

Appendix T – Historic heritage impact assessment

**PROPOSED NEWSTAN MINE
EXTENSION PROJECT
(SSD 10333),
LAKE MACQUARIE, NSW**

Historical Heritage Assessment

FINAL

February 2020



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Historical Heritage Assessment

FINAL

Prepared by
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on behalf of
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1.0 Introduction

Centennial Newstan Pty Ltd (Centennial Newstan) owns and operates Newstan Colliery and is seeking approval for the continuation of mining within the West Borehole seam. This project, the 'Newstan Mine Extension Project', proposes to extract up to 25.9 million tonnes (Mt) over a fifteen-year period. The Newstan Mine Extension Project (herein referred to as 'the project') has been classed as a State Significant Development (SSD, SSD 10333).

The project will encompass four distinct areas, being:

- The Newstan Colliery Surface Site
- The Awaba Surface Colliery Site
- The Extension of Mining Area (allowing for the panel locations as well as a 26.5 degree angle of draw boundary to capture potential vicinity impacts caused by subsidence)
- The Forest Road Ballast Borehole and Services Site.

Collectively, these four areas are referred to as 'the project area' and are shown in **Figure 1.1** for reference.

The project area both contains and is located in proximity to a number of locally listed heritage items and potential historical heritage items that were identified as part of previous heritage assessments undertaken in the area. Centennial have therefore engaged Umwelt Environmental and Social Consultants (Umwelt) to prepare an Historical Heritage Assessment (HHA) that:

- assesses the potential impacts of the project on listed and unlisted items of heritage value
- assesses the potential for the project to interact with as yet unidentified items, elements or areas of historical (non-Aboriginal) heritage significance.

Aboriginal archaeology and cultural heritage have been assessed separately (Umwelt, in prep.) and are not considered in this report.

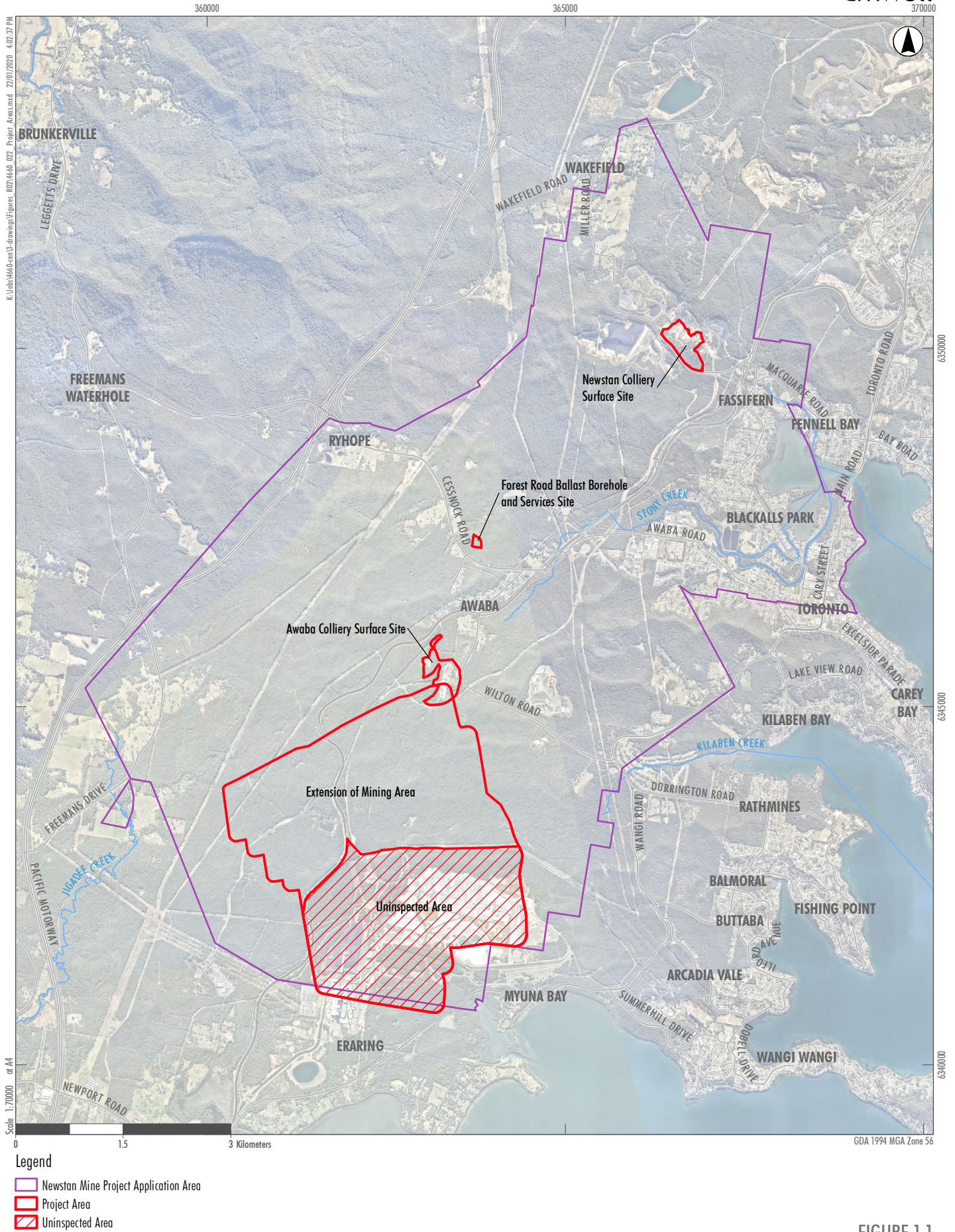


FIGURE 1.1
Project Area

1.1 Project Background

Newstan Colliery is an existing underground coal mine located in the Lake Macquarie Local Government Area (LGA), approximately 25 kilometres (km) south west of Newcastle and 140 km north of Sydney, NSW. It is owned and operated by Centennial Newstan.

Mining operations at Newstan Colliery began in 1887 and upon the introduction of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) operated pursuant to continuing use rights in accordance with Part 4, Division 10 of the EP&A Act (continuing use rights).

Newstan Colliery has at various times mined the upper coal seams (Great Northern and Fassifern seams) and lower coal seams (West Borehole, Borehole, Young Wallsend and Yard seams) and produced both semi-soft coking coal and thermal coal for the domestic and export markets. In the lower seams, workings to date have been concentrated to the west of the seam split, which is a defining geological feature of the mine. Mining has been undertaken using a combination of bord and pillar and longwall mining.

In August 2014, the underground operations at Newstan Colliery were placed onto care and maintenance due to poor market conditions. In recent years, Centennial Newstan has commenced feasibility investigations into the recommencement of mining at Newstan Colliery. The most recent modification to DA 73-11-98 in January 2019, permits first workings mining within the West Borehole seam in the southern portion of the Newstan Colliery mining lease area. The first workings aim to improve Centennial Newstan's understanding of the geology within the West Borehole seam, including the presence, throw and strike of a major fault zone projected from the historic Newstan workings.

Centennial Newstan is now seeking approval for the continuation of mining within the West Borehole seam. The Newstan Mine Extension Project proposes to extract up to 25.9 million tonnes (Mt) over a fifteen year period at a maximum production rate of 4 million tonnes per annum (Mtpa) of Run of Mine (ROM) coal. Bord and pillar mining is proposed using continuous miner methods that will include areas of first workings, partial extraction and total extraction. A mix of metallurgical and thermal coal is proposed to be extracted. ROM coal will be delivered to the Newstan Colliery Surface Site via a series of existing underground conveyors. Once the coal reaches the Newstan Colliery Surface Site it will be handled in accordance with the approved operations for the Northern Coal Logistics Project (SSD-5145), managed by Centennial Coal's Northern Coal Services business unit.

1.2 Description of Works

A summary of works associated with the project that will or may result in ground surface/sub-surface disturbance within the Project Area are provided below. Further detail regarding the works is provided in the Environmental Impact Statement prepared for the project by GHD.

Key features of the project include:

- Utilisation of the Newstan Colliery Surface Site to provide parking, bathhouse, administration and workshop facilities for the underground workforce. A small number of administrative, maintenance and monitoring personnel will also be located at Awaba Colliery Surface Site
- Transportation of personnel and materials to and from the underground mining area via the existing men and materials drift at Newstan Colliery Surface Site
- Continued operation of the two existing ventilation fans at Newstan Colliery Surface Site and the installation and operation of three new ventilation fans at the existing ventilation shaft at Awaba Colliery Surface Site

- In-seam gas drainage, with gas transferred to a new gas flaring facility to be located within the existing disturbance footprint of Awaba Colliery Surface Site (refer to **Plate 7.1**)
- Extraction of underground water via the existing Fassifern Pump Station at Newstan Colliery Surface Site and ongoing groundwater management in accordance with Centennial Coal's Northern Operations Water Management Plan

The project is aligned with the broader Centennial Coal business strategy in that it facilitates the development of a new semi-soft coking coal product stream and a thermal coal product for both the domestic and export markets. The project will enable supply of export coal products while meeting contractual coal supplies to the domestic markets. Over time, the project can potentially replace the coal product currently supplied to the domestic market by other Centennial operations as these other resources become depleted. This will ensure ongoing security of supply for domestic electricity generation.

If approved, the project will allow for the optimisation of resource recovery from Newstan Colliery while providing ongoing direct and indirect employment opportunities. In addition, the project will provide a number of positive flow-on effects to the local, regional and state economies through additional wages and royalties.

Greater detail regarding the proposed works as they relate to listed and potential (unlisted) historical heritage items is provided as part of **Section 5.0** (Visual Inspection) and **Section 7.0** (Impact Assessment) of this report.

1.3 Report Authorship

Karyn Virgin (Umwelt Senior Archaeologist) compiled this HHA and was the primary author of its content. The report has been reviewed and approved for issue by Tim Adams (Umwelt Principal Archaeologist – Historical Heritage). Drafting input was provided by Umwelt's drafting team.

1.4 Objectives of this Assessment

The purpose of this HHA is to:

- identify listed heritage items located within or in proximity to the project area
- identify and assess items, buildings, structures or other elements of potential historical heritage significance (i.e. those which are not listed) located within or in proximity to the project area
- identify and assess any areas of historical archaeological potential within or in proximity to the project area
- identify and assess the likelihood, extent and nature of potential impacts to any listed or unlisted items of heritage significance located within or in proximity to the project area
- develop appropriate measures to avoid, manage and/or mitigate any identified impacts.

This HHA has also been prepared to address and satisfy the relevant project SEARs, and has been prepared with reference to the advice/responses received from relevant agencies including Lake Macquarie City Council and the Department of Planning, Industry and Environment (DPIE), formerly the Office of Environment and Heritage (OEH). The relevant project SEARs have been tabulated, along with agency advice/responses, in the below table.

Table 1.1 Objectives of the assessment in relation to agency comment/requirements

Agency	Advice/Response	Report Reference
DPIE	Requires an assessment that includes the: <i>'... Identification of historic heritage in the vicinity of the development and an assessment of the likelihood and significance of impacts on heritage items.'</i>	Listed and potential (unlisted heritage items are identified at Section 2.2 and shown in Figure 2.1 . Potential impacts are assessed at Section 7.0 .
Lake Macquarie City Council	The applicant proposes that a Historical Heritage Assessment is undertaken, which would include an assessment of the potential subsidence impacts on identified built features of historic heritage significance and identify measures to avoid, mitigate, monitor and manage the potential impacts of the project. This is supported. The report should also include the assessment of the potential impact of the new infrastructure on the Awaba Colliery Surface Site, as identified by the applicant, and any proposed actions to mitigate impacts.	Satisfied by the preparation of this HHA. Potential impacts are assessed at Section 7.0 and management and mitigation strategies are detailed at Section 9.0 . Awaba State Coal Mine/Colliery is specifically assessed at Section 7.4 .
DPIE (formerly OEH)	The EIS must provide a heritage assessment including but not limited to an assessment of impacts to State and local heritage including conservation areas, natural heritage areas, places of Aboriginal heritage value, buildings, works, relics, gardens, landscapes, views, trees should be assessed.	As a result of this assessment, no new potential historical heritage elements, items or sites were identified. This includes potentially significant views and vistas, potentially significant landscape elements, including vegetation, trees and gardens, or potentially archaeologically significant areas or relics. Listed and potential (unlisted heritage items are identified at Section 2.2 and shown in Figure 2.1 . Potential impacts are assessed at Section 7.0 . Aboriginal archaeology and cultural heritage is subject to a separate report prepared by Umwelt and dated 2020.
	Where impacts to State or locally significant heritage items are identified, the assessment shall: outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally	Management and mitigation strategies are detailed at Section 9.0 .

Agency	Advice/Response	Report Reference
	consistent with the NSW Heritage Manual (1996) and	
	be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria) and	Detailed at Section 1.3 .
	include a statement of heritage impact for all heritage items (including significance assessment) and	Assessments of significance are provided at Section 6.0 .
	consider impacts including, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment (as relevant) and	Assessments of impacts are provided at Section 7.0 .
	where potential archaeological impacts have been identified develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations (terrestrial and maritime as relevant) and include the results of these test excavations.	No archaeological impacts have been identified. Refer to Section 6.2 and Section 7.3 .

The policies and guidelines referred to in the preparation of this HHA are outlined in **Section 2.1**.

1.5 Limitations

The southwestern portion of the Extension of Mining Area could not be physically accessed due to restrictions relating to the management of this land by Origin Energy. The area that was not able to be accessed is shown in **Figure 1.1**.

This assessment therefore relies on existing documentation regarding the Power Station and surrounding land, including the listing citation for the Power Station as well as the content and results of previous assessments that have included this area.

2.0 Statutory Context

The project has been declared to be an SSD project under the provisions of State Environmental Planning Policy (State and Regional Development) 2011 and will require Development Consent under Division 4.1 of Part 4 of the EP&A Act.

As the project is classified as SSD, the provisions of the NSW *Heritage Act 1977* do not apply and instead heritage management requirements will be incorporated into the development consent should the project be approved. This means that Section 140 and 60 permits, or Section 139 exceptions and Section 57 exemptions under the NSW *Heritage Act 1977* will not be required for any works undertaken as part of the project, if approved. This includes any further built heritage and/or archaeological investigation or salvage works. It is noted, however, that the appropriate management of any historical heritage and/or archaeology will be required in accordance with this report and/or any relevant conditions of consent associated with the eventual approval.

In accordance with the relevant SEARs and best practice, the policies and guidelines referenced at **Section 2.1** have been considered in the preparation of this HHA.

2.1 Policies and Guidelines

This HHA has been prepared with reference to guidelines set out in the NSW Heritage Manual 1996 (Heritage Office and Department of Urban Affairs & Planning), including:

- Archaeological Assessments
- Assessing Heritage Significance
- Statements of Heritage Impact
- Heritage Terms and Abbreviations.

This HHA has also been prepared with consideration of the principles contained in the:

- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999* (Australia ICOMOS. 2013)
- NSW Heritage Branch (now Heritage, Department of Premier and Cabinet [DPC]), Department of Planning, 2009, *Assessing Significance for Historical Archaeological Sites and 'Relics'*
- NSW Heritage office (now Heritage, DPC), Department of Planning, 2006, *The Historical Archaeology Code of Practice*.

2.2 Relevant Heritage Listings

To inform this assessment, searches of all relevant heritage databases were undertaken. This includes searches of:

- The Commonwealth Heritage List
- The National Heritage List
- The State Heritage Register
- s170 Heritage and Conservation Registers
- relevant Local Environmental Plans (LEPs).

A review of available background information and previous heritage assessments that have been conducted in the area was also undertaken.

As a result of these searches and background review it has been determined that:

- no Commonwealth or Nationally listed heritage items or places are located within the project area
- no State listed heritage items are located within the project area
- no items listed on any s170 Heritage and Conservation Registers (NSW State agency heritage registers) are located within the project area.

Three locally listed heritage items are located within or partially within the project area. These are:

- ‘Eraring Power Station’, built heritage item (Item ID 93), located within the Extension of Mining Area
- ‘Great Northern Railway’, built heritage item (Item ID 189), located within the Extension of Mining Area
- ‘Newstan Colliery’, archaeological item (Item ID A6), located within the Newstan Colliery Surface Site.

In addition to this, there are two potential (unlisted) heritage items located within the project area, being:

- ‘Awaba State Coal Mine’, built heritage item (Item IDs AW-07 and NS11), located within the Awaba Colliery Surface Site
- ‘Awaba to Wangi Power Station Branch Railway Line’, ‘area/archaeological site’ (Item ID RT-13), located within the Extension of Mining Area.

A further potential (unlisted) heritage item is located outside of but in close proximity to the project area, being:

- ‘Bridge over Main Northern Railway Line’, built heritage item (remnants) (Item ID NS6), located in proximity to the Extension of Mining Area.

This potential (unlisted) item has been included in this assessment for completeness.

Listed and potential (unlisted) heritage items located within the project area are summarised in **Table 2.1** below and shown in **Figure 2.1**.

Table 2.1 Listed and potential (unlisted) heritage items located within or in close proximity to the project area

Item Name/ID	Listing and Reference	Description
Eraring Power Station	Listed and Unlisted - LMCC LEP Item ID 93 - ER-01 References Suters et al, 1993	Coal fired electricity power station with four 720 MW Toshiba steam driven turbo-alternators for a combined capacity of 2,880 MW. The station is owned and operated by Origin Energy. It one NSW's largest power stations. Construction of the power station began in 1977, and the first turbo-alternator was brought online in 1982, the second and third in 1983, and the fourth in 1984. The Power Station is still in operation.
Great Northern Railway Line or Main Northern Railway	Listed and Unlisted - LMCC LEP Item ID 189 - RT-03 References Suters et al, 1993	Railway line constructed from 1857 through to 1889, with the section that extends through Lake Macquarie having been opened in 1887. In total, approximately five kilometres of the railway extends through the project area in a north-south orientation.
Newstan Colliery and Newstan Colliery including Tucker's House, Bat Alley Tunnel, Arsenic Smelting Works	Listed and Unlisted - LMCC LEP Item ID 189 - TA-20 References Suters et al, 1993 Higginbotham, 1997	One of a number of mines associated with the second and capital intensive stage of deeper mining in the Newcastle and Hunter Valley Region in the 1880s. Though the colliery has been in operation from the mid-1880s through to the present day, only three elements that pre-date the 1940s are known to be present; these are the remains of Tucker's House (1881-1914), the remains of the Arsenic Smelting Works (1920s) and the Bat Alley Tunnel (Northumberland No. 1) (1887-1930). Within the curtilage of the locally listed item, there remains potential for archaeological remains of earlier workings to be present.
Awaba State Coal Mine or Awaba Colliery	Unlisted - NS11 - AW-07 References Australian Archaeology, 2007 Suters et al, 1993 RPS, 2012	Relatively complete complex of colliery buildings including portals, conveyor, offices, shed, screen and loader. The Colliery or State Coal Mine was planned in the 1940s to provide coal for the (then) proposed Lake Macquarie Power Station, now known as the Wangi Power Station. The Colliery buildings all date from the 1950s.
Awaba to Wangi Power Station Branch Railway Line	Unlisted RT-13 References Suters et al, 1993	Branch line in use between c. 1950 to c. 1972 to haul coal from the Awaba Colliery to the Wangi Power Station. Assessed in the 1993 study to have very high local significance and high regional significance through its associations with Awaba Colliery and Wangi Power Station, both of which the line served for over 20 years. The 1993 study assumed that the majority of the physical components of the line had been removed, and noted that the line lends itself to adaptive re-use as an interpretive cycleway, footpath or heritage trail.

Item Name/ID	Listing and Reference	Description
Bridge Over Main Northern Railway Line	Unlisted NS6 References Australian Archaeology, 2007	Former bridge identified as part of the 2007 Archaeology Australia report. It is described in the 2007 report as having been <i>'in use until recent times'</i>. The bridge, known locally as 'Woodcutter's Bridge', was demolished by the (then) NSW State Rail due to concerns regarding the safety of rail traffic. At the time the bridge was recorded (2007), only the concrete and brick abutments remained. The 2007 assessment noted that the condition of the item was very poor (bridge span demolished). Its archaeological potential was assessed as very low.

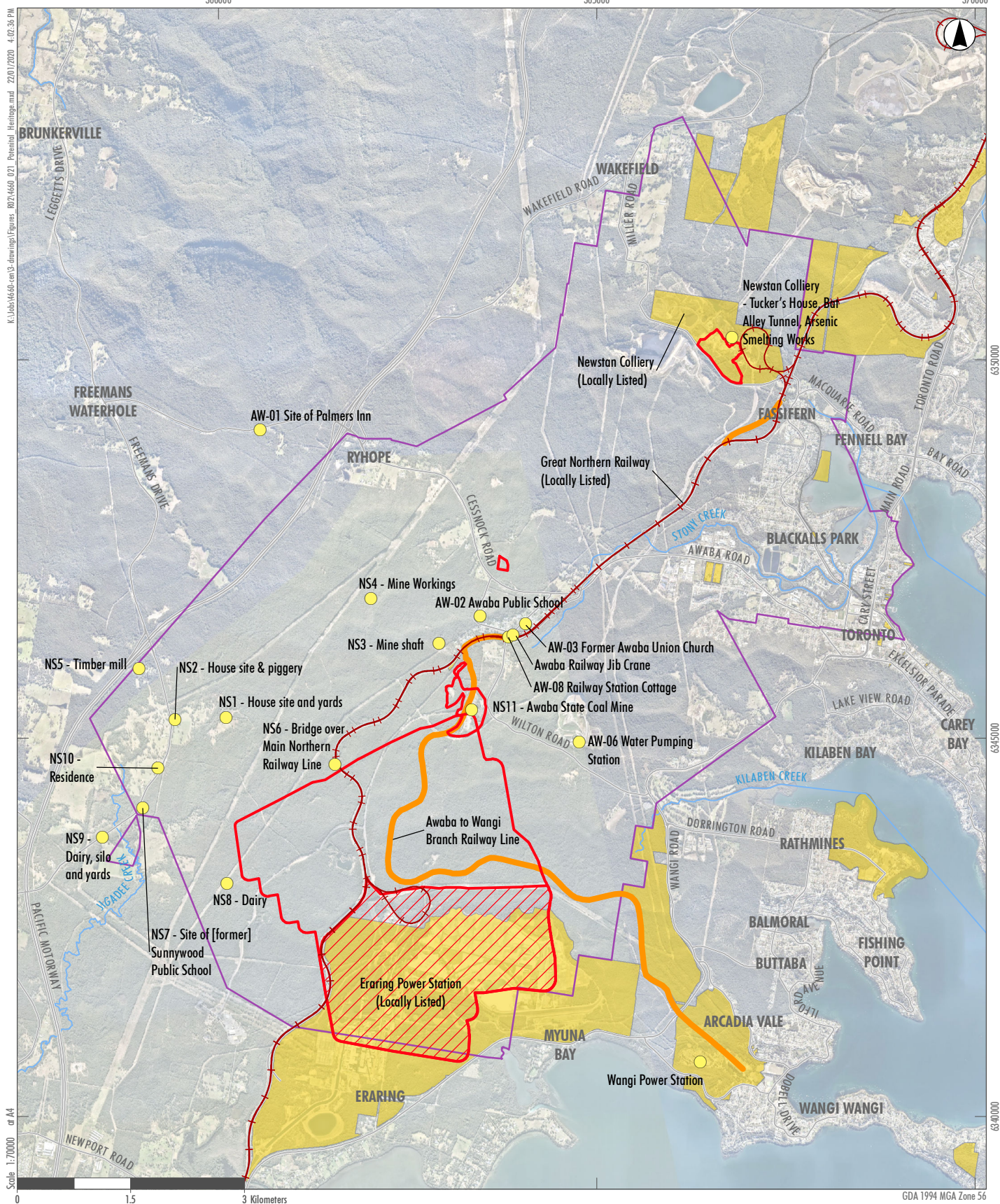


FIGURE 2.1

Project Area in Relation to Listed and Potential (Unlisted) Heritage Items

3.0 Historical Overview

The history of the area within which the project area is located has been well documented within a range of previous historical heritage assessments and local history resources. As such, the historical overview presented here has been sourced directly from previous assessments, unless stated otherwise.

3.1 Aboriginal Cultural Heritage and Ethnohistory

The following information has been sourced from the *Aboriginal Cultural Heritage Assessment – Proposed Newstan Mine Extension Project (SSD 10333), Lake Macquarie, NSW* prepared by Umwelt in 2020 (draft).

The project area is located in the lower Hunter Valley/Lake Macquarie region, within the traditional boundaries of the Awabakal. Earliest European accounts identify the Lake Macquarie area as being a central location of importance within Awabakal Country. While there is some conjecture regarding the boundaries of Awabakal Country it is generally understood to extend south from the Hunter River to Norah Head and Wyong and west to include the Sugarloaf and Watagan Ranges (Umwelt, 2010; Umwelt, 2017).

Perhaps the single-most important source of ethnohistoric information for the Awabakal people was the missionary, Lancelot Threlkeld, who established a mission at Belmont and subsequently at Toronto on Lake Macquarie and collated a large body of information on the Awabakal people and their language between 1825-1841.

There is evidence to suggest that the Awabakal engaged in activities and interactions north and south beyond the Lake Macquarie and Hunter River areas, with Threlkeld's accounts of the Awabakal describing the clan as occupying or travelling through much of the Central Coast, with a direct connection to the Darkinjung and Guring-gai people to the south, as well as to the Wonnarua/Wanaruah to the west and the Worimi to the north (Umwelt 2011). The similarities of the Awabakal language with the Wonnarua/Wanaruah to the west further suggests that the Awabakal interacted extensively with various other Aboriginal groups in the region (Brayshaw 1994).

Historical accounts of the Awabakal note that resources were exploited along the coastline, the shores of Lake Macquarie and along freshwater resources. The early European writers documented that the Awabakal lived in bark huts or 'Gunyah's', with brush material used as windbreaks. Threlkeld also noted in his writings that the local Awabakal name for the Lake Macquarie area was Punte or Derahbambah (Hartley 1998:7). Threlkeld also notes that the area and immediate surrounds was most likely an area utilised by past Aboriginal peoples for the exploitation of resources.

Contact between the Awabakal and early European settlers was varied, with some accounts describing instances of trade between the two (see Blyton 2015), and others noting that relations between Aboriginal people and the white settlers were "hideously violent" (Reeves and Coulter 2006). Relationships were further strained as the European population expanded, and farms were established in the Hunter Valley, where landholders protected and barred their land from Aboriginal people who would have previously accessed the lands.

Altercations became more frequent and violent, and many Aboriginal people moved to Sydney Town or into Newcastle to take on labouring work, where there was some amount of equality in pay and treatment for those willing to engage in physical labour. Others remained on settlers' properties as workers and intermingled this work with traditional lifestyle practices (McDonald 2007 in Virtus Heritage 2019).

3.2 History of the Local Area

The following information has been sourced from the *Newstan Colliery, Modification to Development Consent Statement of Environmental Effects – Non-Indigenous Heritage Impact Assessment* prepared by Archaeology Australia in 2007.

The Lake Macquarie region was not settled until well into the nineteenth century. Newcastle, originally known as King's Town, is located a short distance to the north of the lake and was established in 1804 as a penal settlement (after the first attempt at settlement had failed in 1802)¹ (Clouten, 2000: 12). Lake Macquarie was discovered by Europeans by mistake in 1800 when Captain Reid had sailed into a channel which matched the description he had been given for Port Hunter. He landed near the lake's entrance to the sea and had found coal which is what he was seeking at Port Hunter.

While settlers were eager to take up land outside of the immediate environs of Sydney, there were several obstacles preventing them moving into the Lake Macquarie area. Firstly, the terrain between the Hawkesbury River and Lake Macquarie was difficult to traverse; the channel from the sea into the lake at Swansea was not navigable by large vessels (Suters et al, 1993: 18); and the settlement at Newcastle was more easily reached by sea and no real attempts were made to open up a land route until after 1830. More importantly, settlers were forbidden by the government from colonising areas in the vicinity of penal settlements.

Consequently, it was not until 1825 that the first land grants were offered and the London Mission Society took up 10,000 acres (Suters et al, 1993: 21). In 1826 Percy Simpson selected 2,000 acres on the banks of Dora Creek (near where the Catholic Church stands at Cooranbong). He extended this with another 2,000 acres in 1829. In 1828 Reverend Threlkeld was granted 1,280 acres on the western shores of the Lake where Toronto now stands.

Threlkeld started the first coal mine around the lake at Coal Point (on the tip of the Toronto peninsula), in 1840, and subsequently bought ten acres at Swansea Heads for coal-loading and storage around 1842. The coal was shipped to the entrance channel by barge. He employed seventeen men in the enterprise. In 1844 he sold the mine and moved to Sydney but continued to work for Aboriginal welfare, acting as a translator in court. The mine was subsequently worked until 1850, reopening briefly in the 1850s and 1890s.

The town of Toronto was established by the Excelsior Land Investment and Building Company who purchased the entirety of what was known as the 'Ebenezer Estate' in 1885 with plans to create a tourist resort on the shores of the lake not too far from the coming railway line. It was named in honour of world-champion sculler Edward Hanlan who hailed from Toronto in Canada and who competed in Australia in the 1880s. The company built the Toronto Hotel in 1887. Visitors initially disembarked at Fassifern train station and travelled by boat from Fennell Bay to Toronto wharf. A tramway connection was established in 1891 which was supplanted by a proper branch line in 1911.

In 1861 the Land Acts were amended to open the land and make land acquisition simpler and more equitable. However, a rush for land in or around Awaba did not eventuate. The 'squatters' had not had an impact on settlement and land ownership as it had in many other areas. This was mainly due to the terrain and general poor soil of the area. A few of the creek lines had some alluvial soils but in the main it was the timber industry that occupied the earliest settlers and not the idea of taking up agricultural or pastoral lands. Kingscote selected land to the north of where the Awaba village is now located and extended his run some distance to the south (Nilsen, 1985: 12). Awaba itself was proclaimed in 1881 (Saxon, 1998: 3).

¹ It is noted that the majority of historical sources identify this date as 1801

While coal was known to exist in the area, it was timber that attracted some of the first industry to the area. There were several timber mills operating in the area in the 1880s (Saxon 1998:18). Cedar was avidly sought in the early years of logging but had been largely cut out by the mid -nineteenth century (Stinson, 1994b:75). Blue Gum, Ironbark and Turpentine were common in the area and provided hardwood that was suitable for a variety of purposes - from railway sleepers and construction timber to shingles for roofs and packing cases for the burgeoning fruit industry. Turpentine was favoured for the construction of jetties and piers. The first timber workers to move into the Awaba area came from Mulbring, Mt Vincent and Wallis Plains (Nilsen, 1985: 12).

The Government decision to link the railway between Sydney and Newcastle in the early 1880s heralded great change. Parcels of land were taken up along the proposed route and larger properties were being subdivided. The rail link between Newcastle and Gosford opened in August 1887, extended to the Hawkesbury River in January 1888 and the bridge over the Hawkesbury River opened in 1889 (Strom, 1982: 21). The ease of transport to and from the area greatly boosted the timber and fishing industries. Timber cut in the Watagans and Mulbring was transported to the Awaba siding.

Awaba benefited from the railway and a timber and railway construction depot were established there in 1885 (Nilsen, 1985: 12). Groups of men were living there in crudely built huts and tents (Clouten, 2000: 257). By 1891 the village was sub-divided, and a school opened that year. A post office opened in 1895 (Nilsen, 1985: 12). A crudely built church was erected in 1898 and replaced by the Union Church in 1913 on land donated by early families (*Newcastle Herald*, 30 May 1985).

3.3 History of the Local Mining Industry

The following information has been sourced from the *Newstan Colliery, Modification to Development Consent Statement of Environmental Effects – Non-Indigenous Heritage Impact Assessment* prepared by Archaeology Australia in 2007.

Coal was first mined in the Lake Macquarie area in 1841 when Reverend Threlkeld opened a mine on Coal Point on the 'Ebenezer' property (Suters et al, 1993: 22). He was trying to compete with the Australian Agricultural Company (AA Co.) Newcastle mines. The AA Co. had a monopoly and believed they had exclusive rights to the coal. In fact, their agreement with the government related to coal extracted from lands alienated from 1830 onwards. As Threlkeld's grant was taken up before that date he was able to mine his coal. The government, however, appears to have sided with the AA Co. and denied Threlkeld access to convict labour. Furthermore, to ship the coal across the lake and through the Swansea Channel added to the cost and made it a risky venture.

With the coming of the railway, the cost of transporting coal decreased and brought about a surge in the industry. J. and A. Brown opened mines in the Minmi area in the 1850s, but they closed shortly after due to flooding (Croft, 1981: 38). In 1887, the Northumberland Coal and Land Company sank two shafts on the company's estate near Fassifern and close to the Main Northern Railway line. Apart from short periods of suspension, mining in this area has been continuous since that time with the operators Fassifern Coal Company, Fassifern Colliery Pty Ltd, Newstan Colliery Pty Ltd, Elcom Collieries Ltd and Powercoal (Umwelt, 1998: 1329).

Exploration continued in the area and in 1883 the government diamond drill recorded a good seam of coal at 523 feet (158.5 metres) on Kingscote's land near Awaba (*Town and Country Journal*, 25 August 1883). In 1887 Hughes, Sullivan and Lane applied for a mining lease to the south of Awaba between the lake and the Great Northern Railway. During the early twentieth century a number of mining leases were taken up in the Parishes of Awaba and Coorumbung. All were for coal only or coal and shale.

While the government diamond drill identified the extent of the coal measures, it appears that little was done to exploit it during the nineteenth century. A few small mines opened up around Awaba during the early twentieth century and included the Blowfly, Marchfly, Awaba and Milroy mines (Saxon, 1988: 49).

A large area of the Parishes of Coorumbung and Awaba were declared State Coal mines in 1947 and this area was extended in 1960. The Awaba State Coal Mine was planned in the 1940s to supply coal for the Wangi Power Station (Suters et al, 1993, Vol. 2, Item No. AW-07). In 1942 a geological investigation was carried out by the NSW Mines Department. Test boring revealed that approximately 40,000,000 tons of coal was available for extraction and a probable 20,000,000 tons in reserve (from a souvenir programme for the opening of the Awaba State Coal Mine in 1948).

3.3.1 Newstan Colliery

The following history of the Newstan Colliery has been sourced directly from the *Historical and Archaeological Assessment of Newstan Colliery, Wakefield Road, Fassifern*, prepared by Edward Higginbotham & Associated Pty Ltd in 1997.

The development of the Northumberland (now Newstan) Colliery was part of a second phase of coal mining in the Newcastle and Hunter Valley regions. Most outcropping or surface coal had been exhausted by the 1870s, leading to the development of larger scale enterprises with capital to exploit the deeper coal seams.

The Northumberland Coal and Land Company was established in Britain in the 1880s as part of a boom in private investment in Australia, to exploit the demand for coal. The best opportunities were provided by locations possessing extensive coal seams, together with easy access to available markets. The Sydney to Newcastle railway, opened in the 1880s, provided the impetus for coal extraction.

Portions 60-66 in the Parish of Awaba, County Northumberland, were surveyed for auction sale in June 1879 by Joseph J. Tucker. These portions, along with Portion 44, situated immediately north of the others, later became the core area for the Newstan Colliery.

In February 1881, George Kinnear Clark made an application for conditional purchase, under Section 13 of the Crown Land Alienation Act, for the land, which later became Portions 61, 62, 64, 65, 66, totalling an estimated 433 ½ acres. The application was altered to a purchase of these portions under Section 19 of the Crown Lands Act, thus permitting coal mining. Clark transferred his Conditional Purchase to William Anthony Kingscote in January 1882.

In October 1881 a survey was undertaken of Portion 44, Parish of Awaba, County of Northumberland. The area comprised 429 acres 3 roods, applied for under Section 13 of the Crown Lands Alienation Act of 1861 by Joseph Tucker. There had been partial clearance in the south-eastern corner of the land, on which stood the frame of a house, a hut and a yard. These improvements were again described in further detail in March 1883.

In August 1884, Tucker applied to convert this Conditional Purchase to a purchase under Section 19 for mining purposes, other than gold. This was approved on 20 November 1884. The following day, Tucker transferred his interest in the Conditional Purchase of Portion 44 to a joint partnership of Charles Frederick Stokes, a merchant of Newcastle, and himself.

On 25 August 1883, the *Australian Town and County Journal* referred to the property of W.A. Kingscote (later the Northumberland Colliery on Portions 61, 62, 64, 65, 66 and other land, granted to Kingscote), where government diamond drills had discovered coal at 523 feet, one of the finds being a very high quality seam.

By 1885, Awaba had become the site of a railway construction depot and associated workers huts. This camp eventually grew into a village. Further north at what became Fassifern, a platform was constructed.

3.3.1.1 Northumberland Coal and Land Company 1885 - 1895

In February 1885, Portions 61, 62, 64, 65, 66, Parish of Awaba, were granted to William Anthony Kingscote, as land selected for mining, other than gold mining, under the Section 19 of the Crown Lands Alienation Act. On 16 March 1885, Kingscote transferred these portions to Herbert Palmer, Arthur de Wrage, Parry Piddock, Andrew Stephen Blomfield and Anthony William Kingscote, apparently a syndicate.

The Northumberland Coal and Land Company was formed in 1885 in London, with a capital of £200,000. The company purchased 2,560 acres in the Parish of Awaba County Northumberland, in New South Wales. To that date, the company was one of the largest established to exploit the Newcastle coal resources.

An English mining expert, Thomas W. Crawford, was its first mine manager. He came out from England with a complete and extensive mine plant. The seam had not been specifically tested, when they commenced the first shaft. The plan was to sink a shaft to reach the Borehole Seam. The first two shafts commenced were named Bryant and Trummer, after two of the company's London Trustees, Wilberforce Bryant and Otto Heinrich Trummer. These shafts and pit workings were the first in New South Wales to be lit by electricity (these shafts were located in the vicinity of the present washery).

The company purchased the property held by Tucker, prior to commencing operations in 1887. Stokes and Tucker had obtained a Special Lease in 1886 for the purpose of building a tramway, running from the government railway line across Portion 63 (which had remained Crown Land) to their Portion 44. This special lease was transferred in 1890 to the Northumberland Coal and Land Company, and was used for colliery trains. Portion 44 itself was purchased by the company in 1886.

In January 1887, Portion 44 was inspected by the government and found to contain a railway workers camp, Tuckers house and also a mine shaft, 14 feet in diameter and 16 feet deep. The latter may be the shaft known as 'Bat Alley'.

In May 1887 the company instructed G.G. Donaldson to survey the company's property boundaries and mark out the township for colliery workers (Fassifern). The township had no provision for a mine managers residence, since Tucker's house, built in 1883, served this purpose until it was burnt down in 1914.

In June 1887, further inspection of Portion 44 by the Department of Lands revealed the presence of two mine shafts, named Adelaide and Jubilee (previously named Bryant and Trummer) together with the earlier 'Bat Alley' shaft, and extensive works and improvements. The Trummer Shaft was never completed and is now covered by washery buildings.

As a result of this inspection, Portion 44 was finally granted to the local directors of the company on 10 August 1887 for the purpose of mining, other than gold mining, under the Section 19 of the Crown Lands Alienation Act.

Tenders were let for the construction of the railway sidings, the work being undertaken in 1887-1888. Amid many difficulties, the company sold its first coal in 1889. Works were suspended in 1891.

3.3.1.2 Fassifern Coal Co Ltd 1895 - 1933

In January 1895, the Fassifern Coal Co Ltd was formed to take over the Northumberland Coal and Land Co with authorised capital of £50,000. It proposed to work the colliery on tribute. Bryant and Trummer still occupied key positions on the Board.

The Department of Mines reclassified Northumberland Colliery as a permit colliery, a small-scale employer which could be managed with a third-class certificate of mining competency. Nevertheless, production was to continue at a relatively high level.

The settlement near the mine had gradually grown, providing a small local labour force. In March 1901, the Commonwealth Census showed that along Wakefield Road (old alignment) there were 19 dwellings, along with a church and a school. At Fassifern itself there were 10 dwellings.

A plan of Mineral Lease 3, surveyed in October 1907, showed the colliery railway, some houses near the railway as well as the site of the powder magazine on Portion 63. Mechanisation took place at the Northumberland Mine by 1907, leading to an extended dispute over labour conditions, which was not fully resolved until 1908.

In 1909, major new works commenced at the mine with the sinking of an air shaft for what became known as the Northumberland No. 2 Mine. By 1914 the principal mine workings were officially known as Northumberland Nos 1 and 2. Northumberland No. 1 was the renamed Bat Alley Tunnel. In 1919 the company opened a new mine, south of Fassifern, by the name of Olstan Colliery.

Bushfires in 1926 and 1930 caused an underground fire at Northumberland No. 1, but also destroyed above ground machinery, including gantries. Northumberland No. 1 (Bat Alley) had been decreasing in importance for a number of years and was finally closed in 1930, during the Depression.

3.3.1.3 Fassifern Colliery 1933 - 1948

Demand for coal fell during the Depression. Croft offered to buy the Fassifern Coal Co and keep it running. Croft purchased the Fassifern Coal Company on 26 May 1933. Portions 61, 62, 64, 65, 66, 27, 78, 36 and 44 were transferred to F. R. Croft, Newcastle, mine owner on 22 July 1933. These parcels were formally transferred to Fassifern Colliery Ltd on 5 December 1933. This company operated the colliery for the next fifteen years.

3.3.1.4 Newstan Colliery 1948 - 1997

In 1947 the Commonwealth and NSW governments formed the Joint Coal Board to rationalise coal production and to increase the quality of life by way of a welfare fund for the construction of amenities. In December 1948, the Joint Coal Board formed Newstan Colliery Pty Ltd to take over the former Northumberland Colliery. The company obtained a sub-lease of Olstan Colliery and of the freehold of Northumberland Colliery and combined them to form the Newstan Colliery. Olstan Colliery was closed shortly after and its workers were transferred to Newstan No. 1, a new mine south of Wakefield Road, to mine the Great Northern Seam. Newstan No. 2 was located in the area of the present washery and workings.

Between 1948 and the early 1950s, construction associated with Newstan Nos 1 and 2 largely replaced all the former workings. By the early 1960s the colliery was fully mechanised, thereby increasing the use of electrical power. The declining demand for steaming coal for power generation in NSW resulted in Newstan seeking additional markets overseas, with its coal being carried by train to Newcastle.

In November 1969 production from the Great Northern Seam stopped at Newstan No. 1. Road haulage took over from the use of steam engines in 1971, which was followed in 1972 by the removal of the railway bank engine facilities at Fassifern. Corporate changes occurred within the reconstitution of the State Mines Control Authority. Newstan merged with various other mines to form Elcom Collieries Pty Ltd. Portions 44, 61, 62, 64, 65, 66, 27, 78 and 36 were formally leased to Elcom Collieries Pty Ltd on 11 October 1973.

3.3.1.5 Newstan Colliery 2002 - present

Like the Awaba Colliery, Newstan Colliery was purchased in 2002 as part of the Powercoal acquisition and has been operated since then by Centennial Newstan. It was placed on care and maintenance in 2008, but was re-opened in 2011. It was again placed on care and maintenance in 2014, though the coal preparation plant, coal rail and loading facilities remain operational.

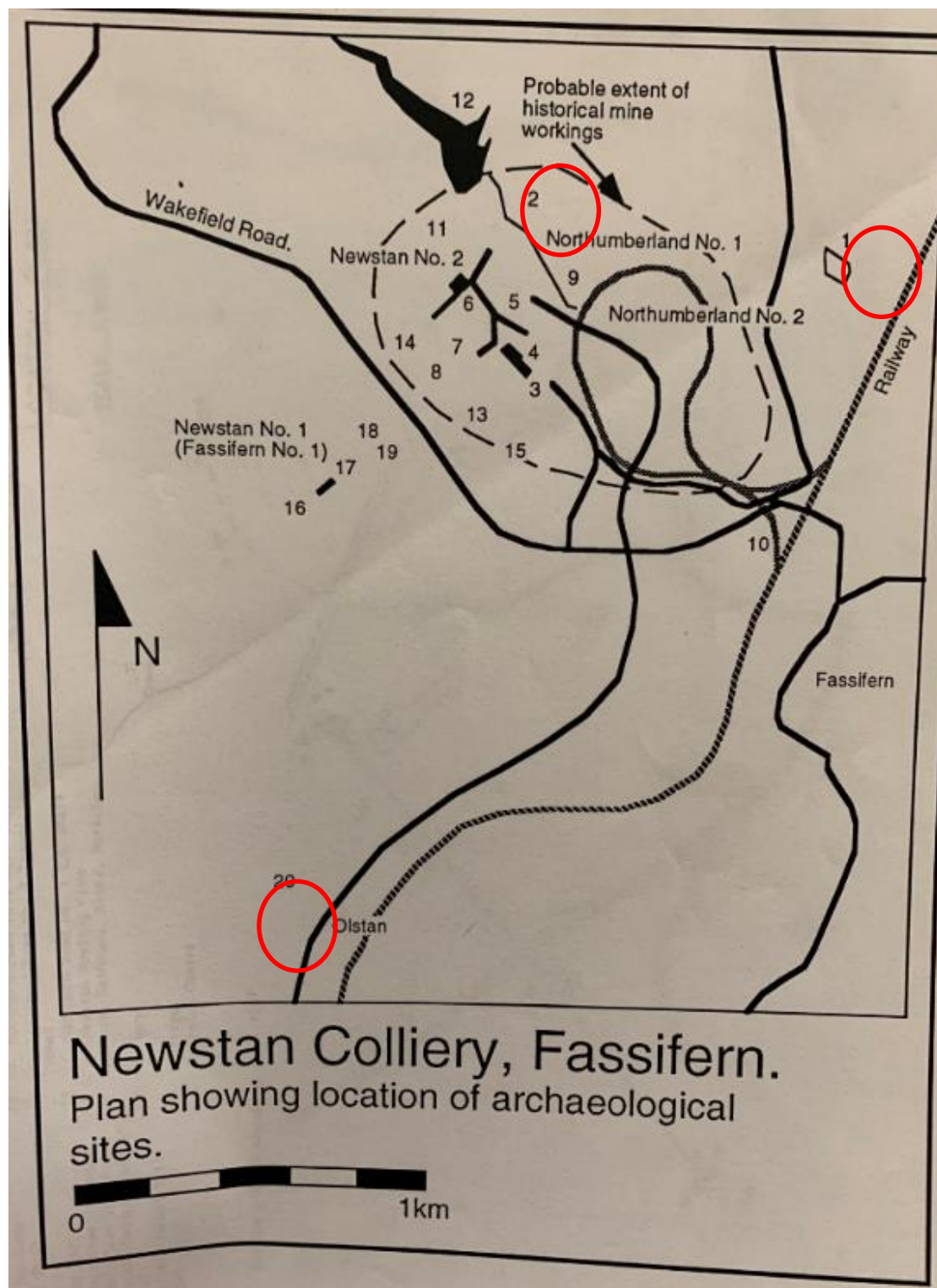


Plate 3.1 Map showing the location of elements identified and recorded at Newstan Colliery
Note: only items 1, 2 and 20 (highlighted in red) have been identified to have any heritage significance
© Higginbotham 1997: 15.

3.3.2 Awaba State Coal Mine

The following history of the Awaba State Coal Mine or Colliery has been sourced directly from the *Awaba Colliery, Near Fassifern, NSW – Post-Mining Heritage Management Plan* prepared by RPS in 2012.

The State Mines Control Authority was responsible for the site selection, establishment, planning and management of the Awaba State Mine which was commenced in 1947. As such, it was the first colliery to be planned, constructed and managed by the Authority because the only other colliery under its control at the time was the pre-existing Lithgow Colliery.

An article by R J Ashworth in 1955, then Director of State Coal Mines and Chairman of the SMCA, describes Awaba State Colliery as “one of the best equipped coal mines in Australia” and goes on to say,

“The bath and change house and other amenities at the mine and also the workshop and stores building, are unsurpassed at any other colliery in the State, whilst the electrical and mechanical installations are of a high order”

(*Mineral*, Vol. 1, No. 3. June 1955).

The colliery was established with the object of providing coal for the Wangi Power Station located five miles away and connected by rail line. The power station was specially designed to burn coal from the Great Northern Seam being worked at Awaba State Colliery. Awaba State Mine’s maximum output was intended to be 2,500 tons per day.

The first unit of the Wangi Power Station was due to come into operation during 1956 (it was officially opened on 7th November 1958) and in the meantime the Awaba State Mine produced coal for Metropolitan power houses. This pattern of collieries providing coal for nearby power stations was the case for most of the state mines that followed.

In 1947, the No. 1 tunnel (the men and materials drift closest to the bathroom complex) was driven in at a grade of 1 in 5 and the first coal was hauled from underground on 4th December 1947. In early 1949, No. 2 tunnel (belt drift) started, and was also driven at a grade of 1 in 5. The Colliery was a “tunnel mine” and the coal was brought from working places by battery and cable reel shuttle cars to “district belts” and then by a series of belts to the main conveyor belt located in the No. 2 tunnel and leading to the modern screening and loading plant on the surface (this was replaced in 1955 with an electric trolley wire locomotive haulage system).

Pit ponies were used to draw one tonne skips along a 760-millimetre gauge track. It is understood that pit ponies were used at the mine until it became fully mechanised in the early 1980s, when continuous miners completely replaced conventional units.

With regard to progression of infrastructure development following the creation of the No. 1 and No. 2 tunnels, the next development was the completion of a screening and crushing plant on the surface in December 1953. Over the next few years the office and bathroom complex and the workshop and stores complexes were completed.

Throughout the life of the Awaba State Mine improvements and upgrades were consistently made to the mining machinery used, the mechanisation of the mine’s workings and haulage system as well as the drifts and facilities. For instance, the No. 1 men and materials drift constructed in 1947 had the original timber supports replaced throughout its length with side walls and girders in 1961.

The method of mining also diversified with the introduction of pillar extraction in 1971; principally in areas where total extraction was not practical because of shallow cover. This subsequently led to water inundation problems for the site with slippages and creep occurring due to heavy rainfall combined with the relatively shallow surface cover. The average depth of cover between the surface and the Great Northern Seam is 30 metres on average across the colliery site area, but is as low as 15 metres in places.

In 1973 the colliery changed ownership when the Government decided to amalgamate the northern coalmining operations under the control of the Electricity Commission of NSW. The mines were vested in the Newstan Colliery Pty and the name changed to Elcom Collieries. This occurred in the context of a declining power station market apparent from the late 1960s and as a result, drilling programmes had been undertaken at Awaba State Mine to determine the potential of other seams with a view to exporting to markets other than power stations.

From 1982 coal from Awaba Colliery was sent to Eraring Power Station via a newly constructed coal haulage road. It is assumed that this was as a result of the imminent closure of the Wangi Power Station which closed in 1986. The Eraring plant was the successor to Wangi Power Station using the same coal sources and employing the same community. Its construction began in 1976 and the last unit was commissioned in 1984.

Two additional drifts were created at Awaba Colliery in the 1980s. The first in 1981 was a 1 in 4 drift which incorporated a new conveyor belt system to replace a trolley wire locomotive coal haulage system. This is assumed to have been constructed to enable the mine to better meet the needs of supplying Eraring Power Station. The second was in 1987 when a 1 in 20 grade drift with trackwork for men and materials haulage was commissioned.

In 1990 Awaba State Mine failed to win a contract to supply coal to Eraring Power Station and its future became uncertain such that it was put up for sale along with a number of other mines. An appropriate buyer was not forthcoming and the Government decided to keep the mine running but with a considerably reduced workforce.

In 1994 Awaba State Mine was renamed Awaba Colliery. The majority of coal was exported overseas and the major buyer was Japan. Centennial Coal, the current owners, took over the colliery in 2002. The colliery was closed and sealed in 2012.

4.0 Previous Assessments

The project area has been subject to a number of previous assessments. These assessments were predominately undertaken in association with previously approved mining activities. Relevant assessments have been summarised below for reference.

RPS Harper Somers O'Sullivan Pty Ltd, 2009, *Aboriginal Cultural Heritage Assessment for the Awaba Revised Stage 3 SMP Area*, prepared for Centennial Coal.

The area assessed by RPS Harper Somers O'Sullivan Pty Ltd in 2009 is located in the northern portion of the Extension of Mining Area (refer to **Plate 4.1**).

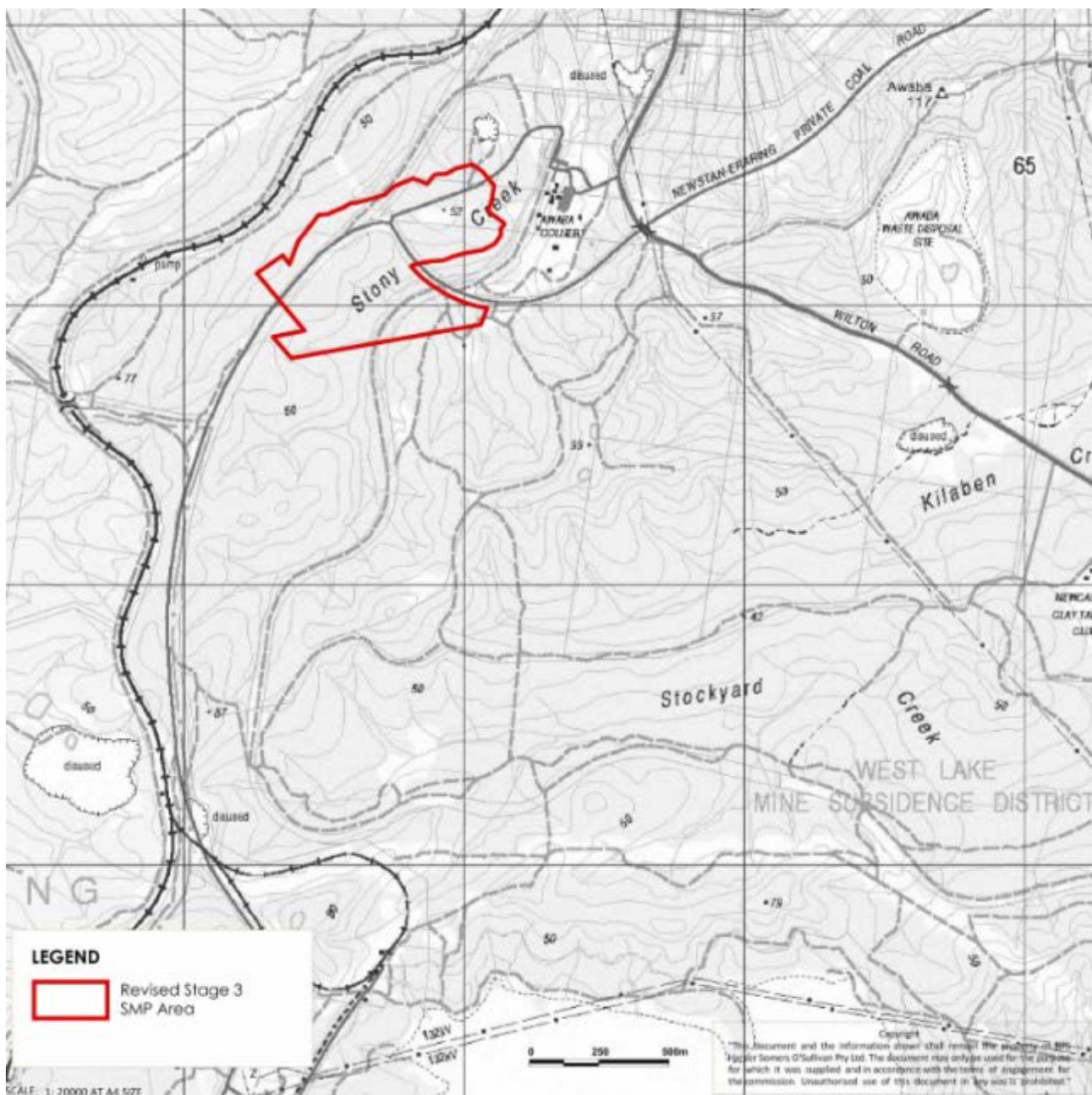


Plate 4.1 Area assessed by RPS Harper Somers O'Sullivan Pty Ltd in 2009

© Figure 1-1 in RPS Harper Somers O'Sullivan Pty Ltd, 2009

With regards to historical heritage, the assessment identified that the only item of historical heritage value within the area assessed was the unlisted Awaba-Wangi Rail Line (also known as the Awaba to Wangi Power Station Branch Railway Line) (Item ID RT-13). No listed items were identified as being located within the assessed area, and no additional potential heritage items were identified as a result of the assessment.

During the visual inspection, the former rail line was inspected and is described in the report as follows:

'The abandoned Awaba-Wangi rail line crosses the south eastern portion of the Study Area, near Stony Creek. Remains of the rail line, timber sleepers, rail pins and the rail embankment were observed. The rail line remains in good condition, with the rails, sleepers and pins still in situ on the embankment (Plate 6).'

The report concluded that the subsidence (then) proposed to occur within the 2009 assessment are would not result in any adverse impacts to the rail line.

RPS, 2010, *Cultural Heritage Impact Assessment for Awaba Colliery*, prepared for Centennial Coal.

The 'project application area' (PAA) assessed by RPS in 2010 comprised four study areas and was located in the northern portion of the Extension of Mining Area and encompassed the majority of the Awaba Colliery Surface Site (refer to **Plate 4.2**). The RPS report notes that the entirety of the PAA had been previously surveyed.

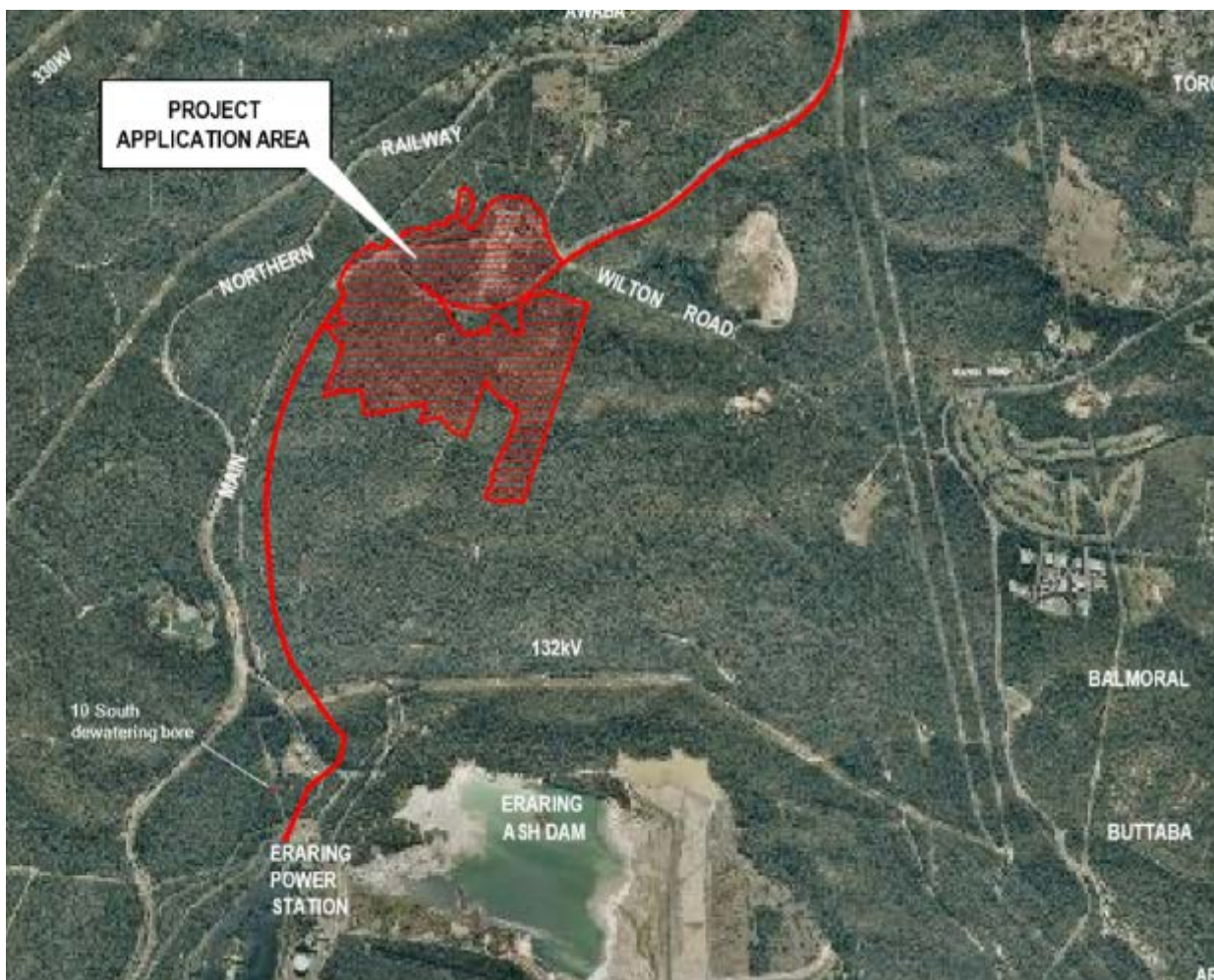


Plate 4.2 Area assessed by RPS in 2010

© Figure 1-1 in RPS, 2010

The report noted that no listed heritage items were present within the PAA. Two potential (unlisted) heritage items were present, being the Awaba-Wangi Rail Line (also known as the Awaba to Wangi Power Station Branch Railway Line) (Item ID RT-13, incorrectly identified in the 2010 RPS report as RT-03) and the Awaba State Coal Mine (Item ID AW-07 and NS11). No previously unidentified elements or places of heritage significance were identified as a result of the assessment.

The assessment concluded that no adverse impacts would occur to either of these unlisted items as a result of the proposal. The 2010 report acknowledged that the Awaba-Wangi Rail Line would be subject to some subsidence as a result of the (then) proposal, and that this had the potential to cause some deformation to the rail line. However, this was considered to be a negligible impact as the significance of the item, being derived from its role as an element that is representative of extractive industries in the Lake Macquarie LGA rather than its integrity, would not be significantly impacted.

Archaeology Australia, 2007, *Newstan Colliery: Modification to Development Consent. Statement of Environmental Effects. Non-Indigenous Heritage Impact Assessment*, prepared for Hansen Bailly on behalf of Centennial Coal Company.

In 2007, Archaeology Australia undertook a historical heritage impact assessment for the (then) proposed Newstan Colliery Modification to Development Consent project (the project). Though the project area is mapped in the report as comprising two discrete areas totalling 114 hectares, the mapping within the report suggests that a considerably larger area was subject to survey, though no boundaries are provided for this larger area.

In total, 11 potential historical heritage items were identified, none of which have since been listed on the Lake Macquarie LEP 2014. These sites are summarised in the below table for reference (**Plate 4.3**), and also shown in **Plate 4.4**.

Table 5
Summary of heritage items located within or in close proximity of Project Area

Item	Location MGA/GDA (GPS)	Description
NS1 House site and yards	E 360104 N 6345274	Rural residential site (house demolished), extensive area of yards and gardens. Formerly used for horse agistment.
NS2 House site & piggery	E 359425 N 6345250	Rural residential site (house demolished), standing shed and site of former piggery
NS3 Mine shaft	E 362914 N 6346251	Infilled shaft
NS4 Mine workings	E 362017 N 6346840	Milroy Mine, adit, track and mullock heap. Some ironware associated.
NS5 Timber mill	E 358950 N 6345920	Standing posts, fallen timber, sheet iron, mill machinery remains
NS6 Bridge over Main Northern Railway Line	E 361540 N 6344650	Known as 'Woodcutters Bridge' Demolished – only abutments remaining
NS7 Site of [former] Sunnywood Public School	E359000 N 6344075 Freeman's Drive, Cooranbong	Removed from site, no evidence extant, historical record only.
NS8 Dairy	E 360116 N 6343079 Freeman's Drive, Cooranbong	Milking shed or similar in poor condition but still standing. Asbestos sheet roofing. Not closely inspected.
NS9 Dairy, silo and yards	E 358468 N 6343688 Freeman's Drive, Cooranbong	Single storey brick-veneer residence from 1960s, accompanying dairy and yards from 1950s or earlier. In use until recently.
NS10 Residence	E359200 N 6344600 751 Freeman's Drive, Cooranbong	Residence not in original condition and has been modified over several phases and remains in use. Not inspected.
NS11 Awaba State Coal Mine	E361850 N 6343482 Wilton Road, Awaba	Complex of colliery buildings including portals, conveyor, offices, sheds, screen and loader. No detailed inspection carried out during this survey.

Plate 4.3 Summary of potential (unlisted) heritage items identified by Australian Archaeology, 2007

© Table 5, Australian Archaeology 2007

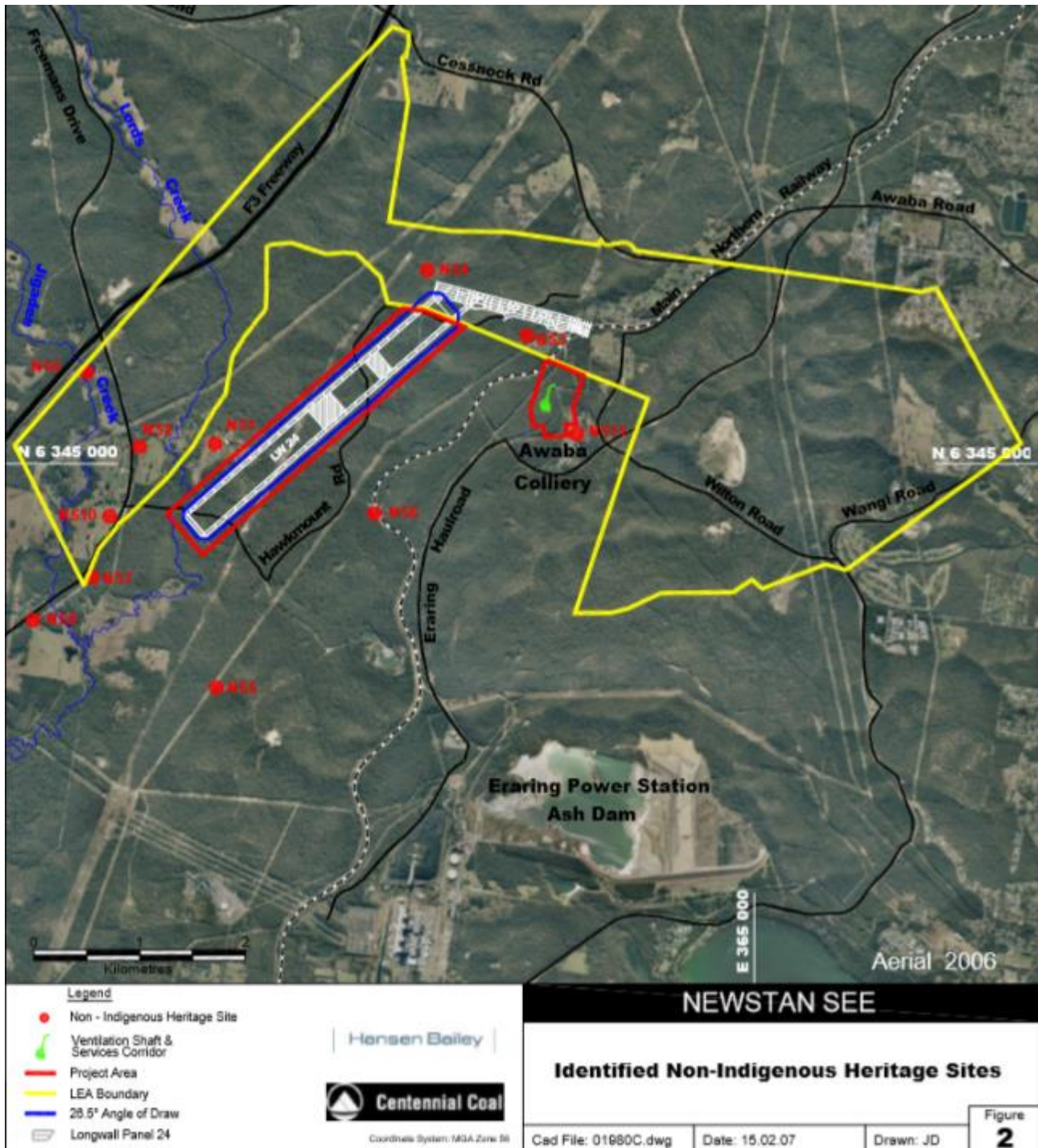


Plate 4.4 Map of potential (unlisted) heritage items identified by Australian Archaeology, 2007

© Figure 2, Australian Archaeology, 2007

The sites identified as part of the 2007 study have been included and assessed in this report.

RPS, 2012, *Awaba Colliery, Near Fassifern, NSW – Post-Mining Heritage Management Plan*, prepared for Centennial Coal Newstan.

In 2012, RPS prepared a heritage impact assessment for Awaba Colliery, which forms the Awaba Colliery Surface Site component of the current project area.

The assessment determined that the Awaba Colliery Complex is of local heritage significance, with further research required to determine whether or not it could be classified as having State significance, noting that the report acknowledged that the potential for the site to have State significance was considered low. The summary statement of significance developed by RPS for the Awaba Colliery is provided below:

The Awaba Colliery complex is historically significant at a local level as the first colliery to be planned, constructed and operated by the NSW State Government via the State Mines Control Authority. It is representative of the significant expansion in colliery development in New South Wales by the State Government during the post-war period. Furthermore, the colliery's operation from 1947 to the present day marks a significant period of continuity in use.

The site has a strong historical association with the State significant Wangi Power Station for which it provided fuel. It was also physically linked to the Power Station by a direct rail line of which some evidence remains.

Evidence suggests that the pit top complex was technically innovative for its period of development in terms of the calibre of the social facilities provided and the standard of mechanical and electrical installations. As such, it may have the potential to yield information on mid-20th Century mining technology.

The pit top complex by virtue of its built form, infrastructure and layout represents an intact and highly legible example of a colliery dating from the immediate post-war era. The Colliery buildings, in particular the main administrative and bath house complex, have a strong industrial aesthetic characteristic of the broader region, evoking its rich coal mining history. The location of the colliery within a valley surrounded by forested slopes creates an attractive setting.

The Awaba Colliery is considered to be of local significance with further research required to establish whether it could be classed as State significant (principally through comparative research into contemporary collieries and in particular, former state coal mines). The likelihood of the site meeting the state significant threshold is considered to be low.

The report also assessed the contribution of individual features to the overall heritage significance of the place, as outlined below.

Feature	Contribution
Main building complex including administrative buildings, bath and change rooms, lamp room and boiler house	High
Workshop	High
1947 Drift Portal	High
1949 Drift Portal	High
1987 Drift Portal	Moderate
Rail Track	High
Demountable storage sheds to south of site adjacent to the 1987 Drift Portal	Low/negligible
Fire Station Shed	Moderate

Plate 4.5 Assessment of contribution of individual features to overall significance of Awaba Colliery

© RPS, 2012, Page 27

RPS, 2013, *Cultural Heritage Impact Assessment for Newstan Extension of Mining Projects*, prepared for Centennial Coal.

RPS were engaged by Centennial Newstan to undertake a Cultural Heritage Impact Assessment (CHIA) to inform an Environmental Impact Statement (EIS) for the (then) proposed Newstan Colliery Extension of Mining Project. The proposal described in the RPS report was ultimately not undertaken.

The assessment comprised two areas, the Project Application Area, covering approximately 7,453 hectares and the Subsidence Study Area (the area potentially impacted by subsidence and the subject of focus for the CHIA), covering approximately 3,917 hectares. Both areas encompass the current project area outlined in this report, with the exception of the Forest Road Ballast Borehole and Services Site in the north. The report provides a summary of previously identified and formally listed historical heritage items.

The Subsidence Study Area (SSA) was split into a total of 21 survey units designed to maximise coverage rather than targeting areas of specific archaeological potential. As a result of this survey, no new historical heritage sites, items or elements were identified, nor were any areas of historical archaeological potential.

In terms of impact assessment, the report noted that:

- The Main or Great Northern Railway was predicted to experience less than 20 millimetres of subsidence. It was not predicted that the railway would experience any significant conventional tilts, curvatures or strains. The report concluded that it was unlikely for the railway or any associated elements to experience adverse impacts as a result of the (then) proposed mining activity.
- The potential for mining activities to impact Eraring Energy owned infrastructure associated with Eraring Power Station was acknowledged. It was noted that in some instances, it would be necessary to reduce the percentage of coal recovered under Eraring Energy owned infrastructure to limit subsidence to acceptable levels, and that this was to be determined through the Subsidence Management Plan and Extraction Plan process. Detailed management strategies for the Eraring Power Station were to be developed, through ongoing consultation with Eraring Energy, as part of this process.

Note, this plate excludes the Newstan Colliery Surface Site and Forest Road Ballast Borehole and Services Site.

Proposed Newstan Mine Extension Project (SSD 10333), Lake Macquarie, NSW
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5.0 Visual Inspection

This section of the HHA details the methodology and results of the visual inspection that was undertaken to inform this assessment.

5.1 Methodology

The purpose of the survey was to enable the identification and inspection of any listed heritage items and/or any unlisted items, elements or places of potential heritage significance and/or historical archaeological potential within and in immediate proximity to all four areas that comprise the project area.

The survey was undertaken concurrent with the Aboriginal cultural heritage survey undertaken by Umwelt over five days from 2 December to 6 December 2019. In attendance on all days of survey were Karyn Virgin and Jessica Blackman, both Senior Consultants at Umwelt. The Aboriginal party representatives who also attended the surveys are outlined in the below table for reference.

The purpose of the five-day survey was to achieve sufficient visual coverage of the project area to enable the identification of previously unidentified items, elements, sites or areas of potential historical heritage significance. Attempts were made to inspect as much of the project area as was feasible, noting that accessibility and visibility were constrained in some areas by:

- Difficult and/or unsafe terrain that was not able to be navigated either via vehicle or on foot
- Vegetation density.

Survey participants were generally spaced between 5 to 20 metres apart dependent on ground surface visibility, topography and vegetation. However, on occasion it was necessary for survey participants to walk in single file or close proximity due to the denseness of vegetation and/or to navigate steeper areas.

Table 5.1 Aboriginal party representatives who participated in the surveys

Date	Organisation	Name
2 December 2019	Awabakal Descendants Traditional Owners Aboriginal Corporation (ADTOAC)	Peter Leven
	Awabakal Traditional Owners Aboriginal Corporation (ATOAC)	Kyle Howie
	Kauwul Pty Ltd trading as Wonn1 Sites	Arthur Fletcher
	Wonnarua Nation	Renee Gillaine
	Awabakal and Guringai	Jackson Walker
3 December 2019	ADTOAC	Peter Leven
	ATOAC	Kyle Howie
	Kauwul Pty Ltd trading as Wonn1 Sites	Arthur Fletcher
	Wonnarua Nation	Renee Gillaine
	Awabakal and Guringai	Jackson Walker
4 December 2019	ADTOAC	Peter Leven
	ATOAC	Kyle Howie

Date	Organisation	Name
	Kauwul Pty Ltd trading as Wonn1 Sites	Arthur Fletcher
	Wonnarua Nation	Renee Gillaine
	Awabakal and Guringai	Jackson Walker
5 December 2019	ADTOAC	Peter Leven
	Kauwul Pty Ltd trading as Wonn1 Sites	Arthur Fletcher
	Wonnarua Nation	Renee Gillaine
	Awabakal and Guringai	Jackson Walker
6 December 2019	ADTOAC	Tori Leven
	ATOAC	Kyle Howie
	Kauwul Pty Ltd trading as Wonn1 Sites	Arthur Fletcher
	Wonnarua Nation	Renee Gillaine
	Awabakal and Guringai	Jackson Walker

An additional day of survey was undertaken by Karyn Virgin (Senior Consultant, Umwelt) on 10 January 2020. The purpose of this additional day of survey was to undertake targeted inspections of listed and previously identified potential (unlisted) historical heritage items within the project area.

5.2 Results

5.2.1 General Survey

As a result of the five-day survey, no new potential historical heritage elements, items or sites were identified. This includes potentially significant views and vistas, potentially significant landscape elements, including vegetation, trees and gardens, or potentially archaeologically significant areas or relics.

The only undocumented historical elements identified within the entirety of the project area were remnant timber fence posts and limited sections of timber mortise and tenon fencing, which was located sporadically throughout the Extension of Mining Area. Greater concentrations of the fence posts were located in association with the 'Awaba to Wangi Power Station Branch Railway Line' (a potential [unlisted] historical heritage item identified in previous assessments), and are likely to have formed part of barrier fencing that was erected around the railway line when it was operational (around 1950 to 1970).

The timber posts and remnant fencing are vernacular in design and proportions, and with the exception of those fence posts associated with the Branch Line, did not appear to be associated with any specific previously present structures or elements. No previous structures or elements are documented to have been present in the areas where the fence posts or remnant fencing were identified, and it is likely that the fence posts and remnant fencing formed part of previous fence lines erected to demarcate land boundaries, possibly in reflection of land ownership or general use.

With the exception of those associated with the Branch Line, none of the timber posts or sections of remnant fencing appeared to form part of a discernible fence line that would be able to be identified, mapped and/or appropriately documented. Further investigation of the fence posts and fencing remnants is highly unlikely to reveal any new or significant information that would contribute meaningfully to our understanding of the history of the project area.

It is noted that the bushfires that moved through the area after the five-day survey was undertaken are likely to have further impacted the physical integrity of these elements.



Plate 5.1 Example of remnant mortise and tenon fencing within the Extension of Mining Area

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Plate 5.2 Example of remnant mortise and tenon fencing within the Extension of Mining Area

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5.2.2 Targeted Survey

As a result of the one-day targeted survey, all six of the listed and potential (unlisted) heritage items known to be located within or in immediate proximity to the project area were targeted for visual inspection and assessment:

- 'Eraring Power Station'
- 'Great Northern Railway'
- 'Newstan Colliery'
- 'Awaba State Coal Mine'
- 'Awaba to Wangi Power Station Branch Railway Line'
- 'Bridge over Main Northern Railway Line'.

Of the six listed and potential (unlisted) heritage items listed above, only one was not able to be inspected as part of the targeted survey, being Eraring Power Station. As already noted, the land on which the Power Station is located could not be physically accessed during the survey due to restrictions relating to the management of this land by Origin Energy.

5.2.2.1 'Great Northern Railway'

The Great Northern Railway was subject to inspection as part of both the five-day survey and the targeted survey. The visual inspection confirmed the descriptions of the Railway as contained in relevant background documentation, including the SHI listing citation for the item.

The section of the Railway that extends through the project area is located approximately between track kilometrages 130.0 km and 135.5 km. Within the project area, the Railway generally traverses a main ridgeline, which acts as a watershed for the area. A Mine Haul Road crosses over the Railway at approximately 133.2 km. Drainage culverts, embankments and cuttings are located along the railway line. Electrical equipment associated with the Railway post-dates 1960. The rail corridor is fenced, and is not publicly accessible.

The Railway was observed to be in good condition.



Plate 5.3 View of the Main Northern Railway, in proximity to the northern boundary of the Extension of Mining Area

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Plate 5.4 View of the Main Northern Railway, in proximity to the northern boundary of the Extension of Mining Area

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5.2.2.2 'Newstan Colliery'

The Newstan Colliery is located within the Newstan Colliery Surface Site portion of the project area. The visual inspection confirmed the descriptions of the Colliery as contained in relevant background documentation, including the SHI listing citation for the item and the 1997 assessment prepared by Higginbotham.

The Colliery presents as a typical colliery that, in its current configuration, predominately post-dates the 1940s with upgrade works to buildings and equipment having been undertaken between the late 1940s and the present.

The Colliery buildings and component elements was observed to be in good condition.



Plate 5.5 Views within Newstan Colliery, showing post-1948 building stock

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Plate 5.6 Views within Newstan Colliery, showing post-1948 building stock

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Plate 5.7 Views within Newstan Colliery, showing post-1948 building stock including the existing ventilation fans

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5.2.2.3 'Awaba State Coal Mine'

The Awaba State Coal Mine is located within the Awaba Colliery Surface Site portion of the project area. The visual inspection confirmed the descriptions of the State Mine or Colliery as contained in relevant background documentation, including the SHI listing citation for the item and the 2012 assessment prepared by RPS.

The Colliery presents as a typical colliery that dates from 1947 onwards. It is almost completely intact, however some of the buildings and elements within the Colliery footprint are in relatively poor condition. This is predominately due to a lack of active use.

There is some miscellaneous mining equipment currently being stored on site, at the southern end of the Colliery footprint. This will be removed and scrapped. This equipment was inspected and photographed for reference. This equipment was not identified as significant in the 2012 RPS report.

The proposed works within the State Coal Mine or Colliery footprint will not interact with or remove any elements of heritage significance identified in the 2012 RPS report.



Plate 5.8 Existing ventilation shaft. A fan house is to be built over the shaft. A new power enclosure will be constructed as indicated.

It should be noted that this area is located some distance from the main Awaba Colliery area

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Plate 5.9 View of the proposed new bulk materials area.

The concrete wall shown in this photograph was previously used to place bulk materials against. The wall is proposed for removal.

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Plate 5.10 It is proposed to establish a vent stack and flares, pumps area, water tank and cooling area, and switchyard, control panels and transformer in the broad area shown.

Note, the rail tracks and other elements shown will generally be retained

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Plate 5.11 The concrete material storage areas will be removed as part of the current proposal. These are not identified as significant in the 2012 RPS report.

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Plate 5.12 The concrete material storage areas will be removed as part of the current proposal. These are not identified as significant in the 2012 RPS report.

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Plate 5.13 Proposed new sediment dam location

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Plate 5.14 Miscellaneous moveable equipment will be removed from site and scrapped

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5.2.2.4 'Awaba to Wangi Power Station Branch Railway Line'

The 'Awaba to Wangi Power Station Branch Railway Line' was observed during both the five-day survey and the one-day targeted survey, in multiple locations. The visual inspection confirmed that the Line is of a standard construction, and extends both through cuttings and on top of embankments. In some areas, the line was observed to lack integrity and be in a relatively poor condition; in these areas, sleepers, rail, and/or fixings were observed to have been removed or moved. In some sections, fabric associated with the Line was completely absent.

The majority of the Line was somewhat obscured by leaf litter. A limited number of concrete culverts were identified in association with the embankments along which the Line extended.

The one-day targeted survey was undertaken following the movement of severe bushfires through the area. The bushfires further impacted upon the Line, and further compromised its physical integrity. Within the sections of the Line that were able to be inspected during the one-day survey, almost all of the timber sleepers were burnt out and no longer present. Power poles associated with the Line had also been burnt, and had failed structurally. Refer to **Plates 5.21 to 5.23**.



Plate 5.15 View of the Line from an adjacent embankment

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Plate 5.16 View of a section of the Line that extends along an embankment

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Plate 5.17 View of a section of the Line that extends along an embankment

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Plate 5.18 Example of a culvert within an embankment along which the Line extends

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Plate 5.19 View of a section of the Line that extends along an embankment

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Plate 5.20 View of a section of the Line that extends through a cutting. Note the density of surrounding vegetation

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Plate 5.21 View of the Line during the one-day survey, following bushfire damage. Note the absent sleepers.

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Plate 5.22 View of the Line during the one-day survey, following bushfire damage. Note the absent sleepers.

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Plate 5.23 Power pole associated with the Line burnt and no longer *in situ*

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5.2.2.5 'Bridge Over Main Northern Railway Line'

This unlisted (potential) heritage item was subject to visual inspection as part of the one-day targeted survey. As previously noted, this potential heritage item is located outside of but in proximity to the Extension of Mining Area.

The visual inspection confirmed the description of the unlisted heritage item included in the 2007 Australian Archaeology report; only the concrete and brick abutments of the bridge remain.

The bridge remains are not directly accessible, as they form part of the corridor of the Great Northern Railway and are therefore fenced off. The remains appeared to be in a stable condition.



Plate 5.24 View of the Bridge remains facing west over the Great Northern Railway

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Plate 5.25 View of the Bridge remains facing west over the Great Northern Railway

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6.0 Significance Assessment

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, sub-surface remains and natural material (Australia ICOMOS 2000).

6.1 Heritage Significance

The NSW Heritage Manual (1996) published by the then 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 (then) Heritage Division, OEH (now Heritage, Department of Premier and Cabinet (DPC)), and used by the NSW Heritage Council as an assessment format within NSW have been used in the preparation of this HHA. The seven criteria are:

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

6.1.1 Assessment of Heritage Significance

As noted at **Section 1.4**, study requirements put forward by DPIE (formerly OEH) state:

Where impacts to State or locally significant heritage items are identified, the assessment shall:

include a statement of heritage impact for all heritage items (including significance assessment)

In accordance with the above, this report includes a significance assessment for only those items, structures or elements for which potential impacts have been identified. Impacts of the project as they relate to historical heritage are discussed further in **Section 7.0**.

As outlined at **Section 7.0**, the items that will potentially be subject to impacts as a result of the project are:

- ‘Eraring Power Station’
- ‘Great Northern Railway’
- ‘Awaba to Wangi Power Station Branch Railway Line’
- ‘Awaba State Coal Mine’
- ‘Newstan Colliery’.

As such, significance assessments have only been prepared for these items. The significance assessments presented in this section are based upon the seven criteria outlined at **Section 6.1**. Historical archaeological potential and significance is assessed separately at **Section 6.2**.

Table 6.1 Significance assessment for items/potential items that will potentially be subject to impacts as a result of the project

Item (Listed or Unlisted)	Assessment of Significance
Eraring Power Station	Criterion (a) Historical Significance Aside from the former Pasminco (the Sulphide Corporation) smelter, Eraring Power Station is the biggest industrial undertaking around the Lake, and one of the largest in the Hunter region. Constructed from 1976 onwards, it is the successor to the State significant Wangi Power Station, which was formally decommissioned in April 1989. The Power Station has historical significance as it is representative of the evolution of the industry within the Lake Macquarie region, and particularly the changing role of the coal mining industry over time. The Power Station meets this criterion on a local level. Criterion (b) Associative Significance The Power Station was the fifth built by the company Elcom, and is of a utilitarian design. There is no evidence in the historical record to suggest that the Power Station is associated with any specific company or individual that is of importance to the local area’s or NSW’s history. The Power Station does not meet this criterion on either a local or State level. Criterion (c) Aesthetic Significance As noted above, the Power Station is of a utilitarian design and construction; that is, it was designed and built for purpose (‘form follows function’). The

Item (Listed or Unlisted)	Assessment of Significance
	construction of the Power Station did not involve any particular creative or technical innovation or achievement. However, the scale of the Power Station means that it is highly visible within the local area, and has landmark qualities. The Power Station meets this criterion on a local level. Criterion (d) Social Significance As a large-scale local industry, the Power Station has provided employment for a significant number of local residents. The Power Station has strong ties to the local community through both past and present employees and their families. The Power Station meets this criterion on a local level. Criterion (e) Research Potential As noted above, the Power Station is of a utilitarian design and construction. Neither the design nor construction of the Power Station involved any particular creative or technical innovation or achievement. The Power Station was constructed relatively recently (1970s) and represents an industry and historical period that is well documented in the historical record. Further assessment of the Power Station is considered unlikely to yield information that would contribute meaningfully to an understanding of the local area's or NSW's cultural or natural history. The Power Station does not meet this criterion on either a local or State level. Criterion (f) Rarity Earning Power Station is one of several coal-fired power stations currently operating throughout Australia. As it is utilitarian in design, and given the ongoing operations of comparable power stations nationally, the Power Station is not rare. The Power Station does not meet this criterion on either a local or State level. Criterion (g) Representativeness The Power Station is representative of large-scale coal fired-power stations operating both NSW and Australia. Within the Lake Macquarie LGA, it is one of a handful of comparable power stations. It is of a utilitarian design and construction that is typical of the period in which it was constructed. The Power Station meets this criterion on a local level.
Great Northern Railway Note: this significance assessment relates only to that portion of the Great Northern Railway that extends through the Lake Macquarie LGA and is listed on the Lake Macquarie LEP 2014.	Criterion (a) Historical Significance The Great Northern Railway is historically significant as: • It changed the relationship of Newcastle with surrounding areas and helped establish Newcastle as a commercial centre • It confirmed the importance of Newcastle as a coaling port • It changed the pattern of development in Lake Macquarie • It linked the towns of Lake Macquarie and Newcastle and influenced development and industry The Railway meets this criterion on a local level. Previous assessments have identified the Railway as having historical significance on a State level. Criterion (b) Associative Significance The historical record does not provide strong evidence of any meaningful associations between the Railway and any individual or group that is important to the local area or NSW's history. The Railway does not meet this criterion on either a local or State level.

Item (Listed or Unlisted)	Assessment of Significance
	Criterion (c) Aesthetic Significance The Railway is predominately of a standard gauge and is of a utilitarian design and construction. Though some sections of the Railway required more complex engineering solutions, the overall Railway is not particularly important in demonstrating the aesthetic characteristics of railways of the period, nor does it have a high degree of creative or technical achievement. The Railway has also been subject to various upgrades over time. The Railway does not meet this criterion on a local or State level. Criterion (d) Social Significance The Railway is likely to have associations with local individuals and groups who are related or interested in those people who worked on the Railway during its construction. It is also likely to have some degree of association with people who used the Railway in the past. However, none of these associations are considered to be strong or special. The Railway does not meet this criterion on a local or State level. Criterion (e) Research Potential The Railway, including its construction and use is well documented. The Railway is of utilitarian design and construction. Further assessment of the Railway is considered relatively unlikely to yield information that would contribute meaningfully to an understanding of the local area's or NSW's cultural or natural history. The Railway does not meet this criterion on either a local or State level. Criterion (f) Rarity As noted, the Railway is of a typical design and construction. The portion of the Railway that extends through the Lake Macquarie LGA is only one component of a larger route. There are multiple other railways of a comparable design and construction, though there are none of a comparable scale within the Lake Macquarie LGA. The Railway meets this criterion on a local level. Criterion (g) Representativeness For the reasons discussed above, the Railway has representative value as the largest public railway line within the Lake Macquarie LGA that is of a standardised design and construction. The Railway meets this criterion on a local level.
Awaba to Wangi Power Station Branch Railway Line	Criterion (a) Historical Significance The Branch Line has some historical value through its associations with both the Awaba State Mine and the Wangi Power Station. The Branch Line is representative of the dominant industry of the area and its evolution into the mid-twentieth century. The Branch Line meets this criterion on a local level. Criterion (b) Associative Significance The historical record does not provide strong evidence of any meaningful associations between the Branch Line and any individual or group that is important to the local area or NSW's history. The Branch Line does not meet this criterion on either a local or State level. Criterion (c) Aesthetic Significance The Branch Line is predominately of a standard gauge and is of a utilitarian design and construction. The Branch Line is in relatively poor condition, and is not particularly important in demonstrating the aesthetic characteristics of

Item (Listed or Unlisted)	Assessment of Significance
	railways of the period, nor does it have a high degree of creative or technical achievement. The Branch Line does not meet this criterion on a local or State level. Criterion (d) Social Significance The Branch Line is likely to have associations with local individuals and groups who contributed to the construction of the line and/or used it between the 1950s and 1970s. However, these associations are not considered to be strong or special. The Branch Line does not meet this criterion on a local or State level. Criterion (e) Research Potential The Branch Line is well documented in the historical record and in previous heritage assessments. The Branch Line is of utilitarian design and construction. Further assessment of the Branch Line is considered relatively unlikely to yield information that would contribute meaningfully to an understanding of the local area's or NSW's cultural or natural history. The Branch Line does not meet this criterion on either a local or State level. Criterion (f) Rarity The Branch Line is one of 20 railways and tramways that were identified in the 1993 <i>Heritage Study</i>. A number of these railways/tramways have since been recognised for their heritage significance through inclusion on the LEP and will therefore be retained <i>in situ</i>. The Branch Line does not meet the criterion for rarity. Criterion (g) Representativeness As noted above, the Branch Line is one of many railways/tramways in the LGA that have been assessed to have heritage significance. However, the Branch Line has never been formally listed for its heritage values (whereas other railways/tramways have). The Branch Line is also in fair to poor condition, with many sections of it removed or altered. The Branch Line does not meet the criterion for representativeness.
Awaba State Coal Mine <i>Note: the significance of the Awaba State Mine was comprehensively assessed by RPS in 2012. The adjacent significance assessment is therefore sourced directly from RPS 2012.</i>	Criterion (a) Historical Significance The Awaba Colliery is historically significant as the first State Mine to be planned, constructed and managed by the State Government through the State Mine Control Authority. This represented a significant phase of post-war expansion in colliery development by the state aimed primarily at providing fuel for state-run power stations. On the basis that the Colliery was conceived to produce coal for the Wangi Power Station (included on the State Heritage Register) there is considered to be an important historical association between the two places. The use of the former State Mine for over 60 years since coal was first extracted in 1949 to the present day, albeit to varying degrees of intensity, demonstrates continuity of an historical activity. Following the closure of the Wangi Power Station, Awaba Colliery provided coal for the Eraring Power Station, its successor. This fact further reinforces the Colliery's significance with respect to continuity of use or function. Criterion (b) Associative Significance There is no evidence to suggest that the site has particular associative value with individuals or groups of persons of cultural historic importance. Further historical research may reveal significant associative value.

Item (Listed or Unlisted)	Assessment of Significance
	Criterion (c) Aesthetic Significance The building and structures associated with the former Awaba State Colliery are utilitarian in character and solidly constructed in good quality materials, particularly in the case of the main building complex (red brick and timber casement windows). They are not considered to be accomplished architecturally or particularly aesthetically pleasing. They do display, however, a distinctive industrial aesthetic which is characteristic of the broader region and its rich coal mining history. The immediate setting of the colliery complex is visually attractive as characterised by the surrounding heavily forested ridges which feature in views throughout the site. It is understood that the colliery was built to the highest standards for its time as commented upon in 1955 by the Director of State Coal Mines, R J Ashworth. He describes the facilities as being unsurpassed at any other colliery in the State and that the electrical and mechanical installations are of a 'high order'. The complex is therefore considered to demonstrate technical achievement. Criterion (d) Social Significance This heritage significance assessment criterion is aimed at identifying social or cultural value currently in evidence. In order to fully demonstrate that a site or place has social significance, community consultation is usually required. Nonetheless, the continuous operation of the Colliery from the 1940s to 2012 suggests that there will be many current and former employees and their families within the local community who have a connection with the site or indeed, consider that the colliery gives the locale a sense of identity. Criterion (e) Research Potential This criterion relates to whether a site can provide further substantial scientific and/or archaeological information that no other site or resource (for instance, documentary evidence) can. On the basis that the Colliery was considered to be technically advanced for its time, there may be evidence available at the site that would yield information on the development of mining technology and mid-twentieth century mining technology. Further research would be required to establish whether this criterion is met through a thorough inventory of potential moveable heritage items for instance. Site survey findings and discussions with longstanding Awaba Colliery staff has revealed, however, that there is little of the original mid-twentieth century machinery and equipment remaining at the site. For instance, it is understood that the original coal crushing machinery in the coal crushing plant was replaced in its entirety in the 1980s. Criterion (f) Rarity In order to fully understand whether the site has rarity value it is necessary to carry out a comparative analysis of contemporary, former state coal mines. There is a lack of readily available information on the extent of original fabric remaining at former state mines still in operation. A review of local and state heritage registers indicates that none of the other broadly contemporary state mines or items within the sites (Oakdale, Liddell, Munmorah and Wyee) are included on statutory heritage registers. Further research is required to determine whether the other former state coal mines broadly contemporary to the Awaba Colliery retain a significant level of original built form and infrastructure. The Awaba Colliery could be considered rare if its level of survival and intactness is greater than the other state coal mines. Pearson and McGowan emphasise that the gathering of comparative information and its rigorous analysis is a necessary part of assessment of the

Item (Listed or Unlisted)	Assessment of Significance
	rarity criteria. There is a lack of readily available information on other former state coal mines and as such, a definitive response cannot be provided for this criterion. Criterion (g) Representativeness The Awaba Colliery pit top complex is relatively intact and retains the main components of a typical colliery dating from the post-war era including administrative complex, bath and change houses, lamp room, workshop and boiler house. Pearson and McGowan (1998) note that social facilities such as bath and change houses only started to appear at collieries in the 1940s and administrative buildings in the post-war period. The site is therefore considered to be representative of a mid-twentieth century colliery.
Newstan Colliery <i>Note: the significance of the Newstan Colliery was comprehensively assessed by Higginbotham in 1997. The adjacent significance assessment is therefore sourced directly from Higginbotham 1997 with only minor changes. Original text from the 1997 report is italicised.</i>	Criterion (a) Historical Significance <i>Northumberland Colliery, now known as Newstan Colliery, was one of a number of mines associated with the second and capital intensive stage of deeper mining in the Newcastle and Hunter Valley Region in the 1880s.</i> <i>Northumberland Colliery was one of the first mines to be lit by electric light in New South Wales.</i> <i>The historical development of the Colliery demonstrates economic, social, technological and other factors, which affected the successes or failures of collieries throughout the Hunter and Newcastle region.</i> <i>Tuckers House more specifically is one of the earliest settlement sites in the immediate area, associated with the initial development of coal extraction.</i> <i>Bat Alley Tunnel (Northumberland No. 1) is the site of the earliest coal extraction in the locality. It is a well-preserved example of a late nineteenth century mine shaft with later additions and alterations.</i> <i>The Arsenic Smelting Works is a rare example of an arsenic smelting works, in collapsed condition, but able to demonstrate the technology and processes used in production.</i> Criterion (b) Associative Significance <i>The Colliery is associated with one of the largest companies (Northumberland Coal and Land Company) established by the 1880s to speculate in and exploit the coalfields of Newcastle and the Hunter Valley.</i> Criterion (c) Aesthetic Significance The Higginbotham report did not specifically identify aesthetic significance in association with the Colliery. However, Bat Alley Tunnel and the Arsenic Smelting Works are acknowledged in the report to have technical significance in terms of the technological innovations they represent. Criterion (d) Social Significance The Higginbotham report did not specifically identify social significance in association with the Colliery. It is likely, however, that the Colliery has some social value for those individuals and groups who were employed at the Colliery as well as their families. Criterion (e) Research Potential Tuckers House, Bat Alley Tunnel and the Arsenic Smelting Works are all identified by Higginbotham to have research potential as archaeological sites. As noted above, Bat Alley Tunnel and the Arsenic Smelting Works are acknowledged in the report to have technical significance in terms of the technological innovations they represent, and their potential to reveal further information about these technologies through archaeological investigation.

Item (Listed or Unlisted)	Assessment of Significance
	Criterion (f) Rarity The Higginbotham report notes that the Colliery is rare as: - <i>It was one of the first mines to be lit by electrical lighting</i> - <i>It is associated with the Northumberland Coal and Land Company</i> - <i>Tuckers House is one of the earliest settlement sites of the immediate area</i> - <i>Bat Alley Tunnel is the site of the earliest coal extraction in the locality</i> - <i>The Arsenic Smelting Works is a rare example of an arsenic smelting works</i> Criterion (g) Representativeness The Higginbotham report identifies the Colliery to have representative value as: - <i>It was one of a number of mines associated with the second and capital intensive stage of deeper mining in the Newcastle and Hunter Valley Region in the 1880s.</i> - <i>The historical development of the Colliery demonstrates economic, social, technological and other factors, which affected the successes or failures of collieries throughout the Hunter and Newcastle region.</i>

6.2 Archaeological Significance

As a component of the holistic concept of significance, archaeological significance has traditionally 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).

Archaeological significance has traditionally been linked to archaeological research potential in that ‘*a site or resource is said to be scientifically significant when its further study may be expected to help answer questions...*’; that is, scientific significance is defined as research potential (Bickford & Sullivan 1984 23-24).

Following Bickford and Sullivan’s work on archaeological significance (Bickford & Sullivan 1984) the following questions are generally used as a guide to assessing the significance of an archaeological site in terms of its research potential (Criterion I of the NSW Heritage assessment criteria):

- 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?

In 2009 the Heritage Council of NSW endorsed the Heritage Branch Department for Planning (now Heritage, DPC) guideline *Assessing Significance for Historical Archaeological Sites and ‘Relics’* which considers a broader approach to archaeological significance, rather than one focused on the research potential of an archaeological site only.

6.2.1 Assessment of Archaeological Significance

Based on the historical overview presented at **Section 3.0** of this report, no undocumented historical structures or other elements are known to have been present within the project area.

Documented areas of historical archaeological potential are limited to those areas identified by Higginbotham 1997 in association with Newstan Colliery. Areas of archaeological potential associated with the Colliery are well documented and mapped, and are entirely contained within the locally listed heritage curtilage of Newstan Colliery as defined in Schedule 5 of the Lake Macquarie LEP 2014. No works are proposed within the areas of identified archaeological potential.

No other areas of historical archaeological potential have been identified within the project area as a result of previous heritage and/or archaeological assessments undertaken in the area, or as a result of the visual inspection of the project area. Based on the available information, the historical archaeological potential of the project area is assessed as low to nil.

Based on the above assessment of historical archaeological potential, it is not considered warranted to undertake an assessment of historical archaeological significance for the project area.

7.0 Impact Assessment

As noted at **Section 5.0**, no new potential historical heritage elements, items or sites were identified within the project area as a result of the visual inspection. This includes potentially significant views and vistas, potentially significant landscape elements, including vegetation, trees and gardens, or potentially archaeologically significant areas or relics.

The following impact assessment has therefore been prepared to address potential impacts associated with the project in relation to previously identified listed and unlisted (potential) heritage items known to be present within and in the vicinity of the project area.

7.1 'Eraring Power Station'

No direct physical impacts are proposed to occur to Eraring Power Station as a result of the current proposal. However, the Power Station may be subject to indirect impacts as a result of subsidence. With regards to potential subsidence impacts, the *Subsidence Predictions and Impact Assessments* report prepared for the project by MSEC states the following:

The Eraring Power Station is a coal fired electricity power station which was constructed in 1977. The infrastructure associated with the power station extends above the southern ends of the proposed panels. However, first workings areas are proposed beneath the majority of the building structures and associated infrastructure. Total extraction is proposed directly beneath the ash dam. The main power generation facility itself is located south of the proposed mining area.

The MSEC report identifies that potential subsidence impacts may occur to a range of built elements within the Power Station complex. An excerpt of the complete impact assessment is provided below for reference:

- *The main building structures associated with the Eraring Power Station are predicted to experience less than 20 mm vertical subsidence. Whilst the structures located close to or directly above the first workings areas within the proposed panels could experience very low levels of vertical subsidence, they are not predicted to experience measurable tilts, curvatures or strains.*
- *The power generation facility is predicted to experience horizontal bending with a minimum radius of curvature of 1.5 km and an average extension of less than 0.1 mm/m. The structural steel frame of this building is likely to tolerate these low level movements without adverse impacts.*
- *The maximum predicted tilt for the rail receival facility is 50 mm/m (i.e. 5 %, or 1 in 20). This tilt could be sufficient to result in adverse impacts on the serviceability of this structure and associated coal handling infrastructure. The predicted curvatures and strains could also be sufficient to result in cracking of the concrete walls beneath the railway loop line.*
- *The maximum predicted tilt for the structures associated with the diesel storage is 5 mm/m (i.e. 0.5 %, or 1 in 200). It is possible that minor serviceability impacts could develop due to the mining-induced tilt, including issues with gutter and wet area drainage. It is unlikely that the building structure itself would become unserviceable or unsafe based on the predicted subsidence effects. Adverse impacts on the structures should be repaired after active subsidence.*
- *The maximum predicted tilt for the weighbridges is 40 mm/m (i.e. 4 %, or 1 in 50). Tilting, if sufficiently large, can displace the centre of gravity of the vehicle which can then reduce the accuracy*

of the measurement. It is possible that the predicted mining-induced tilts would be sufficient to result in adverse impacts on the serviceability of the weighbridges.

- *The structures associated with the substation, light fuel storage and reclaim water storage are predicted to experience vertical subsidence of 100 mm or less. Whilst these structures could experience low level vertical subsidence, they are only expected to experience minor tilts, curvatures and strains. The building structures themselves are unlikely to experience adverse impacts due to the proposed mining. However, infrastructure and services associated with these structures could be sensitive to low level movements.*
- *The switch yard is located at a minimum distance of 680 m from the nearest secondary extraction area within the proposed panels. At this distance, the switch yard is not predicted to experience measurable vertical subsidence, tilt, curvatures or strains.*
- *The transformers on the eastern side of the switch yard could be sensitive to low level tilts.*
- *The 330 kV and 500 kV transmission lines run from the switch yard towards the west and away from the proposed mining area. It is also unlikely, therefore, that these transmission lines would experience measurable vertical subsidence, tilt, curvatures or strains.*

To effectively manage the above identified potential subsidence impacts to the Eraring Power Station, MSEC have developed a series of recommendations specific to subsidence impacts. As these recommendations have been developed by the relevant professional consultant, they have been replicated without change at **Section 9.0** of this report.

7.2 'Great Northern Railway'

No direct physical impacts are proposed to occur to the Great Northern Railway as a result of the current proposal. However, the Railway may be subject to indirect impacts as a result of subsidence. With regards to potential subsidence impacts, the MSEC report has provided the following impact assessment.

Neither partial nor total extraction are proposed directly beneath the Great Northern Railway. The partial and total extraction areas within the proposed panels are located at a minimum distance of 250 metres from the centreline of the Railway. The existing Awaba workings are generally set back from the Railway, providing a coal pillar beneath it. However, the first workings within the Great Northern Seam extend beneath the railway in eight location.

As such, the Railway is predicted to experience vertical subsidence of less than 20 millimetres due to the mining of the proposed panels. Low level subsidence could occur where first workings are extracted in the proposed 213 and 214 Panels directly beneath the Railway. There remains a degree of possibility that the Railway could experience additional low-level subsidence movements due to mining-induced effects on existing workings within the Great Northern Seam.

Overall, MSEC have assessed that based on the subsidence predictions described above and the fact that only first workings or no mining has occurred directly beneath or adjacent to the Railway in the overlying Great Northern Seam, it is unlikely that the Railway will experience adverse impacts due to the extraction of the proposed panels.

There remains, however, a low likelihood that the railway could experience low level subsidence movements where the track is adjacent to the existing Teralba Conglomerate Spanning Areas and the total extraction areas within the Great Northern Seam. Whilst the likelihood is extremely low, there is a possibility that higher than expected movements could occur at the track and

adverse impacts could occur along the railway, if management measures were not implemented. The adverse impacts could include changes in rail stress, changes in track geometry and/or changes in the performance of the overhead electrical wiring.

Whilst the predicted mining-induced movements are small, the rate of subsidence development could be rapid, thereby reducing the time available to respond and prevent a safety hazard developing on the track. The management measures therefore must consider the development of these low level movements.

The MSEC report states that it is considered feasible to implement robust management strategies to ensure that the railway remains safe and serviceable during and after the proposed mining. To this end, MSEC have prepared a number of recommendations to effectively manage potential subsidence impacts to the Railway, based on report content authored by Pigeon Civil Engineering. As these recommendations have been developed by the relevant professional consultant, they have been replicated without change at **Section 9.0** of this report.

7.3 ‘Newstan Colliery’

As Newstan Colliery is not located within any predicted subsidence areas, it will not be subject to any indirect impacts as a result of subsidence. The Colliery will be subject to direct physical impacts in association with the proposed removal of ventilation fans.

Proposed works within ‘Newstan Colliery’ are limited to the decommissioning of existing ventilation fans that are located within the Colliery complex (refer to **Plate 5.7**). These fans post-date the 1940s, and have not been identified in any relevant background reports to be of heritage significance. The Higginbotham 1997 report suggests that, at the time of authoring, the ventilation fans were less than 50 years old, and did not have any identified heritage significance.

No other physical works will occur within the Newstan Colliery footprint in association with the current project. As such, none of the previously identified significant elements within the Colliery listing curtilage (being Tuckers House, Bat Alley Tunnel and the Arsenic Smelting Works) will be subject to any impacts as a result of the project.

The overall presentation and character of the Colliery will not be adversely impacted by the decommissioning of the ventilation fans, which represent a relatively minor element of the overall site.

There are therefore no identified impacts to this listed item as a result of the project.

7.4 ‘Awaba State Coal Mine’

As the Awaba State Coal Mine is not located within any predicted subsidence areas, it will not be subject to any indirect impacts as a result of subsidence. The State Coal Mine or Colliery will be subject to direct physical impacts in association with:

- The construction of a proposed new power enclosure in association with existing infrastructure
- The use of the northeastern portion of the Colliery as a bulk materials area
- The removal of a concrete wall previously used to place bulk materials against
- The removal of concrete material storage areas

- The introduction of new elements including a vent stack and flares, pumps area, and switchyard, control panels and transformer
- The construction of a new sediment dam
- The removal of miscellaneous moveable equipment.

The proposed works listed above are assessed with regards to their heritage impacts in **Table 7.1** below. This impact assessment is informed by the 2012 RPS report, which provides the following figure showing the location of the core 1940s area and preferred locations for new development.

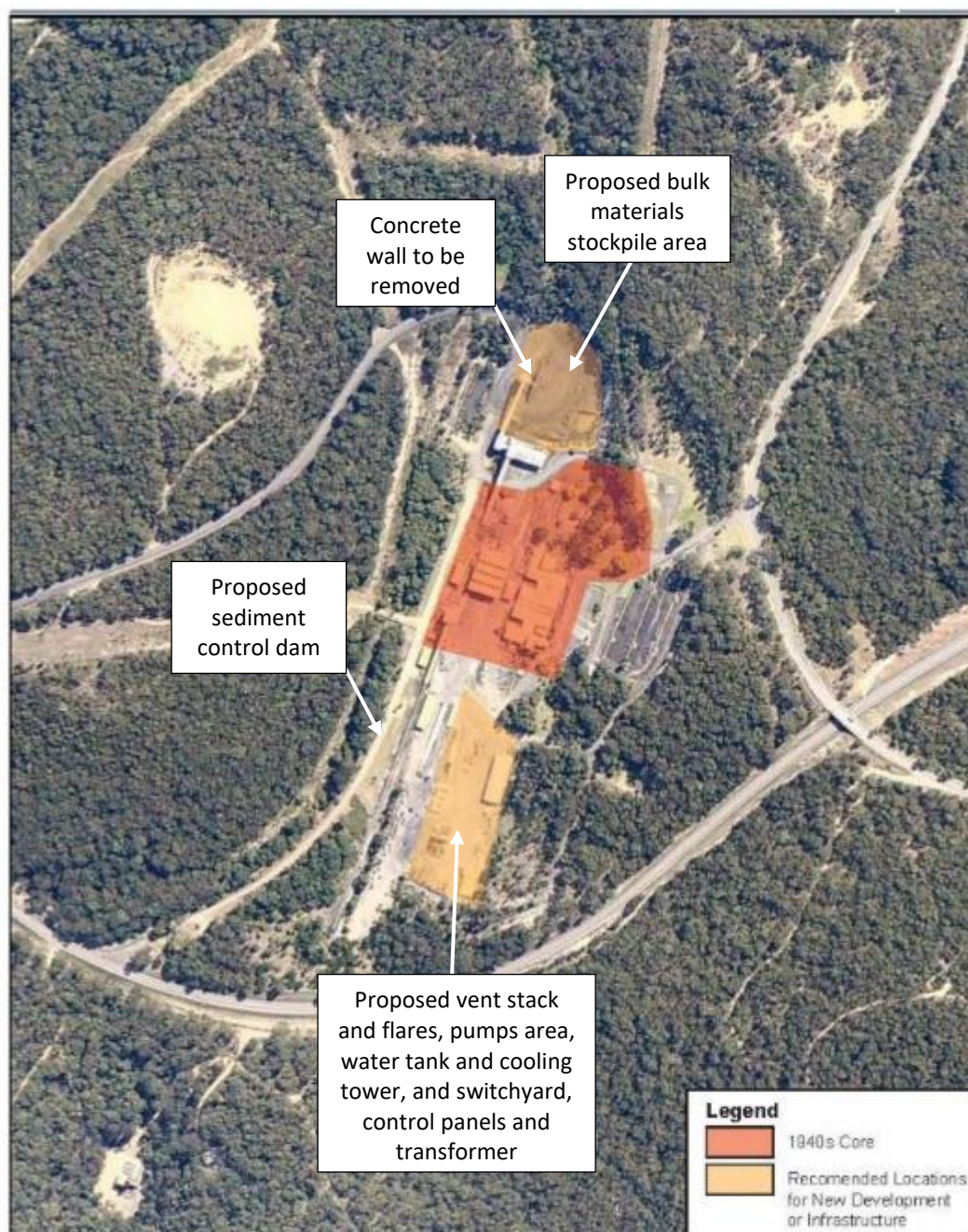


Figure 3: Recommended locations for new development

Plate 7.1 Figure from RPS 2012 showing core 1940s area and preferred locations for new development

© RPS, 2012, Figure 3

Table 7.1 Assessment of impacts to Awaba State Coal Mine/Colliery

Proposed Works	Assessment of Impacts
Construction of a proposed new power enclosure in association with existing infrastructure	These works are located outside of the defined boundaries of the Awaba State Coal Mine as they relate to its heritage significance. Works in this area will not interact with any elements of identified heritage significance. There are no identified impacts associated with this component of the works.
Use of the northeastern portion of the Colliery as a bulk materials area	Centennial Coal have advised that this portion of the State Coal Mine was previously used as a material storage area. It is currently used for storing gravels and other miscellaneous materials, and is becoming overgrown with vegetation. This area does not contain any elements of fabric of identified heritage significance, and is located outside of the core 1940s area and within an area of preferred new development identified in the RPS 2012 report. The storage of bulk materials in this area will not significantly alter and obscure existing views within and to the core 1940s area. There are no identified impacts associated with this component of the works.
Removal of a concrete wall previously used to place bulk materials against	The concrete wall has not previously been identified to be of heritage significance, and is located outside of the core 1940s area. The wall is located within an area of preferred new development identified in the RPS 2012 report. The removal of this wall will not significantly alter the overall character, appearance of setting of the State Coal Mine, which is predominately derived from the core 1940s area. The photographic recording undertaken as part of this report is considered to provide sufficient evidence of this element. There are no identified impacts associated with this component of the works.
Removal of concrete material storage areas	The concrete storage areas have not previously been identified to be of heritage significance, and are located outside of the core 1940s area. The storage areas are located within an area of preferred new development identified in the RPS 2012 report. The removal of these storage areas will not significantly alter the overall character, appearance of setting of the State Coal Mine, which is predominately derived from the core 1940s area. The photographic recording undertaken as part of this report is considered to provide sufficient evidence of these elements. There are no identified impacts associated with this component of the works.
Introduction of new elements including a vent stack and flares, pumps area, water tank and cooling area, and switchyard, control panels and transformer	All of these new elements will be located within an area of preferred new development identified in the RPS 2012 report, and will not encroach on the core 1940s area. Existing rail lines located within the concrete in this area will not be removed or impacted to facilitate construction of the new elements. New elements in this area will measure between 4.5 and 10 metres in height, and will therefore have some impact on the overall visual presentation of the State Coal Mine. However, this impact will be negligible, given that the proposed new elements will not obscure existing views to and within the core 1940s area. There are no identified impacts associated with this component of the works.
Construction of a new sediment control dam	The sediment control dam will be located within a suitable area that is vegetated and does not contain any structures or elements of identified heritage significance. The nominated location for the dam is located in association with a low-lying area that sits considerably lower than the ground surface level of the State Coal Mine. The proposed sediment control dam is located well outside of the core 1940s area, and by its nature will have a negligible degree of visibility. There are no identified impacts associated with this component of the works.

Proposed Works	Assessment of Impacts
Removal of miscellaneous moveable equipment	The miscellaneous moveable equipment have not previously been identified to be of heritage significance, and are located outside of the core 1940s area. The equipment is located within an area of preferred new development identified in the RPS 2012 report. The removal of this equipment will not significantly alter the overall character, appearance of setting of the State Coal Mine, which is predominately derived from the core 1940s area. The photographic recording undertaken as part of this report is considered to provide sufficient evidence of the equipment. There are no identified impacts associated with this component of the works.

7.5 ‘Awaba to Wangi Power Station Branch Railway Line’

In relation to the Branch Line MSEC have advised (*J. Barbato, pers. Comm.*) that:

The railway could experience the full range of predicted subsidence effects as described in Chapter 4 of the subsidence report (up to 3250 mm vertical subsidence, tilts greater than 100 mm/m and curvatures greater than 3.0 km⁻¹). The predicted subsidence effects are sufficient to result in rail break (in tension) or buckling of the rail (in compression). The susceptibility to impacts will depend on the existing condition of the track and whether the track is continuous (i.e. no existing breaks or joints).

As the Branch Line lacks physical integrity, with some sections missing and breaks in the line where rail is present, it may be less susceptible to subsidence impacts such as buckling or breaking. The Branch Line will, however, be subject to some degree of adverse physical impact as a result of the project.

The identified heritage significance of the Branch Line (**Table 6.1**) is predominately derived from its historical value, rather than any identified aesthetic significance. The Branch Line has been recorded as part of several heritage assessments previously undertaken for the area, including the current assessment.

As noted at **Section 5.2.2.4**, the Branch Line is in relatively poor condition and is, in some sections, entirely absent. The recent bushfires that extended through the area have further degraded the item’s physical integrity. It is also noted that the area within which the Branch Line is located is not readily accessible to the public, particularly in comparison to other former railways/tramways in the area such as the Toronto Branch Railway, the West Wallsend Steam Tramline or the Fernleigh Track.

The recording of the Line undertaken as part of this assessment, coupled with the recordings of the Line undertaken as part of previous assessments, are a sufficient record of the Line. The physical extent of the Line has been fully mapped, and historical records pertaining the Line’s construction and use are generally available.

For these reasons, the potential physical impacts that may occur to the Branch Line as a result of the current project area considered to be acceptable, and should not pose a constraint to the current project.

7.6 'Bridge over Main Northern Railway Line'

No direct physical impacts are proposed to occur to the Bridge remnants as a result of the current proposal. The Bridge remnants are located outside of the 26.5° angle of draw line, and is therefore predicted to experience less than 20 millimetres vertical subsidence.

The MSEC report concludes that the Bridge remnants are not expected to be sensitive to far-field horizontal movements (as the bridge deck is missing). The Bridge remnants are therefore not expected to experience adverse impacts due to the proposed mining.

There are therefore no potential impacts to this potential (unlisted) item as a result of the project.

8.0 Conclusion

This report has been prepared to meet the relevant SEARs for the project with regards to historical (non-Aboriginal) heritage. It has also been prepared to address comments and recommendations received from other agencies.

This assessment has considered the historical context of the project area and has provided an outline of listed heritage items and unlisted (potential) heritage items located within and in immediate proximity to this project area. A total of six listed or potential (unlisted) heritage items are known to be located within or in close proximity to the project area.

This assessment has determined that five of these six listed or potential (unlisted) heritage items may be subject to impacts as a result of the project. Management and mitigation strategies for these five listed/unlisted items are therefore provided at **Section 9.1**.

Through historical research, a review of previous heritage and archaeological assessments, and a targeted visual inspection of the project area, it has been determined that no additional potential (unlisted) historical heritage items, elements or sites are present within the project area. This includes potentially significant views and vistas, potentially significant landscape elements, including vegetation, trees and gardens, or potentially archaeologically significant areas or relics.

Based on the above, no recommendations for the further assessment, investigation or recording of historical heritage are considered warranted for the current project. For the purposes of best practice, standard recommendations have been included at **Section 9.2**.

9.0 Management and Mitigation Strategies

9.1 Listed and Potential (Unlisted) Heritage Items

Based on the impact assessment presented at **Section 7.0**, the following management and mitigation strategies have been developed for listed and potential (unlisted) heritage items located within the project area.

As noted at **Section 7.0**, management and mitigation measures for Eraring Power Station and the Great Northern Railway have been developed by MSEC and are replicated here without change.

9.1.1 ‘Eraring Power Station’

As noted above, the following management and mitigation strategies for Eraring Power Station have been sourced directly from MSEC’s 2020 report.

The detailed management strategies for the Eraring Power Station will be developed, through ongoing consultation with Eraring Energy, as part of the development of the Built Features Management Plan. It is recommended that the following actions are taken as part of these works:

- *the predictions for the power generation facility and major structures and plant enclosures should be provided to the structural engineer and machine manufacturers, so that the designs can be reviewed based on the predicted far-field movements;*
- *development of management strategies for the conveyor (north) and conveyor (east), which could include:*
 - o *assessment of the serviceability and structural integrity of the conveyors based on a detailed inspection and the predicted mine subsidence movements; and*
 - o *development of preventive measures, including the provision of the necessary adjustments to the conveyors, to maintain them in a safe and serviceable condition during mining;*
- *development of management strategies for the larger tanks, weighbridges, pipelines and other services, so that they can be maintained in a safe and serviceable condition during mining;*
- *development of management strategies for the ash dam, which could include a detailed assessment of the integrity of the ash dam wall and base as a result of the proposed mining. If these assessments show that the ash dam cannot be maintained in a safe and serviceable condition, during the extraction of the proposed South West panels, it may be necessary to reduce the percentage of coal extracted (i.e. pillar recovery, extraction height, panel width) beneath the dam, to limit the mine subsidence movements in this location;*
- *development of a Trigger Action Response Plan (TARP), in consultation with Eraring Energy, based on the outcomes of the detailed studies and the established preventive or remediation measures; and*
- *development of the appropriate monitoring at the Eraring Power Station, where required, including major structures and infrastructure located directly above mining, or where these features may be sensitive to far-field movements.*

The preventive or remediation measures, TARP and monitoring plan should be formalised in the agreed Built Features Management Plan for the facility.

9.1.2 ‘Great Northern Railway’

As noted above, the following management and mitigation strategies for the Great Northern Railway have been sourced directly from MSEC’s 2020 report.

Potential mine subsidence impacts along railways have been successfully managed by underground coal mines in NSW, including the Main Southern Railway above Tahmoor and Appin Collieries (Pidgeon et al., 2011), the Main Northern Railway at Teralba during the mining at Teralba Colliery and the Mt. Owen Railway above the Integra Underground Mine.

The management strategies have been developed in consultation with the rail operators via a Rail Technical Committee, which includes representatives from the rail operator, the mine and specialist consultants in the fields of railway track engineering, geotechnical engineering, structural engineering, track signalling, mine subsidence, risk assessment and project management. The Technical Committee consults with the Resources Regulator and the Office of the National Rail Safety Regulator.

Works by the Rail Technical Committee include:

- *identification of potential impacts on the railway;*
- *application of a risk management approach, where identified risks are assessed and risk control measures are implemented; and*
- *development of management measures that include mitigation and preventive works, monitoring plans, triggered response plans and communication plans.*

It is recommended that Newstan appoint a Rail Technical Committee for this project. It is considered that a Rail Technical Committee will be able to implement robust management strategies to ensure that the railway remains safe and serviceable during and after the proposed mining. The strategies could include the following investigations and considerations:

- *field investigations to explore the current status of goafing within the Teralba Conglomerate Spanning Areas and full extraction areas in the Great Northern Seam that lie adjacent to the Main Northern Railway;*
- *consideration of targeted grouting of large voids if discovered adjacent to the Main Northern Railway;*
- *intensive monitoring of ground movements and other instrumentation to detect rapid subsidence events, such as geophones and seismic sensors above early proposed panels that are located well away from the Main Northern Railway and during and after the extraction of the proposed panels adjacent to the railway;*
- *installation of a track expansion system to decouple the rail from potential mining-induced ground strains, as described by Pidgeon et al. (2011);*
- *engineering assessment of the current condition of the railway track, overhead wiring and associated structures (the haul road overbridge, culverts, embankments and cuttings) and, if required, maintain the track and associated structures so that their condition is within operating tolerances prior to the influence of mining;*

- *regular monitoring of ground movements and visual inspections directly above the proposed panels during and after extraction adjacent to the railway;*
- *regular monitoring of ground movements and visual inspections along the railway corridor during and after the extraction of the proposed panels adjacent to the railway;*
- *regular monitoring of changes in rail stress and track geometry along the railway and changes in the condition of associated railway structures during and after the extraction of the proposed panels adjacent to the railway;*
- *installation of real-time monitoring (web based) with alarms if measured changes exceed trigger levels; and*

implementation of procedures to immediately respond in the unlikely event of adverse movements or changes are observed to the track to ensure that the railway remains safe. The procedures would include the worst case but extremely low likelihood response to immediately stop trains and inspect the track for hazards before allowing train operations to recommence.

With an appropriate subsidence management plan in place, it is considered that the potential impacts on the Main Northern Railway can be managed to ensure that the railway remains safe and serviceable during and after the proposed mining. Further recommendations for the Main Northern Railway are provided in the report by PCE (2019).

9.1.3 'Newstan Colliery'

Works to the Awaba State Coal Mine have been assessed at **Section 7.3**, and no adverse impacts have been identified. In accordance with best practice, the following management strategies are recommended:

- All staff, contractors and sub-consultants should be made aware of the heritage significance of the item (specifically Tuckers House, Bat Alley Tunnel and the Arsenic Smelting Works) and their statutory obligations for heritage under the *Heritage Act 1977* when working near items of heritage significance as part of any site inductions.

9.1.4 'Awaba State Coal Mine'

Works to the Awaba State Coal Mine have been assessed at **Section 7.4**, and no adverse impacts have been identified. In accordance with best practice, the following management strategies are recommended:

- All staff, contractors and sub-consultants should be made aware of the heritage significance of the potential (unlisted) item (specifically the core 1940s area) and their statutory obligations for heritage under the *Heritage Act 1977* when working near items of heritage significance as part of any site inductions.
- Measures should be developed and implemented during works to ensure that adjacent fabric of significance is not inadvertently impacted during works. This includes the entirety of the core 1940s area as shown in **Plate 7.1**.
- Significant fabric that could be inadvertently impacted by the proposed works should be protected for the duration of works, and regularly inspected for signs of accidental damage. Works in proximity to fabric of significance should be undertaken in a controlled and careful manner. It is noted that within the Awaba Colliery Surface Site, significant fabric is limited to the core 1940s area identified in **Plate 7.1**.

9.1.5 'Awaba to Wangi Power Station Branch Railway Line'

For the reasons described at **Section 7.5** of this report, no management or mitigation strategies are considered warranted for this potential (unlisted) item.

Impacts to this potential (unlisted) item as a result of the current project have been assessed to be acceptable. The Line has been subject to multiple instances of photographic recording, and is fully mapped.

9.1.6 'Bridge over Main Northern Railway Line'

For the reasons described at **Section 7.6** of this report, no management or mitigation strategies are considered warranted for this potential (unlisted) item.

There are no identified impacts to this potential (unlisted) item as a result of the current project.

9.2 General Recommendations

The following general recommendations have been prepared in accordance with best practice.

- In the unlikely event that unexpected historical (non-Aboriginal) archaeological remains are discovered during works within the project area they should be managed with reference to the standard protocols and procedures of Section 146 of the *Heritage Act 1977*, including providing Heritage, Department of Premier and Cabinet with notification of the discovery of any 'relics'. The advice of a suitably qualified archaeologist should be sought, to determine if further assessment and investigation may be required.
- It is recommended that the relevant aspects of the unexpected historical (non-Aboriginal) archaeological finds procedure detailed above be incorporated into site inductions for the reference of relevant employees, contractors and subcontractors that work on the project.
- As noted at **Section 2.2** of this report, the Newstan Colliery Surface Site is subject to a local heritage listing. Future works proposed in this area may therefore require approval from LMCC, depending on the nature and scope of the works proposed. Prior to any works occurring, advice should be sought from a suitably qualified heritage professional regarding obligations for assessment and/or approval required under the LEP.
- Based on the assessment presented in this report, there are no further requirements for investigation or assessment with regards to historical heritage in relation to the project. However, relevant employees, contractors and subcontractors that work on the project should be made aware of their obligations and requirements in relation to the relevant provisions of the *Heritage Act 1977*. This information can be most effectively provided within mandatory site inductions provided to employees, contractors and sub-contractors working on the project.

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