water removal, process/fire water supply, emulsion supply, compressed air;
- access roads and other minor infrastructure within the project area;
- underground mine access (man riding shaft/drift);
- refuelling facilities;
- the operation of the Bobadeen basalt quarry; and
- communications and monitoring services including communication towers, etc.

3.0 Historical Background

As part of NSW heritage assessment procedures it is essential to have a full understanding of a site or item based on its historical and physical context. This section summarises the available historical resource of the project area.

A number of heritage reports (some including both Aboriginal and historical heritage) have previously been prepared for the project area and the surrounding region. The context below has been prepared using the historical information included in the following reports:

- *Non-Aboriginal Heritage Assessment* prepared by Veritas Archaeology and History Service for the neighbouring Moolarben Coal Project (Tickle 2005);
- the *Old Ulan Conservation Study* prepared by Godden Mackay (Godden Mackay 1992);
- the *Ulan Waratah Preliminary Heritage Report* prepared by South East Archaeology (Kuskie 2008);
- *Bobadeen Station, Ulan NSW 2850, A Statement of Cultural Significance for the property, the homestead and adjacent farm buildings* prepared by Aitken & Broadley (Aitken & Broadley, 1997); and
- *Assessment of the Talbragar Fish Fossil Reserve* prepared by Australian Museum Business Services (AMBS 1996).

Documentary research included the above in addition to other available resources. These included Haglund and Associates 1998 and 1999 Aboriginal Survey reports, *Regional Histories* (published by Heritage Office and Department of Urban Affairs and Planning, 1996), Dot Birchall's unpublished poster for the Ulan Community Day 2008, Longworth & MacKenzie 1980 Environmental Impact Statement, NSW online rail network and Australian Dictionary of Biography Online.

3.1 European Contact

The project area forms part of a landscape that was used by traditional Aboriginal owners prior to European contact and continues to be highly valued by Aboriginal people. The project area is included within the Wiradjuri traditional lands which are close to Kamilaroi to the north, the Geawegal to the north-east and the Wonnarua to the east (Kuskie 2008).

European contact with the region had profound effects on the Wiradjuri with the introduction of agriculture, pastoralism and later mining. In the Ulan area fighting between European and Aboriginal people occurred in the 1820s as settlers sought to establish grazing runs (Haglund 1999). The dramatic increase in the number of European settlers around Mudgee, Bathurst and Gulgong from the 1850s to the 1870s (during the gold rush) resulted in the further displacement of the Aboriginal people (Burless 1997).

3.2 Early Settlement and Exploration

In 1813 George Evans (1780-1852) crossed the Blue Mountains and reached the Macquarie River beyond Bathurst, noting the well watered open plains suitable for grazing. The subsequent colonisation of the tablelands and the establishment of the early towns came as a direct response to the new colonies' need for expansive grazing land. The major stimulus

for European entry into the Mudgee / Gulgong area in particular may have been due to a shortage of feed for stock in the Bathurst region in the early 1800s (Godden Mackay 1992). The government station of Bathurst was established in 1815 with the town of Bathurst being formed by 1833 (Heritage Office 1996).

In the early 1820s James Blackman (1792-1868) and William Lawson (1774-1850) led separate exploration parties to the Mudgee area. In 1820 Blackman marked out a road from Bathurst to Wallerawang and in 1821 explored a route from Bathurst to the Cudgegong River. Allan Cunningham, botanist and explorer, records that Blackman discovered both the site of Mudgee and the Cudgegong Valley

...James Blackman...discovered the valuable limestone sixteen miles on his route the 'Cugeegang'...and fine grazing country in the immediate vicinity of the native station called Mudgee (Mudgee Guardian 1982:18).

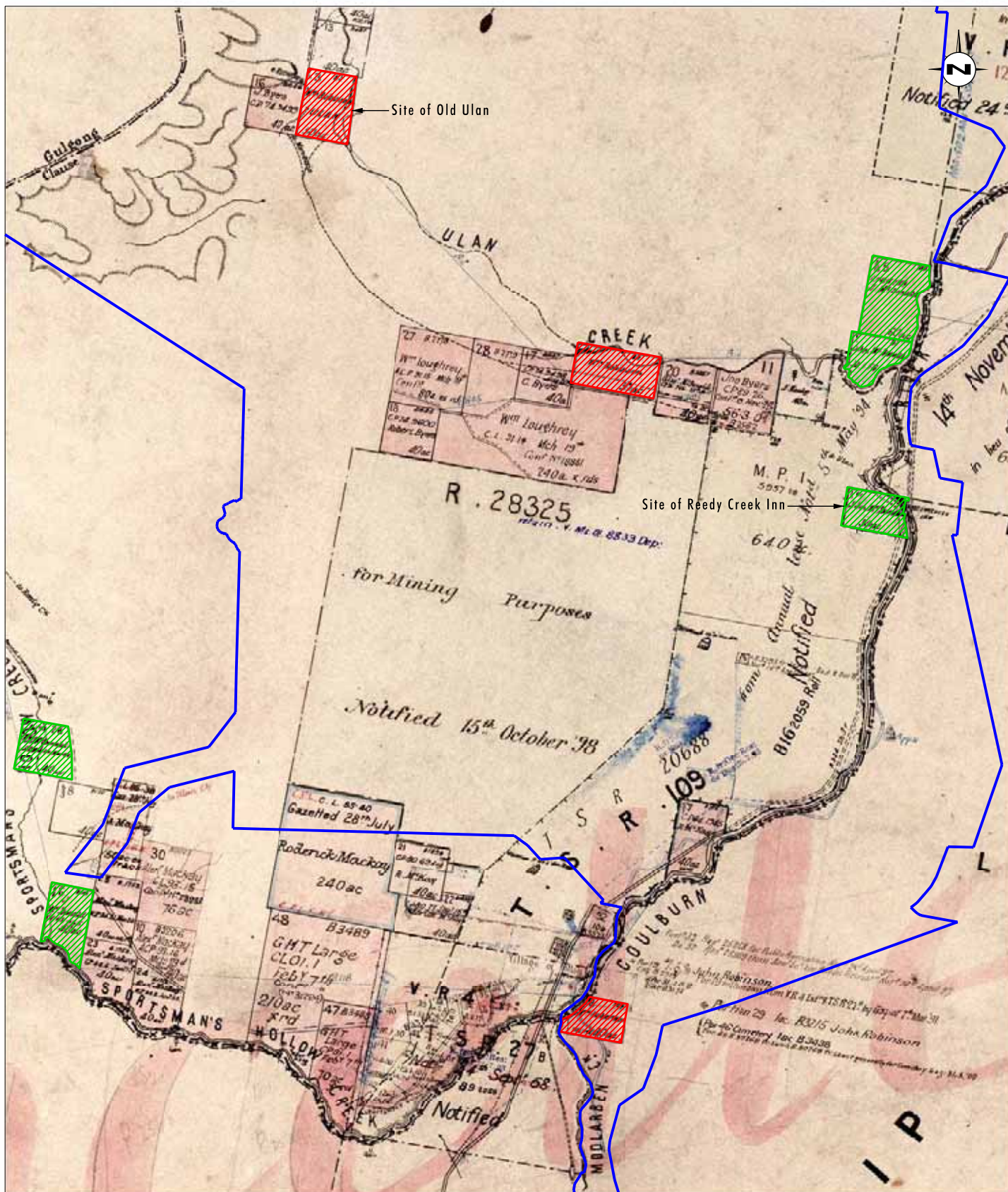
William Lawson followed Blackman's route later in the year and claimed he discovered the site of Mudgee approximately 16 kilometres from the furthest point reached by Blackman earlier in the year. Lawson only attributes the discovery of the Cudgegong River to Blackman. The first settlers started to arrive the following year. In 1822 Blackman and Lawson traced out a route from Wallerawang to Dabee, near Rylstone (Greaves 1966). From the 1820s the number of settlers moving to the area greatly increased and the Mudgee and Gulgong district was settled around 1822 (Haglund 1996a).

George and Henry Cox took up land in the area in February 1822. In 1823 Allan Cunningham (1791-1839) described the area north of the project area as 'a more delightful and rich country cannot possibly be'. Due to the remoteness of the Cassilis region, settlement in the area was slower than around Mudgee. The earliest land taken up in the Ulan area was that of settlers John McDonald and William Robinson (refer to **Section 3.3**). Robinson and McDonald selected land where there was good water and suitable crossings of the Goulburn River and its tributary creeks; Ulan, Moolarben and Sportsman Hollow (refer to **Figure 3.1**). These selections became the sites of inns and staging posts. Other early selectors chose places that had good water and reasonable soil, in an area characterised by a lack of fertility (Tickle 2005).

The gold rush began in the 1850s and brought thousands of people to the Central Tablelands and caused the exponential growth of many towns in the region. Alluvial mining was followed by reef and shaft mining across the region, peaking in the 1870s and thereafter declining but continuing into the 1920s (Heritage Office 1996). The gold rush had little direct impact upon the Ulan area, apart from increasing traffic through the area, as activities and population were concentrated on Gulgong and its surrounding gold fields (Haglund 1999). When mining activities started to decline in the late 1870s, some miners who had been farmers in the past stayed on in the area, moving away from the town of Gulgong to find good land, and returned to farming or the supply of food and timber to the mines (Haglund 1998).

Land selection in the region of the project area was comparatively slow except for two periods in 1873 to 1877 and again in 1889 to 1892. The first peak may have been as a result of the gold rush to Gulgong and surrounding district. By December 1872 it is estimated that 20,000 people were in the Gulgong area. The 1880s were periods of drought which most likely curtailed land selection. From the 1890s many selectors were taking annual leases rather than selecting the poorer country that remained. The Parishes of Ulan and Lennox had very little suitable land and most land in these Parishes was never selected or was only selected as late as the 1950s and 1960s (Tickle 2005) (refer to **Figures 3.1 and 3.2**).

Some blocks were only held for a few years and then forfeited, which allowed them to be reselected by other persons, or the selections were sold to more successful land owners.



Source: Land & Property Information (2009)

0 0.5 1.0 2km
1:40 000

Legend

- ▬ Project Boundary
- ▨ Land Selected by Robinson
- ▨ Land Selected by McDonald

FIGURE 3.1

Detail of 1886 Parish Map of Ulan indicating location of McDonald and Robinson Land Selections

Some of the successful early selectors included Swords, Robinson, Roberts and Blackman. The selectors were very much self-sufficient and very little goods were brought into the area. The 1885 survey of land owners showed that all had horses and cattle, with a few keeping sheep and pigs. The stock brought to the Central Tablelands initially was cattle, however by 1828 sheep outweighed cattle by four to one in the region as a whole (Heritage Office 1996). In the Ulan area, sheep and cattle grazing was supplemented by farming, with wheat and oat crops being cultivated along cleared river and creek flats (Haglund 1999). The arrival of rabbits in the late 1890s provided another food and income source for many.

The original natural forest of the area included Ironbark, Box Apple, Gum, Stringybark and pine. The exploitation of the cypress pine and iron bark forests played an important part for many early selectors and sustained a thriving timber industry at Ulan (Longworth & Mackenzie 1980). Railway sleepers, pit props, fence posts and building material were extracted from the surrounding forests. Early timber was pit sawn and later primitive saw mills were established in the area (Tickle 2005).

The quarrying of 'Mudgee Stone' (a coloured chert), kaolin and clay for bricks were another source of local income (Haglund 1998). The use of stone as a building material is rare in the Ulan area. The only known stone building was the 'Old Stone House' constructed by the McDonald family (refer to **Section 3.3.2**). Most early buildings in the area were constructed of slab or bark with stone being used for the base of the chimney (Tickle 2005).

3.3 Landowners

As discussed in **Section 3.2**, the earliest land taken up in the Ulan area was that of settlers William Robinson and John McDonald. Robinson and McDonald selected land where there was good water and suitable crossings of Ulan Creek and Goulburn River (refer to **Figure 3.1**). These selections became the sites of inns and staging posts.

3.3.1 Robinson Family

William Robinson, born in 1805, was a farm hand who arrived in Australia from England in 1827. He worked as an employee of Charles Purcell of Emu Plains and later Botobolar near Mudgee where he married Catherine Kenny on 9 June 1841 (Birchall 2008).

In approximately 1840 William acquired 640 acres of leasehold country from which he selected 30 acres adjacent to the present village of Ulan, 50 acres at 'The Lagoons', Moolarben, and two 50 acre blocks in the area later to become known as Old Ulan (refer to **Figure 3.1**). On one of these latter blocks at Old Ulan William made his home. The Robinson family (William, Catherine and their two children Anne and Catherine) moved there in 1843-44 (Mudgee Guardian 1982:22).

William Robinson died near his home at Old Ulan on 25 November 1855. Robinson family history recounts that William died after his horse fell while drafting cattle. In 1873 Catherine Robinson sold the two Old Ulan blocks to Robert Byers and went to live at 'The Lagoons' in Moolarben where she established an inn. The main Mudgee to Maitland road went past the property in the 1870s and the inn became a regular stopping point for wagons travelling to and from Maitland (Mudgee Guardian 1982:22). In 1874 she sold the inn to John Swords and continued to live in her home on land she retained behind the inn until she died there in 1884 (Birchall 2008). Following purchase of the inn John Swords also selected and acquired considerable land at Moolarben (Mudgee Guardian 1982:22).

After marrying Henrietta Emma Carlisle at Moolarben in 1875, John Wilson Robinson (son of William Robinson) made his home at Glen Moor on selected farming and grazing land about

two miles south of Ulan Village. In the late 1890s John and Henrietta Robinson established a boarding house (which later became the hotel, refer to **Plates 3.1** and **3.2**), post office, store and butchery at Ulan. They also helped establish St Cuthberts Church of England and the Presbyterian Church at Ulan (refer to **Section 3.6.1**) (Mudgee Guardian 1982:22). The hotel was sold to Chas Buchanan just before John Wilson Robinson died in October 1916. Henrietta died 7 September 1944 (Birchall 2008).

John William Robinson (became the owner of the Glen Moor property following the death of his father. John William Robinson is the son of John Wilson Robinson and the grandson of William Robinson. John William and his wife Irene (maiden name Buchanan) lived there with their family until they died. Both are buried in Ulan cemetery (Birchall 2008).

John William Robinson's son, Lloyd John Wilson Robinson, acquired Glen Moor following his father's death and he and his wife Mary (nee Fahey) lived with their family there. Lloyd died in 1988 aged 70 years and Mary died in 1979 aged 54 years. They are buried in Ulan cemetery (Birchall 2008).

3.3.2 McDonald Family

John McDonald took up land along Ulan Creek and Goulburn River, likely from the early 1850s, selecting land where there was good water and suitable crossings of the Goulburn River (refer to **Figure 3.1**). The McDonald family settled near the Goulburn River about 5 kilometres north of the present village of Ulan. The Goulburn River was bridged at this site and the family built their house there in the early 1850s. The house became known as the 'Old Stone House' as the only known stone building in the area. Its location beside a bridge crossing the Goulburn River led to the house being used as a hotel and changing post on the Ulan Road to the north. Known as the Reedy Creek Inn it was licensed in 1851 (Haglund 1998). The house and inn, originally constructed in the 1850s with four rooms of fieldstone external walls with slab internal walls before being extended east with a further four rooms also constructed of stone, now resides in the Gulgong Museum. It was relocated in the early 1980s.

3.4 Villages and Stations

3.4.1 Old Ulan

Old Ulan is the location of early European settlement near Ulan Creek, approximately 5 kilometres north-west of Ulan (refer to **Figure 3.1**). The name is Irish Gaelic for boulders. The site of Old Ulan now consists of the remains of a number of structures (including a hotel, a small outbuilding and a potential dwelling), a ford and roadway, a graveyard, two sets of stockyards and associated fence lines (Haglund 1999). The ford was an important link in the road north from Mudgee and Gulgong to Cassilis. Prior to the bridge across the Goulburn River being built to the north-east of Old Ulan, this route to the north, via Bobadeen, was the safest, as it was over rock instead of sand. There is also permanent water at the site of Old Ulan and many rock shelters flanking stretches of open flats. Shelters are known to have been used by travellers and shepherds, as well as by Aboriginal people who used this route before the arrival of European settlers (Haglund 1998). The land around the ford was originally owned by the Robinson family and appears to have been occupied at least up to the 1890s, although the Robinson family sold and moved to Moolarben in 1873 (refer to **Section 3.3.1**). The original siting of the settlement here was likely the result of the availability of permanent freshwater from a nearby spring which may have also been an important stock watering point on the route from Gulgong to Cassilis (Godden Mackay 1992).



PLATE 3.1
1903 Photograph of Ulan Hotel – front view
(Photo supplied by Dot Birchall)



PLATE 3.2
1903 Photograph of Ulan Hotel - side view
(Photo supplied by Dot Birchall)

Following settlement, the area surrounding Old Ulan Village was gradually cleared and farming of wheat and oats commenced in addition to grazing (Godden Mackay 1992). Old Ulan decreased in significance when the road was realigned after the bridge over the Goulburn River to the north-east of present Ulan Village was built.

3.4.2 Bobadeen Station

Bobadeen Station and Homestead once extended as far south as Old Ulan and is one of the oldest properties in the area (Haglund 1999). Bobadeen is located 11 kilometres north of the village of Ulan and south of the village of Turill. Bobadeen Homestead is located on Portion 50 in the Parish of Bobadeen in the County of Bligh and was initially granted as a Crown grant of 270 acres in October 1881 to William Robert Elliot (Kuskie 2008) (refer to **Figures 3.3** and **3.4**). Elliot is unlikely to have lived on his grants in the Ulan area as he also had land at New Turee to the north of Ulan, south-east of Coolah and west of Cassilis. In 1882 Samuel Young (a grazier from Cassilis) purchased Bobadeen and in 1890 the property was transferred to Goldsborough Mort & Co pastoral company. Henry Crossing (an auctioneer from Mudgee) purchased the property in 1899. The Crossing family were prominent in pastoral and commercial enterprises in the town of Mudgee and surrounding district (refer to **Figure 3.5** - Parish Map of Bligh showing the extensive lands of Henry Crossing). Bobadeen Homestead was built for Henry Crossing in approximately 1900. It was built of timber and located on a hill; providing a view of the surrounding property. The homestead was not Crossing's primary residence as he had built Menah Homestead in 1885 and lived there until 1913. Although not a significant residence for the Crossing family, Bobadeen Station was an important pastoral asset providing extensive grazing for cattle and sheep. The homestead was likely originally built as a base for the station manager and was later owned by Henry Norton (1913), Alexander Bruce (1920) and the Heywood family who lived there until 1985 (Aitken & Broadley 1997).

Wyaldra Park, another large historic station in the area, is located south of Ulan (Haglund 1999). Bobadeen and Wyaldra Park are likely to have provided employment for many families living on the stations or on small holdings in the area. Types of employment would have included shearing, timber cutting, clearing and burning off land, rabbit trapping, fencing and small scale farming (Haglund 1998).

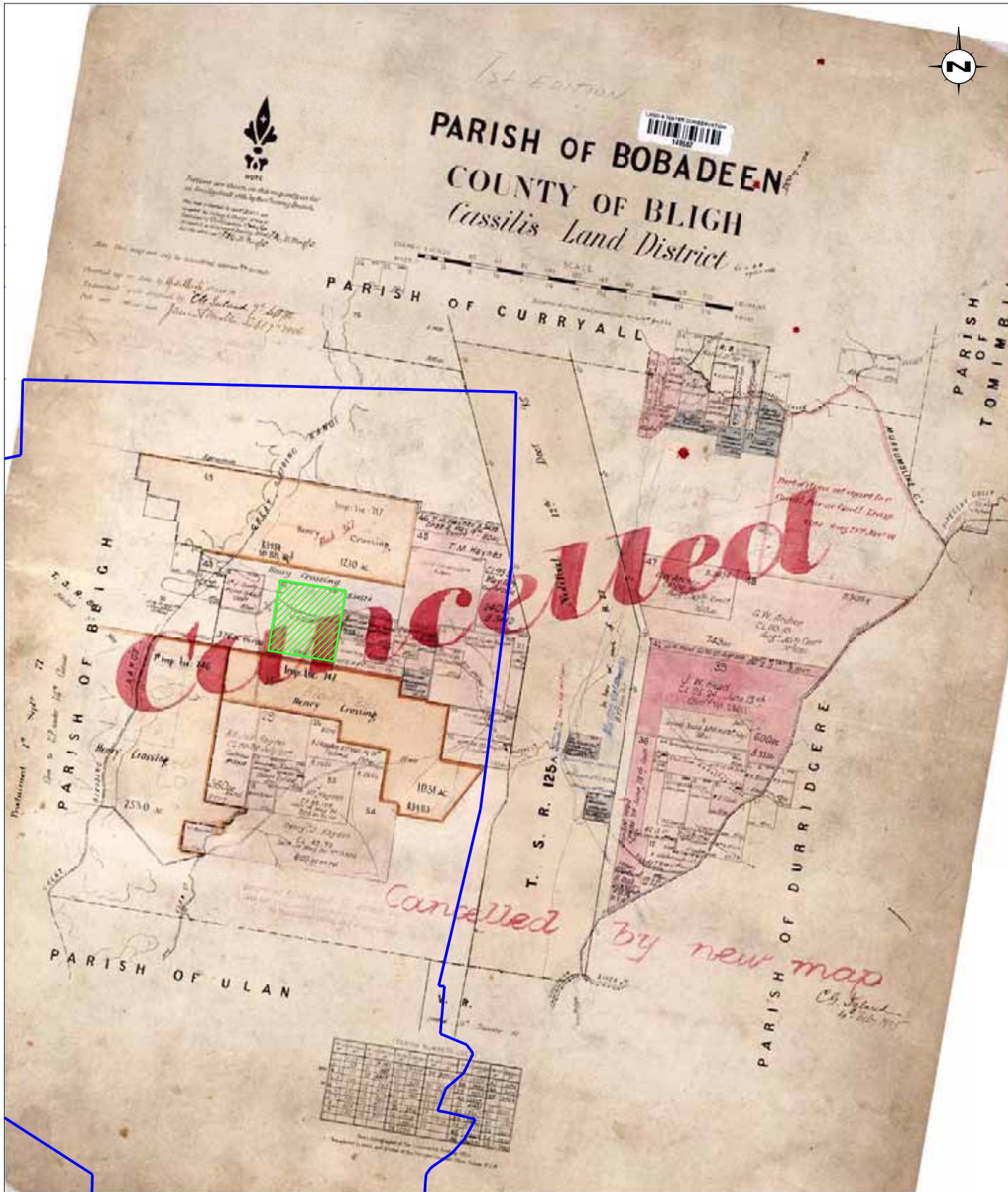
3.4.3 Village of Ulan

Ulan was named after Old Ulan where William Robinson first settled (refer to **Sections 3.3.1** and **3.4.1**). The village of Ulan formerly included buildings such as churches, a hotel, a hall, butcher shop and general store.

The village of Ulan was proclaimed on 21 August 1897 on the west bank of the Goulburn River where Moolarben Creek joins the river (refer to **Figures 3.1**, **3.2** and **3.6**). Ulan was set out as a small village with four sections of residential land and never progressed beyond that. Ulan Village cemetery is located in Portion 46, Parish of Ulan. The cemetery was dedicated in 1900 and although another area had previously been dedicated in 1898 the area does not appear to have been used.

In 1908, the Ulan Post Office was reported as serving a district of 35 families with a total population of 196 persons. In 1912 it was reported that Ulan had a hotel/store, three boarding houses, 23 householders and 20 other persons. In 1914 the village had a hotel, post office, hall, church, school and eight houses (Tickle 2005).

Ulan increased in size and population in the 1950s following the construction of the powerhouse located immediately north of Ulan Village (operational by mid-1950). The



Source: Land & Property Information (2009)

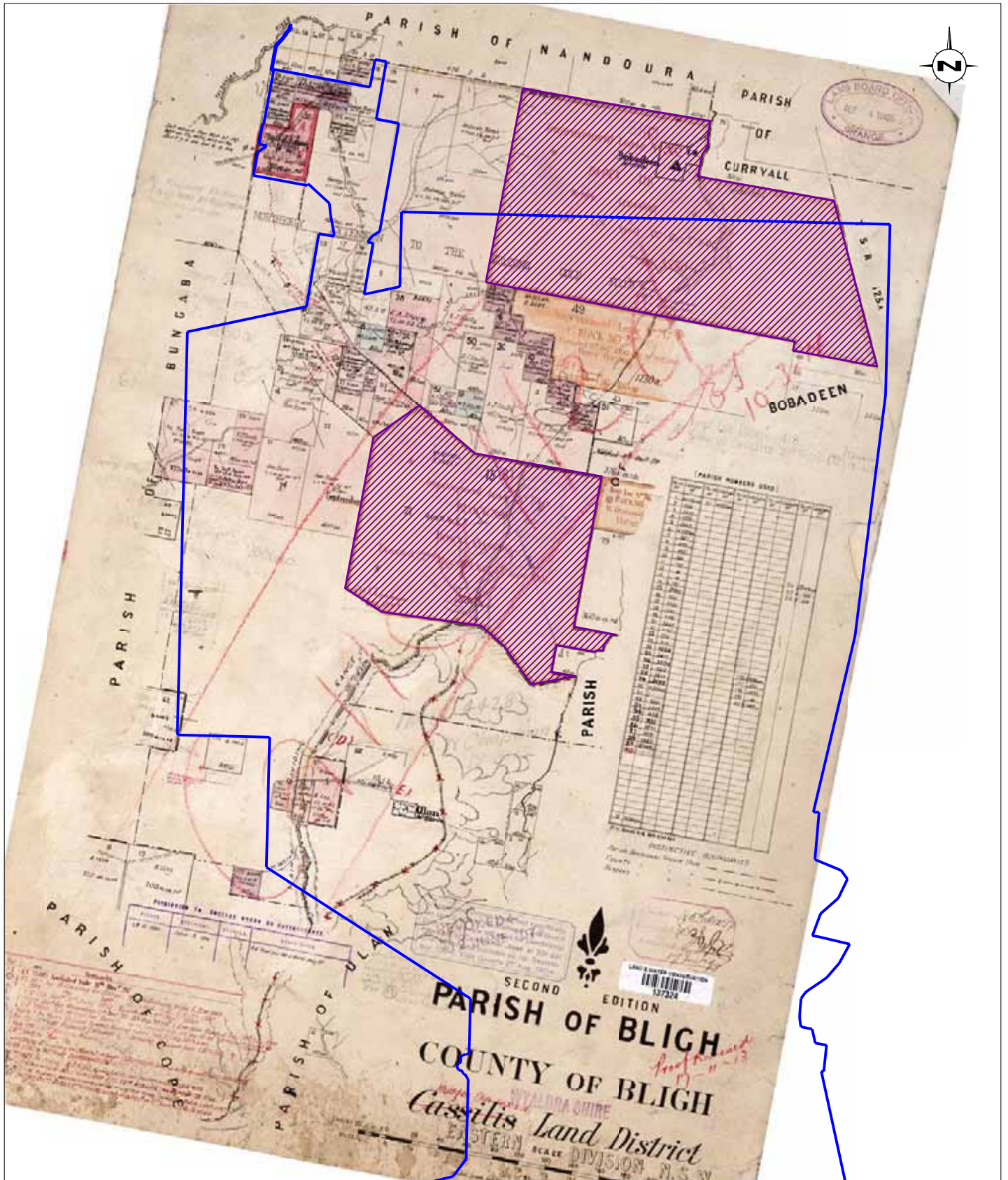
0 1.0 2.0 4.0 km
1:80 000

Legend

- Project Boundary
- Portion 50 - Location of Bobadeen Homestead

FIGURE 3.3

1886 Parish Map of Bobadeen indicating location of The Bobadeen Homestead



Source: Land & Property Information (2009)

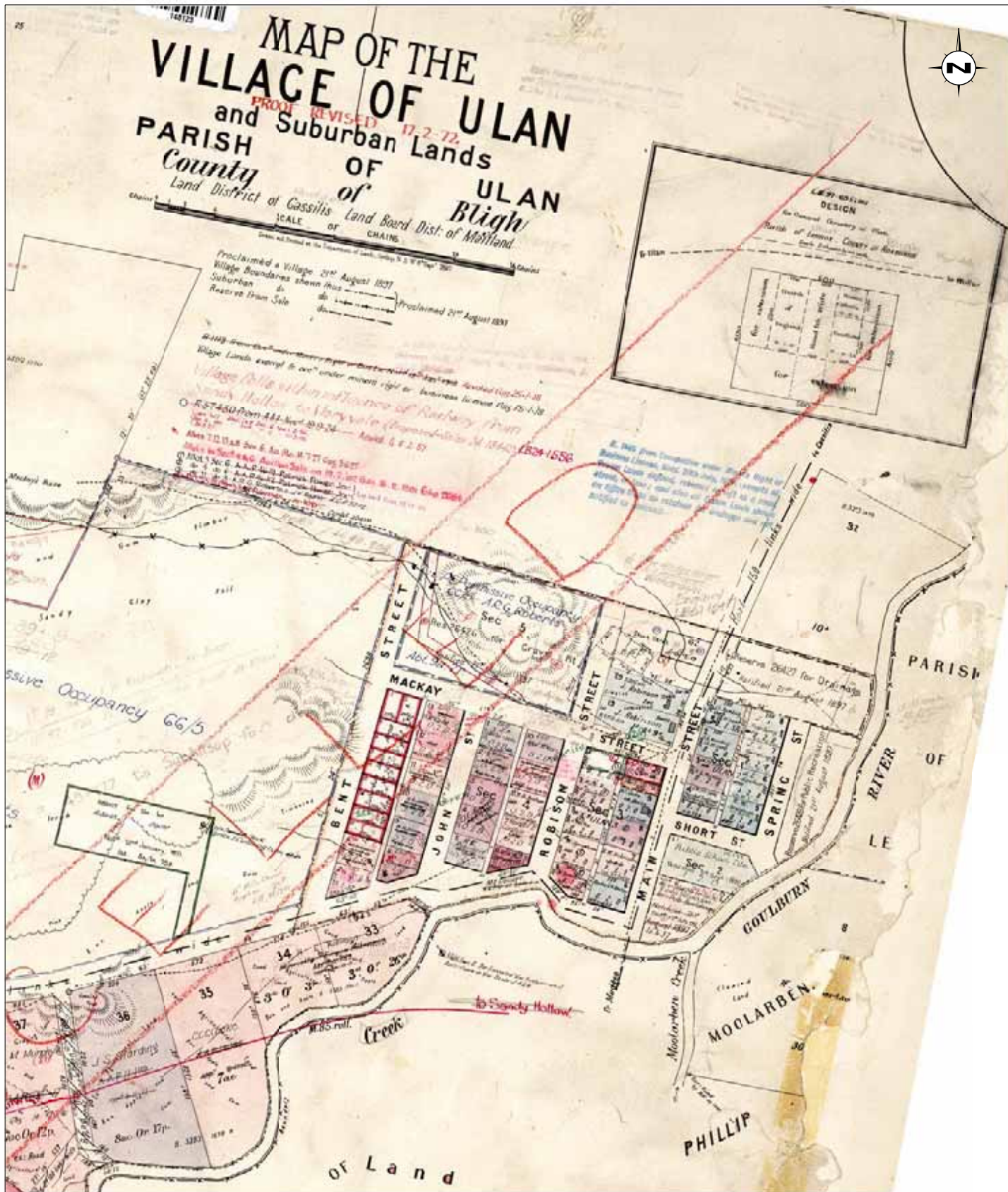
0 1.0 2.0 4.0 km
1:80 000

Legend

- Project Boundary
- Land Selected by Henry Crossing

FIGURE 3.5

1897 Parish Map of Bligh indicating location of the Crossing Family land holdings



Source: Land & Property Information (2009)

0 100 200 400m
1:7 000

FIGURE 3.6
Detail of 1898 Town Map of Ulan

operation of the powerhouse enabled the coal mine to be opened up on a larger scale (Connell Wagner 1992) (refer to **Section 3.7.1**).

The village of Ulan is located outside and to the south of the project area.

3.5 Communication, Roads and Railways

Early lines of communication in the area built on the systems that had been previously established by earlier explorers and squatters. As stations became established to the north around Cassilis, a line of transportation for stock to Sydney was established via Bathurst rather than the Hunter Valley. To assist with the stock movements the government established a network of watering points and wide corridors for stock routes. The Parishes of Moolarben, Ulan and Bobadeen had one of these stock routes which developed into the present main road corridor (refer to **Figures 3.1** and **3.3** for Parish Maps of Ulan and Bobadeen showing the locations of the early Traveling Stock Routes (TSR)). Other tracks were developed allowing for access to new areas of land selection. Early tracks came from Mudgee to Cooyal then up the Moolarben Valley. One track branched off to go via Carr's Gap to Murrumbidgee, Wilpinjong and Wollar (known as the Maitland Road). The other branch continued via present Ulan, Old Ulan and on to Cassilis. As the need for transport increased, especially with the discovery of gold, coach lines commenced, with one line using the Moolarben valley. However, coaches were an expensive form of travel and many people remained on their selections, rarely venturing out of the area. In 1915 the mail coach ran three times per week between Mudgee and Cassilis, with one of the changing posts being at Ulan.

Charles Lawrence Carlisle Robinson (grandson of William and Catherine Robinson) spent his childhood years at Ulan and attended Moolarben and Ulan schools. Whilst attending Ulan school he cared for the horses kept in the village for the mail coach which travelled between Mudgee and Cassilis. The horse teams were changed at Ulan on the way to Cassilis, then again at Cassilis for the return trip, and changed once more at Ulan before arriving back in Mudgee. He recalled the excitement at Ulan school one day when the inspector for schools, Mr Reay, arrived in a motorised buggy. With the arrival of the motor car, the mail truck became another method of travel to larger centres (Birchall 2008).

In 1884, 42 residents of the Ulan district signed a petition requesting that a post office be set up at Old Ulan as the closest post offices were Cassilis or Budgee Budgee. A post office was established with John Robinson as post master, however it was soon relocated to present Ulan with John Robinson continuing as post master.

The earliest reference to a telephone service in the area was in 1906 when C M Archer, the telephone mistress, notified the Postal Department that she wished to resign. At this stage the only telephone in the district was at the post office. In 1909 Bobadeen Station was the first private residence to be connected with a telephone. It was not until 1912 that other private lines were connected. By 1944 there were four subscriber lines connected to the post office. Early telephones were on a party system with a number of residents using the one line from a manual exchange in Ulan (Tickle 2005).

There were plans as early as 1900 to connect the Western districts of NSW to the rail system via Muswellbrook. Railway lines had reached the Central Tablelands in the 1870s, although the link from Lithgow to Mudgee was not established until the 1880s and a railway line between Mudgee and Gulgong was not created until 1909. With the introduction of these rail lines, commerce and urban development boomed in many towns, while additional discoveries of coal, copper, silver, zinc, antimony and oil shale led to the creation of a long-lasting mining industry in the wider area (Heritage Office 1996).

Proposals for the construction of a railway to link Maryvale (to the west of the project area) and Sandy Hollow (to the east) were considered in a Royal Commission in 1911. However, construction of the rail line did not commence (Pearson 2004). At that time there were a large number of rail lines which were planned for NSW, but never built. Some lines never made it past the survey stage, some were authorised for construction but never built, and some were abandoned during construction. The Sandy Hollow, via Gulgong, to Maryvale line was one of these lines; authorised by an Act of Legislation (Railway Act 1927 No 28), but never completed (Bozier nd). The line was planned to connect the existing northern and western railway systems. It was to commence at the western end of Sandy Hollow Station on the Muswellbrook to Merriwa Branch and proceed westerly across Goulburn River past the villages of Baerami, Bylong, Wollar and the village of Ulan before crossing the Murrumbidgee Creek and the Main Dividing Range to Gulgong and eventually reaching Maryvale. A total distance of 146.5 miles (236 kilometres) of line was planned at an estimated cost of £1,353,789 (Bozier nd).

In 1936 unemployment relief funds were allocated for the construction of track formation works along the Sandy Hollow to Gulgong section of the proposed line. The work was started but abandoned in 1951 without the railway being completed. The construction of the line was revived in 1976 for the transport of coal from the Ulan Coal Project to the Hunter Valley power stations. Work was approved in 1980 and completed in 1982, connecting the Ulan Colliery to Newcastle (Pearson 2004).

3.6 Religion and Education

3.6.1 Churches

The area has had three churches; Presbyterian, Anglican and Roman Catholic. The Presbyterian Church is reputed to have been financed by Sir Frederick McMaster of Dalkeith Station, Cassilis and built on land donated by him. The present Anglican Church was built in 1908 and named St Cuthbert's. St Cuthbert's is likely to have replaced an earlier church as it was reported in 1900 that 43 people were camped in the Ulan Church during the Governor Brothers' reign of terror. The Governor Brothers were outlaws who terrorised the areas of Ulan, Wollar and Turill in July 1900. On 23 July 1900 they killed one of Ulan's pioneer settlers, Alex McKay of Sportsmans Hollow Creek, near his home, just west of Ulan on the Gulgong Road. For many years the Ulan Roman Catholics did not have a church and utilised private homes or the community hall. However, in January 1959, the Moolarben Roman Catholic Church, originally built in 1911 on a block of land at Moolarben was relocated to Ulan. In May 1959 it was re-opened and re-named St Pious (Tickle 2005).

3.6.2 Schools

Schools were an important part of the local community and some areas put a considerable amount of their scarce resources into trying to ensure that a school was established in their area. Twice the residents of Murrumbidgee erected a school, but had to ask the Department of Public Instruction (now Department of Education and Training) for financial assistance to complete the buildings. Schools were often relocated if the population centre shifted; hence Moolarben had two locations, Portions 85 and 176. There were also schools at White Munghorn, Murrumbidgee, Ulan and Old Ulan. Ulan Public School is the only school still operating in the district (Tickle 2005).

In 1883 five families lived in the area between Sportsmans Hollow Creek and Ulan Creek. They sent an official application to the Department of Public Instruction asking for a Provisional School to be established at a place they called Sportsmans Hollow Creek. The families included John Robinson and Roderick McKay, a farmer who owned the proposed

school building. The establishment of a provisional school was recommended, and the Department officially approved the Ulan school on 12 February 1884. In 1884 its enrolment was 29, although the average attendance was only 14 (Burnswoods nd).

Ulan operated as a Half-Time School with Murragamba from 1895 to 1908 and as Half-Time School with Cooks Gap from 1913 to 1917. Reedy Creek was meant to open as a Half-Time School with Ulan in 1885 but was permanently closed the following year because of the change of Ulan's site from Old Ulan to the present site of Ulan Village (Burnswoods nd).

3.7 Development of Mining

3.7.1 Coal

The development of coal resources comprises an important part of the area's history. In 1899 the NSW Department of Mines contacted the Department of Education and asked if they had any objections to a Mr E Brissenden mining under the 2 acre school site (Portion 15, Parish Ulan). However, coal mining is unlikely to have occurred at this site, or within the wider area until 1924 with the commissioning of Ulan No. 1 mine. The coal deposits were first worked for local markets by a man named Cunningham. However, the mine was too far from major markets to be a success. The mine was reopened in 1942 by the Key family who also purchased the Ulan hotel to provide accommodation for the mine employees. The mine remained in operation until it was sold to Ulan County Council in 1950. Ulan County Council started to build a new power station just north of Ulan Village. The power station was taken over by the NSW Electricity Commission and opened in 1957. A new company was formed by Hogan & Gorman and the Ulan No. 2 underground mine was developed to supply coal to the new power station. Hogan and Gorman Pty Limited increased mining operations to supply both the power house and other new local markets. When the power station closed in 1969 mining of the Ulan No. 2 underground mine continued on a limited basis to supply other domestic markets (Connell Wagner 1992).

In the late 1970s Hogan & Gorman registered UCML and ownership transferred to White Industries and later part ownership on to Mitsubishi Operations and NSW State Super Board. An exploration program undertaken in 1976 in the Ulan area proved the existence of extensive coal reserves, and mining operations at UCML expanded substantially in the 1980s with the establishment of the open cut mine. This expansion included the construction of the coal preparation plant and rail loading facility and augmentation of No. 2 underground in 1982. Traditional board and pillar underground mining methods were used from the mid 1970s to mid 1980s prior to longwall methods being introduced in 1986 with the commencement of Ulan No. 3. In the mid 1990s UCML saw the successful introduction of high wall mining. Xstrata purchased 90% of UCML in 2001. Mining within the open cut continued until mid 2008, when approved reserve recovery areas were exhausted. Underground mining within Ulan No. 3 is ongoing with current approvals allowing for longwall mining operations until 2021.

3.7.2 Gold and Other Mining

A major impetus to the region resulted from the gold rush, sparked by the discovery of a gold nugget by Tom Saunders in 1870 in Gulgong. This and other gold strikes in the surrounding districts resulted in the establishment of Gulgong and its satellite villages with a population which peaked at approximately 20,000 in 1876 (Longworth & McKenzie 1980).

Although gold mining is no longer commercially worthwhile, the area has supported a number of other mining activities. These include kaolin within the locality of Ulan and

Gulgong and deposits of ‘Mudgee or Ulan stone’ at Havelock and Greenbanks. This stone is used as a paver. Leases were also taken out of molybdenite, silica and fireclay.

3.8 Historical Themes

A historical theme is a research tool, which can be used at the national, state or local level to aid in the identification, assessment, interpretation and management of heritage places (AHC 2001:1). Nine national historical themes have been identified by the Australian Heritage Commission (now DEWHA). The Heritage Branch, DoP has identified 35 historical themes for understanding the heritage of NSW. The development of the project area is broadly reflective of the history of the local region, and can be assessed in the context of the broader historic themes defined by the Heritage Branch, DoP and DEWHA. In accordance with the Heritage Branch, DoP and DEWHA framework of historic themes, the themes tabulated below are relevant to the project area and locality.

Table 3.1 - Historical Themes

National	National Sub Themes	State Themes	Local Themes/Application
1. Developing local, regional and national economies.	Developing Primary Production.	Pastoralism. Mining.	Pastoralism. Development of coal mining.
2. Building settlements, towns and cities.	Making settlements to serve rural Australia. Remembering significant phases in the development of settlements, towns and cities.	Land Tenure. Early Settlement.	Land Tenure and Early Settlement including the history of selection.
3. Working.	Working on the land. Organising workers and workplaces.	Pastoralism. Railways.	Other industries – timber clearing and rabbiting. Development of coal mining. Gold Mining. Railways.
4. Educating.	Establishing schools.	Religion. Education.	Religion and Education.
5. Developing Australia’s Cultural Life.	Worshipping.	Religion. Education. Death.	Religion and Education. Death.

4.0 Physical Context

This section lists any potential heritage items within the project area, identified through a search of relevant heritage registers, historical research and archaeological survey. This information, in conjunction with the historical context (refer to **Section 3.0**), forms the basis of the significance assessment (**Section 5.0**) and management strategy (**Section 6.0**).

A number of Aboriginal archaeological surveys and excavations have been undertaken within the lease areas of Ulan Coal Mine. For a comprehensive description of all of the studies undertaken within the lease area, refer to SEA 2009.

The historical site survey of the project area was undertaken in tandem with the Aboriginal heritage investigation conducted by SEA and representatives of four Aboriginal stakeholder groups (Warrabinga Native Title Claimants Aboriginal Corporation, Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islanders Corporation and North East Wiradjuri). One individual, Warranha Ngumbaay, also registered an interest in the Project, but did not participate in the field survey program.

For the purposes of the survey, the project area was divided into different survey areas, each representing a specific environmental context. The aim of the survey was to sample the entire Project area by physically inspecting on foot a sample of every survey area. For detailed methodologies and description of the survey strategy refer to SEA 2009 Aboriginal Heritage report.

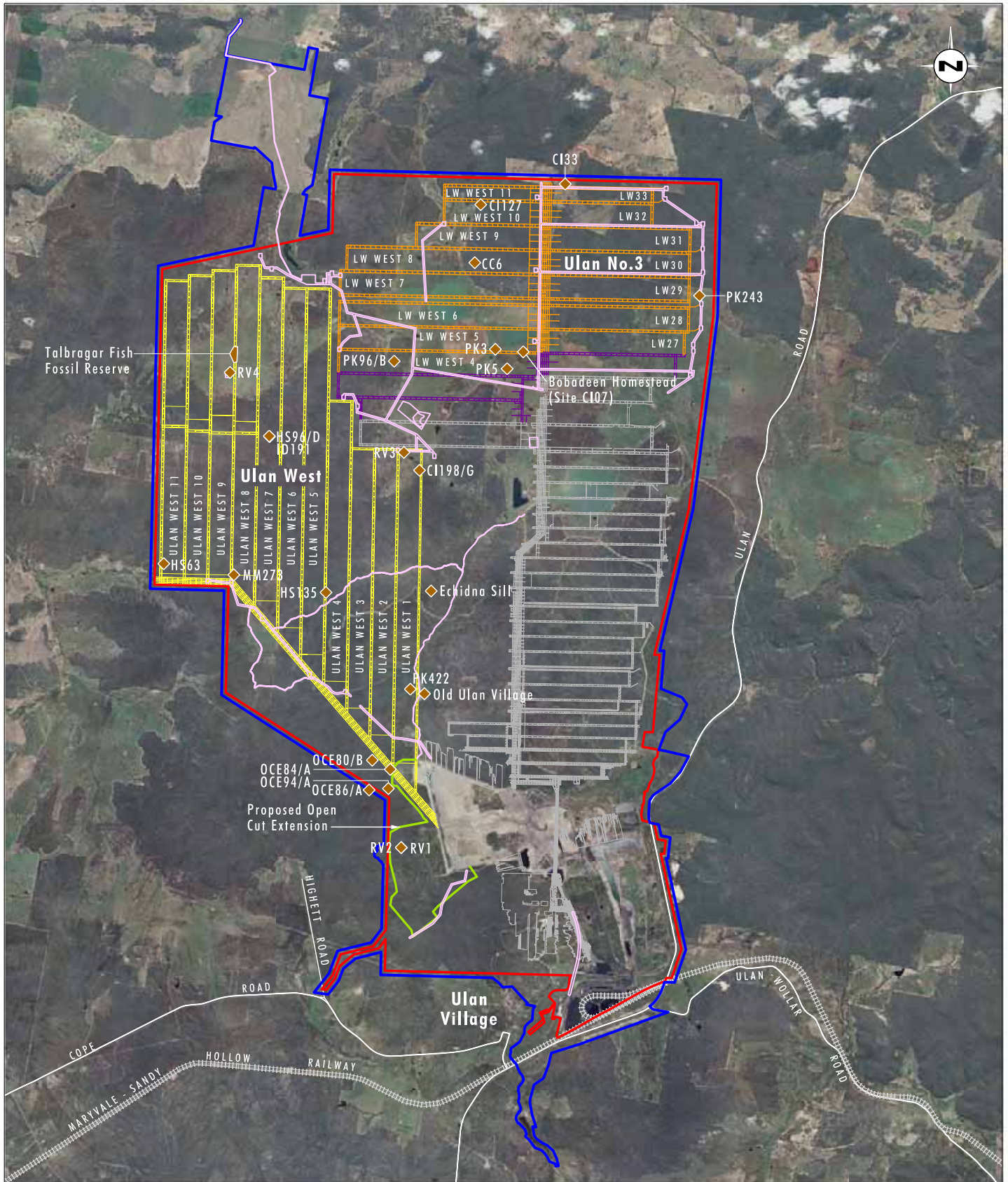
The information discussed in this section is based on information provided by SEA following the detailed Aboriginal Heritage survey of the project area undertaken in 2008, in addition to other heritage survey reports detailed in **Section 3.0**.

4.1 Potential Heritage Sites/Items

Table 4.1 lists the potential heritage sites/items identified within the project area. The locations of the sites are illustrated on **Figure 4.1**. The site/item names listed follow those assigned during the survey or already established for previously known sites. These sites/items are further illustrated in **Plates 4.1** to **4.30**.

Table 4.1 – Potential Heritage Items Identified during the Survey of Project Area

Site/item name	Location		Site Type/Description
	MGA Easting	MGA Northing	
Old Ulan Village	756758.6	6431568.8	Site of Old Ulan Village including the remains of a number of structures, including a hotel, a small outbuilding and potential dwelling (site PK422 discussed below), a ford and roadway, a graveyard, two sets of stockyards and associated fence lines (refer to Plates 4.1 to 4.4). Old Ulan Village is further discussed in Section 4.2.1 .



Source: Ulan Coal, Aerial Photo December 2007, Mount King (2008), Umwelt (in preparation), Kuskie (2008)

0 1.0 2.5 5.0 km
1:100 000

Legend

- ▬ Colliery Holding Boundary
- ▬ Project Boundary
- ▬ Proposed Open Cut Extension
- Proposed Ulan West Mine Plan
- Ulan No.3 Underground Mine Plan
- Previous Underground Mining Operations
- Current Mining and SMP Approved Area
- ◆ Historical Sites/Items (South East Archaeology 2008)
- Infrastructure Footprint

FIGURE 4.1

Historical and Natural Heritage Sites/Items within Project Area

Table 4.1 – Potential Heritage Items Identified during the Survey of Project Area (cont)

Site/item name	Location		Site Type/Description
	MGA Easting	MGA Northing	
PK422	756480	6431707	Chimney bases – part of Old Ulan complex (refer to Section 4.2.1). Comprises of two small mounds (likely former chimney bases) of conglomerate measuring approximately 1 by 2 metres and located approximately 6 metres apart. Isolated historical artefacts are located in the vicinity (refer to Plate 4.5).
Bobadeen Station/Homestead (Site/item CI07)	758623.6	6438105.1	Rural farm complex (Bobadeen Station) including the homestead group of buildings comprising the original slab timber residence (refer to Plate 4.6), a former kitchen and laundry block, large timber post built shed (refer to Plate 4.7), stables, workshop, toilet, carport, garden landscaping and a number of other associated structures and features related to the former operation of this large station. Bobadeen Station is further discussed in Section 4.2.2 .
PK3	758089	6438136	Large recently constructed metal and timber post built hay shed. Adjacent to this shed is an approximately 25 metre long narrow concrete slab with a small timber post double enclosure at one end (refer to Plate 4.8). Associated with Bobadeen Station, refer to Section 4.2.2 .
PK5	758311	6437768	Metal windmill associated with a dam likely twentieth century (refer to Plate 4.9). Associated with Bobadeen Station, refer to Section 4.2.2 .
Talbragar Fish Fossil Reserve	753138.2	6438033.8	Deposit of Jurassic age sediments that contain an abundance of extremely well preserved fish, plant and invertebrate fossils (refer to Plates 4.10 to 4.12). The reserve is further discussed in Section 4.2.3 .
CI33 (Calbunya)	759410	6441263	Weatherboard and corrugated iron clad cottage with brick built external chimney and corrugated iron gable and skillion roof (refer to Plate 4.13). Associated with the cottage are timber and corrugated iron sheds, timber post built stockyards, water tanks and recently installed metal silos.
PK243 (Apple Tree Flat)	761950	6439150	Rural farm complex (Apple Tree Flat) including house (comprising substantially intact mid to late 1800s constructed cottage reclad in fibrous cement sheeting, late 1800s weatherboard cottage addition with corrugated iron hipped roof and several later fibrous cement sheet extensions), corrugated iron and timber built sheds and associated yards (refer to Plates 4.14 to 4.16).
RV3	756359	6436185	Homestead complex comprising derelict house (weatherboard cottage with corrugated iron hipped roof, external brick chimney and later fibrous cement sheet extension), timber post shed clad with corrugated iron, timber post and rail stockyards and extensive former gardens (refer to Plates 4.17 and 4.18).

Table 4.1 – Potential Heritage Items Identified during the Survey of Project Area (cont)

Site/item name	Location		Site Type/Description
	MGA Easting	MGA Northing	
CI127	757811	6440872	Small rectangular timber built shelter constructed using four corner timber posts with timber cross beams and roofed with corrugated iron (refer to Plate 4.19).
RV4	753069	6437698	Former stockyard with adjacent current timber stockyard. Former stockyard comprises a derelict timber post and rail constructed yard (refer to Plate 4.20). Current yard is timber post constructed with timber and metal rails.
HS63	751816	6434081	Timber getting site (evidence of timber clearing and timber offcuts).
CC6	757699	6439775	Timber getting site (evidence of timber clearing and timber offcuts).
MM273	753141	6433870	Timber getting site (evidence of timber clearing and timber offcuts).
OCE80/B	755759	6430363	Timber getting/sleeper cutting site (refer to Plate 4.21) comprising an area measuring approximately 400 square metres with extensive evidence of partially cut timber sleepers, timber offcuts and mounds of decomposed sawdust. Two small dams are located in the vicinity which may have served as small reservoirs while timber cutting works were being undertaken in the area. A single mature ironbark is the only surviving mature tree in the area. The tree has been partially cut close to its base and the bottom quarter of its trunk has been burnt. Timber getting sites are further discussed in Section 4.2.4 .
OCE84/A	756100	6430190	Timber getting/sleeper cutting site (refer to Plate 4.22) comprising an area with evidence of timber offcuts and bark (likely stripped off portions of iron bark) associated with a trench measuring approximately 10 by 5 metres with a mound of spoil at one end. The trench may have been used as a saw pit or to load timber for transportation.
OCE86/A	755700	6429800	Timber getting/sleeper cutting site (refer to Plate 4.23) comprising an area with evidence of iron bark log portions and stripped bark. There is also a trench measuring approximately 9 by 5 metres with a mound of spoil at one end. The trench may have been used as a saw pit or to load timbers for transportation.
OCE94/A	756064	6429828	Timber getting/sleeper cutting site (refer to Plate 4.24) comprising an area with piles of bark, which have been stripped off ironbark log portions and several cut logs associated with a trench measuring approximately 10 by 5 metres with a mound of spoil situated at one end. The trench may have been used as a saw pit or to load timber for transportation.
RV1	756310	6428711	Timber getting site comprising a stockpile of remnant timber offcuts and bark located on either side of a track (refer to Plate 4.25).

Table 4.1 – Potential Heritage Items Identified during the Survey of Project Area (cont)

Site/item name	Location		Site Type/Description
	MGA Easting	MGA Northing	
RV2	756306	6428712	Timber getting site comprising remnant timber offcuts adjacent to a track (refer to Plate 4.26).
CI198/G	756653	6435846	Rock shelter comprising an isolated slab of rock tilted to form a shelter with associated low rough stone built wall (refer to Plate 4.27 and 4.28).
PK96/B	756175	6437912	Rock shelter with potential collapsed low stone wall (refer to Plate 4.29).
ID191	753816	6436485	Large natural rock overhang with historical artefacts including metal and wooden artefacts (pieces of wood and metal derived from horse cart, oven with metal door and metal sheet walls, horse cart mud guard, swindle bar, cart metal bar, 2 x billy cans, 2 x copper barrel rings, wooden boards off the sulky, horse cart side rails, plough hook, spring metal hook to protect the wheel hub, horse cart wooden seat, glass bottles (marked AGMIS106, AGM 1926 1981), whip hook, horse shoe, haymes, buckle with a floral design, rasp for grinding horse hooves, part of wheel-bolt, horse cart axle) (refer to Plate 4.30).
HS96/D	753809	6436494	Natural rock overhang with historical artefacts - associated with site/item ID191.
Echidna Sill	756873	6433564	Three unidentified out of context coins.
HS135	754883	6433538	A number of out of context bottles – possibly associated with a timber getting camp.

4.2 Discussion of Heritage Sites

4.2.1 Old Ulan Village

Old Ulan is the location of early European settlement near Ulan Creek, approximately 5 kilometres north-west of Ulan (refer to **Section 3.4.1**). The site of Old Ulan now consists of the remains of a number of structures (including a hotel, a potential small outbuilding formerly used for storage and another potential dwelling), a ford and roadway, a graveyard, two sets of stockyards and associated fence lines (Haglund 1999) (refer to **Plates 4.1** to **4.5**).

Godden Mackay prepared a conservation study of Old Ulan in 1992. Although likely to have suffered from natural degradation and potentially also human interference, the site appears to have remained how it was when assessed in 1992. The sites are located generally in two discrete areas separated by a small unnamed tributary of Ulan Creek. To the south of the unnamed tributary Godden Mackay identified the remains of several structures including the former hotel (Godden Mackay numbered structure 1, refer to **Plates 4.3** and **4.4**); the remains of which include two stone chimneys and some *in situ* and relocated structural timbers. Other structural remains associated with Old Ulan include the remains of a former outbuilding comprising wooden upright posts and postholes (Godden Mackay numbered structure 2 located approximately 35 metres north-east of structure 1). The following structures are located to the north of the unnamed tributary: a potential former residence (Godden Mackay numbered structure 3/site PK422 located approximately 250 metres north-west of structure 1, refer to **Plate 4.5**), two timber stockyards (one with a gallows), two fords

(one over Ulan Creek the other a small unnamed creek), a graveyard consisting of three graves and timber post and rail fence lines (Godden Mackay 1992). For a detailed description of the surviving structures and fabric of Old Ulan refer to the 1992 Godden Mackay report.

4.2.2 Bobadeen Station

Bobadeen Station is located on the low undulating hills of the dividing range, approximately 6 kilometres north-west of the Cassilis to Mudgee Road (refer to **Section 3.4.2**). A Statement of Cultural Significance was prepared for Bobadeen Station in 1997 (Aitken & Broadley 1997).

The property consists of a number of isolated dwellings and buildings related to the former operation of this large station. The main homestead and associated outbuildings are located on a low treed hill and are accessed from the east. The homestead group of buildings comprises the original slab timber residence, a former kitchen and laundry block, stables, workshop, toilet, carport and a number of other associated structures (refer to **Plates 4.6 and 4.7**). The structures are predominantly of slab or timber construction with corrugated galvanised iron roofs (Aitken & Broadley 1997). The buildings are described in detail in the Aitken & Broadley 1997 report.

While not carrying out a full structural assessment, in 1997 the Aitken & Broadley assessment described the homestead as being in:

...fair to good condition with only minor moisture and damp problems leading to localised damage to some internal walls (Aitken & Broadley 1997:14-15).

The original homestead structure is further described as being:

...intact, in good condition and unusual for the extensive use of sawn slab timbers for a building of this period (Aitken & Broadley 1997:27)

The homestead has deteriorated from when it was last occupied and is considered to be uninhabitable in its current state. The electrical wiring is sub-standard and not compliant. In certain rooms the ceiling has collapsed or the cornices have come away. The moisture and damp problems have increased and there is water damage to parts of the house as a result of the roof leaking. In addition there is evidence of white ants throughout approximately 25 per cent of the house UCML has maintained an active maintenance program around the grounds of the homestead, however age and fatigue in the building fabric is starting to show.

4.2.3 Talbragar Fish Fossil Reserve

AMBS prepared an assessment of the Talbragar Fish Fossil Reserve in 1996.

The reserve includes the majority of a deposit of Jurassic age sediments that contain an abundance of extremely well preserved fish, plant and invertebrate fossils (refer to **Plates 4.10 to 4.12**). The fossils were first discovered in 1889. Collection has taken place ever since and over 100 years a large amount of rock has been removed. The deposit covers an area of approximately 4 hectares (550 by 100 metres) (AMBS 1996). The site is thought to be the erosional remnant of the margin of a small fresh water lake bed deposit, with a thickness no greater than 60 centimetres.

The site itself is inconspicuous, forming a north to south orientated low ridge on the side of a small hill. It is made up of hard cherty shales, characteristically weathered into rectangular slabs (the fossil bearing rock) with concentric iron stained bands. These slabs float over the soil and part readily along bedding planes to reveal perfectly preserved plant and fish fossils.

The first fossil to be described from the locality was an insect specimen, *Cicada Lowei*. A further twelve species of plant fossils have been described from the site, as well as eight species of fish fossils, all of which are unique to the locality (DEWHA RNE listing 465).

The site has been significantly disturbed as a result of two major trenches that have been excavated across the deposit by tertiary education institutions (predominantly Australian National University (ANU)) as part of field investigations in the earlier part of this decade (refer to **Plate 4.11**). Artefacts from this survey are now contained within the Gulgong Pioneer museum which houses an exhibit dedicated to the Talbragar Fish Fossil Reserve and describes the University field trip.

4.2.4 Timber Getting Camps

Intensive logging/clearing is evident as having been undertaken across parts of the project area. Mature growth forests within the project area are missing old growth elements suggesting timber getting has been a feature of the area from the time of European settlement. The 1937 Parish Map of Ulan (refer to **Figure 4.2**) shows a large area of land listed as 'for timber' alongside the Goulburn River, illustrating the continued importance of timber getting in the area.

By the mid 1850s European settlement had been established around the Ulan area (refer to **Section 3.2**). In the 1920s coal mining commenced at Ulan (refer to **Section 3.7**). In 1936 track formation works commenced along the route of the proposed Sandy Hollow to Gulgong rail line (refer to **Section 3.5**). Timber clearing and getting would have been undertaken associated with each of these events. The forests would have been cleared for pastoral and agricultural purposes and the timber utilised for construction, fence posts/property boundaries, mine props and rail sleepers (for both mine and train line).

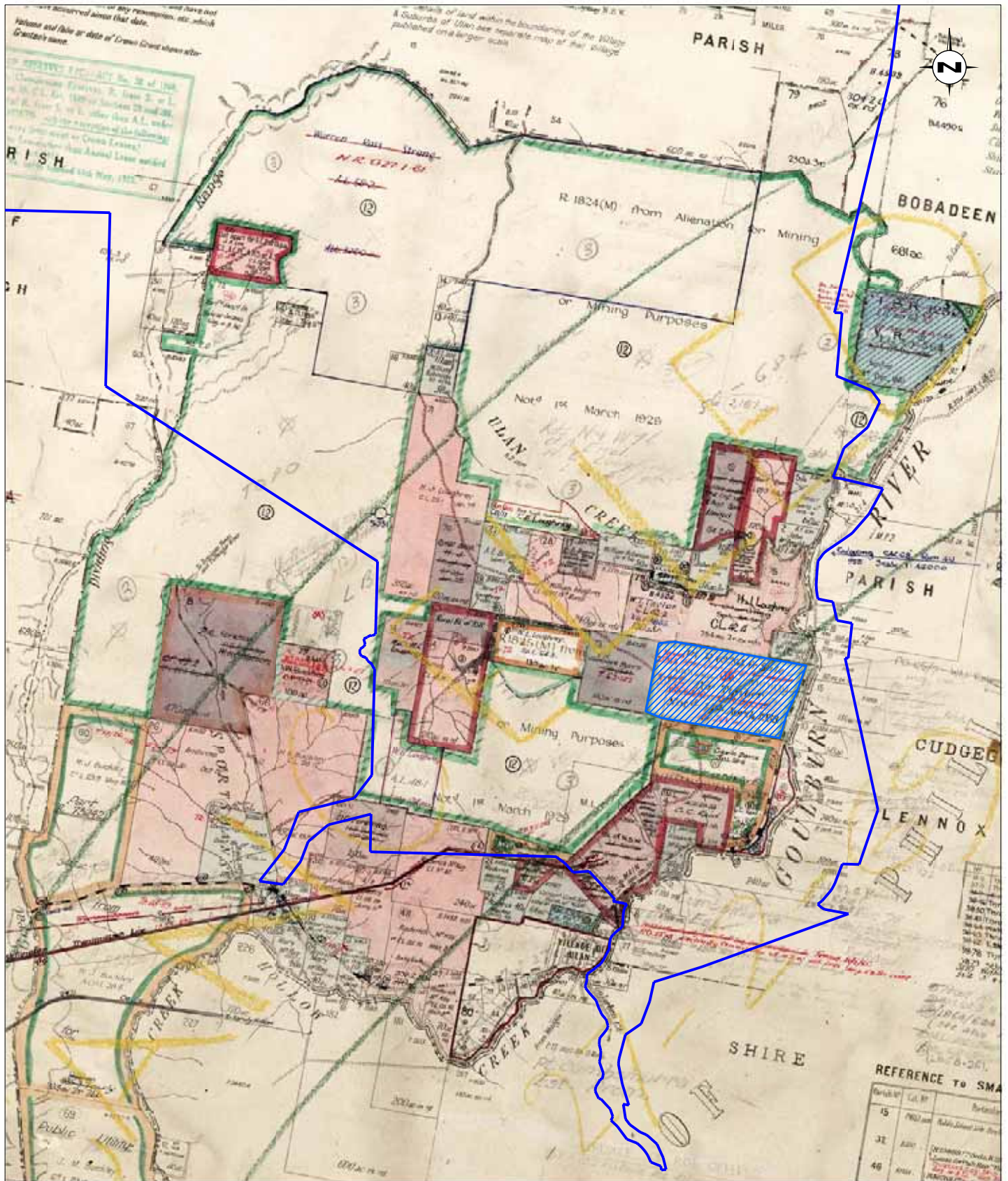
Based on the evidence of the identified timber getting camps (discussed in **Table 4.1**) and knowledge of the past use of the land for timber clearing/getting, there are likely to be other similar, as yet unidentified, areas with evidence of timber getting within the project area. No physical evidence of timber mills has been identified within the project area.

4.3 Summary of Historical, Archaeological and Physical Contexts

The Project area is situated in a rural area, primarily surrounded by rural landholdings, native bushland and primary industries including agriculture, forestry and extractive industries. Grazing is widely spread throughout the surrounding area.

The heritage resource of the project area generally reflects the documented history of the area (discussed in **Section 3.0**) which indicates that the land has predominantly been utilised by graziers, agriculturalists, timber getters and miners. The heritage evidence of the project area demonstrates the documented pattern of settlement and use from the mid nineteenth century, including its settlement by Europeans and subsequent use of the land for pastoral and agricultural activities. Evidence of extant houses and former house sites, former timber getting camps, shelters and dumps of artefacts demonstrate the pattern of land use and historical development of the area.

Sheep and cattle grazing was undertaken across the project area supplemented by agricultural activities with the cultivation of wheat and oat crops on the fertile alluvial flats and Jurassic based soils. The areas of timber clearing identified across the project area reflect both the early land clearing activities and timber getting likely undertaken for building materials, fence posts, mine props and sleepers. While the gold rush had little direct impact



Source: Land & Property Information (2009)

0 1.0 2.0 3km
1:60 000

Legend

- Project Boundary
- Land Listed "for timber"

FIGURE 4.2

1937 Parish Map of Ulan indicating location of Ulan Coal Continued Operations Mine Lease Boundary

on the Ulan area, mining has played an important part in the history of the area from the 1920s.

Any additional, as yet unidentified, heritage items that may be present on the site are likely to be similar to those items described above.

The significance of the potential heritage sites/items discussed above is assessed in **Section 5.0** of this report. The impact of the Project on these items and recommended management strategies to address any heritage impacts is discussed in **Section 6.0**.



Track to be Upgraded

Standing Stone Chimneys
(former hotel)

PLATE 4.1

Aerial photograph of project area showing location of Old Ulan Village
(Photo supplied by SCT Operations Pty Ltd 2008)



PLATE 4.2

View of Old Ulan Village from track proposed for upgrade
(Photo supplied by South East Archaeology 2008)



PLATE 4.3
Detail of remnant stone chimneys of the former hotel of Old Ulan Village
(Photo supplied by SCT Operations Pty Ltd)



PLATE 4.4
Detail of remnant stone chimney of former hotel of Old Ulan Village



PLATE 4.5
View of site/item PK422 – remnant stone chimney bases
associated with Old Ulan Village



PLATE 4.6
View of site/item C107 – Bobadeen Homestead
(photo supplied by South East Archaeology 2008)



PLATE 4.7
View of site/item C107 - timber post built hayshed associated
with Bobadeen Homestead
(Photo supplied by South East Archaeology 2008)



PLATE 4.8
View of site/item PK3 – concrete slab and timber
posts associated with Bobadeen Homestead
(Photo supplied by South East Archaeology 2008)



PLATE 4.9
View of site/item PK5 – windmill associated with Bobadeen Homestead
(Photo supplied by South East Archaeology 2008)



PLATE 4.10
View of Talbragar Fish Fossil Reserve
(Photo supplied by SCT Operations Pty Ltd 2008)



PLATE 4.11

Detail of Talbragar Fish Fossil reserve showing one of two trenches excavated as part of Australian National University (ANU) 2006 field investigations



PLATE 4.12

Detail of Talbragar Fish Fossil Reserve showing the fragments of chert that make up the fossil beds overlying softer strata
(Photo supplied by SCT Operations Pty Ltd 2008)



PLATE 4.13
View of site/item CI33 – Calbunya House site



PLATE 4.14
View of site/item PK 243 (Apple Tree Flat farm complex).
Original mid to late nineteenth century constructed
cottage shown to rear with steeper pitched roof



PLATE 4.15
View of site/item PK 243 (Apple Tree Flat farm complex).
Original mid to late nineteenth century constructed
cottage shown to rear with steeper pitched roof



PLATE 4.16
View of sheds associated with site/item PK 243
(Apple Tree Flat farm complex)



PLATE 4.17
View of site/item RV3 - derelict weatherboard cottage



PLATE 4.18
View of gardens associated with site/item
RV3 - derelict weatherboard cottage



PLATE 4.19
View of site/item C1127 – timber shelter
(Photo supplied by South East Archaeology 2008)



PLATE 4.20
View of site/item RV4 - derelict stockyard complex



PLATE 4.21

View of site OCE80/B - timber getting site
(Photo supplied by South East Archaeology 2008)



PLATE 4.22

View of site OCE84/A - timber getting site
(Photo supplied by South East Archaeology 2008)



PLATE 4.23

View of site OCE86/A - timber getting site
(Photo supplied by South East Archaeology 2008)



PLATE 4.24

View of site OCE94/A - timber getting site
(Photo supplied by South East Archaeology 2008)



PLATE 4.25
View of site/item RV1 - timber getting site



PLATE 4.26
View of site/item RV2 - timber getting site



PLATE 4.27

View site/item C1198/G - natural rock shelter with potential low stone wall
(Photo supplied by South East Archaeology 2008)



PLATE 4.28

View site/item C1198/G - detail of natural rock shelter with potential low stone wall



PLATE 4.29

View of site/item PK96/B – natural rock overhang with potential collapsed stone wall
(Photo supplied by South East Archaeology 2008)



PLATE 4.30

View of site/item ID191 – natural rock overhang with associated historical artefacts

5.0 Significance

5.1 Introduction

An assessment of significance is undertaken to explain why a particular place is important and to enable appropriate site management to be determined.

The Australian ICOMOS *Burra Charter* 1999 (the *Burra Charter*) defines cultural significance as meaning 'aesthetic, historic, scientific or social value for past, present or future generations' (Article 1.2). The *Burra Charter* was written to explain the basic principles and procedures that should be followed in looking after important places. Cultural significance is defined as being present in the 'fabric, setting, use, associations, meanings, records, related places and related objects'. The fabric of a place refers to its physical material and can include built elements, subsurface remains and natural material (Australian ICOMOS *Burra Charter* 1999).

5.2 Basis of Assessment

The *NSW Heritage Manual (1996)*, published by the former NSW Heritage Office and Department of Urban Affairs and Planning, sets out a detailed process for conducting assessments of heritage significance. The manual provides a set of specific criteria for assessing the significance of an item, including guidelines for inclusion and exclusion.

The seven criteria defined by the Heritage Branch, DoP, and used by the NSW Heritage Council as an assessment format within NSW are outlined below:

Criterion (a) an item is important in the course, or pattern, of NSW's cultural or natural history;

Criterion (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 cultural or natural history;

Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;

Criterion (d) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;

Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history;

Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history; and

Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments.

The following significance assessment is based upon the above seven criteria.

As a component of the holistic concept of significance, archaeological significance has been described as a measure by which a site may contribute knowledge, not available from other sources, to current research themes in historical archaeology and related disciplines (Bickford & Sullivan, 1984 19-26; Sullivan & Bowdler 1984). Archaeology is concerned with

material evidence and the archaeological record may provide information not available from other sources. An archaeological study focuses on the identification and interpretation of material evidence to explain how and where people lived, what they did and the events that influenced their lives.

Considerations material to the study of the archaeology include:

- whether a site, or the fabric contained within a site, contributes knowledge or has the potential to do so. If it does, the availability of comparative sites and the extent of the historical record should be considered in assessing the strategies that are appropriate for the management of the site; and
- the degree and level at which material evidence contributes knowledge in terms of 'current research themes in historical archaeology and related disciplines'.

Following Bickford and Sullivan's work on archaeological significance (1984, 19-26) the following questions can be used as a guide to assessing the significance of an archaeological site:

- Can the site contribute knowledge that no other resource can?
- Can the site contribute knowledge that no other site can?
- Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

The Heritage Council of NSW recognises four levels of significance for heritage in NSW: Local, State, National and World. An item has local heritage significance when it is important to the local area. An item has state heritage significance when it is important in NSW. Most heritage in NSW is of local significance.

The significance of the project area as a whole is considered in the Statement of Cultural Significance in **Section 5.5**.

5.3 Significance of the Heritage Sites within the Project Area

The heritage significance of the known heritage sites of Old Ulan, Bobadeen and the Talbragar Fish Fossil Reserve has already been established and is discussed in **Section 5.3.1**. The potential heritage sites/items identified during the site survey are assessed in **Section 5.3.2**.

5.3.1 Known Heritage Sites

5.3.1.1 Old Ulan

Godden Mackay (1992) assessed the site of Old Ulan (discussed in **Sections 3.4.1** and **4.2.1**) to be a place of considerable heritage value. The significance of the site was summarised in the 1992 Godden Mackay report as:

The Old Ulan remains provide physical evidence of early settlement in the district and make the site an evocative place of historic and social interest within the surrounding rural landscape. The location and nature of the site reveals much about early settlement and communication patterns. The surviving structures evidence early vernacular building

technologies. The entire complex has great potential as an archaeological site, which may yield information about Australian history that is not available from other sources (Godden Mackay 1992:19).

In their 1992 conservation study of Old Ulan, Godden Mackay concluded that while the site of Old Ulan is not listed on any heritage register it is recognised as a heritage site/item with heritage significance and as such the fabric of the site is covered by the 'relics' provisions of the *NSW Heritage Act 1977* (Godden Mackay 1992:20).

5.3.1.2 Bobadeen Station

A Statement of Cultural Significance for Bobadeen Station was prepared in 1997 (Aitken & Broadley 1997) and concluded that:

Bobadeen Homestead is an early timber homestead significant to Merriwa Shire and the adjacent Shires of the region, built at the turn of the century, later extended and still largely intact retaining much of its original form and material. It has strong historic and technical/research significance values and some aesthetic values (Aitken & Broadley 1997:33).

In addition, the Aitken & Broadley report identified the importance of the visual setting and curtilage of Bobadeen Station. From the identified significance of Bobadeen Station the Aitken & Broadley 1997 report identifies the following curtilages that should be considered:

- Relationship between homestead and its pastoral landscape including important views to the homestead from the approach road, the dry stone wall entry point and the entrance drive.
- The spaces contained by the house fences, approach driveway, the tennis court, the front, side and rear gardens, and the outbuildings including the corrals. This curtilage enables an understanding of the functioning and use of a working homestead and its grounds.
- The immediate area around the buildings. This curtilage enables the interpretation and understanding of the significance of the structures and their specific methods of construction (Aitken & Broadley 1997).

5.3.1.3 Talbragar Fish Fossil Reserve

AMBS prepared an assessment of the Talbragar Fish Fossil Reserve in 1996. The assessment identifies that scientifically the site is very important as it is the most significant Jurassic terrestrial fossil deposit in Australia with the potential for the discovery of otherwise unknown species. As a result of its scientific significance the site is listed on the Register of the National Estate. Percival (1985) claims the site is of highest significance to the geological heritage of New South Wales.

The 1982 Register of the National Estate listing for Talbragar Fish Fossil Reserve states that the reserve:

...is an internationally significant site as an example of a Jurassic fresh water lake deposit. It exhibits a high diversity of fossils including twelve species of plant fossils, of which three are new. Eight species of fish fossils, dominated by *LEPTOLEPIS TALBRAGARENSIS*, are found only in this place. A perfectly preserved insect fossil *CICADA? LOWEI* has also been found here. The place is a type locality and palaeontological research site.

It is possible that cultural values, both Indigenous and non Indigenous, of National Estate significance may exist in this place. As yet, the Australian Heritage Council has not identified, documented nor assessed these values (DEWHA RNE listing 465).

5.3.2 Potential Heritage Sites/Items

The potential and known heritage sites/items of the project area (refer to **Section 4.0**) are assessed in **Table 5.1**.

Table 5.1 - Statement of Significance

Heritage Branch Standard Criteria	Statement of Significance
Criterion (a) Historical	<p>The project area demonstrates the pattern of settlement and use of the area from the mid nineteenth century, including its settlement by Europeans and subsequent use of the land for pastoral and agricultural activities through to its exploitation for timber and mineral resources.</p> <p>Evidence of extant houses (the original portion of the house at Apple Tree Flat (site/item PK243) could date to as early as the mid 1800s), timber getting camps, shelters and dumps of artefacts demonstrate the pattern of land use and historical development of the area. However, the potential heritage sites/items identified within the project area are unlikely to provide information not already known from the historical record.</p>
Criterion (b) Associative	<p>The project area has associations with several prominent families in the region (including the McDonald, Robinson and Crossing families).</p> <p>However, while the project area has this associative significance due to its land tenure history, the potential heritage items/sites identified within the project area are unlikely to provide evidence of these associations.</p>
Criterion (c) Aesthetic	<p>The potential heritage sites/items identified within the project area do not generally demonstrate distinctive aesthetic qualities or technical innovations, other than those typical of buildings and features found in rural areas characterised by rural landholdings, native bushland and primary industries including agriculture, forestry and extractive industries.</p> <p>The standing ruins at Old Ulan has ...distinctive aesthetic qualities as a picturesque and evocative ruin which provides a focal point of historic interest within the surrounding rural landscape (Godden Mackay 1992:18).</p> <p>The study area may demonstrate some aesthetic significance as a rural landscape through the creation of a pastoral landscape via the clearing of the native vegetation. In parts of the area the clearing to create a grassed landscape for grazing is still evident today.</p>
Criterion (d) Social	<p>The project area demonstrates the pattern of settlement and development in the area from the mid nineteenth century, and is typical of a large rural landscape within the wider regional area. It would be considered unlikely that the area would have a strong association with any previous or contemporary community or group. Accordingly, the potential heritage sites/items identified within the project area do not meet this criterion.</p>

Table 5.1 - Statement of Significance (cont)

Heritage Branch Standard Criteria	Statement of Significance
Criterion (e) Scientific	<p>There are unlikely to be any intact archaeological remains associated with any of the extant structures on the site, with the exception of Old Ulan (refer to Section 5.3.1.1). A high degree of intactness in the archaeological resource is necessary before a substantive contribution can be made to the research potential and hence, the ability of the archaeological resource to answer research questions for the site. Generally any remains that may be present (with the exception of Old Ulan) would be unlikely to have any research potential and would at best provide only a minor contribution to the significance of the area.</p> <p>The timber getting camps support the known history of timber getting in the area and are unlikely to provide any additional information to that already known for the area.</p> <p>The artefacts identified associated with a rock overhang are likely to comprise a dump artefacts/rubbish and are out of context and as such may only have limited research potential regarding the use of horse and carts in the area, possibly associated with the timber clearing.</p> <p>With the exception of Old Ulan and the Talbragar Fish Fossil Reserve, potential heritage sites/items extant in the project area are typical of the area as a large rural landscape and are unlikely to provide further unknown information regarding the area's history and development.</p> <p>Old Ulan has been identified as having</p> <p style="padding-left: 40px;">...great potential as an archaeological site, which may yield information about Australian history that is not available from other sources (Godden Mackay 1992:19).</p> <p>The Talbragar Fish Fossil Reserve is very important scientifically as it is the most significant Jurassic terrestrial fossil deposit in Australia with the potential for the discovery of otherwise unknown species (ABMS 1996:2)</p>
Criterion (f) Rarity	<p>With the exception of the Talbragar Fish Fossil Reserve the potential heritage sites/items identified within the project area are typical of structures and other sites/items typically found within rural landscapes such as that of the project area and are unlikely to meet this criteria.</p>
Criterion (g) Representativeness	<p>With the exception of the Talbragar Fish Fossil Reserve the potential heritage sites/items identified within the project area are representative of the structures items/sites typically found in a rural landscape with a history of pastoral and agricultural activities and the exploitation of timber and mineral resources.</p>

With the exception of the potential archaeological resource of Old Ulan (refer to **Section 5.3.1.1**) and the out of context dump of artefacts (ID191) and isolated finds (HS135 and Echidna Sill) no potential historical archaeological resource has been identified within the project area. The archaeological significance of Old Ulan has been established through Godden Mackay's 1992 Conservation Study. The dump of artefacts (ID191) and isolated finds (HS135 and Echidna Sill) are out of context, unlikely to provide information not already known about the project area and as such have no or limited research potential. As a result, the three questions derived from Bickford and Sullivan's work on archaeological significance (discussed in **Section 5.2**) have not been further considered as part of this significance assessment.

5.4 Condition and Integrity

This section addresses matters that combine with the assessment of significance to allow a formal Heritage Impact Statement to be appropriately validated. The heritage significance of the sites/items within the project area is assessed on the basis of their condition and integrity. *Condition* considers the physical state of the fabric of the resource and its potential for survival. *Integrity* observes the degree to which the residual material evidence is an appropriate representation of the site/relic/object in its original form.

5.4.1 Condition

The condition of potential and known heritage site/items that have been identified above is assessed on a five-stage scale, that is to say:

- (i) *intact*, where the material evidence allows a complete recording of the resource without archaeological hypothesis;
- (ii) *substantially intact*, where the material evidence is incomplete but the recording of material evidence will be sufficient to allow an accurate archaeological reconstruction, with hypotheses based on the archaeological record only;
- (iii) *standing ruin*, where the material evidence is incomplete and the recording of material evidence will be sufficient to define the footprint of the site/item and some of its elevations and features but will be insufficient to allow an accurate archaeological reconstruction of the site/object/place without hypotheses based on the archaeological record and on a range of outside sources;
- (iv) *ruin*, where the material evidence is incomplete and the recording of material evidence may be sufficient to define part, or the whole, of the footprint of the site/item but will be insufficient to allow an archaeological reconstruction of its features, perhaps spatially and certainly vertically, without hypotheses based on the archaeological record and on a range of outside sources, and in circumstances where the validation of the reconstruction cannot be assured; and
- (v) *archaeological site*, implying a mostly sub-surface residue, where the material evidence suggests the former presence of an archaeological site that cannot be defined without sub-surface investigation.

5.4.2 Integrity

The integrity of potential and known heritage site/items that have been identified above is assessed on a five-stage scale, that is to say:

- (i) *Intact*, where the site/item has remained virtually unchanged in its form and/or design and/or function can be totally discerned from the material evidence;
- (ii) *Minor Modification*, where the site/item has been modified or deteriorated cosmetically and/or in a manner that does not inhibit the discernment of its form and/or design and/or function by archaeological interpretation of the material evidence;
- (iii) *Material Modification*, where the site/item has been modified so that its form and/or design and/or function cannot be discerned only by archaeological interpretation and without reference to external sources;
- (iv) *Major Modification*, where the site/item has been so modified that attempted discernment of its form and/or design and/or function cannot be achieved by

archaeological interpretation of the material evidence and requires a heavy reliance on external sources and in circumstances where discernment of one or more elements may be equivocal; and

- (v) *None*, where the integrity of the site/item has been completely destroyed and the evidence for its form and/or design and/or function is totally external.

5.4.3 Condition and Integrity of Assessed Items

The condition and integrity of the known and potential heritage sites/items within the project area are summarised in **Table 5.2**.

Table 5.2 - Summary of Condition of Known and Potential Heritage Sites/Items in the Project Area

Site/item	Level of Significance	Condition	Integrity
Old Ulan Village and site/item PK422	Local	Ruin/archaeological site	Material modification
Bobadeen Station/Homestead (Site/item C107)	Local	Substantially intact	Minor modification
PK3	Nil-Local (as part of Bobadeen Station)	Substantially intact	Minor modification
PK5	Nil-local (as part of Bobadeen Station)	Intact	Intact
Talbragar Fish Fossil Reserve	State/National	Substantially intact	Minor modification
CI33	Nil-local	Intact	Intact
PK243	Local	Intact	Intact
RV3	Nil-local	Standing ruin	Minor modification
CI127	Nil	Intact	Intact
RV4	Nil-local	Standing ruin	Minor modification
HS63	Nil-local	Substantially intact	Minor modification
CC6	Nil-local	Substantially intact	Minor modification
MM273	Nil-local	Substantially intact	Minor modification
OCE80/B	Nil-local	Substantially intact	Minor modification
OCE84/A	Nil-local	Substantially intact	Minor modification
OCE86/A	Nil-local	Substantially intact	Minor modification
OCE94/A	Nil-local	Substantially intact	Minor modification
RV1	Nil-local	Substantially intact	Minor modification
RV2	Nil-local	Substantially intact	Minor modification
CI198/G	Nil-local	Substantially intact	Minor modification
PK96/B	Nil-local	Substantially intact	Minor modification
ID191	Nil-local	Intact	Intact
HS96/D	Nil-local	Intact	Intact
Echidna Sill	Nil	Intact	Intact
HS135	Nil	Intact	Intact

5.5 Summary Statement of Significance

The project area is typical of a rural landscape within the Central Tablelands of NSW. The history of the area from the mid nineteenth century, including its settlement by Europeans and subsequent use as cleared pastoral and agricultural land, through to its exploitation for timber and mineral resources, is reflected in the low potential of the archaeological resource and in the evidence of houses and other structures/shelters, timber getting sites, and dumps of artefacts present within the project area.

In general terms, with the exception of Old Ulan Village, Bobadeen Station/Homestead, Apple Tree Flat farm complex and the Talbragar Fish Fossil Reserve, the identified and potential heritage components of the site are of nil to low local significance with nil to low research potential. Old Ulan, Bobadeen Station/Homestead and the Apple Tree Flat farm complex have been assessed as being of local significance. Talbragar Fish Fossil Reserve has been assessed as being of State or National significance.

6.0 Heritage Impact Statement and Management Strategy

This section provides a heritage impact statement and management strategy for the potential heritage sites/items within the study area. The heritage impact statement identifies the potential impact of the Project (including subsidence, open cut mining and construction of surface infrastructure) on all known and potential heritage sites/items identified within the project area. The impacts are assessed against the significance of the respective elements.

SCT Operations Pty Ltd (SCT) in 2009 assessed the subsidence impacts from longwall mining on historic heritage items and natural heritage sites within the project area (SCT 2009). The SCT report has been used to assess the potential heritage impacts of the Project.

Figure 4.1 shows the conceptual mine plan (including locations of longwalls, proposed open cut extension and infrastructure corridors) in relation to the locations of the known and potential heritage sites/items.

6.1 Ulan Coal - Continued Operations Project

6.1.1 Longwall Underground Mining

As detailed in **Section 2.0** and illustrated on **Figure 4.1**, the Ulan Coal - Continued Operations Project involves underground mining within the Ulan West and Ulan No. 3 mines utilising the retreat longwall method of mining with a panel width of approximately 400 metres.

6.1.1.1 Summary of the Predicted Subsidence Movements

The following summary of predicted subsidence movements has been taken from the SCT (2009) report.

Maximum subsidence is estimated based on previous subsidence monitoring at Ulan and elsewhere in the Western Coalfield. Predictions of strains and tilts are based on the empirical relationships developed from the results of subsidence monitoring at Ulan Coal Mine and in the Western Coalfield (Holla 1991) generally.

Subsidence monitoring at Ulan indicates that the longwall panels are likely to be predominantly of supercritical width with the maximum subsidence controlled primarily by goaf reconsolidation and not panel geometry. Previous monitoring, especially recent monitoring of Longwalls 23 and 24 and Longwall W1 at Ulan No. 3 mine indicates that maximum subsidence varies typically between 0.9 metres and 1.3 metres as a result of variations in goaf reconsolidation.

For a nominal mining section of 2.9 metres, the maximum subsidence over the project area is expected to be in the range of 0.9 to 1.5 metres (1.4 metres typical in Ulan No. 3 mining area and 1.2 metres typical in Ulan West mining area) with the possibility of increasing up to 1.6 metres, particularly at the southern end of the first three Ulan West longwall panels. Subsidence over the chain pillars is expected to increase with overburden depth ranging from 0.2 metres in shallow areas of Ulan West and over the isolation barrier pillar in Ulan No. 3 mine and up to approximately 0.8 metres in the deeper areas of Ulan No. 3 mine over the normal chain pillars. Subsidence over each panel is likely to be substantially complete once the panel has been mined, but additional subsidence will occur when the next longwall panel is mined, mainly within 100 to 150 metres of the intermediate chain pillar.

Maximum tilts of 10-20 mm/m are expected over most of the mining area for overburden depth greater than 150 metres, increasing to 20-40 mm/m in areas where the overburden is less than 150 metres, but greater than 120 metres, and to 40-120 mm/m where the overburden depth is less than 120 metres at the southern end of the Ulan West longwall panels.

Over the centre of each longwall panel, tilt is likely to be transitory, although some low levels of residual tilt may remain, particularly in the shallower areas. Tilt is likely to be permanent over the solid goaf edges and be greater over the start and finish of each longwall panel. As each subsequent longwall panel is mined, there is likely to be additional vertical subsidence over the intermediate chain pillar between panels so the permanent tilt along the chain pillar edge is likely to reduce as a result of mining the adjacent panel.

Systematic horizontal ground movements are expected to occur in a direction toward the goaf and then in the direction of mining once the longwall face has passed. The magnitude of systematic horizontal movements is typically less than 150 millimetres in total.

Maximum horizontal strains of 5-15 mm/m are expected over most of the proposed mining area. Strains up to 50 mm/m are expected to occur in areas of less than 120 metres overburden depth at the southern end of the first few Ulan West longwall panels.

Permanent tension cracks are expected around the edges of each panel and along the tops of topographic highs. Tension cracks are expected to be greatest at the start of each panel and most apparent on hard surfaces. They may also occur at regular intervals along the centre of the panel interspersed with compression humps. Previous experience indicates that cracks are generally less than 250 millimetres wide where the overburden is 80 metres thick, 100 millimetres wide at overburden depths of 150 metres and less than 40 millimetres at overburden depths of 250 metres. Cracks are likely to be generally more perceptible in areas of low overburden depth, especially near the southern end of the first few longwall panels in the Ulan West mining area where they may reach 250 mm wide parallel to the chain pillar edges. Permanent compression humps are expected at topographic lows such as drainage channels and at regular intervals along the panel.

6.1.2 Open Cut Mining

As detailed in **Section 2.1** and illustrated on **Figure 4.1**, the Project involves an area of open cut mine to the west of the current open cut.

6.1.3 Surface Infrastructure

As detailed in **Section 2.1.2** and illustrated on **Figure 4.1** (which shows the combined disturbance footprint for surface supporting infrastructure such as but not limited to road, pipeline and power infrastructure), the Project will require the construction of a number of surface infrastructure facilities to support the operation of the open cut and underground mines.

6.2 Potential Impact of the Project and Management Strategies

This section addresses the potential impacts resulting from either the proposed longwalls, open cut extension or construction of surface infrastructure to each of the identified site/items and proposes a management strategy to mitigate any impacts.

6.2.1 Old Ulan Village and site PK 422

Comparison of photographs taken by Haglund in 1981, Godden Mackay in 1992 and the site today suggest Old Ulan Village is continually deteriorating.

In their 1992 conservation study of Old Ulan, Godden Mackay identified that any construction works (including any works in infrastructure corridors) in the vicinity of Old Ulan would have a number of impacts on the integrity, safety and significance of the site. The assessment concluded that any works would likely diminish the significance of the site and would likely require approvals (or exceptions from the need for approval) under the Heritage Act (Godden Mackay 1992).

Subsidence

The main area of Old Ulan Village is located more than 45 metres away from the goaf edge of the first longwall panel of Ulan West (refer to **Figure 4.1**). The remnant stone chimneys are located outside of a protection barrier defined by an angle of draw of 26.5° from the nearest goaf edge. The chimneys are not likely to be perceptibly impacted by mining subsidence (SCT 2009). The other associated remains of the main area of Old Ulan (including a small outbuilding, a ford and roadway, a graveyard, two sets of stockyards and associated fence lines) are expected to be tolerant of the low levels of subsidence movement expected (SCT 2009).

The remnant chimney bases of Site PK422 are located within the boundary of Ulan West mine Longwall 1 (W1). The full range of subsidence (ranging from between 0.9 and 1.3 metres) is expected at this site. Surface cracking (up to 250 millimetres wide) may also occur during the period of active mining, however the cracks are likely to substantially close again as the mining passes the site (SCT 2009). As the cracks are likely to close again following mining works there is unlikely to be any remediation work, except possible localised filling of cracks, required in the area following mining. No impacts are expected from this low level of remediation.

Infrastructure Works

Proposed infrastructure works include the upgrading of existing tracks, one of which runs through Old Ulan Village (refer to **Figure 4.1** and **Plate 4.1** which shows an aerial photograph of Old Ulan illustrating the location of the track in relation to the standing stone chimneys). The track is located approximately 25 metres to the west of the two stone chimneys of the former hotel (Godden Mackay structure 1, refer to **Plate 4.1**). The proposed upgrade works are likely to comprise the resurfacing of the existing track and the excavation of drainage channels approximately 1 metre either side of the track. Although the track is likely to be resurfaced and its level raised, it would remain within its existing footprint. All upgrade works, including resurfacing and drainage channels, will occur within the existing easement of the track. There is unlikely to be any direct impact to the remains of the standing stone chimney structure. There is also unlikely to be any impact to any potential archaeological deposits associated with Old Ulan, including the artefact scatters identified by the 1992 Godden Mackay report, as all works are proposed to be undertaken within the existing track easement.

Heritage Impact Statement

Old Ulan Village has been assessed as having Local significance with great potential as an archaeological site.

There is not expected to be any direct impacts on the main area of Old Ulan Village. SCT assessed that the standing stone chimneys are not likely to be perceptibly impacted by

mining subsidence (SCT 2009). However, the site is continually deteriorating and will continue to deteriorate. Although unlikely, any acceleration or change in the degradation of the site resulting from mining subsidence would have an impact on the heritage significance of the site.

The form and fabric of the remnant stone chimney bases (site/item PK422) may be impacted by subsidence and cracking.

Recommendation

The site of Old Ulan Village should be archivally recorded to Heritage Branch, DoP standards prior to longwall mining within 100 metres of the structure.

A Conservation Management Plan or Strategy should be prepared for the site of Old Ulan to ensure appropriate short and long term management strategies are determined.

A maintenance strategy should be developed as part of this Conservation Management process, prior to longwall mining within 100 metres of the structure, including routine inspections by the UCML Environment & Community Manager, or their delegate, when mining is within 100 metres of the structure.

The archival record should be used as a maintenance guide should degradation be observed during the mining period.

6.2.2 Bobadeen Station/Homestead (site CI07) and associated sites PK3 and PK5

Subsidence

The homestead building (site CI07) is located over a chain pillar approximately 70 metres from the eastern ends of Longwalls W4 and W5 (refer to **Figure 4.1**). The overburden depth at the site is approximately 250 metres. The location of a structure over a chain pillar rather than within the boundary of a longwall substantially reduces the impacts on the structure. Mining of Longwalls W4 and W5 is expected to cause vertical subsidence at the homestead of approximately 300 millimetres, ground strains of less than 2 mm/m and tilts less than 3 mm/m. The 2009 SCT report assesses that these strains and tilts may be perceptible on the concrete pathways and brick/concrete tank stand but are unlikely to change the character of the Homestead building and its associated sheds/outbuildings or the rate of ongoing deterioration of these structures.

Site PK3 (shed and associated concrete slab) is located over Longwall W5 approximately 40 metres north of the chain pillar (refer to **Figure 4.1**). Subsidence of up to 900 millimetres is expected at the completion of Longwall 5W. Permanent tilts of 5 mm/m, horizontal strains of 2 mm/m and surface cracking less than 40 millimetres wide are expected in the area, which may result in the cracking and slight tilting of the concrete slab (SCT 2009). The SCT 2009 report concluded that given the rustic construction of PK3, any cracks are unlikely to significantly change the character of the building, its ongoing use or the rate of ongoing deterioration.

Site PK5 (windmill) is located over the central Longwall W4 (refer to **Figure 4.1**). While the windmill structure is expected to experience the full range of subsidence movements, the structure itself is expected to be able to accommodate the horizontal movements and transitory tilts. The bore from which it pumps is likely to shear off so that the windmill pump becomes inoperable (SCT 2009). This bore is currently in an inactive state and is not utilised for the supply of a water resource.

Infrastructure Works

The proposed infrastructure disturbance footprint is located approximately 400 metres to the east and 700 metres to the south of Bobadeen Homestead (refer to **Figure 4.1**). The 1997 Aitken & Broadley report identified three visual settings/curtilages that would need to be considered when assessing impacts to Bobadeen Homestead:

- Relationship between the homestead and its pastoral landscape including important views to the homestead from the approach road, the dry stone wall entry point and the entrance drive.
- The spaces contained by the house fences, approach driveway, the tennis court, the front side and rear gardens, and the outbuildings including the corrals. This curtilage enables an understanding of the functioning and use of a working homestead and its grounds.
- The immediate area around the buildings. This curtilage enables the interpretation and understanding of the significance of the structures and their specific methods of construction (Aitken & Broadley 1997).

The Burra Charter defines setting as ‘the area around a place, which may include the visual catchment (Definitions, Articles 1.12). The Charter’s Conservation Principles for Setting (Article 8) expand on the definition:

Conservation requires the retention of an appropriate visual setting and other relationships that contribute to the cultural significance of the place.

New construction, demolition, intrusions or other changes which would adversely affect the setting or relationships are not appropriate (Marquis-Kyle1992).

The proposed infrastructure disturbance footprint is outside the curtilage identified by the Aitken & Broadley report as being necessary to interpret the functioning and use of the homestead and its grounds (Aitken & Broadley 1997:37).

The important views to the homestead from the approach road, the dry stone wall entry point and the entrance drive identified by Aitken & Broadley would not be impacted by the proposed infrastructure corridor as the corridor is located to the east and south of the approach road, sandstone wall and entrance drive.

The significance of Bobadeen as assessed in the Aitken & Broadley report comes from its historical significance as one of the oldest and largest properties in the area and its associations with the prominent Crossing family. The homestead was assessed as having the ability to illustrate the historical development and continuity of land use patterns in the area. The fabric of the homestead and its outbuildings provide excellent and rare examples of early Australian rural construction materials and techniques. The slab timber and weatherboard constructed buildings were also assessed as having aesthetic significance with uses for research and education. The gardens and landscaping were also considered in the statement of significance.

While the proximity of the infrastructure corridor may have a minor impact on the views of the surrounding property from the homestead, the proposed infrastructure is temporary and unlikely to detrimentally impact on the heritage significance of Bobadeen as assessed by the Aitken & Broadley report.

Heritage Impact Statement

Bobadeen Homestead has been assessed as having local significance. It has strong historic and technical/research significance values and some aesthetic values (Aitken & Broadley 1997).

There may be minor impacts as a result of subsidence to the fabric of the homestead (the two brick built chimneys, internal features, concrete pathways and the tank).

The construction of the infrastructure corridor may have a minor impact on views to and from the homestead. However, this is unlikely to impact on the assessed heritage significance of Bobadeen Homestead.

Although some cracking of the concrete slab may occur as a result of subsidence, tilts and strains, there are unlikely to be any significant impacts to the heritage significance of site PK3 as a result of the project.

There are unlikely to be any significant impacts to site PK5 or its heritage significance as a result of the project.

Recommendation

The Homestead and its associated structures/elements should be archivally recorded to Heritage Branch, DoP standards prior to any subsidence impact at this site. Archival recording should identify whether there is any evidence of an earlier structure, potentially dating to the original land grant in 1881, within the extant building.

6.2.3 Talbragar Fish Fossil Reserve

Subsidence

The Talbragar Fish Fossil Reserve is located within the northern part of the Ulan West mining area (refer to **Figure 4.1**). SCT's 2009 subsidence assessment reported that mining subsidence is expected to cause lowering of the ground surface and possible surface cracking. Given the fragmented nature of the rock and the low strength of the underlying strata (the fragments of chert making up the fossil beds appear to lay in a bed on top of softer strata), the SCT assessment considered it likely that mining subsidence movements would be accommodated without significant disturbance to the fossil beds (SCT 2009).

In addition, the AMBS 1996 assessment of the Talbragar Fish Fossil Reserve concluded that the rock is hard and durable and because there is no bedrock outcrop and only float blocks it would be expected that any cracking and fissuring as a result of subsidence will have no effect on the fossil deposit. The 1996 report assessed the main potential impact to the site as being from illegal collecting.

The AMBS report stated that as long as:

...the site was secured with appropriate fencing together with suitable signage in order to inhibit illegal collectors from gaining access, there would be no reason to recommend against mining beneath the reserve (AMBS 1996).

Heritage Impact Statement

Mining subsidence movements will be accommodated without significant disturbance to the fossil beds or their heritage significance.

While the subsidence movements will result in a change in elevation to the location of the Talbragar Fish Fossil Reserve and possible cracking of the ground surface, these movements are expected to be accommodated without significant disturbance to the fish fossil beds because of their already fragmented nature. These changes are not predicted to be important, notable or of consequence or result in either direct or indirect impacts on the existing character or heritage values of the site. The impacts on the Talbragar Fish Fossil Reserve are therefore not considered to be significant.

The Talbragar Fish Fossil Reserve is located within a fenced and secure site and there is unlikely to be any impacts as a result of illegal collectors during the mining period.

Recommendation

Following completion of the Project, the Talbragar Fish Fossil Reserve should be secured with appropriate fencing and suitable signage.

6.2.4 Site/Item CI33 - Weatherboard and Corrugated Iron Clad Cottage

Subsidence

Site CI33 is located approximately 100 metres north of the northern goaf edge of Longwall 32 (refer to **Figure 4.1**). The overburden depth is approximately 330 metres at this location. The structure is expected to experience up to 40 millimetres of vertical subsidence and imperceptible tilts and strains. No perceptible impact on the structure is expected as a result of mining (SCT 2009).

Infrastructure Works

The proposed infrastructure disturbance footprint is located approximately 65 metres to the south of site CI33 (refer to **Figure 4.1**). Any significance the cottage may have is likely to derive from its historical context and the integrity of its materials rather than any views to and from the cottage. The proposed infrastructure corridor is unlikely to impact on the potential local heritage significance of the cottage.

Heritage Impact Statement

There are unlikely to be any significant impacts, resulting from subsidence or the proposed infrastructure corridor, to site CI33 or its heritage significance during the proposed mining period.

Recommendation

No further management of site CI33 is required during the proposed works.

6.2.5 Site/Item PK243 - Rural Farm Complex

Subsidence

Site PK243 is located approximately 300 metres east of the eastern end of Longwall 29 (refer to **Figure 4.1**). No perceptible subsidence movements are expected in this location (SCT 2009).

Infrastructure Works

Site PK243 is located within the current proposed infrastructure disturbance footprint (refer to **Figure 4.1**). Any significance associated with the complex is likely to derive from its historical context and the integrity of its materials. The site is likely to be substantially impacted during the construction of the current proposed infrastructure corridor.

Heritage Impact Statement

There are unlikely to be any significant impacts, resulting from subsidence to site PK243 or its heritage significance during the proposed mining period.

The construction of the infrastructure corridor in its current proposed alignment is likely to substantially impact the fabric and thus heritage significance of this site.

Recommendation

The proposed infrastructure corridor should be realigned during the detail design phase to avoid impacting the farm complex. This is considered achievable given the infrastructure at this location is pipelines, road and power services, all of which can be readily realigned at this location to avoid any impacts.

Should any other potential impacts be proposed to this property during the Project, further assessment should be undertaken, including detailed historical research and historical land title searches.

6.2.6 Site/Item RV3 – Homestead Complex

Subsidence

Site RV3 is located near the edge of Longwall 1 of Ulan West mine (refer to **Figure 4.1**) and will be subject to mining subsidence movements which are not expected to be perceptible in the context of the existing condition of this site.

Infrastructure Works

Site RV3 is located within the current proposed infrastructure disturbance footprint (refer to **Figure 4.1**). The site is likely to be substantially impacted during the construction of the current proposed infrastructure corridor.

Heritage Impact Statement

The structures at the site are standing ruins with little integrity. Any deterioration as a result of subsidence is unlikely to impact any heritage significance of the site.

The construction of the infrastructure corridor in its current proposed alignment is likely to substantially impact the fabric of this site.

Recommendation

If possible, the proposed infrastructure corridor should be realigned during the detail design phase to avoid impacting the complex. This is considered achievable given the infrastructure at this location is pipelines, road and power services, all of which can be readily realigned at this location to avoid any impacts.

6.2.7 Site/Item CI127 - Small Timber Built Shelter

Subsidence

Site CI127 is located over Longwall W10 and is expected to experience the full range of subsidence movements and the area may experience some permanent cracking (refer to **Figure 4.1**). As a result of the small size of the structure, it is unlikely to be significantly affected by mining subsidence movements. Some permanent cracking through the area is possible (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site during the proposed mining period.

Recommendation

No further management of site CI127 is required during the proposed works.

6.2.8 Site/Item RV4 - Stockyards

Subsidence

Site RV4 is located within the northern part of the Ulan West mining area (refer to **Figure 4.1**). The site will experience mining subsidence movements which are not expected to be perceptible in the context of the existing condition of this site.

Heritage Impact Statement

There are unlikely to be any significant impacts to this site or its heritage significance during the proposed mining period.

Recommendation

No further management of site RV4 is required during the proposed works.

6.2.9 Site/Item HS63 - Timber Getting Site

Subsidence

Site HS63 is located close to the chain pillar at the western boundary of Ulan West mine (refer to **Figure 4.1**). The full range of subsidence movements are expected at this site. However, the site is not expected to be sensitive to subsidence and no perceptible impact is expected (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site or its heritage significance during the proposed mining period.

Recommendation

No further management of site HS63 is required during the proposed works.

6.2.10 Site/Item CC6 - Timber Getting Site

Subsidence

Site CC6 is located over Longwall W8 (refer to **Figure 4.1**). The full range of subsidence movements are expected at this site. However, the site is not expected to be sensitive to subsidence and no perceptible impact is expected (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site or its heritage significance during the proposed mining period.

Recommendation

No further management of site CC6 is required during the proposed works.

6.2.11 Site/Item MM273 - Timber Getting Site

Subsidence

Site MM273 is located above the chain pillar between Longwalls 8 and 9 at the southern boundary of Ulan West mine (refer to **Figure 4.1**). The full range of subsidence movements are expected at this site. However, the site is not expected to be sensitive to subsidence and no perceptible impact is expected (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site or its heritage significance during the proposed mining period.

Recommendation

No further management of site MM273 is required during the proposed works.

6.2.12 Sites/Items OCE80/B, OCE84/A, OCE86/A and OCE94/A - Timber Getting Sites

These four sites are located beyond the subsidence zone of impact for the Ulan West mine and to the west of the proposed open cut extension (refer to **Figure 4.1**). No perceptible impacts to these sites are expected under the current mine plan (SCT 2009) and the sites are likely to be tolerant to subsidence movements if the mine plan changes.

The previous blasting activities associated with the open cut mining operations have exposed these sites to vibration levels in excess of those predicted for the Project (Wilkinson Murray 2009). Inspection of these sites has not identified any detrimental impact from these past activities and therefore no detrimental impacts from future blasting are anticipated.

Heritage Impact Statement

There are unlikely to be any significant impacts to these sites or their heritage significance during the proposed mining period.

Recommendation

No further management of sites OCE80/B, OCE84/A, OCE86/A and OCE94/A is required during the proposed works.

6.2.13 Site/Item RV1

Proposed Open Cut Extension

Site RV1 is located within the proposed Open Cut Extension (refer to **Figure 4.1**). This site will be removed during the proposed open cut extension.

Heritage Impact Statement

This site has been assessed as having nil-low significance and no research potential. The site will be removed during proposed works.

Recommendation

No further management of site RV1 is required during the proposed works.

6.2.14 Site/Item RV2

Proposed Open Cut Extension

Site RV2 is located within the proposed Open Cut Extension (refer to **Figure 4.1**). This site will be removed during the proposed open cut extension.

Heritage Impact Statement

This site has been assessed as having nil-low significance and no research potential. The site will be removed during proposed works.

Recommendation

No further management of site RV2 is required during the proposed works.

6.2.15 Site/Item CI198/G - Rock Shelter with Associated Rough Stone Built Low Wall

Subsidence

Site CI198/G is located near the edge of Longwall 1 of Ulan West mine (refer to **Figure 4.1**). The overburden depth is approximately 200 metres. The full range of mining subsidence movements are expected in this location, however, as a result of the relatively small size of the site, impacts are likely to be limited to the cracking of the floor. The rock itself is not expected to be destabilised as a result of mining (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site or its heritage significance during the proposed mining period.

Recommendation

No further management of site CI198/G is required during the proposed works.

6.2.16 Site/Item PK96/B - Rock shelter with Potential Collapsed Low Stone Wall

Subsidence

Site PK96/B is located above the centre of Longwall W4. The overburden depth in the area is approximately 220 metres. The full range of mining subsidence movements are expected in this location and as a result some movement and minor cracking is expected. The rock itself is not expected to be destabilised as a result of mining. The stones forming the potential wall do not appear to have been laid in a structured fashion and are unlikely to be adversely impacted by subsidence movements (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site or its heritage significance during the proposed mining period.

Recommendation

No further management of site PK96/B is required during the proposed works.

6.2.17 Sites/Items ID191 & HS96/D - Natural Rock Overhangs with Historical Artefacts

Subsidence

Sites ID191 and HS96/D are located close together on the same cliff formation within a conservation barrier in the middle of Longwall 7 of Ulan West mine (refer to **Figure 4.1**). The overburden depth at this location is approximately 140 metres. The sites (and the cliff formations in general) are not expected to be perceptibly impacted by mining subsidence. However, if the mine plan were to change and the conservation barrier removed, there is considered to be a greater than 20 per cent probability of rock falls and some perceptible fracturing of the rock strata (SCT 2009).

Heritage Impact Statement

Under the current mine plan (the conservation barrier remains) there are unlikely to be any significant impacts to these sites or their heritage significance during the proposed mining period.

Recommendation

No further management of site ID191 or site HS96/D is required during the proposed works.

6.2.18 Site/Item Echidna Sill - Three Unidentified Coins

This site is located outside the proposed longwall mining area and will not be impacted by mining subsidence (refer to **Figure 4.1**).

Recommendation

No further management of this site is required during the proposed works.

6.2.19 Site/Item HS135 – Bottles

Subsidence

Site HS135 is located above the chain pillar between Longwalls 4 and 5 of Ulan West mine (refer to **Figure 4.1**). Between 400 and 600 millimetres of subsidence is expected to occur at the site as a result of mining. However, it is unlikely that subsidence movements will adversely impact the bottles (SCT 2009).

Heritage Impact Statement

There are unlikely to be any significant impacts to this site during the proposed mining period.

Recommendation

No further management of site HS135 is required during the proposed works.

6.3 Unexpected Finds

In the unlikely event that unexpected archaeological remains not identified as part of this report are discovered during the Project (for example during works associated with the construction of surface infrastructure or the proposed open cut extension), all works in the immediate area will cease, the remains and potential impacts should be assessed by a qualified archaeologist and, if necessary, the Heritage Branch, DoP notified.

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