



# **Bayswater Water and Other Associated Operational Works Project**

## **Appendix I – Non-Aboriginal Heritage Assessment**





# AGL Bayswater Water and other Associated Operational Works

## Non-Aboriginal Heritage Assessment

Final | 2.0

21 October 2019

**AGL Macquarie**

IA215400

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## Executive Summary

Jacobs Group (Australia) Pty Limited (**Jacobs**) was commissioned by AGL Macquarie Pty Ltd (**AGL Macquarie**) to provide a non-Aboriginal heritage assessment for the proposed Water and Other Associated Operational Works (**WOAOW**) project (**Project**) at the Bayswater Power Station (**Bayswater**). The purpose of this assessment is to identify non-Aboriginal heritage values and assess any impacts to those values.

Bayswater is located approximately six kilometres west of the locality of Liddell and approximately 15 kilometres south east of the township of Muswellbrook in the Upper Hunter Valley of New South Wales. The study area comprises a power station and associated infrastructure.

The purpose of the Project is to improve the management of ancillary processes over the remaining operating life of Bayswater and to facilitate an improved rehabilitation outcome for the ash disposal area. The construction phase would include:

- Augmentation of the existing Bayswater ash dam to provide additional ash storage capacity;
- Improvements to water management structures and systems to ensure continued collection and reuse of process water and return waters from the Bayswater ash dam;
- Improvements to the management of water and waste materials within the coal handling plant sediment basin and associated drainage system;
- Increasing coal ash recycling activities to produce up to 1,000,000 tonnes per annum of ash derived product material and reuse of coal ash;
- Upgrades to existing fly ash harvesting infrastructure including the installation of weighbridges, construction of a new 240 tonne silo, tanker wash facility and additional truck parking;
- Construction and operation of a new coal ash pipeline to Ravensworth Void No. 3 for ash emplacement;
- Construction and operation of a salt cake landfill facility to dispose of salt cake waste; and
- Construction and operation of up to four borrow pits to facilitate the improvements proposed for the Project and other works on AGL Macquarie land.

In addition, the Project would include routine clearing of vegetation along the alignments of the Lime Softening Plant (LSP) Sludge Line and High Pressure (HP) Pipeline to provide ongoing access for maintenance and management within the disturbance footprint.

Searches of National, State and Local heritage databases identified only one heritage item within the vicinity of the proposal, being the former Chain of Ponds Inn, located approximately 500 metres from the proposed Ravensworth ash line, on the north eastern side of Bayswater Creek. It is considered to be of sufficient distance from the Project to not be impacted.

A review of historical literature indicates that the land comprising the study area was used primarily for grazing up until the 1950s and 1960s, after which time the power station was built. A site inspection undertaken between 9-13 September 2019 by Jacobs Heritage Consultant, Clare Leever and Jacobs Senior Heritage Consultant, Oliver Macgregor, confirmed that there were no significant items of non-Aboriginal heritage within the study area and little potential for non-Aboriginal archaeological deposits to remain. A permanent survey marker (trigonometric station Glendower) was identified in Borrow Pit 2, and as a protected element of the State Control Network, it will require management prior to project commencement.

As a consequence, it is concluded that there are no significant non-Aboriginal heritage constraints associated with the proposal. However, the following general management measures are recommended.

### Recommendation 1

An application for authorisation to remove or replace a permanent survey mark (TS Glendower) must be made in accordance with clause 90 of the *Surveying and Spatial Information Regulation 2017* at least 30 business days before the proposed removal or replacement. It is recommended that consultation with Spatial Services

and/or the Surveyor-General be started as soon as practicable, to seek advice on the management of TS Glendower and to avoid any subsequent delays to the Project.

### **Recommendation 2**

Should any historical archaeological remains be discovered during construction, all works must stop, the area cordoned off and a heritage professional engaged to examine and advise on the significance of the archaeological finds. If deemed to be of significance, under section 146 of the Heritage Act, a s146 form would be submitted to notify the Heritage Council of the discovery of relics. Further investigation may be required, and appropriate management would be agreed through consultation with the Department of Premier and Cabinet (Heritage).

### **Recommendation 3**

In the unlikely event that human remains are uncovered, all work must cease immediately in the vicinity of the remains and the area cordoned off. The local NSW Police must be notified, who would make an initial assessment as to whether the remains are part of a crime scene or Aboriginal remains. If the remains are thought to be Aboriginal, the Environment, Energy and Science Group (EESG) of the Department of Planning, Industry and Environment (former NSW Office of Environment and Heritage) must be contacted. An EESG officer would determine if the remains are Aboriginal and if so, a management plan would be developed in consultation with the relevant Aboriginal stakeholders before works recommence.

### Important note about your report

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The sole purpose of this report and the associated services performed by Jacobs is to undertake a non-Aboriginal heritage assessment in accordance with the scope of services set out in the contract between Jacobs and the client.

Jacobs derived the data in this report from information sourced from the client and information available in the public domain at the time or times outlined in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures, and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.



## List of abbreviations

Acronym / abbreviation	Meaning
AHD	Australian Heritage Database
CHP	Coal handling plant
DP	Deposited Plan
EESG	Environment, Energy and Science Group
EIS	Environmental Impact Statement
EP&A Act	<i>Environment Planning and Assessment Act 1979</i>
HP	High Pressure
LEP	Local Environmental Plan
LGA	Local Government Area
LSP	Lime Softening Plant
MW	megawatts
NSW	New South Wales
SEARs	Planning Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SSD	State significant development
SSI	State significant infrastructure
TS	Trigonometric Station
WOAOW	Water and Other Associated Operational Works

## 1. Introduction

AGL Macquarie owns and operate the Bayswater Power Station (**Bayswater**), located approximately 16 km south-east of Muswellbrook, NSW. Bayswater was commissioned in 1985 to utility standards of the time and has a current technical life up to 2035. Prior to its retirement, water and wastewater infrastructure and site improvements are required to ensure its continued operational and environmental performance.

The proposed Water and Other Associated Operational Works (**WOAOW**) project (**Project**) at Bayswater would ensure the continued safe, efficient and reliable operation of the Power Station until its retirement. This project provides the opportunity for improvements based on post-installation advances in water and wastewater management.

Jacobs, on behalf of AGL Macquarie has been commissioned to prepare an Environmental Impact Statement (**EIS**) for the assessment of infrastructure and water upgrade works, in accordance with Division 4.7 of the *Environmental Planning and Assessment Act 1979* (NSW).

### 1.1 Description of works

Bayswater has a current generation capacity of 2,640 megawatts (MW) and approval for efficiency upgrades that will increase its capacity to 2,740 MW. The site employs technology common to other NSW coal-fired power stations.

Ancillary activities arising out of coal fired power generation at Bayswater include:

- Receipt, storage and transfer of coal within the coal handling and preparation plant area;
- Pumping of water from the Hunter River under existing water entitlements and storage and treatment of this water, including the management of salt and other impurities, to supply boilers and for cooling purposes; and
- The management of incombustible coal residue, in the form of bottom ash and fly ash, which is collected and transported to ash disposal areas or recycled.

The purpose of the Project is to improve the management of these ancillary processes over the remaining operating life of Bayswater and to facilitate an improved rehabilitation outcome for the ash disposal area. The construction phase would include:

- Augmentation of the existing Bayswater ash dam to provide additional ash storage capacity;
- Improvements to water management structures and systems to ensure continued collection and reuse of process water and return waters from the Bayswater ash dam;
- Improvements to the management of water and waste materials within the coal handling plant sediment basin and associated drainage system;
- Increasing coal ash recycling activities to produce up to 1,000,000 tonnes per annum of ash derived product material and reuse of coal ash;
- Upgrades to existing fly ash harvesting infrastructure including the installation of weighbridges, construction of a new 240 tonne silo, tanker wash facility and additional truck parking;
- Construction and operation of a new coal ash pipeline to Ravensworth Void No. 3 for ash emplacement;
- Construction and operation of a salt cake landfill facility to dispose of salt cake waste; and
- Construction and operation of up to four borrow pits to facilitate the improvements proposed for the Project and other works on AGL Macquarie land.

In addition, the Project would include routine clearing of vegetation along the alignments of the Lime Softening Plant (LSP) Sludge Line and High Pressure (HP) Pipeline to provide ongoing access for maintenance and management within the disturbance footprint.

## 1.2 Study area

Bayswater is located on the New England Highway approximately 6 kilometres west of the locality of Liddell and approximately 15 kilometres south east of the township of Muswellbrook in the Upper Hunter Valley of New South Wales (see Figure 1-1). Bayswater lies within the Local Government Areas of Muswellbrook and Singleton. The study area comprises water and other works infrastructure related to the power station.

The Project is predominately located on land owned by AGL Macquarie although some Project infrastructure also crosses road reserves owned by RMS and Singleton and small areas of Crown land. The Project is located within the following land:

- Lot 610 DP 1019325
- Lot 112 DP 1059007
- Lot 2 DP 1095515
- Lot 1 DP 113655
- Lot 1 DP 1142103
- Lot 2012 DP 1151790
- Lot 1 DP 1158700
- Lot 120 DP 1174907
- Lot 1 DP 1175303
- Lot 3 DP 1193253
- Lot 10 DP 1204457
- Lots 4, 6, 9 & 11 DP 247943
- Lot 13 DP 247945
- Lot 1 DP 252530
- Lot 1 DP 369326
- Lots 1 & 2 DP 574168
- Lot 1 DP 616025
- Lot 2 DP 619383
- Lot 10 DP 700554
- Lots 19, 30, 62, 75, 86, 88, 89 & 151 DP 752468
- Lot 331 DP 752486
- Lots 1 & 2 DP 774679
- Lot 5 DP 966589
- Lot 107 DP 547864
- Lot 4 DP 1193254.

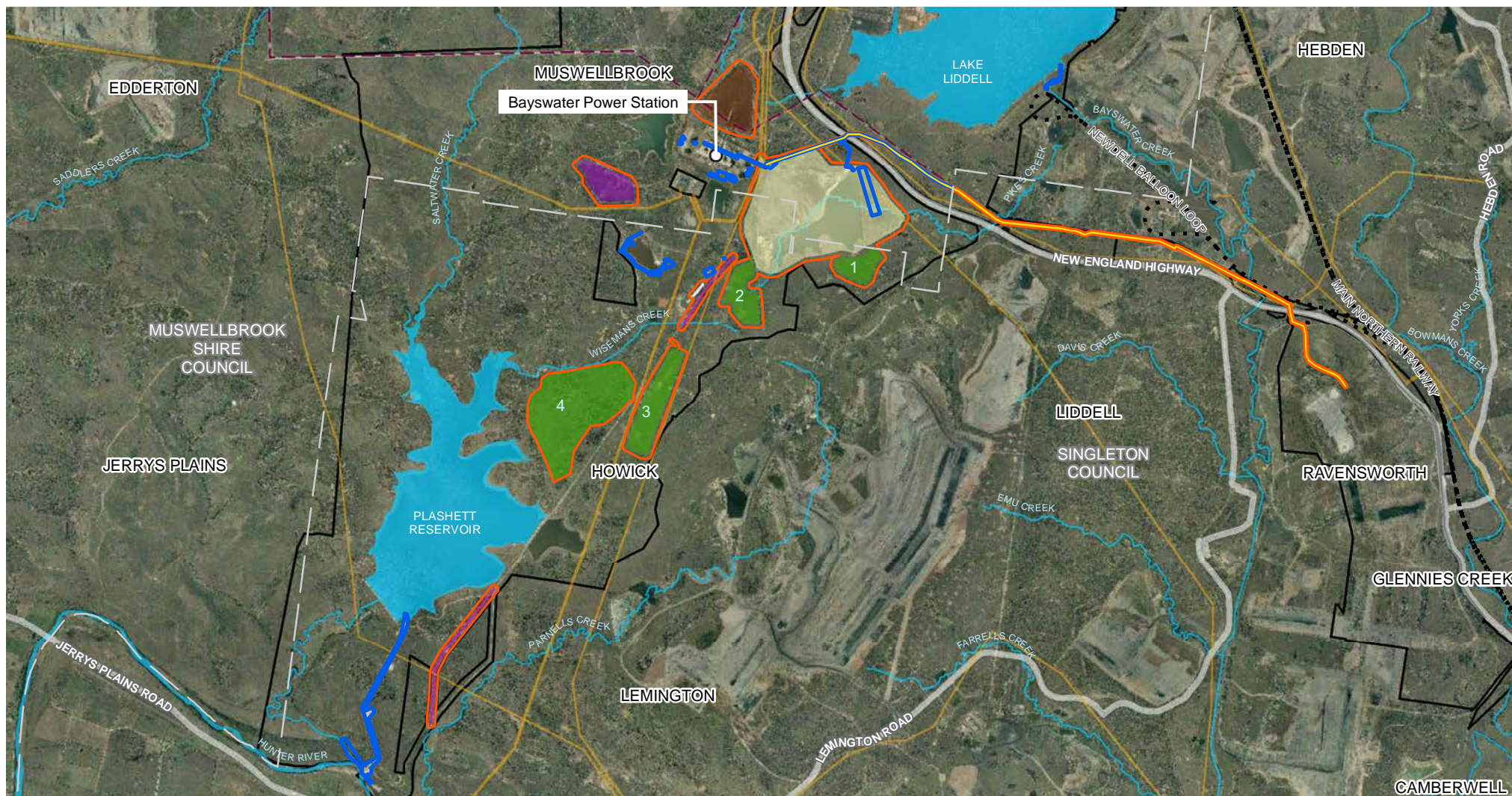
### **1.3 Assumptions and limitations**

This report has been based on information received from AGL Macquarie and observations made in the field.

### **1.4 Authorship and acknowledgements**

This report has been prepared by Jacobs Heritage Consultant, Clare Leever with the assistance of Jacobs Senior Heritage Consultant, Deborah Farina. A technical review was undertaken by Jacobs Technical Director – Archaeology and Cultural Heritage, Dr Karen Murphy. Mapping/GIS was prepared by Kasia Dworniczak (Spatial Analyst, Jacobs).





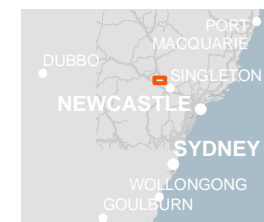
- |  |   |
|--|---|
| <span style="border: 2px solid orange; padding: 2px;"> </span> Study area                              | <b>Project elements:</b>  |
| <span style="border: 1px dashed black; padding: 2px;"> </span> Local Government Area boundary          | <span style="background-color: yellow; border: 1px solid black; padding: 2px;"> </span> Ash Dam Augmentation, Ash Harvesting and Water Management Works |
| <span style="border: 2px solid blue; padding: 2px;"> </span> Footprints of approvals to be surrendered | <span style="background-color: yellow; border: 1px solid black; padding: 2px;"> </span> Ravensworth Ash Line  |
| <span style="border: 1px solid black; padding: 2px;"> </span> AGL owned land                           | <span style="background-color: brown; border: 1px solid black; padding: 2px;"> </span> Coal Handling Plant Water and Wastewater Infrastructure Upgrades |
| <span style="border-top: 1px dotted black; padding: 2px;"> </span> Railway                             | <span style="background-color: magenta; border: 1px solid black; padding: 2px;"> </span> HP Pipe Clearing   |
| <span style="border-bottom: 1px solid orange; padding: 2px;"> </span> Electricity transmission line    | <span style="background-color: lightgrey; border: 1px solid black; padding: 2px;"> </span> LSP Sludge Line Clearing                                     |
| <span style="border-bottom: 1px solid purple; padding: 2px;"> </span> Coal supply conveyor             | <span style="background-color: green; border: 1px solid black; padding: 2px;"> </span> Clay Borrow Pits   |
|  | <span style="background-color: purple; border: 1px solid black; padding: 2px;"> </span> Salt Cake Landfill  |



#### Data sources

Jacobs 2019  
AGL 2019  
NSW Spatial Services 2019

GDA94 MGA56



**Figure 1 - 1** AGL Site Plan and Project Elements



## 2. Legislative Context

### 2.1 State legislation

#### 2.1.1 *Environmental Planning and Assessment Act 1979*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) requires that environmental impacts are considered in land-use planning, including impacts on Aboriginal and non-Aboriginal heritage. Division 4.7 of the EP&A Act applies to development declared to be State Significant Development (SSD). This influences the way in which other legislation, including the *Heritage Act 1977* is applied.

##### 2.1.1.1 State Significant Development

Major project assessment has been replaced by two separate assessment pathways: SSD and State significant infrastructure (SSI). The Project is declared to be SSD under the *State Environmental Planning Policy (State and Regional Development) 2011 (SEPP SRD)*. The consent authority for SSD development applications is the Minister for Planning and Public Spaces (**Minister**). The Minister has delegated the determination of SSD development applications to senior officers of the DPIE and the Independent Planning Commission (IPC).

##### 2.1.1.2 Planning Secretary's Environmental Assessment Requirements

When a proposed development qualifies as SSD, under Section 4.12(8) of the EP&A Act, the Planning Secretary's Environmental Assessment Requirements (**SEARs**) are issued. In preparing these, the Department of Planning, Infrastructure and Environment consults with relevant public authorities such as the Office of Environment and Heritage (former), who provide inputs into the requirements.

The SEARs require the current EIS to include an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, including consultation with the local Aboriginal community. The SEARs for the Project were issued on 30 November 2018 and include the following requirement for historical heritage:

8. *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.*

#### 2.1.2 *Heritage Act (NSW) 1977*

The *Heritage Act 1977* provides a number of mechanisms by which items and places of heritage significance may be protected. The Act is designed to protect both listed heritage items, such as standing structures and potential archaeological remains or relics. Different parts of the Act deal with these different situations.

Approvals under Part 4 or an excavation permit under s139 of the Heritage Act are not required for an approved project under Division 4.7 of the EP&A Act, however, this assessment follows the intent of the Heritage Act and the conditions of the approval which are based upon the Heritage Act requirements.

##### 2.1.2.1 State Heritage Register

The Heritage Council of NSW maintains the State Heritage Register (SHR). Only those items which are of state-level heritage significance in NSW are listed on the SHR. Listing on the SHR controls activities such as alteration, damage, demolition and development.

##### 2.1.2.2 Archaeological relics

Part 6 Division 9 of the Heritage Act protects archaeological 'relics' from being 'exposed, moved, damaged or destroyed' by the disturbance or excavation of land. This protection extends to the situation where a person has 'reasonable cause to suspect' that archaeological remains may be affected by the disturbance or excavation of the land. It applies to all land in NSW that is not included in the SHR. A 'relic' is defined by the Heritage Act as:

*Any deposit, object of material evidence which relates to the settlement of the area that comprises NSW, not being Aboriginal settlement, and has local or state significance.*

Section 146 of the Heritage Act requires any person who is aware or believes that they have discovered or located a relic must notify the Heritage Council of NSW providing details of the location and other information required.

### **2.1.2.3 Works**

The Heritage Act identifies 'works' as a category separate to relics. 'Works' refer to past evidence of infrastructure which may even be buried, and so therefore 'archaeological' in nature and with the potential to provide information that contributes to our knowledge. Exposure of a 'work' does not trigger reporting obligations under the Heritage Act. However, good environmental practice recognises the archaeological potential of such discoveries and the need to balance these against the requirements of development.

### 3. Heritage database searches

#### 3.1.1 World, National and Commonwealth heritage

The Australian Heritage Database (AHD), administered by the Federal Department of the Environment and Energy, contains details of heritage items of World, National and Commonwealth significance. A search of the AHD was undertaken on 5 September 2019 with no historic heritage places identified within the study area.

#### 3.1.2 State heritage

A search of the SHR, administered by the Department of Premier and Cabinet (Heritage), was undertaken on 5 September 2019 with one result located in proximity to the study area – Inn & Outbuildings (former) (SHR 00242). This heritage item is located approximately 500 metres to the north of part of the proposed new Ravensworth Ash line, on the north eastern side of Chain of Ponds Creek. It is therefore not likely to be impacted by the proposed works. Details are provided in Table 3-1 and mapped in Figure 3-1. The SHR listing is provided in Appendix A.

**Table 3-1: State Heritage items within the study area**

Item Name	Address	SHR #
Inn & Outbuildings (former)	Old New England Highway, Chain of Ponds	00242

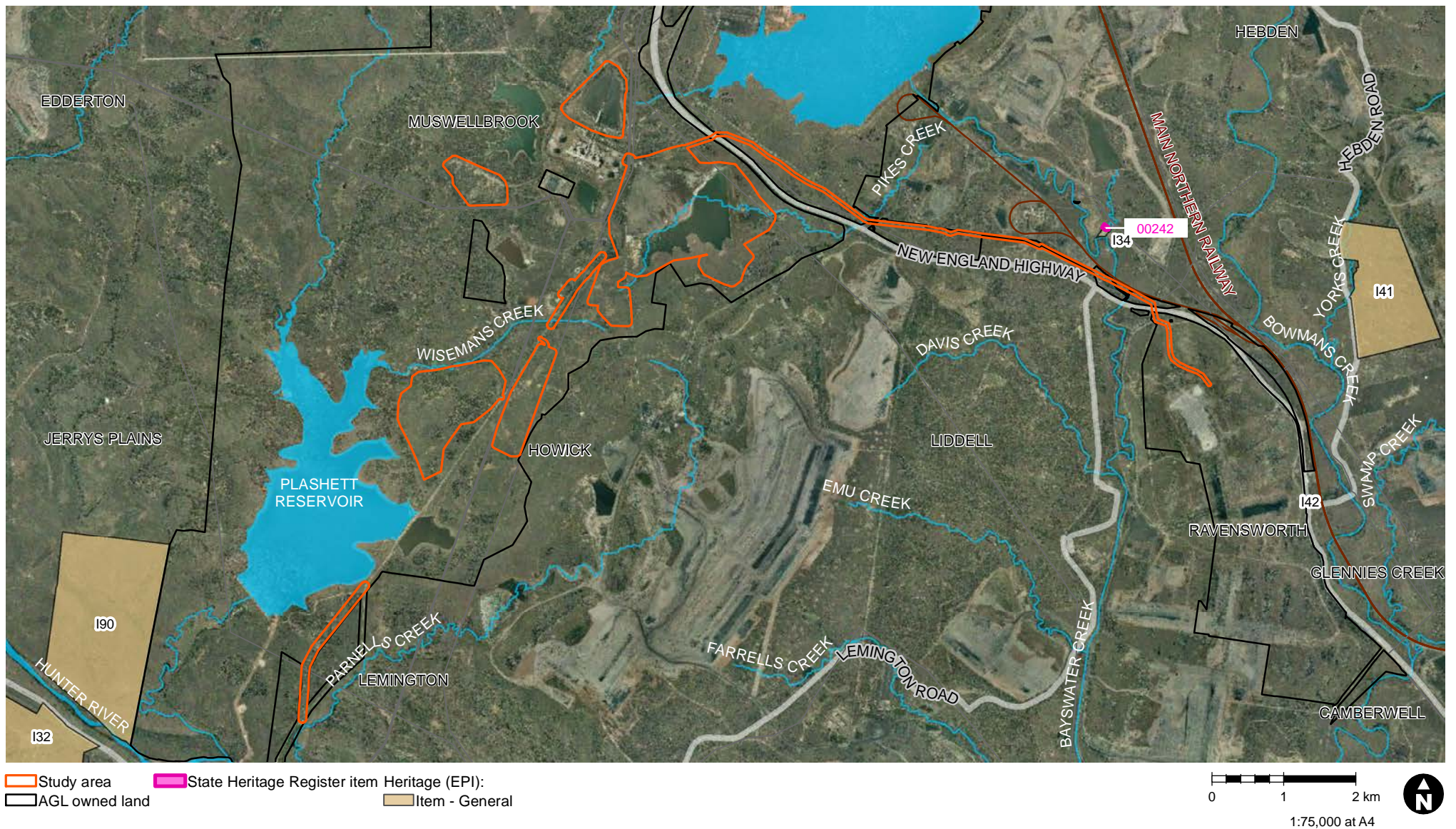
#### 3.1.3 Local heritage

The study area crosses the boundaries between Muswellbrook LGA and Singleton LGA. A search of Schedule 5 of the Muswellbrook LEP 2009 was undertaken on 5 September 2019. No heritage items were identified. A search of Schedule 5 of the Singleton LEP 2013 was undertaken on 5 September 2019, showing one heritage item located in proximity to the study area. Details are provided in Table 3-2 and mapped in Figure 3-1. This is the same heritage item as is listed on the SHR.

**Table 3-2: Local heritage items, Muswellbrook and Singleton LGA, within the study area**

Item name	Address	LEP Id
Inn and Outbuildings	Old New England Highway, Liddell	I34 (Singleton LEP)





**Figure 3-1** Heritage items in proximity to the project area

**Data sources**

Jacobs 2019, AGL 2019,  
DPE 2019, OEH 2019  
NSW Spatial Services 2019

GDA94 MGA56

## 4. Historical context

### 4.1 Brief timeline

Date	Event
Until 1828	Crown land
1829-1839	Various land grants to Dr James Bowman for “Ravensworth”
1842	Construction of the Chain of Ponds Inn
1846	Death of Dr Bowman
1847	Sale of Ravensworth to Captain William Russell
1863	Grant of land in parish of Savoy to Thomas Burne (also Burns, Byrne)
1866	Death of Captain Russell

### 4.2 Previous land uses

The land comprising Bayswater is located within the boundaries of four parishes, being Savoy (north west sector), Liddell (north east sector), Howick (south west sector), and Ravensworth (south east sector). It is also on the boundaries of two LGAs, being Muswellbrook (west) and Singleton (east).

In Savoy, the first land grant of 300 acres was made to Thomas Burns (Portion 20, Parish of Savoy) in 1863 and a grant of 60 acres to Michael Byrne (Portion 143, Parish of Savoy). Thomas Burns (also known as “Burne” and “Byrne”) died in 1891 and the property passed to his brother and sister as tenants-in-common. The Burne family were graziers and owned a number of properties in the Savoy and Howick parishes, all run by family members. Following Thomas Burne’s death his mother, Sarah, retained a life interest in the estate to dwell in the homestead of the Pike’s Gully property; it is not known where the homestead was located within the 300 acres. The Burne family retained ownership until the early 20<sup>th</sup> century. In 1950, the land was resumed to be used as part of Bayswater.

Portion 89 in the parish of Liddell was granted to Dr James Bowman, surgeon, in 1839 and formed the eastern boundary of his “Ravensworth Estate”. While the property covered the current location of Bayswater, the homestead and major outbuildings are located approximately 10 kilometres to the east of Bayswater (Figure 4-1). Dr Bowman had married Mary Macarthur, daughter of John and Elizabeth Macarthur, which enabled him to apply for the 11,000-acre estate that became known as Ravensworth. Over 40 convicts worked on Ravensworth as labourers, shepherds, carpenters, sawyers, blacksmiths and stone masons (Umwelt 2014:3.7).

Bowman held the estate until falling into financial difficulties during the depression of the 1840s, whereupon his brothers-in-law, James and William Macarthur, took over his liabilities and the running of the Ravensworth estate. James Bowman died at Ravensworth in 1846, and his brothers-in-law sold the estate the following year to Captain William Russell, who already held substantial land interests adjoining Ravensworth to the east. Russell held the lands until his death 1866, after which his wife, Eliza, began subdividing the Estate over the ensuing 20 years.



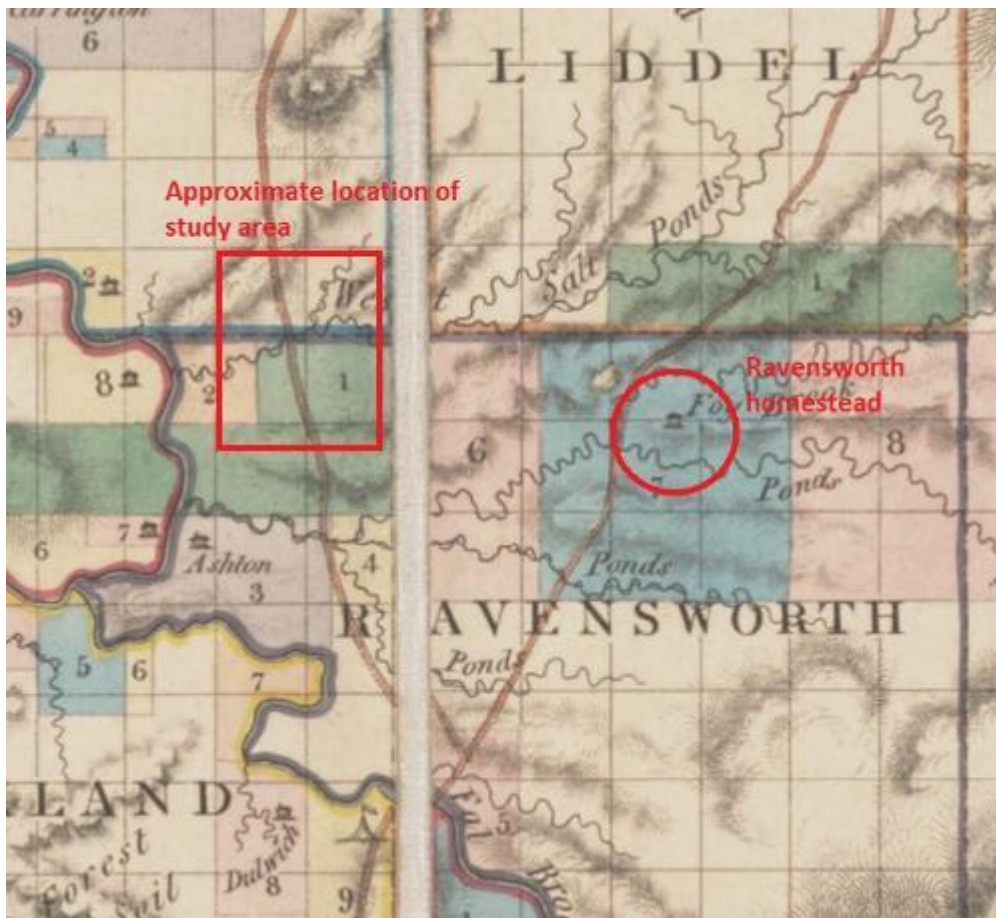


Figure 4-1: Detail of Henry Dangar's 1828 map of the Hunter Valley, with Ravensworth homestead and the approximate location of the current study area marked in red (Courtesy: National Library of Australia, Map NK 646).

#### 4.3 Chain of Ponds Inn, Liddell (Inn & Outbuildings [former], SHR ID# 00242)

The Chain of Ponds Inn was constructed in the 1840s by Henry Rowland as a coaching inn for traffic on the main road from Morpeth to Tamworth (Umwelt 2014:3.20) (Figure 4-2). The inn was convict built, and one of the structures was a stone lock-up to house convicts being transported to the north (Thorp 1990).

The Inn has been known by several names since its construction including the Lady Mary Fitzroy, the Coach and Horses Inn, the Star of the North Inn, the Travellers Inn and the Liddell House when it was used as a private residence in the late 19<sup>th</sup> century. It also operated as a post office from 1890 until 1920 (EJE Heritage 2013:10).

The former Chain of Ponds Inn and its outbuildings, comprising a police lock-up and stables, were listed on the State Heritage Register in 1999. It is located approximately 500 metres outside of the study area, on the north-eastern side of Bayswater Creek. It is therefore unlikely to be impacted by the proposal.



Figure 4-2: Chain of Ponds Inn, Liddell (Courtesy: EJE Heritage, 2013:1).

#### 4.4 Mining

Significant seams of coal were known to exist in the Singleton area from the mid-late 19<sup>th</sup> century. In the advertisement for sale for Ravensworth, the presence of coal on the property was highlighted as a selling point:

*The estate also possesses a great prospective advantage in its large deposits of coal and other minerals, which are visible in many places.* (Maitland Mercury and Hunter River General Advertiser, 1882:8).

The first open cut mines, however, did not start until later in the 19<sup>th</sup> century. Coal was discovered at Wambo, approximately 17 kilometres to the south east, in 1863, but the first mine was started shortly afterwards at Rix's Creek, 15 kilometres to the south east. This mine was not successful owing to the poor transport network.

According to *Maitland Mercury*, the Howland brothers (who opened the Chain of Ponds Inn) began mining for coal at Rixs Creek, others began mining on the Ravensworth estate in 1886 (though coal in the Upper Hunter was not exported until the 1890s):

*Several months ago, we stated that Messrs A and H Howland had succeeded in cutting a splendid seam of coal on their Rosedale Estate, within a few yards of the G N Railway, between Rixs Creek and Glennies Creek... Since Messrs Nowland opened their mine, sinking for coal has been actively prosecuted on the Ravensworth estate; and we learn that the perseverance of the promoters has been successful to such a degree that they intend to float the undertaking shortly into a company, with a nominal capital of £50,000.* (Maitland Mercury and Hunter River General Advertiser, 1886:7).

#### 4.5 Pacific Power (Liddell and Bayswater)

Pacific Power was the state-owned, power generator for NSW. In 1950, the land at Bayswater was reserved by way of the *Electricity (Pacific Power) Act 1950* (NSW). Land was compulsorily acquired in Savoy, Ravensworth and Liddell parishes in order to construct the facility. Liddell Power Station (Liddell) was constructed in 1964, along with Lake Liddell, which serves to provide cooling water to Liddell and Bayswater. Bayswater was constructed sixteen years later in 1980 (Umwelt, 2014:3.24).

Pacific Power comprised four entities (TransGrid, Delta Electricity, Eraring Energy and Macquarie Generation) between 1995 and 2003, with Macquarie Generation retaining ownership of Liddell and Bayswater. In 2014 Macquarie Generation was sold by the NSW Government to AGL Energy, and now trades as AGL Macquarie.

## 5. Site Visit

### 5.1 Method

A site inspection of the study area was conducted between 9 to 13 September 2019 by Jacobs Heritage Consultant, Clare Leever with the assistance of Jacobs Senior Heritage Consultant Oliver MacGregor.

The survey was restricted within the study area in each section surveyed. Areas that appeared free of major prior disturbance were surveyed on foot. Areas with obvious major ground disturbance, resulting in negligible archaeological potential and/or an obvious lack of heritage potential, were surveyed from the site vehicle.

### 5.2 Results

#### 5.2.1 Ravensworth ash line

The ash line passes through a landform of low rolling hills with low-gradient slopes, rounded tops, and flat-floored valleys.

Existing above-ground pipelines and conveyors run along the entire length of the ash line corridor (Figure 5-1). Graded vehicle tracks run alongside the existing pipeline for most of the length of the ash-line corridor. These vehicle tracks and the ground immediately adjacent to them are highly disturbed by the grading, drain excavation, capping, and other earthworks required to construct the tracks. Various localised areas of disturbance occur along the ash line corridor, where it is crossed by road bridges and conveyors; and where graded and gravel-capped laydown yards have been constructed. As a result, remnant intact areas of ground that appear to be free of prior disturbance make up only a minority of the ash line corridor. No historical heritage or potential for subsurface archaeology was observed in this area.



Figure 5-1: Vehicle track and working coal conveyor (ash line out of frame to right) (Source: Jacobs 2019)

#### 5.2.2 Ash dam augmentation

The ash dam augmentation area consists of a landform of low rolling hills. Pike's Creek runs through the area from the southwest to southeast.



The existing ash dam sits in the centre and covers the majority of the area. The dam wall runs north-south across the eastern end of the area, and areas inundated by water and ash slurry cover much of the area to the west of the dam. The construction of the dam wall and inundation of the ground surface by ash and water both represent a major disturbance to the original ground surface.

The section to the north of the dam area has been impacted by various prior ground-disturbing works. The Ravenswood ash-line (see Section 5.2.1) runs along the northern edge of this area. Adjacent to the ash dam itself, existing modern buildings, vehicle parking and laydown yards, vehicle tracks, and a pipeline have been constructed. A high-voltage powerline runs northwest-southeast through this section. Most of this area has been subject to disturbance works during the operational life of the ash dam and the power station.

The section to the east of the dam wall shows no visible signs of disturbance, apart from those areas underneath or immediately adjacent to the dam wall itself, where buildings and other infrastructure, and earthworks to dam and control the course of Pike's Creek, have been constructed. The only other noticeable source of disturbance in this area is the high-voltage powerline, which runs northeast-southwest through the section. Areas adjacent to the pylons of this powerline have been assumed to be highly disturbed.

The section to the south of the ash dam consists of low rolling hills, some of which have small sections that have eroded to bedrock. No signs of major disturbance were identified in this area during the survey.

There are various visible signs of prior disturbance to the ground surface in the western section. Various vehicle tracks run through the section. Artificial ponds have been constructed, and signs of water ponding against the western edge of the ash dam are identifiable. Ponding of water in this section is probably the result of rainwater runoff from the ground to the west, which ponds against the artificially raised ground along the western edge of the ash dam. High voltage powerlines also run through this section. The ground is patterned with linear plough lines and furrows, indicating that the entire area has probably been subject to the low-level disturbance of ground ploughing and perhaps contour bank formation in the recent past.

No historical heritage or potential for archaeological relics were observed in this area.



Figure 5-2: Open fields to the south of the ash dam, looking north-west (Source: Jacobs 2019)

### 5.2.3 Salt cake landfill

The salt cake landfill area has been cut into the surrounding landscape of low rolling hills, drastically modifying its topography (Figure 5-3 and Figure 5-4). It is currently divided into small segments of land with surrounding

vehicle tracks and each segment is used for a different purpose. These activities/purposes include gypsum handling, stockpiling of construction materials, storage sheds, vehicle parking, rubbish tips and other ancillary products power plant works. This area is considered to be highly disturbed and showed no visible signs of historical heritage, or indicators of subsurface potential for archaeological relics.



Figure 5-3: Mapping of salt cake landfill area overlaid with 1 m contour lines (Source: Jacobs 2019)



Figure 5-4: Salt cake landfill area with aerial base map (Source: Jacobs 2019)





Figure 5-5: View from the entrance of the landfill area, looking south-west (Source: Jacobs 2019)

#### 5.2.4 Coal handling plant (CHP)

The CHP area is almost entirely covered by the extant operational CHP, with the majority of the area currently buried underneath a coal stockpile within an area of ground that has been artificially lowered several metres by prior earthworks. The coal stockpile is surrounded by a drainage trench and a vertical excavation face rising up to the surrounding ground surface.

To the south, the CHP area is immediately adjacent to Bayswater itself. A dense array of buildings, conveyors, vehicle tracks, carparks and other infrastructure cover all the ground between the coal stockpile and Bayswater.

An encircling chain-link fence has been placed around the coal stockpile, on the ground surface above and adjacent to the vertical excavation face. The ground surface adjacent to this fence shows signs of earthworks associated with its construction, in the form of graded or flattened ground, and incised drainage channels diverting water runoff away from the fence and the coal stockpile within it. The margin around the chain-link fence is currently regrowth native vegetation with Eucalypt saplings and casuarinas (Figure 5-6). No historical heritage or potential for subsurface archaeology was observed.



Figure 5-6: Regrowth vegetation on the outer margin of the CHP (Source: Jacobs 2019)

#### 5.2.5 HP pipe and LSP sludge line cleaning/clearing

The HP water pipe and LSP sludge line traverses cleared rolling hills which are currently used as grazing land. The lack of tree coverage gives a good overview across the survey area with tall grasses obscuring approximately 30-40 cm above the ground surface. No historical heritage was observed, and nothing to indicate a potential for archaeological relics was recorded.

#### 5.2.6 Borrow pit 1

This area consists of low rolling hills, and flat-floored valleys. The ground surface rises upward to the north, toward the hilltops bordering the ash dam. To the south the ground surface slopes downward into a flat-floored valley running east-west along the area's southern border. Some small farm dams have been constructed along drainage lines within the area and it is probable that this creek incorporated ponds and swampy areas prior to European land clearing. Although signs of grazing stock were observed, the infrastructure all appeared to be recent, and no items of potential heritage significance were observed.



Figure 5-7: Borrow pit 1 - View down into the valley, looking south-east (Source: Jacobs 2019)

#### 5.2.7 Borrow pit 2

This area consists primarily of a large round-topped hills with a crest in the centre of the area, dropping away to the north, east and west. The slopes running eastward drain into the headwaters of Pike's Creek. The slopes in the west and south of the area drain into Wiseman's Creek, which runs past the southern boundary of the area.

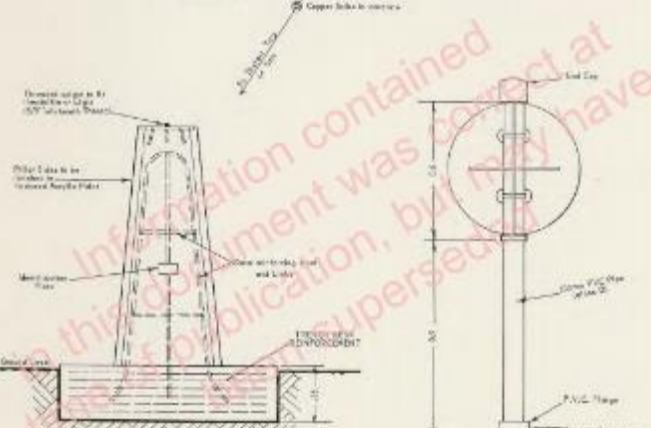
Erosion has stripped away the soil from several of the steepest slopes, and in some areas has exposed the underlying bedrock. In most areas, erosion, which is understood to likely be associated with rabbit infestations, has stripped away all topsoil and exposed the underlying yellow-orange subsoil (the edges of these eroded areas indicate that topsoil across the area is less than 10cm thick). Given the skeletal nature of the soil, the potential for subsurface remains is considered to be minimal.

##### 5.2.7.1 Trigonometric Station Glendower

The highest elevation of the crest has a broken trigonometrical (trig) station (Figure 5-9), marked 'T.S. Glendower' (Figure 5-10), adjacent to a wooden post and wire fence.

It is a concrete pillar trig station of a common design which rose to prominence in the mid-1970s (Figure 5-8). It has a concrete pillar of approximately 1.3 metres tall with a metal mast and circular vane mounted using a P.V.C. flange (this flange is broken on TS Glendower, which has allowed the mast to be dislodged). The mast is designed to be removable in order to access a threaded spigot which provides a mount for a theodolite or prism.





No other items of potential heritage significance were observed.



Figure 5-9: Derelict trig station (mast and vanes broken off and lying on the ground; Bayswater at rear of frame), looking north (Source: Jacobs 2019)



Figure 5-10: Survey marker plaque 'T.S. Glendower' (Source: Jacobs 2019)

### 5.2.8 Borrow pit 3

This area also consists of rolling hills and flat-floored valleys. The ground slopes downward toward the west of the area. An ephemeral creek runs from east to west through the centre of the area and eventually joins Wisemans Creek to the west. Two farm dams have been constructed on the ephemeral creek running through the area. No signs of construction or prior ground disturbance, aside from erosion, were identified in this area during the survey.

To the south of the creek line, a circle of trees with a central clearing showed signs of past camp activity, with a metal tub likely used as a hearth or small stock-feeding tub (Figure 5-11), and a wooden structure of indeterminate purpose (Figure 5-12). The wooden structure was constructed using modern Phillips head screws as well as older metal bolts, and although evidence of land use and past human activity, the features appear relatively modern and neither feature is considered to be of heritage significance.

There were no other features of potential heritage significance, or evidence to suggest a potential for archaeological relics.





Figure 5-11: Metal tub, likely either a hearth or feeding tub, looking north-east (Source: Jacobs 2019)



Figure 5-12: Indeterminate wooden feature, likely livestock related, looking south-west (Source: Jacobs 2019)

#### 5.2.9 Borrow pit 4

This area consists of rolling hills, with rounded tops, low gradient slopes and flat-floored valleys. The ground slopes downward to the northwest and south of the area. The southern half (approximately) of the area drains southward into a small ephemeral creek that runs southwest into Plashett Reservoir. The northern half of the area drains to the northwest into Wisemans Creek. Wisemans Creek runs west to east along the area's northern boundary.

Some farm dams have been constructed on the ephemeral creek running through the area. Contour banks have been cut into the side of the hillslope toward the northern edge of the area, to control water runoff into Wisemans Creek. No other signs of prior or earthworks were identified in this area during the survey.

A series of cattle yards and modern metal run fencing has been installed at the entrance to this borrow pit area (Figure 5-13). The fencing material, gates and shipping container present all appear to be relatively recent.

No other features of potential heritage significance, or areas of potential archaeological relics, were observed.



Figure 5-13: Fences, gate and stock run at the entrance to Borrow pit 4, looking south-east (Source: Jacobs 2019)

### 5.3 General observations and archaeological potential

The potential heritage of the study area reflects the documented history of the surrounding landscape, with utilisation by graziers, agriculturalists, timber getters, and in recent times, mining and power generation industries. It presents as cleared agricultural and pastoral land typical of the surrounding region. Stock grazing (currently cattle) has been undertaken across the study area, and extant fence lines show the portioning-off of the landscape and are typical of fence types found throughout the Hunter Valley. Any additional, yet unidentified, heritage items that may be present within the study area are likely to be similar to those noted within this assessment.

Outside of the major operational elements of Bayswater, large swathes of land still exist as cleared grassland (some of which are within the current study area). Previously pastoral, these areas are still operated as grazing land for cattle under a schedule of grazing licenses to local farmers. As part of these operations, there is remnant infrastructure (e.g. cattle yards of varying age), fencing (both modern barbed wire and older post and rail), and other small-scale agricultural elements (such as contour banks and farm dams) throughout the landscape. Given the results of the site survey, and the distance of the study area from the homesteads of past estates, there is no substantial built heritage or potential archaeological relics expected within the study area.

Given the pastoral nature of the historical land-use, the lack of any documentary evidence to suggest significant built structures within the study area, and the scale of past ground disturbance as part of the study area's operation as a working coal-fired power plant (as observed during the site visit), the archaeological potential of the study area is considered to be negligible.



## 6. Significance Assessment

### 6.1 Agricultural remnants

Rural fences have been erected by NSW landholders since early settlement; they were used to mark boundaries, manage stock and aid land management. Fence lines can provide insights in the sequence of land settlement, environmental changes and farming practices of settlers in the Hunter Region (Pickard 2009:3); e.g. nineteenth century land legislation in NSW required the fencing of conditional purchases and leases (Umwelt 2010). Although post-and-rail fencing is iconic, it was expensive and required skilled workers to construct, and the introduction of wire in fencing enabled both cost savings (requiring fewer posts) and faster construction by laypersons. Remnant fence lines are located across the study area and are a combination of timber and metal posts with line wire and occasional timber top rails. They provide evidence of the enclosing of the landscape to make paddocks and are typical of the Hunter Valley and greater rural NSW.

A number of small farm dams and contour banks are also located within the borrow pit areas and are of importance for the supply of fresh water and evidence of water management. Their location relative to the fence lines can also provide evidence of how the landscape has been used (often in combination with other infrastructure such as stockyards). They are likely not original to the early pastoral efforts however, with alterations over time and maintenance as part of their ongoing use. Therefore, they are not considered to be of heritage significance.

### 6.2 TS Glendower

Trig stations are permanent survey marks generally situated at the highest point of hills and mountains, and form part of the Geodetic Survey Network, supported in NSW by Spatial Services (previously Land Property Information), a division of the Department of Finance, Service and Innovation.

The Trigonometrical Survey of NSW commenced in 1867 and continued uninterrupted until World War One, by which time approximately one third of the state had been covered (Figure 6-1). The survey was resumed intermittently between the world wars (largely due to the Royal Australian Survey Corps) and continued unencumbered post-war. In 1973, a plan to update and complete the network was launched (commencing in Sydney-Newcastle-Wollongong), during which it was found that many of the old stations had disappeared. Wherever possible, old-style cairn and pole stations were replaced by a concrete pillar with a demountable mast and vane, allowing a theodolite and distance measuring equipment to be centred on it (Gowans et al 2015).

The trig station in Borrow Pit 2 (TS Glendower, #TS10176) is an integral part of a key spatial network dating from the mid-nineteenth century and represents its continuing development through time with advancements in technology and spatial services. The next closest trig stations are TS Shepard (#TS10925), 5 kilometres to the south-east, which may have been removed by the Ravensworth open-cut pit, and TS Savoy (#TS5333), 5.7 kilometres to the north-west which is still in operation.

Due to their importance in the State Control Network and role in supporting valuable investments, property rights and infrastructure, permanent survey marks (for example trig stations) are protected by the Surveyor-General's Direction No.11 – *Preservation of Survey Infrastructure*, under Section 24 of the *Surveying and Spatial Information Act 2002*. This legislation makes it a finable offence to 'remove, damage, destroy, displace, obliterate or deface any survey mark'. In order to remove a permanent survey mark, authority must be obtained from the Surveyor-General.



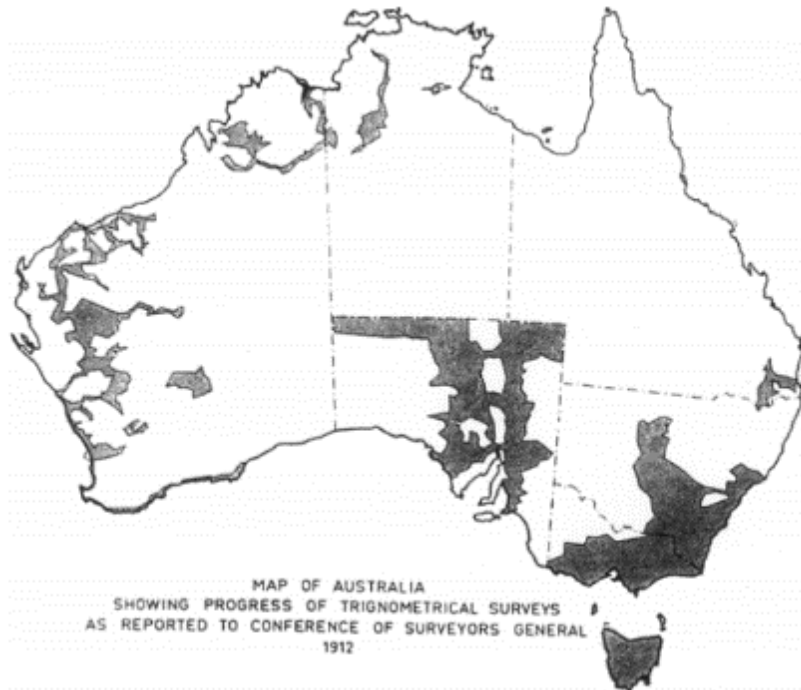


Figure 6-1: Progress of State trigonometrical surveys in 1912 (Division of National Mapping 2019)

### 6.3 Summary of significance

Table 6-1: Significance of heritage sites within the study area

Heritage Branch Standard Criteria	Statement of Significance
Criterion (a) Historical	<p>Although the study area has potential to demonstrate the pattern of European land use and development, it is unlikely to contain historical archaeological relics associated with this history.</p> <p>Any archaeological relics associated with the use of the area is likely to be sporadic and it is impossible to specify what and where any such relics may be.</p> <p>Evidence of extant fencing and dams demonstrate the pattern of land use and development of the area, however in general the potential heritage items are unlikely to provide any information not already available from documentary evidence.</p> <p>The study area and its potential heritage is considered to be of low historical significance and does not meet the threshold for local heritage.</p>
Criterion (b) Associative	<p>The study area has no strong associations to its original European settlers, except in its land tenure history. However, potential heritage in the study area is unlikely to provide evidence of these associations.</p> <p>The study area and its potential heritage is not considered to meet this criterion.</p>

Criterion (c) Aesthetic	<p>The potential heritage within the study area does not demonstrate distinctive aesthetic qualities, other than those of features found in rural areas characterised by rural landholdings and primary industries.</p> <p>The study area has low levels of aesthetic significance as a rural landscape formed through the clearing of native vegetation and construction of fenced pastoral land.</p> <p>The location of TS Glendower has aesthetic significance as the highest point within the surrounding landscape, with scenic 360-degree views in all directions including the two boundary mountain ranges of the valley, obstructed only by the power station itself.</p> <p>However, the study area does not meet the threshold for local heritage.</p>
Criterion (d) Social	<p>The study area is typical of rural landscapes within the region and it is unlikely that the area has a strong association with any previous or contemporary community or group.</p> <p>The study area and its potential heritage is not considered to meet this criterion.</p>
Criterion (d) Scientific	<p>It is unlikely that any intact archaeological deposits associated with the nineteenth and twentieth century development and occupation of the study area survive. Any archaeological relics that may be present are unlikely to have any significant research potential.</p> <p>General evidence of rural fences and dams may provide evidence of land use, however as individual elements they have little research potential beyond their physical presence. The potential heritage within the study area is typical of the rural landscapes of the region and are unlikely to provide additional information regarding the history and development of the area.</p> <p>The study area and its potential heritage is not considered to meet this criterion.</p>
Criterion (f) Rarity	<p>The potential heritage elements (i.e. rural infrastructure) within the study area are typical of the region's rural landscapes are not assessed as meeting this criterion.</p> <p>The study area is not associated with an unusual or remarkable aspect of the region's history, and although part of a decreasing resource, does not meet this criterion.</p>
Criterion (g) Representativeness	<p>The potential heritage elements identified within the study area are representative of those typically found in rural landscapes with a history of pastoral activities and exploitation of mineral resources. However, they are not particularly intact or substantial, and many other rural sites within NSW would better demonstrate this aspect of NSW's history.</p> <p>The trig station is representative of a class of station preferred during the network overhaul of the 1970s, while the station location is a key point in what was the primary spatial reference system of the state (gradually being superseded by the Global Navigational Satellite Systems). However, it is not considered to be of heritage significance.</p>

## **6.4 Statement of Significance**

The study area is typical of a rural landscape within the upper Hunter Valley of NSW. The history of the area from the early nineteenth century (including its occupation by Europeans, subsequent use as cleared pastoral land, and through to its exploitation for mineral resources) is reflected in the low potential for archaeological relics and in the evidence of rural infrastructure. The identified and potential heritage of the study area is of low aesthetic and historical significance and negligible research potential, and therefore does not threshold at Local or State level of heritage significance.

## 7. Conclusions and recommendations

As noted in Sections 4 and 5 above, there are no registered heritage items, and no previously unidentified heritage items or areas of archaeological potential identified within the study area during the field survey. The historical context demonstrates that prior to the establishment of open-cut mining and power stations, the study area was primarily an agricultural landscape, similar to areas surrounding the mines now. Grazing of sheep and cattle was the primary land use, with Ravensworth being one of the larger properties in the area (its central homestead was located 10 kilometres from the current project area). Physical evidence of these agricultural uses was largely removed by subsequent mining and the construction of Bayswater and ancillary structures.

The following management recommendations are made for managing TS Glendower, and any unexpected finds during construction works for the Project.

### Recommendation 1

An application for authorisation to remove or replace a permanent survey mark (TS Glendower) must be made in accordance with clause 90 of the *Surveying and Spatial Information Regulation 2017* at least 30 business days before the proposed removal or replacement. It is recommended that consultation with the NSW Government Spatial Services and/or the Surveyor-General be started as soon as practicable, to seek advice on the management of TS Glendower and to avoid any subsequent delays to the Project.

### Recommendation 2

Should any historical archaeological remains be discovered during construction, all works must stop, the area cordoned off and a heritage professional engaged to examine and advise on the significance of the archaeological finds. If deemed to be of significance, under section 146 of the Heritage Act, a s146 form would be submitted to notify the Heritage Council of the discovery of relics. If deemed significant, further investigation may be required, and appropriate management would be agreed through consultation with the Department of Premier and Cabinet (Heritage).

### Recommendation 3

In the unlikely event that human remains are uncovered, all work must cease immediately in the vicinity of the remains and the area cordoned off. The local NSW Police must be notified, who would make an initial assessment as to whether the remains are part of a crime scene or Aboriginal remains. If the remains are thought to be Aboriginal, the EESG of the Department of Planning, Industry and Environment (former NSW Office of Environment and Heritage) must be contacted. An EESG officer would determine if the remains are Aboriginal and if so, a management plan would be developed in consultation with the relevant Aboriginal stakeholders before works recommence.

## 8. References

Department of Lands 1975 *Specifications for Design and Marking Control Survey Traverses, Survey Integration, New South Wales* 2<sup>nd</sup> Ed.

Division of National Mapping 2019 *XNATMAP Australia*, accessed at <https://www.xnatmap.org/>

EJE Heritage 2013 *Dilapidation Report - Former Chain of Ponds Inn and Outbuildings, Old New England Highway, Liddell NSW 2333*, Unpublished report to Liddell Coal Operations Pty Ltd.

Gowans N., McElroy S. and Janssen V. 2015 *Survey infrastructure preservation and upgrade: Trigonometrical stations in NSW*. Proceedings of Association of Public Authority Surveyors Conference (APAS2015). Coffs Harbour, Australia, 16-18 March, 67-84.

Pickard, J. 2009 *Illustrated glossary of Australian rural fence terms*, Heritage Branch, News South Wales Department of Planning, Sydney. Heritage Branch Report HB 09/01.

Thorp, W. 1990 *Archaeological Report - Chain of Ponds Inn, Liddell*, Unpublished report to Dawson Brown Ackert.

Umwelt 2010 *Ravensworth Operations Project: Historical Heritage Assessment*, Unpublished report to Ravensworth Operations Pty Ltd.

Umwelt 2014 *Historic Heritage Assessment: Mount Owen Continued Operations Project*, Unpublished report to Mount Owen Pty Ltd.

## **Appendix A. State Heritage Register Listing for Former Chain of Ponds Inn**

[Home](#) > [Topics](#) > [Heritage places and items](#) > [Search for heritage](#)

# Inn & Outbuildings (former)

## Item details

<b>Name of item:</b>	Inn & Outbuildings (former)
<b>Other name/s:</b>	Chain of Ponds Inn & Outbuildings
<b>Type of item:</b>	Built
<b>Group/Collection:</b>	Commercial
<b>Category:</b>	Inn/Tavern
<b>Location:</b>	Lat: -32.4056940562 Long: 151.0251023170
<b>Primary address:</b>	Old New England Highway, Chain of Ponds, NSW
<b>Parish:</b>	Liddell
<b>County:</b>	Durham
<b>Local govt. area:</b>	Singleton
<b>Local Aboriginal Land Council:</b>	Wanaruah

## Property description

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
LOT	211		DP	975271
LOT	212		DP	975271

## All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
Old New England Highway	Chain of Ponds	Singleton	Liddell	Durham	Primary Address
Old New England Highway	Liddell	Singleton	Liddell	Durham	Alternate Address

## Procedures /Exemptions

Section of act	Description	Title	Comments	Action date
57(2)	Exemption to allow work	Standard Exemptions	SCHEDULE OF STANDARD EXEMPTIONS HERITAGE ACT 1977 Notice of Order Under Section 57 (2) of the Heritage Act 1977	Sep 5 2008

			<p>I, the Minister for Planning, pursuant to subsection 57(2) of the Heritage Act 1977, on the recommendation of the Heritage Council of New South Wales, do by this Order:</p> <p>1. revoke the Schedule of Exemptions to subsection 57(1) of the Heritage Act made under subsection 57(2) and published in the Government Gazette on 22 February 2008; and</p> <p>2. grant standard exemptions from subsection 57(1) of the Heritage Act 1977, described in the Schedule attached.</p> <p>FRANK SARTOR</p> <p>Minister for Planning</p> <p>Sydney, 11 July 2008</p> <p>To view the schedule click on the Standard Exemptions for Works Requiring Heritage Council Approval link below.</p>	
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 **Standard exemptions** for works requiring Heritage Council approval

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		00242	02 Apr 99	27	1546
Heritage Act - Permanent Conservation Order - former		00242	19 Nov 82	157	5292

References, internet links & images

None

Note: internet links may be to web pages, documents or images.



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