Eraring Battery Energy Storage System

Aboriginal Cultural Heritage Assessment Report

IS365800_ACHAR | 03

12 October 2021

Origin Energy Eraring Pty Limited

SSD-15950052 **EIS Appendix F**

Eraring Battery Energy Storage System

Project No:	IS365800
Document Title:	Eraring BESS Aboriginal Cultural Heritage Assessment Report
Document No.:	IS365800_ACHAR
Revision:	03
Document Status:	Final
Date:	12 October 2021
Client Name:	Origin Energy Eraring Pty Limited
Client No:	SSD-15950052
Project Manager:	Thomas Muddle
Author:	Alison Lamond
File Name:	IS365800_Eraring BESS_ACHAR_Rev03_Final_12102021

Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
Leve 4, 12 Steward Avenue
Newcastle West NSW 2302 Australia
PO Box 2147 Dangar NSW 2309 Australia
T +61 2 4979 2600
F +61 2 4979 2666
www.jacobs.com

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
01	27/05/2021	Draft Aboriginal Cultural Heritage Assessment Report for issue to client	A Lamond	F Scully	F Scully	T Muddle
02	11/06/2021	Draft Aboriginal Cultural Heritage Assessment Report for issue to RAPs	A Lamond	F Scully	F Scully	T Muddle
03	12/10/2021	Final Aboriginal Cultural Heritage Assessment Report for exhibition	A Lamond	R Taddeucci	F Scully	T Muddle

Contents

Figures

Tables

Executive Summary

Origin Energy Eraring Pty Limited (Origin) owns and operates the Eraring Power Station (EPS) which is one of Australia's largest power stations, having a capacity of 2,880 megawatts (MW). Origin is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale Battery Energy Storage System (BESS) with a discharge capacity of 700 MW and storage capacity of 2,800 megawatt hours (MWh) within the Origin landholding associated with the EPS (the Project). The Project area is located within the Local Government Area (LGA) of Lake Macquarie.

Jacobs on behalf of Origin currently developing an Environmental Impact Statement (EIS) for the assessment of the Eraring Battery Energy Storage System in accordance with Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This Aboriginal Cultural Heritage Assessment Report (ACHAR) has been developed to support the EIS for the Project.

This document presents the results of an assessment of Aboriginal cultural heritage within the Project area. This Aboriginal cultural heritage assessment involved:

- Consultation with Aboriginal stakeholders following relevant guidelines and procedures (DECCW 2010a) to obtain feedback on the assessment process and input on significance and cultural values associated with the Project area;
- An archaeological assessment including a desktop study and an archaeological survey of the areas subject to impacts;
- Assessment of the potential impact to Aboriginal archaeological sites; and
- Recommendation of management measures to prevent or mitigate impacts to archaeological sites.

Previous archaeological assessments within the Project area and vicinity have identified a concentration of Aboriginal archaeological sites on the Lake Macquarie foreshore and freshwater tributaries.

The archaeological survey was carried out on 3 May 2021. On-site consultation with nominated site officers from the Registered Aboriginal Parties (RAPs) enabled the development of recommendations for any further assessment. No previously recorded sites existed within the Project area. No new Aboriginal sites or Potential Archaeological Deposits (PADs) were identified within the Project area.

The following Management recommendations are provided for the Project, to minimise impacts to cultural heritage:

- The Unanticipated Finds Protocol in Section 10.1 and Section 10.2 will be followed for any unidentified Aboriginal heritage objects found during the works.
- An Aboriginal cultural heritage awareness training will be developed with the local Aboriginal community and will be provided to workers involved in clearing and ground disturbance activities associated with construction.

1. Introduction

1.1 Project background

Origin Energy Eraring Pty Limited (Origin) owns and operates the Eraring Power Station (EPS) which is one of Australia's largest power stations, having a capacity of 2,880 megawatts (MW). EPS is scheduled to be among 14 gigawatts (GW) of coal-fired generation plants to be retired within the next few decades (AEMO, 2020). The retirement of the EPS will support Origin's carbon emission reduction goals. As such, Origin is currently progressing an application to provide energy storage and key network services that would facilitate long term emissions reduction in the National Electricity Market (NEM) while supporting the delivery of secure and reliable electricity for consumers and businesses.

Origin is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale Battery Energy Storage System (BESS) with a discharge capacity of 700 MW and storage capacity of 2,800 megawatt hours (MWh) next to the EPS on existing Origin landholding (the Project).

The Project is a State significant development (SSD) under the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) and subject to Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such, the Project requires the preparation of an Environmental Impact Statement (EIS) in accordance with Secretary's Environmental Assessment Requirements (SEARs) and the approval of the Independent Planning Commission under circumstances described in SRD SEPP or the NSW Minister for Planning and Public Spaces.

This Aboriginal Cultural Heritage Assessment Report (ACHAR) has been developed to support the EIS for the Project.

1.2 Purpose of this report

This ACHAR has been prepared in accordance with the SEARs issued for the Project on 19 April 2021 by the Planning Secretary of the NSW Department of Planning, Industry and Environment (DPIE).

The SEARs relevant to the ACHAR are presented in Table 1-1.

Table 1-1: SEARs

SEARs	Section addressed
▪ Heritage – including an assessment of the development: - on Aboriginal heritage (cultural and archaeological) impacts of the development and consultation with the local Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents;	Throughout report. In particular see Section 3 for a description of Aboriginal consultation actions and Section 9 for the assessment of impacts. Supporting data to this ACHAR is provided in the Archaeological Assessment Report (AAR) in Appendix B.

The protection of Aboriginal cultural heritage in NSW is governed by a set of interrelated local, state and Commonwealth legislation and planning instruments. These Acts and their relevant sections and associated regulatory documents (e.g. codes of practice, guidelines, etc.) that govern the Project and is provided in Table 1-2.

Table 1-2: Environmental planning instruments and considerations

Environmental planning instrument	Mandatory considerations	Where addressed
Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (ATSIHP Act)	The ATSIHP Act protects Aboriginal cultural property in a wider sense and includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. The Act may apply to contemporary Aboriginal cultural property as well as ancient sites. The responsible Minister may make a declaration under section 10 of the Act in situations where state or territory laws do not provide adequate protection of heritage places.	Throughout report.
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act provides for the protection of the environment, especially in Matters of National Environmental Significance (MNES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the MNES without approval from the Australian Minister for the Environment. The definition of the environment under the EPBC Act includes both natural and cultural elements. The EPBC Act includes provisions to protect matters of national environmental significance and Commonwealth land. Lists and registers made under the Act include: ▪ a National Heritage List (NHL) of places of national heritage significance ▪ a Commonwealth Heritage List (CHL) of heritage places owned or managed by the Commonwealth ▪ An independent expert body, the Australian Heritage Council, advises the Minister for the Environment on the listing and protection of heritage places.	No Items on the lists are located within the, or in the vicinity of, the Project area.
Native Title Act 1993 (NT Act)	The NT Act recognises and protects native title and provides that native title cannot be extinguished contrary to the NT Act. The National Native Title Tribunal (NNTT) is a Commonwealth Government agency set up under this Act and mediates native title claims under the direction of the Federal Court of Australia. NNTT maintains the following registers: ▪ National Native Title Register ▪ Register of Native Title Claim ▪ Unregistered claimant applications ▪ Register of Indigenous Land Use Agreements (ILUAs). The Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 stipulates that, where relevant, consultation must be conducted with Native title holders or registered native title claimants in accordance with the NT Act.	There are no Native title claims over the Project area.
Environmental Planning & Assessment Act 1979 (EP&A Act)	This legislation provides the framework for environmental planning and assessment in NSW. This act includes the requirement for environmental impacts to be considered prior to development approval including:	Throughout report.

Environmental planning instrument	Mandatory considerations	Where addressed
	▪ The requirement for impacts or likely impacts upon Aboriginal cultural heritage to be assessed as part of a project's environmental approval ▪ Local government areas prepare Local Environment Plans (LEPs) and Development Control Plans (DCPs) in accordance with the EP&A Act to provide guidance on the level of environmental assessment required ▪ Division 4.7 of the Act applies to SSD and guides the application of the National Parks and Wildlife Act 1974 in relation to assessment and secondary approvals required for SSD projects.	
National Parks and Wildlife Act 1974 (NPW Act)	The NPW Act provides for the protection of Aboriginal objects and Aboriginal places. Under section 5 of the Act, an Aboriginal object is defined as: '*any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.*' An Aboriginal place is defined under the NPW Act as an area that has been declared by the Minister administering the NPW Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects. Under section 86 of the NPW Act it is an offence to harm an Aboriginal object or harm or desecrate an Aboriginal place, without the prior written consent from the Director General of DPIE. Penalties apply to the offence of impacting on an Aboriginal object or Aboriginal place. The largest penalties apply when a person harms an object that they know to be an Aboriginal object (called a 'knowing offence'). However, a 'strict liability' offence still applies whether or not a person knows it is an Aboriginal object or place. Section 4.7 of the EP&A Act identifies that consent under section 86 of the NPW Act is not required for SSD projects. Under section 89A of the NPW Act it is a requirement to notify the DPIE Director-General of the location of an Aboriginal object. Identified Aboriginal objects and sites are registered in NSW on the Aboriginal Heritage Information Management System (AHIMS). Procedures that accompany the N*ational Parks and Wildlife Amendment Act 2010* include the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010c), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b).	Throughout report. The results of the AHIMS search are located in Section 7 and Appendix B.
Aboriginal Cultural Heritage Consultation Requirements	The ACHCRP establishes the requirements for consultation (under part 6 of the NPW Act) with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of the Project on Aboriginal objects and places. The report comprises four stages with associated timeframes which must be adhered to:	Section 3

Environmental planning instrument	Mandatory considerations	Where addressed
for Proponents (ACHCRP) 2010	▪ Stage 1- Notification of project proposal and registration of interest (14 days from date letter sent to register as a registered Aboriginal stakeholders) ▪ Stage 2- Presentation of information about the proposed project (potentially including meetings, prepare info etc) ▪ Stage 3- Gathering information about cultural significance (28 days for registered Aboriginal stakeholders to provide a review and feedback to consultants' methodology) ▪ Stage 4- Review of draft ACHAR (registered Aboriginal stakeholders have 28 days from sending of the report to make a submission).	
Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (the Code of Practice)	The Code of Practice sets out the detailed requirements for archaeological investigations of Aboriginal objects in NSW for activities that require assessment under Part 4 or Part 5 of the EP&A Act. The Code of Practice sets out in detail: ▪ Minimum qualifications for anyone undertaking archaeological investigation under the Code in NSW ▪ Assessment steps required to be undertaken for all archaeological investigation ▪ Assessment steps that may be required to be undertaken to adequately characterise the Aboriginal objects being investigated.	Appendix B
Native Title Act (NSW) 1994	The *Native Title Act (NSW) 1994* was introduced to ensure that the laws of NSW are consistent with the Commonwealth *Native Title Act 1993*. The Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 stipulates that, where relevant, consultation must be conducted with Native title holders or registered native title claimants in accordance with the NSW Native Title Act (NSW) 1994.	Section 3
Aboriginal Land Rights Act (NSW) 1983	The *Aboriginal Land Rights Act (NSW) 1983* recognises the rights of Aboriginal people in NSW and provides a vehicle for the expression of self-determination and self-governance. The purposes of the Act are: ▪ to provide land rights for Aboriginal persons in NSW ▪ to provide for representative Local Aboriginal Land Councils (LALCs) in NSW ▪ to vest land in those LALCs ▪ to provide for the acquisition of land, and the management of land and other assets and investments, by or for those LALCs and the allocation of funds to and by those LALCs to provide for the provision of community benefit schemes by or on behalf of those LALCs.	Section 3

1.3 Project location

The Project will be situated on land zoned SP2 Infrastructure for electricity generating purposes and within an area previously disturbed by power station activities. No re-zonings or land acquisitions are required. The Project is located within Lots 10 and 11 DP (Deposited Plan) 1050120, Rocky Point Rd Eraring, within the Lake Macquarie LGA, as illustrated in Figure 1-1.

Surrounding land external to the EPS consists of broadacre rural development and low-density residential properties. The largest commercial centre and population centre nearby is Charlestown (29.1 kilometres (km) northeast), and the closest residential suburb is Dora Creek (1.2 km south). The Great Northern Railway alignment runs along the border of Dora Creek and Eraring suburbs, approximately 200 m west of the Project area.

The Project area is surrounded by the following features with the Origin landholding:

- EPS operations area, elevated TransGrid switchyard, coal yards and extensive EPS buffer lands to the north;
- Elevated attemperation reservoir to the east;
- Elevated EPS inlet canal to the south and east; and
- Mature vegetation within E2 environmental protection zoned land along a ridge line to the west.

1.4 Report structure

The report structure is as follows:

- Section 1 provides the Project background and briefly describes the Project location. Also outlines the legislative and policy framework relevant to the investigation and assessment of Aboriginal heritage in NSW;
- Section 2 describes the Project, and the proposed works that would involve ground disturbance and consequently could pose a risk to Aboriginal objects and sites;
- Section 3 presents an overview of consultation undertaken with the Aboriginal community in relation to the Project. Consultation was carried out in accordance with the *Aboriginal Cultural Heritage Requirements for Proponents* (ACHCRP) (DECCW 2010a);
- Section 4 presents background information relevant to the Project, including environmental information (geology, soils, climate and vegetation);
- Section 5 presents a review of ethnographic information relevant to the Project;
- Section 6 presents a summary of the identified Aboriginal cultural values associated with the Project area;
- Section 7 summarises the archaeological assessment and the Aboriginal archaeological sites and other areas of archaeological sensitivity the assessment has identified in the Project area. This summary draws upon supporting data presented in the AAR;
- Section 8 assesses the heritage significance of the identified Aboriginal sites assessed as part of this report using the NSW heritage significance criteria;
- Section 9 assesses the Project's direct and indirect impact on identified Aboriginal sites and PADs and the significance of these impacts to the area's Aboriginal cultural heritage resource; and
- Section 10 presents recommended management and mitigation measures for the Project.

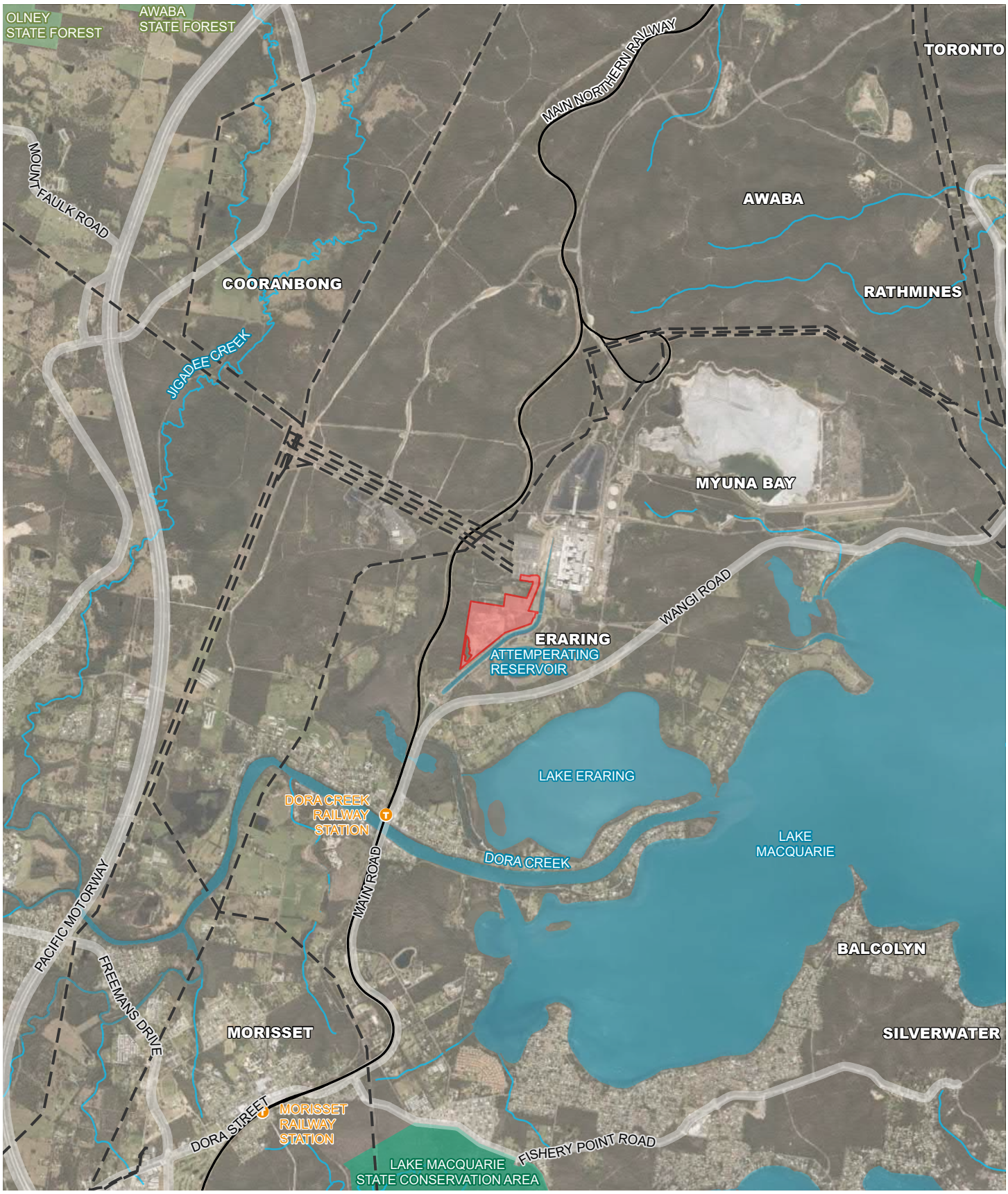


Figure 1-1 Project location

2. Project description

2.1 Overview

Origin is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale BESS with a discharge capacity of 700 MW and storage capacity of 2,800 MWh at the Project area. The Eraring BESS would be among the largest battery projects in NSW and Australia in terms of peak power output and discharge duration. The Project would provide energy storage and key network services that would facilitate long term emissions reduction in the NEM while supporting the delivery of secure and reliable electricity for consumers and businesses.

The Project would be situated within the Origin landholding associated with the EPS located on the western shore of Lake Macquarie. EPS is approximately 40 km south of Newcastle and approximately 120 km north of Sydney in NSW. The total area of the Origin's landholding is approximately 1,200 hectares (ha), including EPS operational areas, Eraring Ash Dam and surrounding buffer lands consisting of bushland and grassland interspersed with roads, water management and electricity transmission infrastructure. The Project area is about 25 ha and is shown in Figure 2-1.

The Project would include the construction and operation of:

- BESS compounds comprising of rows of enclosures housing lithium-ion type batteries connected to associated power conversion systems (PCS) and high voltage (HV) electrical reticulation equipment;
- A BESS substation housing HV transformers and associated infrastructure;
- Approximately 400 m of overhead 330 kilovolt (kV) transmission line connecting the BESS substation to the existing 330 kV TransGrid switchyard; and
- Ancillary infrastructure and facilities including safety protection systems and site ancillary facilities such as laydown areas and site offices.

A full description of the Project is included in Section 3 of the EIS.

The BESS will be capable of providing Energy Frequency Control Ancillary Services (FCAS), System Restart Ancillary Services (SRAS), as well as Fast Frequency Response (FFR) and synthetic inertia - security services currently under consideration in the NEM.

The Project maximum disturbance area is approximately 25 ha in size with permeant infrastructure likely to cover half this area. Construction may require temporary compounds or laydown areas outside the permanent footprint but within the Project area and would be located in existing vacant areas of the EPS site as illustrated in Figure 2-1.

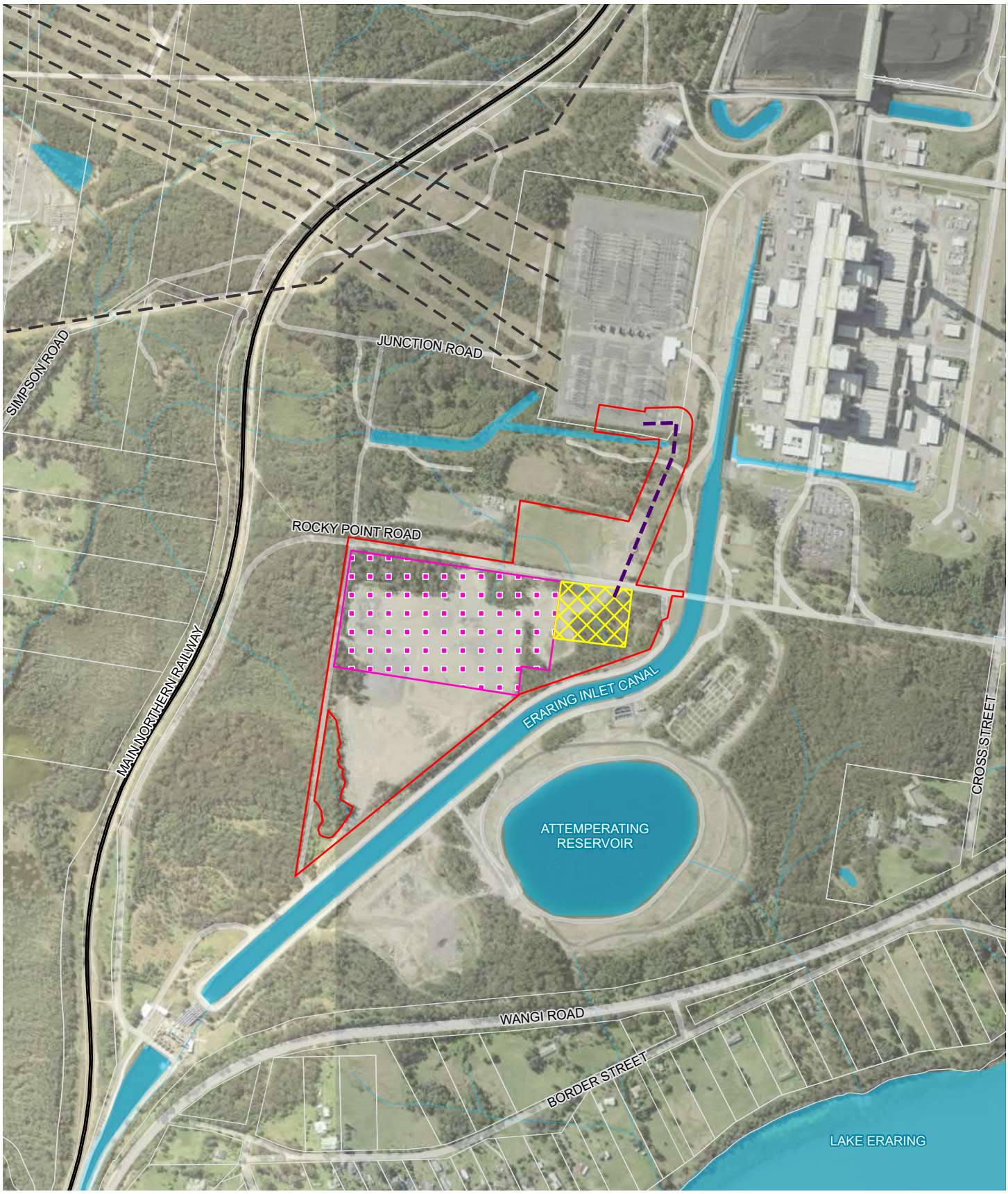
2.2 Battery system

The BESS technology provider is not yet confirmed; however, the batteries are likely to consist of modular lithium-ion type racks, housed within battery enclosures containing protection, control and heating, ventilation and air conditioning.

Other infrastructure within the BESS compound will include:

- PCS comprising of inverters and battery transformers;
- HV reticulation including ring main unit (RMU), cables and switchboards; and
- Switch rooms and control rooms.

The PCS will be four-quadrant bidirectional type, with capability for both charge/ discharge in leading and lagging reactive power scenarios. The PCS will also have Grid forming capability to allow islanded operation and SRAS where required.



Project area
Proposed 330kV transmission connection
Battery Energy Storage System
Substation
Electricity transmission line
Railway
Cadastre

0 300 m

1:10,000 at A4
GDA94 MGA56

Data sources

Origin 2021,
Aerometrex 2020,
© Department Finance, Services and Innovation Dec 2020
© Department Customer Service

Figure 2-1 Project overview

2.3 Network connection

The Project would take advantage of the close proximity to the existing TransGrid owned 330 kV switchyard which has sufficient spare capacity for the size of the proposed BESS. The Project's connection will be electrically separate to that of EPS, so it can be operated independently of the existing site.

The following components are required to connect the BESS to the NEM:

- 33/330 kV transformers in a bunded transformer area;
- Overhead steel structure lattice towers complete with insulators and conductor(s) spanning the distance between The Project area and the existing TransGrid 330 kV switchyard;
- Associated protection and control systems.

Connection works into the TransGrid switchyard is targeting existing vacant connection bays but allowance is made for bench extension and installation of additional infrastructure.

2.4 Construction works

The construction methodology for the Project will be developed in more detail during the preparation of the detailed design. However, it is expected to involve:

- Installation and maintenance of environmental controls including drainage and sediment controls;
- Upgraded construction access track from existing internal access road to battery location;
- Vegetation clearing;
- Cut and fill to level areas and establish a hardstand pad and construction laydown areas;
- Structural works – slabs to support battery modules, power conversion systems and transformer structures;
- Delivery, installation and electrical fit-out of battery modules, power conversion systems and transformers;
- Installation of 330 kV overhead cabling from the battery transformers to the TransGrid switchyard;
- Testing and commissioning activities; and
- Removal of construction equipment and rehabilitation of construction areas.

2.5 Construction workforce

The Project will involve the recruitment and training of a construction workforce and ongoing operations and maintenance roles. The Project will also provide localised upskilling and training in the region in relation to the deployment of batteries. Major contractors will be asked to demonstrate their commitment to using a regional workforce and creating Indigenous and equal opportunity employment.

2.6 Operation

Operation will be 24 hours/365 days per week and will respond to market demand, fluctuating from discharge at full capacity for up to four hours or partial capacity for a longer duration. Maintenance activities will be ongoing (landscaping, asset protection zones, water management infrastructure, access tracks and inspection, testing and replacement of components). Operation life is expected to be between 20 to 30 years. Component replacements and/or upgraded may extend this timeframe.

2.7 Decommissioning

Following the end of economic life, above ground components would be removed and, where possible, re-purposed. Land rehabilitation will be undertaken where necessary to achieve acceptable conditions as far as reasonably practicable.

3. Aboriginal community consultation

The ACHCRP (DECCW 2010a) establishes the requirements for consultation with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of the Project on Aboriginal objects and places. These requirements include four stages with associated timeframes which must be adhered to:

Stage 1 — Notification of project proposal and registration of interest (14 days from date letter sent to register as registered Aboriginal stakeholders).

Stage 2 — Presentation of information about the proposed project.

Stage 3 — Gathering information about cultural significance (28 days for registered Aboriginal stakeholders to provide a review and feedback to consultants regarding the methodology).

Stage 4 — Review of draft ACHAR (registered Aboriginal stakeholders have 28 days from sending of the report to make a submission).

Aboriginal stakeholder engagement and involvement is important for the identification of Aboriginal cultural values relevant to the Project. This section summarises the consultation process relating to the organisation and conduct of the ACHAR. Details of consultation including examples of letters sent to the Registered Aboriginal Parties (RAPs) and knowledge holders, conversations undertaken during archaeological survey, native title search results, records of cultural heritage values interviews and a detailed consultation log are included in Appendix A.

This section summarises the consultation process throughout the archaeological assessment to date (refer to Table 3-1) and outlines the stages of consultation.

Table 3-1: Summary of consultation process

Task Name	Start	Finish
Stage 1- Agency Letters.	22 February 2021	
Stage 1- Newspaper advertisements.	18 February 2021 (Koori Mail) and 22 February 2021 (Newcastle Herald)	
Stage 1- Project Notification and invitation to register supplied to potential Aboriginal stakeholders.	2 March 2021	17 March 2021
Stage 1- Supply of the list of RAPs to Heritage NSW and Wanaruah LALC.	30 March 2021	
Stage 2 and 3- RAP review of Project information and methodology and request for information about cultural significance.	19 March 2021	19 April 2021
Stage 4- Carry out archaeological survey and prepare a draft ACHAR.	3 May 2021	
Stage 4- Present the draft ACHAR to RAPs for review and comment.	11 June 2021	9 July 2021

3.1 Stage 1 - Notification of Project and registration of interest

Stage 1 of the consultation process is to identify, notify and register any Aboriginal people or groups who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the Project area.

Notification was initiated on 22 February 2021 to all relevant organisations listed under Section 4.1.2 in the ACHCRP (DECCW 2010a). These organisations are listed below in Table 3-2.

Table 3-2: List of contacted organisations (stage 1 consultation)

Name of Organisation	Date of Notification Sent	Date of Response Received
Biraban Local Aboriginal Land Council	22 February 2021	No response
NTSCorp	22 February 2021	No response
Heritage NSW – Hunter Branch	22 February 2021	25 February 2021
Office of the Registrar, Aboriginal Land Rights Act 1983	22 February 2021	24 February 2021
Lake Macquarie Council	22 February 2021	25 February 2021
Hunter Local Land Services	22 February 2021	No response

In accordance with Section 4.1.3 of the ACHCRP (DECCW 2010a) a notice in the local newspaper circulating in the general location of the Project was completed, with information explaining the Project and its exact location. Notices were placed in the Koori Mail (18 February 2021) and Newcastle Herald (22 February 2021). These advertisements provided additional opportunity for Aboriginal people who are interested in the Project to register. A copy of the advertisement is included in Appendix A.

Project notifications were sent to all groups and individuals identified in the above consultation process. A total of 12 groups and individuals registered their interest:

- A1 indigenous Services;
- Awabakal and Guringai Pty Ltd;
- Awabakal Traditional Owners Aboriginal Corporation;
- Biraban Local Aboriginal Land Council;
- [redacted]
- Didge Ngunawal Clan;
- [redacted]
- Jumbunna Traffic Management Group Pty Ltd;
- Kawul Pty Ltd trading as Wonn1 Sites;
- Lower Hunter Aboriginal Incorporated;
- Murra Bidgee Muilangari Aboriginal Corporation; and
- Widescope Indigenous Group.

Following Section 4.1.6 of Stage 1 of the ACHCRP (DECCW 2010a), a list of RAPs for the Project and copies of the notifications from Section 4.1.3 were submitted to Heritage NSW and Biraban LALC on 30 March 2021. A copy of the notification is provided in Appendix A.

3.2 Stage 2 – Presentation of information about the proposed Project

Stage 2 of the consultation process provides RAPs with information about the scope of the proposed Project and the proposed cultural heritage assessment process.

The RAPs were provided with a letter outlining the Project and a copy of the document Eraring BESS Aboriginal Cultural Heritage Assessment Methodology which included all Project information (refer to Appendix A). Comments on this document were invited from RAPs and they were invited to contact Jacobs at any time throughout the assessment process to discuss the Project.

Every RAP organisation was invited to provide a site officer for the archaeological survey and were issued a checklist to ensure safety and preparedness for work.

3.3 Stage 3 – Gathering information about cultural significance

Stage 3 of the consultation process is to facilitate a process whereby RAPs can contribute to culturally appropriate information gathering and the research methodology, provide information that will enable the cultural significance of Aboriginal objects and/or places on the Project area to be determined, and have input into the development of any cultural heritage management options.

RAPs were invited to submit information relevant to the cultural significance of the Project area and any areas and objects within it, at all stages of the consultation process.

3.4 Stage 4 – Review of draft ACHAR

Stage 4 of the consultation process (this stage) involves the RAPs review and feedback on the draft ACHAR. The ACHAR was drafted to facilitate the RAP review and feedback process. The draft ACHAR was sent to all RAPs on 11 June 2021, so that they could review the document and supply comments and provide feedback by 9 July 2021. At the end of the review period, no feedback was received from the RAPs.

3.5 Sensitive cultural information and management protocol

It is possible that during the consultation process, RAPs will provide sensitive cultural information to which access needs to be restricted. In the event that such information is supplied, the RAP supplying the information should state to Jacobs how they wish that information to be treated, and how access to the information should be restricted. Jacobs will follow the stated wishes provided by the RAP group in question when managing and using the information provided. All stated restrictions of access, communication and publication of the information will be followed. These might include:

- Restrictions on reproducing the information (in whole or in part) in reports;
- Restrictions on reproducing the information in reports provided to different audiences (for example, the version provided to the client, the version provided to DPIE and the AHIMS database);
- Restrictions on communication of the information in other ways;
- Restrictions on the location/storage of the information;
- Other required processes relating to handling the information;
- Any names and contact details of persons authorised within the relevant Aboriginal group to make decisions concerning the information, and their degree of authorisation;
- Any details of any consent given in accordance with customary law; and
- Any restrictions on access to and use of the information by RAPs.

The above list should be considered when providing a statement of requirements regarding any culturally sensitive information.

3.6 Consultation log

A log summarising the consultation carried out with RAPs in relation to the Project to date is provided in Appendix A.

4. Background Information

4.1 Environmental context

4.1.1 Landforms, geology and soils

The geology of the Project area consists of the Late Permian to early Triassic aged Munmorah Conglomerate. The Munmorah Conglomerate is characterised by conglomerate, pebbly sandstone and grey to green shale.

The Project area is located within the Doyalson Soil landscape, with the northern section located on disturbed terrain (ESPADE 2021). The Doyalson Soil landscape consists of gently undulating rises with broad crests and long gently inclined slopes.

4.1.2 Vegetation and hydrology

Due to past grazing and industrial uses the Project area has been previously cleared. Typical vegetation for the Doyalson soil landscape consists of scribbly gum (*Eucalyptus haemastoma*), red bloodwood (*E. gummifera*) , brown stringybark (*E. capitellata*), smooth barked apple (*Angophora costata*), grey gm (*E. punctata*), hill banksia (*Banksia spinulosa*), banksia (*Banksia oblongifolia*)and mountain devil (*Lambertia Formosa*).

The Project area is located approximately 1 km northeast of Lake Eraring, which feeds into Lake Macquarie. The drainage line that crosses the Project area (highly modified) drains west into Muddy Creek.

4.1.3 Post contact land use

The Project area has been previously used for grazing, as a hardstand area during the construction of the power station; residential and farming in the 1960s and 1970s; as a high level canal during the late 1970s and early 1980s and stockpile and borrow areas during construction of the Attemperating Reservoir in the early 2000s (GHD 2021).

5. Ethnohistorical information

5.1 Aboriginal people of the area

Ethnographic information which relates to the Aboriginal occupation of the Project area is derived from publications and other surviving forms of documentation which were compiled by early non-Aboriginal explorers, settlers, missionaries and government officials who went to the region during the mid to late 19th century. Unfortunately, within the ethnographic record, early researchers sometimes referred to tribes as having as few as 10 members, to as many as 500, which makes the determination of social organisation within certain groups difficult.

It should be noted that the information provided here does not necessarily reflect the opinions of the Aboriginal knowledge holders for the Project regarding their tribal affiliations and boundaries. The following information was compiled from a number of written sources based on language research and ethno-historic observations.

5.2 Aboriginal tribal boundaries

According to Tindale (1974) in relation to Australian Aboriginal people, the term 'tribe' describes a group of people that share a common language. Tindale describes Aboriginal tribal boundaries as the limits beyond which it is dangerous to move without adequate recognition, while Stanner (1965) argues that a tribe's territory is the sum of its constituent clan estates. According to the tribal boundaries as defined by Tindale (1974), the Project area traverses the traditional lands of the Awabakal people.

It should be noted, however, that the identification of names and boundaries of tribal groups in the Hunter regions (which includes Lake Macquarie) remains unclear and may never be resolved. More recent attempts to delineate the grammar of languages in the Hunter and Lake Macquarie region however have indicated that indeed there was a degree of bilingualism and shared lexicon amongst the tribes in the district (Lissarrague 2006).

5.3 Social Organisation, Settlement and Subsistence

Berndt & Berndt (1988) describe Aboriginal society as being comprised of a hierarchy of organisational levels and groups with fluid boundaries between them. The smallest group in the hierarchy is the family comprised of a man with one or more wives, their children and some of their parents. The second level of the hierarchy consisted of bands, small groups consisting of members of several nuclear families who conduct hunting and gathering tasks together for most of the year. The third level of the hierarchy consists of regional networks or clans which comprise a number of bands. Members of these regional networks usually share beliefs in a common language dialect and assemble for specific ceremonies. The tribe is the next highest unit which is recognised as a linguistic unit with flexible territorial boundaries. The highest level of the hierarchy is the 'cultural area', which consists of groups who share certain cultural characteristics, such as initiation ceremonies and closely related languages.

The main subsistence strategy employed by Aboriginal people in the Hunter region focused on a hunter-gather lifestyle. In general, males undertook hunting activities, while women gathered smaller faunal and plant resources. The most basic unit in Aboriginal society was a 'band' that consisted of a collection of families, who grouped together for subsistence (Habermann 2003). Land ownership resided with the larger 'clan' or descendent group, of which the bands formed a part (Habermann 2003).

Single men were said to have lived separately to married men, single women and children. A single male entering a married man's camp without invitation would be met with violence. Campsites were thought to be on the banks of rivers:

'In choosing the site [for their camps], proximity to fresh water was one essential, some food supply a second, whilst a vantage ground in case of attack from an enemy was a third.' (Fawcett 1898, cited in Habermann 2003).

Kinship was an integral part of Aboriginal society, and created complex relationships between individuals, which governed the foods people consumed, their social and environmental interactions and the land they used. The kinship network extended social links beyond the band and even the language territory, resulting in economic ties outside the core group. As such, other territories could be visited; social gatherings promoted and maintained these extended rights and ties. Inter-clan and inter-tribal participation were also known to occur for ceremonies, such as initiation rites (Habermann 2003), and trade was a physical expression of these inter-tribal and clan networks (Habermann 2003).

5.3.1 Resources

The traditional use of resources for the Hunter region was perhaps best described in ethnographical terms by Threlkeld at Lake Macquarie who comprehensively described the variety of the diet available to people at the time. At his mission, Threlkeld (cited in Gunson 1974) noted that Aboriginal people ate a variety of different fauna and flora. Threlkeld observed that people used the resources year-round, eating certain species when they were available, such as wild plums, cobra (maggots from grass trees), snakes, cockles, lizards, fish, flying-foxes, ducks, pigeons, kangaroo, possum, swans, wallaby, kangaroo rat, eels, craw-fish, geese, oysters, honey and goanna (Threlkeld cited in Dillion 1989; Gunson 1974; Neal and Stock 1986). Even whale was consumed when stranded on the beaches and was feasted on by all Aboriginal people within reasonable travelling distance (Threlkeld cited in Dillion 1989; Gunson 1974; Thomas 2008).

Hunting practices, such as beating grasslands with waddies to flush out bandicoots, and the trapping of kangaroos through the use of fire, were also recorded (Gunson 1974). Men hunted for possum while women climbed trees in search of honey. Sometimes, a worker bee would be caught and a tuft of down attached to it, so it could be tracked to its hive. In addition, women would dive for lobster among the rocks, and would fish with lines, while men used spears. Fishing was such an important role for women, that a mother would select a female child and appoint her in the same role; this was signified by amputating the little finger on her right hand (Threlkeld cited in Gunson 1974). Cooking was said to have been done exclusively by men (Dillion 1989). Fish was usually consumed after being cooked, with fires kept alight on canoes during angling (Dillion 1989; Thomas 2008). Threlkeld noted that:

‘Their mode of fishing is curious, sometimes angling with hook and line thrown by the hand as they are seated in the bark canoe, sometimes diving for shell fish, sometimes standing in their frail bark darting their spears into the fish as they pass, or at other times, using hand nets forming a circle in shallow waters and enclosing the fish, but the most curious method is that of planting sprigs of bushes in a zig-zag form across the streams leaving an interval at the point of every angle where the men stand with their nets to catch what others frighten towards them by splashing in water.’ (Gunson 1974: 30).

Plant resources such as ferns potentially Bracken Fern (Pteridum esculentum) or Swamp Fern (Blechnum spp.) were crushed or sometimes roasted, before being ground to produce some flour for bread-making (Threlkeld cited in Gunson 1974; Habermann 2003; Thomas 2008). Bracken Ferns comprise an edible starchy rhizome and are available from late summer to autumn (Thomas 2008). According to Scott (2015), however, Aboriginal people had ceased eating ferns in preference for the root of the Gigantic Lily (Doryanthus excelsa), although this had to be soaked (Scott 2015). The consumption of Macrozamia nuts was also noted, but due to their toxic nature, had to be soaked for two to three weeks prior to being consumed (Murphy and Morris 2013; Thomas 2008). The Macrozamia seeds or nuts would also be roasted prior to consumption (Murphy and Morris 2013; Thomas 2008). It is also possible that Kangaroo Grass seeds were ground and eaten, although there is no direct ethnographic evidence to support this (Thomas 2008).

The Hunter people were great proponents of fire farming, which altered the landscape (Dillion 1989). ‘Fire-stick farming’ resulted in both long- and short-term gain, with cleared areas exposing the burrows and nests of prey, and in the long term, created breaks in forest cover, attracting herbivores (Dillion 1989).

Brayshaw (1987:21) describes the use of fire carried out one month prior to a hunt to attract game to the new grass (Dyall 1971:4.1; Kuskie 1997). Sokoloff notes fire was also used in burials, for fishing, and farming (Sokoloff 1978a:73; 1978b:125).

5.3.2 Material culture

The majority of the Project region's material culture (shields, spears, boomerangs, clubs, digging sticks, canoes, containers, shelters, and woven nets and bags) were made from wood or other vegetative material that is rarely preserved in the archaeological record. Generally, artefacts crafted from shell, bone or stone are preserved for future generations to record.

5.3.3 Bark and wood implements

Aboriginal people were recorded within the Hunter region as utilising a variety of bark and wood resources. Bark and wood were harvested from a variety of Stringybark species (Stringybark, White Stringybark, and Thin-leaved Stringybark), Tea-Tree (Melaleuca quinquenervia), Grass Trees (Xanthorrhoea australis), Cabbage-tree (Livistona australis), River Gum, Kurrajong (Brachychiton populneus), Iron Bark (Eucalyptus crebra or E paniculata) and Swamp Mahogany (Eucalyptus robusta) (Dillion 1989; Neal and Stock 1986). The extraction of bark from the Nettle Tree (Urticaceae) and the Giant Fig Tree (Ficus sp.) was also recorded for use in shield making (Threlkeld cited in Gunson 1974). Bark and timber were used to make canoes; spears, clubs, and shelter, among many other items were crafted from bark and timber resources. They were also used in burial practices (Neal and Stock 1986).

Up to four different types of spears have been recorded for the region, and these could be thrown up to a distance of 36.6 m (Dawson 1830 cited in Thomas 2008). Spears were crafted from the stem of Grass Trees. The fish spear – the 'Kul-là-ra' and 'Mo-ting' – was approximately 1.83 m in length, with four pieces of hardwood at the base, which added approximately an extra 0.61 m to the length. The hardwood pieces were fastened with bark-thread covered with Grass Tree gum, and held apart through small wedges, also smeared with gum. The wooden points were fire hardened and had gum-fastened bone barbs at the tips. The hunting spear, or the 'wa-rai', had one hardened joint of wood at the base. The battle spear was also constructed similarly, although it had pieces of quartz stuck along one side of the wooden joint and were likened to the teeth of a saw. Following European settlement, glass was substituted for quartz (Threlkeld and Browne cited in Gunson 1974; Thomas 2008). Spears were thrown using a 'wom-mur-rur', which was tapered at the end where the barb was fixed and were 1.22 m in length and half an inch thick. Spears were traded for possum skin cloaks and 'hanks of line, spun by hand from the fur of animals of the opossum tribe' further inland (Threlkeld cited in Gunson 1974; Thomas 2008).

Canoes were observed at Maitland (Threlkeld cited in Gunson 1974; Heritage Alliance 2008; Thomas 2008), and described as being from 1.17 m in length, up to 3.66 to 4.27 m in length and 0.91 to 1.22 m wide (Threlkeld cited in Gunson 1974; Barrallier 1802 cited in Heritage Alliance 2008). Three types of canoe have been recorded, one made from a strong strip of gum bark, which was scraped, and fire hardened. The second type was made from bark that was closed and pointed at both ends, sometimes kept taut by wedges, with the third type ('mooten'), crafted from fire. A log would be selected that was still aflame, and Aboriginals would control the fire to form a canoe (Dillion 1989).

Other implements known to have been used included – waddies (often crafted from ironbark), yamsticks (up to 2 m long and 40 millimetres (mm) in diameter), fire sticks, wooden bowls (crafted from tree burls), bark water carriers with twig handles, shields (oval and up to 0.91 m long, 0.46 m wide and painted white with two red bands or stripes), clubs, boomerangs, baskets (made from palm leaves), and lances (up to 5.48 m to 6.70 m in length) (Scott cited in DEDJTR 2015; Threlkeld cited in Gunson 1974; Barrallier 1802 cited in Heritage Alliance 2008; Neal and Stock 1986; Thomas 2008). Plant fibres (and fur cords) were also used to make fishing nets and twined dilly bags (Threlkeld cited in Dillion 1989; Gunson 1974; Thomas 2008). Women were described as making string from bark and also being the crafters of fishing nets (Dawson 1830 cited in Dillion 1989; Thomas 2008).

5.3.4 Stone

Few ethnographic references describe the stone artefacts used by Aboriginal people in the Hunter region (Thomas 2008), however, stone axes were observed, and an Australian Museum collection of implements included 'primitive flaked celts' made from chert (Thorpe 1928 cited in Dillion 1989; Thomas 2008). Stone axes had ground edges and were often made from basalt or diorite, with the stone fastened to a handle with gum. The

handle was crafted from vines or saplings, which were heat treated (Mathews 1894 cited in Dillion 1989; Thomas 2008). Stone axes were used for cutting saplings, peeling bark, and cutting notches into trees (Threlkeld cited in Gunson 1974; Thomas 2008). Axe grinding grooves have been described as being indicative of a large-scale manufacturing industry (Dillion 1989).

While not specified as being made from stone, Mathews (1894 cited in Thomas 2008) stated that the 'largest knives' were used for skinning and dressing prey. Barrallier (cited in Heritage Alliance 2008) also noted the use of a fish weir at Newcastle. Near Merewether, chert (silicified tuff) was described as being abundant (Thorpe 1928 cited in Thomas 2008). The toolkit included stone artefacts that could be used as chisels, scrapers, gravers and rasps (Dillion 1989).

5.3.5 Shell and bone

Shell was used to make fish hooks and tools. Fish hooks were made from oyster shell, while shell tools could be used to sharpen spears (until the advent of glass) (Threlkeld cited in Dillion 1989; Gunson 1974; Neal and Stock 1986; Thomas 2008). Kangaroo bones were made into combs or awls, the latter of which were used for sewing kangaroo and possum skin, belts and headbands (Heritage Alliance 2008; Neal and Stock 1986; Thomas 2008). Shell and glass were traded for possum skins, yarn and headbands (Dawson 1830 cited in Thomas 2008). According to Thorpe (1928 cited in Dillion 1989), shell middens extended from Port Waratah to Sandgate along the Hunter River. The sheer volume and size of the middens indicated a population of thousands (Dillion 1989; Gillison 1974).

5.3.6 Spiritual locations and culture

Other aspects of Aboriginal culture, such as burials, initiation ceremonies, corroborees and cosmological beings have been described in the ethnographic record (Thomas 2008). The following sites were considered to be of importance to Aboriginal people (Department of Transport Planning and Local Infrastructure 2014; from Wallsend & Plattsburg Sun 1890 and 1891, Threlkeld cited in Gunson 1974; Thomas 2008):

- 'Pòr-ro-bung' a bora ring;
- 'Yu-lung' a ring where tooth extraction occurred;
- 'Ko-pur-ra-ba' another volcano on the Hunter River, where red ochre ('ko-pur-ra') was sourced;
- 'Pit-to-ba' a source of pipe-clay ('pit-to');
- 'Pu-r-ri-bang-ba', the ants' nest place, and another source of yellow ochre ('Pur-ro-bàng');
- 'Nir-rit-ti-ba' island, or Moon Island, where mutton bird and their eggs are eaten; and
- 'Nul-ka-nul-ka' at Reid's Mistake, a source of silicified tuff.

The Eaglehawk was an important animal to the many tribal groups, and was significant in astronomy, legend and social structure (Dillion 1989; Gunson 1974). The use of fire has also been described as an integral part of the Aboriginal way of life, as it was used in farming, hunting, cooking, warmth, communication, initiation ceremonies, burials, mourning, weapon making, canoe construction, and fishing (Chandler 2008; Thomas 2008).

Initiation ceremonies often took place within one or two cleared circles, with the circles sometimes up to 350 m apart (Habermann 2003). Carved trees often marked the area around the circle. One known initiation ceremony included the extraction of a front tooth for boys (Threlkeld cited in Gunson 1974; Brayshaw 1987). Burials were often deposited in the ground, with the body placed in various positions, often covered in a bark shroud (Habermann 2003). Grave goods, such as spears and stone tools, were often buried with the deceased (Habermann 2003).

5.4 European and Aboriginal interaction

Many of the initial interactions between Aboriginal people and non-Aboriginal settlers (such as timber cutters, convicts and settlers) have been described as friendly (Allom Lovell and Associates 1998; Graeme Butler & Associates 2007; Threlkeld cited in Gunson 1974; Thomas 2008). In 1790, four convicts landed at Port Stephens

after seizing a small vessel and sailing from Port Jackson. After landing, they lived with local Aboriginals for five years (Goold 1981; Thomas 2008). Another group of convicts, this time of 15 individuals, stole the Norfolk and wrecked it at Stockton, where six men chose to live with the local Aboriginal people. After several months, three men made their way back to Sydney, assisted by Aboriginal guides (Goold 1981).

In 1799, conflict arose on the shores of the Hunter River, where the Aboriginal people gathered in great numbers on the foreshores' and drove the non-Aboriginal people away. An armed party was sent to rescue the remaining men, who the Aboriginal people had said had returned to Sydney overland, but they were not believed. Several Aboriginal people were wounded as a consequence of the resulting attack (Goold 1981). The early 1800s saw a variety of conflicts between escaped convicts and farmers (Andrews 2016), but in 1821, when Governor Macquarie visited Maitland, he was greeted by the chief of the 'Boan Native Tribe', Bungaree, who with his family, held a corroboree in welcome (Heritage Alliance 2008).

Aboriginal people also served as guides and trackers. In 1842, the explorer FW Ludwig Leichhardt was guided by Bo-win-bah (Gorman, chief of the Pambalong) and Biraban (Johnny M'Gill) from Ash Island to Minmi cattle station, around the margins of Hexham Wetlands (Department of Transport Planning and Local Infrastructure 2014; Thomas 2008). Peaceful encounters were soon replaced with serious conflict, however, and were generated from the mistreatment of Aboriginal women, misunderstandings with pastoral settlers, and violent behaviour from the convicts towards Aboriginal people (Gunson 1974; Dawson 1830 cited in Thomas 2008). Timber harvesting and hunting soon became other causes of conflict, due to spiritual beliefs (trees were thought to house the souls of Aboriginal people awaiting rebirth, with some fauna being totem animals to Aboriginal people) (Allom Lovell and Associates 1998). From the 1830s, Aboriginal groups raided settlers for food and those who were captured were tried before the Supreme Court in Sydney; some were acquitted, others sentenced to death (Wooldridge 2016).

Aboriginal populations suffered a dramatic decline after the arrival of non-Aboriginal settlers, with disease, the loss of traditional hunting grounds, and conflict with settlers (including massacres of Aboriginal people (Dillion 1989) all contributing to the reduced number of Aboriginal people. In 1821 in the Lake Macquarie area, over 100 individuals were observed by Reverend Middleton, whereas in 1840, only 15 adult males, seven adult females and four children were recorded (Thomas 2008). Diseases such as smallpox, typhoid, influenza, scarlet fever, measles, diphtheria, whooping cough and croup were all disastrous to the Aboriginal people (Dillion 1989; Thomas 2008). The smallpox epidemics alone, in 1789, 1829 and 1831, meant that it was impossible for non-Aboriginal settlers to understand the population sizes of Aboriginal people prior to European arrival (Gunson 1974; Thomas 2008). The first epidemic was reported to have reduced the Aboriginal population by half, between Botany Bay and the Hawkesbury (Lovell Chen 2016).

Due to the loss of traditional hunting grounds, and the modification of the landscape, food resources such as kangaroo, wallaby, emu and possum became scarce (Wilson cited in Graeme Butler & Associates 2007). Normal hunting processes were also restricted, due to the clearance of vegetation and draining of lagoons (Graeme Butler & Associates 2007). However, Wooldridge (2016) argued that European settlement was not a major factor in Aboriginal population decline; rather, it was violence of non-Aboriginal men against Aboriginal women. Threlkeld (cited in Gunson 1974) and Dawson (cited in Thomas 2008) both report on the violence committed against Aboriginal women – including young girls – with rape resulting in the possible transmission of diseases which could lead to infertility, and the practice of infanticide reported by Reverend Middleton (Dillion 1989; Graeme Butler & Associates 2007). While violence against women would have certainly had an effect on populations, the culmination of general violence, landscape alteration and diseases would have all contributed to the massive reduction in Aboriginal populations in the region. The population loss affected traditional practices, such as kinship systems, marriage, subsistence strategies and more (Thomas 2008).

By the 1840s, Aboriginal people were reliant on settlers for clothing, food and money (Graeme Butler & Associates 2007; Thomas 2008) and were employed in a variety of functions, such as timber cutters, water drawers, farm assistants, and errand runners, among others (Graeme Butler & Associates 2007; Murphy and Morris 2013). Near the end of the 19th century, concern over the Aboriginal peoples' plight took root, with the Aborigines Protection Association formed in 1881. In 1883, a Board for the Protection of Aborigines was established by the government, and rural stations were developed to allow Aboriginal people to stay on

traditional lands (Thomas 2008). Yet by the mid-20th century, Aboriginal people had begun to move to Newcastle and Lake Macquarie to escape the oppression of the Aborigines Protection Board and to gain employment (Thomas 2008). Between 1909 and 1967, 5,300 Aboriginal children had been removed from their families and placed in institutions (Thomas 2008). The main sources of employment during this time were Broken Hill Propriety Limited and the Department of Railways, with Aboriginal people living in shanty settlements or in tent villages near the railway lines (Dillion 1989; Thomas 2008). In the 1930s, the new policy of assimilation was created, to try and absorb Aboriginal people into the wider community, and by the 1940s, the concept of re-settlement was established. By the 1960s, Aboriginal people were once again occupying Newcastle (at the university) (Dillion 1989). Those living at the university were 'removed' from the premises (Dillion 1989). Kuskie also documented significant and widespread traditional, historical and contemporary cultural values identified by RAPs and ethno-historical evidence. Associations and cultural values included a number of gender related sites, the association of Mount Sugarloaf with the supreme being 'Koe-in', burial locations, and pathways throughout the landscape, such as through Black Hill Spur, Hexham Swamp and along Sugarloaf Ridge (Kuskie 1997).

The Aboriginal people of the Hunter region would have used the wide variety of natural resources present within the fertile landscape, and ethno-historical accounts list some of the methods through which Aboriginal people harvested fruits, nuts, marine resources, terrestrial fauna, birds and so forth. While there are gaps in the ethno-historical account, such as the lack of description regarding stone artefact manufacture and use, it does provide a basis that can be used to understand how Aboriginal people used the landscape prior to non-Aboriginal colonisation.

Modification of the landscape by Aboriginal people took place through the use of fire farming and reed planting/weir development, but little evidence of such activities is likely to have been preserved in the archaeological record due to the perishable nature of the materials used and the consequent alteration of the landscape through non-Aboriginal occupation. Evidence of campsites, through deposits of stone artefacts and shell, hearths or middens are, in contrast, likely to be found where the landscape has not suffered severe ground disturbance or sedimentation. While ethno-historical accounts make reference to camps being located near waterways, campsites would not have been limited to riverbanks. These descriptions do, however, aid in developing a predictive model for the location of Aboriginal sites.

5.4.1 Implications for the distribution of Aboriginal cultural heritage

Scarred trees, which were a result of the production of items such as canoes, containers, shelters and bowls also have the potential to be present within the region. Carved trees, which were decorated with designs and could be associated with ceremonial sites, are much rarer. However, the prevalence of logging in the Hunter region would have severely reduced remaining scarred and carved tree numbers.

Other sites, such as grinding grooves, stone quarries, burials and ceremonial grounds (bora rings, stone arrangements), while rarer, are discussed in the ethno-historical records and are known to be focal points within the current cultural landscape.

6. Aboriginal cultural values and landscapes

6.1 Method of obtaining information

Input and feedback can be provided by RAPs at any time throughout the assessment process. Jacobs has sought input and feedback from RAPs at several points during the process (following procedures outlined in DECCW 2010a):

- During Stage 2 – Initial presentation of information about the proposed Project;
- During Stage 3 - Providing RAPs with the draft proposed methodology. RAPs were invited to provide feedback on the proposed methodology, and to identify cultural heritage values associated with the Project area;
- During fieldwork; and
- During Stage 4 - Providing RAPs with the draft ACHAR. RAPs are invited to provide feedback on the report, and any further information they wish to be included.

6.2 Cultural heritage values Identified during this assessment

Discussions regarding the cultural values of the Project area were undertaken on 3 May 2021 during the survey. It was identified that the Lake and foreshore was of high cultural value, while the Project area is away from the water and heavily disturbed. No feedback regarding the cultural heritage value of the Project area was supplied by the RAPs during the comprehensive stakeholder consultation completed in accordance with the ACHCRP (DECCW, 2010a).

7. Summary of Archaeological Assessment

The AAR, which contains detailed data on the method and results of the archaeological assessment, is provided in Appendix B.

Previous archaeological assessments within the Project area and vicinity have not identified any sites or PADs. The long post-contact history of development in the area has resulted in destruction of most of the natural landforms.

A search of the AHIMS database of the footprint of the Project area and included a 3 km buffer zone identified no sites within the Project area.

The following specific predictive points are noted for the landforms within the Project area:

- Flat and gently inclined landforms associated with freshwater tributaries of Lake Macquarie have high archaeological potential;
- The most common site type will be surface and sub-surface scatters of stone artefacts and middens;
- There is low potential for grinding grooves, ceremonial site and rock shelters as the Project area is not located on the slopes of the Wattagans; and
- There is potential for scarred trees in areas that have not been subject to vegetation removal.

The archaeological survey was conducted on the 3 May 2021 (refer to Figure 7-1). On-site consultation with nominated Site Officers from the RAPs contributed to the development of management and mitigation recommendations, including recommendations for any further assessment. No previously recorded sites existed within the Project area. No new Aboriginal sites or PADs were identified within the Project area.

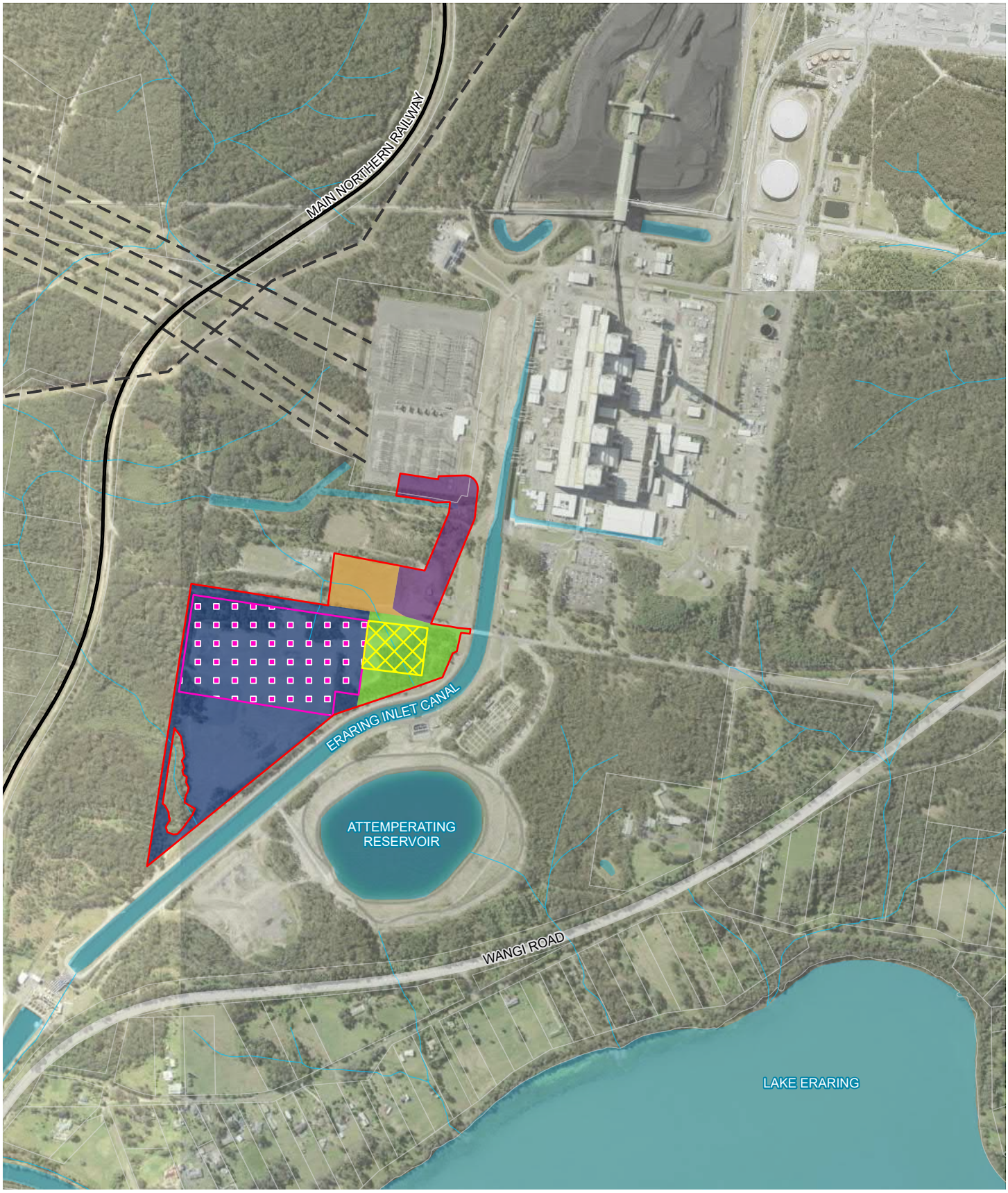


Figure 7-1 Survey units

8. Significance assessment

No Aboriginal sites or areas of PAD have been identified throughout the pedestrian survey. A significance assessment of the scientific, social, historic and aesthetic values of the study area is included below.

8.1 Assessment criteria

A significance assessment is made up of several significance criteria that attempt to define why a site is important. Such assessment recognises that sites may be important for different reasons to different people, and even at different times. The assessment of Aboriginal cultural heritage in this assessment is based upon the four values of the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter (Australia ICOMOS 2013).

- Social values – does the area have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.
- Historical values – is the area important to the cultural or natural history of the local area and/or region and/or state.
- Scientific values – does the area have the potential to yield information that will contribute to an understanding of the cultural and natural history of the local area and/or region and/or state.
- Aesthetic values – is the area important in demonstrating aesthetic characteristics in the local area and/or region and/or state.

Scientific values should be considered in light of the following criteria:

- Research potential - does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness - how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity - is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential - does the subject area contain teaching sites or sites that might have teaching potential?

It is important to note that heritage significance is a dynamic value. Each of these values is assessed for Aboriginal sites in or adjacent to the Project area, and an overall significance is assigned based on an average across the values. This is inherently a reductive process and oversimplifies what is important for different reasons to a range of different stakeholders but is a necessary process in being able to create comparative values between sites. The significance of each site ultimately informs the management of sites and places.

8.2 Significance values

8.2.1 Historic value

Historic values refer to the association of the place with aspects of Aboriginal history. Historic values are not necessarily reflected in physical objects, but may be intangible and relate to memories, stories or experiences.

The study area is not known to be associated with any people, events or activities of historical importance to the Aboriginal community. The survey of the study area did not result in the identification of any Aboriginal objects. Therefore, there is no tangible evidence that the study area was a location of any significant event or activity in the pre-contact or post-contact past. At this level of assessment, the study area is considered to be of low historic significance.

8.2.2 Aesthetic value

Aesthetic values refer to the sensory, scenic, architectural and creative aspects of the place. These values may be related to the landscape and are often closely associated with social/cultural values. The study area has undergone significant alteration and clearance. As a result, study area no longer demonstrates aesthetic significance.

8.2.3 Socio value

Social/cultural heritage significance should be addressed by the Aboriginal people who have a connection to, or interest in, the area. As part of the consultation process the registered Aboriginal stakeholder groups were asked to provide appropriate information on the cultural significance of the subject site. No specific social values relevant to the study area were provided by the RAPs during the consultation completed for this assessment or during the archaeological survey.

8.2.4 Scientific value

The AAR (Jacobs 2021) did not identify any Aboriginal object, places or areas of PAD. Therefore, the study area is not considered to be hold any scientific significance.

8.3 Statement of significance

No specific historic, aesthetic or socio/cultural values associated with the study area were identified. As no Aboriginal objects, places or PADs were identified within the study area, the study area possesses low scientific significance. Overall, the study area is considered to be of low significance.

9. Impact Assessment

9.1 Potential heritage impacts

The definition of harm is limited to impacts which '…destroys, defaces, damages an object or place or in relation to an object – moves the object from land on which is has been situated.' (s5, NPW Act). As the proposal would not result in impacts to identified Aboriginal objects or a registered Aboriginal place the proposed works would not result in harm as identified under the NPW Act.

9.2 Ecological Sustainable Development principles

Ecological Sustainable Development (ESD) principles must be considered when assessing harm and recommending mitigation measures in relation to Aboriginal objects. The following relevant ESD principles are outlined in Section 3A of the EPBC Act:

- Decision-making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations (the 'integration principle');
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle'); and
- The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'principle of intergenerational equity').

9.2.1 The integration principle

The Project has complied with the integration principle regarding Aboriginal heritage as Aboriginal heritage values of the study area have been considered as part of the planning process for the proposed works.

9.2.2 The precautionary principle

The Project would comply with the precautionary principal through the establishment of an unexpected finds protocol to manage and mitigate any Aboriginal objects that may be identified during the proposed works.

9.2.3 The principle of intergenerational equity

The Project would adhere, as closely as possible, to the principle of intergenerational equity by collating scientific and cultural information on former Aboriginal occupation of the Project area through the previous investigations into the AAR (Jacobs 2021) and this ACHAR.

9.3 Cumulative Impacts

Assessing cumulative impacts involves the consideration of the proposed impact in the context of existing developments and past destruction of heritage sites, as well as the population of heritage sites that still exist in the region of interest (Godwin 2011). The concept of assessing cumulative impacts aims to avoid discussing the impact of a development in isolation and aims to assess the impact in terms of the overall past and future degradation of a region's heritage resource.

Prior impact to large areas of land in the immediate surrounding region, have increased the rarity of surviving Aboriginal sites in the region. However, as no Aboriginal Sites or PADs have been identified in the Project area the cumulative impact of the Project is assessed as being low.

10. Management Recommendations

Mitigation measures are provided to minimise impact to sites. As no Aboriginal sites or PADs have been identified in the Project area no site-specific management recommendations are necessary. The management recommendations presented in Table 10-1 have been provided for management of any unexpected finds and to recognise the Aboriginal cultural values of the region.

Table 10-1: Management Measures

Management Measure	
1	The Unanticipated Finds Protocol in Section 10.1 and Section 10.2 will be followed for any unidentified Aboriginal heritage objects found during the works.
2	An Aboriginal cultural heritage awareness training will be developed with the local Aboriginal community and will be provided workers involved in clearing and ground disturbance activities associated with construction.

10.1 Unanticipated Finds Protocol

This protocol is to be followed if unanticipated Aboriginal objects are encountered during or prior to works (including objects that are suspected to be Aboriginal objects).

An Aboriginal object is defined by the NPW Act as:

> *"any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains"*

This definition includes stone artefacts, midden material, rock art, scarred and carved trees, skeletal material, and burials.

The following provisions regarding the appropriate management action(s) for previously unrecorded Aboriginal archaeological evidence identified within the Project area throughout the life of the Project would be implemented. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts.

The unanticipated finds protocol would include the following steps if an Aboriginal object is identified or harmed:

1. Immediately cease all work at the particular location;

2. Secure the area to avoid further harm to the Aboriginal object;

3. Seek advice from a qualified archaeologist on appropriate management considering the nature, type and significance of the object;

4. Should it be determined the object is Aboriginal, it must be registered on Heritage NSW's AHIMS database as soon as practicable;

5. The following management should apply for previously unrecorded objects identified within the Project area:

    a. Open artefact sites (i.e., isolated artefacts and artefact scatters) assessed of low significance subject to Project related direct surface impacts should be subject to community collection. Sites assessed of moderate significance should be subject to surface collection and other forms of mitigation (i.e., detailed

recording, test or open area excavation), regardless of impact type (i.e., including direct surface and subsidence related). Management of sites assessed as being of high significance would be determined through consultation with Origin and RAPs;

b. Scarred trees identified within the Project area subject to Project related impacts would be managed through discussions between a qualified archaeologist, Origin and RAPs and may include removal and relocation;

c. Grinding grooves identified within the Project area subject to Project related impacts would be managed through discussions between a qualified archaeologist, Origin and RAPs and may include removal and relocation; and

d. Other sites (i.e. stone quarries, ochre quarries, stone arrangements, engravings) identified within the Project area subject to Project related impacts would be managed through discussions between a qualified archaeologist, Origin and RAPs.

6. A record of the find and management completed should be included in annual reporting; and

7. If the site would be impacted, an Aboriginal Site Impact Recording form would be completed and submitted to Heritage NSW, prior to disturbance.

10.2 Potential Human skeletal remains

If skeletal remains are uncovered during the course of works, all work must stop in the vicinity of the remains immediately and the area be secured, so that no further harm occurs.

If it is identified that the skeletal remains are likely to be human, the NSW Police must be called in the first instance. The NSW Police will determine the appropriate course of action.

If it is identified that the skeletal remains are likely to be human and are likely to represent Aboriginal Ancestral Remains, or human remains that would require consideration under the *Heritage Act 1977* (both Aboriginal and non-Aboriginal), both the NSW Police and Heritage NSW must be called. Heritage NSW will determine the appropriate course of action.

Work may not recommence in this area until either NSW Police or Heritage NSW determine that it is appropriate to do so.

Please note, if the remains are identified as Aboriginal, discussions and negotiations will need to occur with the relevant Aboriginal communities and Heritage NSW to determine the most appropriate course of action. These discussions will be led by Heritage NSW.

If it is identified that the skeletal remains are not human, appropriate recording must take place and works can continue.

11. References

Andrews, G., D. Daylight and J. Hunt (2006). Aboriginal Cultural Landscape Mapping of Coastal NSW. Report to the Comprehensive Coastal Assessment (Department of Planning) by the Department of Natural Resources, Sydney.

Australia ICOMOS. (2000). The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 1999, with associated Guidelines and Code on the Ethics of co - existence.

Australia ICOMOS (2013). Draft Practice Note: Understanding and Assessing Cultural Significance Australia ICOMOS Incorporated Burwood.

Berndt, R.M. & Berndt, C.H. (1988). The world of the first Australians: Aboriginal Traditional Life: Past and Present. Aboriginal Studies Press Canberra 1999.

Brayshaw, H. (1987). Aborigines of the Hunter valley. Scone: Scone & Upper Hunter Historical Society.

DECCW (2010). Aboriginal Cultural Heritage Consultation Requirements for Proponents.

Dyall, L.K. (1971). Aboriginal Occupation of the Newcastle Coastline. Hunter Natural History 3:154-163.

Fawcett, J.W. (1898). Notes on the Customs and Dialect of the Wonnah-Ruah Tribe. Science:152-154.

GHD (2021). Site Investigation for Battery Energy Storage System, Geotechnical Factual Report. A report Prepared for Origin Energy Eraring.

Godwin, L. (2011). The application of assessment of cumulative impacts in cultural heritage management: a critique. Australian Archaeology 73:88-91.

Goold, W. (1981). The Birth of Newcastle. New Lambton, Newcastle and Hunter District Historical Society.

Gunson, N. (ed) (1974a). Australian Reminiscences & Papers of L.E. Threlkeld missionary to the Aborigines 1824-1859. Australian Aboriginal Studies No. 40. Canberra, Australian Institute of Aboriginal Studies.

Hale, H. (1845). The Languages of Australia. U.S.N. Ethnography and Philology Expedition. [Philadelphia].

Hughes, P.J. (1984) NSW National Parks and Wildlife Service Hunter Valley Region Archaeology Project Stage 1, Volume 1: An overview of the archaeology of the Hunter Valley, its environmental setting and the impact of development, Report to National Parks and Wildlife Service, NSW.

Kuskie, P. (1997). An Aboriginal Archaeological Assessment of a Newcastle City Council Property at the Corner of lenaghans Drive and Jogn Renshaw Drive, Berefield, Lower Hunter Valley, NSW, Report to Newcastle City Council.

Lissarrague, A (2006). A salvage grammar and wordlist of the language from the Hunter River and Lake Macquarie. Muurrbay Aboriginal Language and Culture Cooperative.

Mathews, R.H. and L.S. Corres (1896). The Keeparra Ceremony of Initiation. Anthropological Institute Journal 26:320-340.

Mathews, R.h. (1904). The Kamilaroi Class System of the Australian Aborigines', Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia, vol. 10, 1894–95.

Moore, D. R. (2000). Technology of hunter valley microliths assemblages. Australian Archaeology, No. 51, 2000

Neal, R. and E. Stock (1986). Pleistocene occupation in the southeast Queensland coastal region. Nature 323:618-621.

Sokoloff, B. (1978a). Aborigines and Fire in the Lower Hunter Region, Part I: Importance of Fire for the Worimi and Awabakal. In, Hunter Natural History. Newcastle.

Sokoloff, B. (1978b). Aborigines and Fire in the Lower Hunter Region, Part II Importance of Fire. In, Hunter Natural History. Newcastle.

Threlkeld, L.E. (1892). An Australian Language. Sydney.

Tindale, N.B. (1974). Aboriginal Tribes of Australia. South Australian Museum.

Stanner, W.E.H. (1965). Aboriginal Territorial Organisation: Estate, Range, Domain and Regime. Oceania 36(1):1-26.

Veale, S. and Schilling, K. (2004). Talking History: Oral History Guidelines. National Library of Australia. Department of Environment and Conservation.

Appendix A. Aboriginal Stakeholder Consultation Log

Redacted for public display

Appendix B. Aboriginal Archaeological Report

Eraring Battery Energy Storage System

Aboriginal Archaeological Report

IS365800_AAR | 03

12 October 2021

Origin Energy Eraring Pty Limited

SSD-15950052

Eraring Battery Energy Storage System

Project No:	IS365800
Document Title:	Eraring BESS Aboriginal Archaeological Report
Document No.:	IS365800_AAR
Revision:	03
Document Status:	Final
Date:	12 October 2021
Client Name:	Origin Energy Eraring Pty Limited
Client No:	SSD-15950052
Project Manager:	Thomas Muddle
Author:	Alison Lamond
File Name:	IS365800_Eraring BESS_AAR_Rev3_Final_12102020

Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
Leve 4, 12 Steward Avenue
Newcastle West NSW 2302 Australia
PO Box 2147 Dangar NSW 2309 Australia
T +61 2 4979 2600
F +61 2 4979 2666
www.jacobs.com

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
01	21/05/2021	Draft Aboriginal Archaeological Report for issue to client	A Lamond	F Scully	F Scully	T Muddle
02	11/06/2021	Draft Aboriginal Archaeological Report for issue to RAPs	A Lamond	F Scully	F Scully	T Muddle
03	12/10/2021	Final	A Lamond	R Taddeucci	F Scully	T Muddle

Contents

Figures

Tables

Executive Summary

Origin Energy Eraring Pty Limited (Origin) owns and operates the Eraring Power Station (EPS) which is one of Australia's largest power stations, having a capacity of 2,880 megawatts (MW). Origin is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale Battery Energy Storage System (BESS) with a discharge capacity of 700 MW and storage capacity of 2,800 megawatt hours (MWh) next to the EPS on existing Origin landholding (the Project).

Jacobs on behalf of Origin currently developing an Environmental Impact Statement (EIS) for the assessment of the Eraring Battery Energy Storage System in accordance with Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project area is located within the larger Origin landholding associated with the EPS and the Local Government Area (LGA) of Lake Macquarie. This Aboriginal archaeological report is prepared to inform the Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project.

Previous archaeological assessments within the Project area and vicinity have not identified any sites or Potential Archaeological Deposits (PADs). The long post-contact history of development in the area has resulted in destruction of most of the natural landforms.

A search of the Aboriginal Heritage Information Management System (AHIMS) database of the footprint of the Origin landholding and 3 kilometres (km) buffer zone identified no sites within the Project area.

The following specific predictive points are noted for the landforms within the Project area:

- Flat and gently inclined landforms associated with freshwater tributaries of Lake Macquarie have high archaeological potential;
- The most common site type will be surface and sub-surface scatters of stone artefacts and middens;
- There is low potential for grinding grooves, ceremonial sites and rock shelters as the project area is not located on the slopes of the Wattagan mountain range; and
- There is potential for scarred trees in areas that have not been subject to vegetation removal.

The archaeological survey was conducted on 3 May 2021. On-site consultation with nominated Site Officers from the Registered Aboriginal Parties (RAPs) contributed to the development of management and mitigation recommendations, including recommendations for any further assessment (refer to the Aboriginal Cultural Heritage Assessment). No previously recorded sites existed within the Project area. No new Aboriginal sites or PADs were identified within the project area.

The Project area demonstrates extensive disturbance, and all proposed works are limited to this disturbance or located on landforms of low archaeological potential. No previously recorded sites existed within the Project area. No new Aboriginal sites or PADs were identified within the project area. It is therefore recommended that:

- No further assessment is required as no known Aboriginal objects or areas of PAD will be impacted by the project;
- An unexpected finds policy would be implemented, as outlined in Section 8;
- This report should be finalised and appended to the ACHAR.

1. Introduction

1.1 Project background

Origin Energy Eraring Pty Limited (Origin) owns and operates the Eraring Power Station (EPS) which is one of Australia's largest power stations, having a capacity of 2,880 megawatts (MW). EPS is scheduled to be among 14 gigawatts (GW) of coal-fired generation plants to be retired within the next few decades (AEMO, 2020). The retirement of the EPS will support Origin's carbon emission reduction goals. As such, Origin is currently progressing an application to provide energy storage and key network services that would facilitate long term emissions reduction in the National Electricity Market (NEM) while supporting the delivery of secure and reliable electricity for consumers and businesses.

Origin is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale Battery Energy Storage System (BESS) with a discharge capacity of 700 MW and storage capacity of 2,800 MWh within Origin landholding associated with the EPS (the Project).

The Project is a State significant development (SSD) under the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) and subject to Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such, the Project requires the preparation of an Environmental Impact Statement (EIS) in accordance with Secretary's Environmental Assessment Requirements (SEARs) and the approval of the Independent Planning Commission under circumstances described in SRD SEPP or the NSW Minister for Planning and Public Spaces.

1.2 Purpose of this report

This Aboriginal Archaeological Report (AAR) will identify Aboriginal sites or areas of Potential Archaeological Deposit (PAD) in the Project area and provide recommendations in for mitigation or further assessment. The AAR documents the survey methodology and outcomes only and is not intended to assess potential impacts. This Aboriginal Archaeological Report is intended to identify the potential for Aboriginal cultural heritage values and previously recorded or unknown Aboriginal objects and sites to be present within the Project area and informs the impact assessment contained within the associated Aboriginal Cultural Heritage Assessment Report (ACHAR).

1.3 Project framework

This AAR has been undertaken in accordance with the following requirements and guidelines:

- The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010a);
- The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010b); and
- SEARs issued for the Project on 19 April 2021 by the Planning Secretary of the NSW Department of Planning, Industry and Environment (DPIE).

The SEARs relevant to this technical report are presented in Table 1-1.

Table 1-1: SEARs – Historic Heritage

SEARs	Section addressed
▪ Heritage – including an assessment of the development: - on Aboriginal heritage (cultural and archaeological) impacts of the development and consultation with the	Throughout report. This report has been prepared to support the ACHAR in compliance with the SEARs.

SEARs	Section addressed
local Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents;	

1.4 Project location

The Project will be situated on land zoned SP2 Infrastructure for electricity generating purposes and within an area previously disturbed by power station activities. No re-zonings or land acquisitions are required. The Project is located within, Lots 10 and 11 DP 1050120, Rocky Point Road Eraring, within the Lake Macquarie LGA, as illustrated in in Figure 1-1.

Surrounding land external to the EPS consists of broadacre rural development and low-density residential properties. The largest commercial centre and population centre nearby is Charlestown (29.1 km north east), and the closest residential suburb is Dora Creek (1.2 km south). The Great Northern Railway alignment runs along the border of Dora Creek and Eraring suburbs, approximately 200 m west of the Project area.

The Project area is surrounded by the following features with the Origin landholding:

- EPS operations area, elevated TransGrid switchyard, coal yards and extensive EPS buffer lands to the north;
- Elevated attemperation reservoir to the east;
- Elevated EPS inlet canal to the south and east; and
- Mature vegetation within E2 environmental protection zoned land along a ridge line to the west.

1.5 Investigators and contributions

This report was authored by:

- Alison Lamond (Senior Archaeologist, Jacobs). Alison holds a Bachelor of Arts (Honours) in Australian Prehistoric and Historical Archaeology and a Bachelor of Science in Geology and Geophysics from the University of Sydney and has over ten years' experience as an archaeologist and cultural heritage advisor.

The report was reviewed by:

- Fran Scully (Principal Archaeologist, Jacobs). Fran holds an MSc in archaeological geophysics from the University of Bradford and has over 28 years' experience as an archaeologist and cultural heritage advisor.

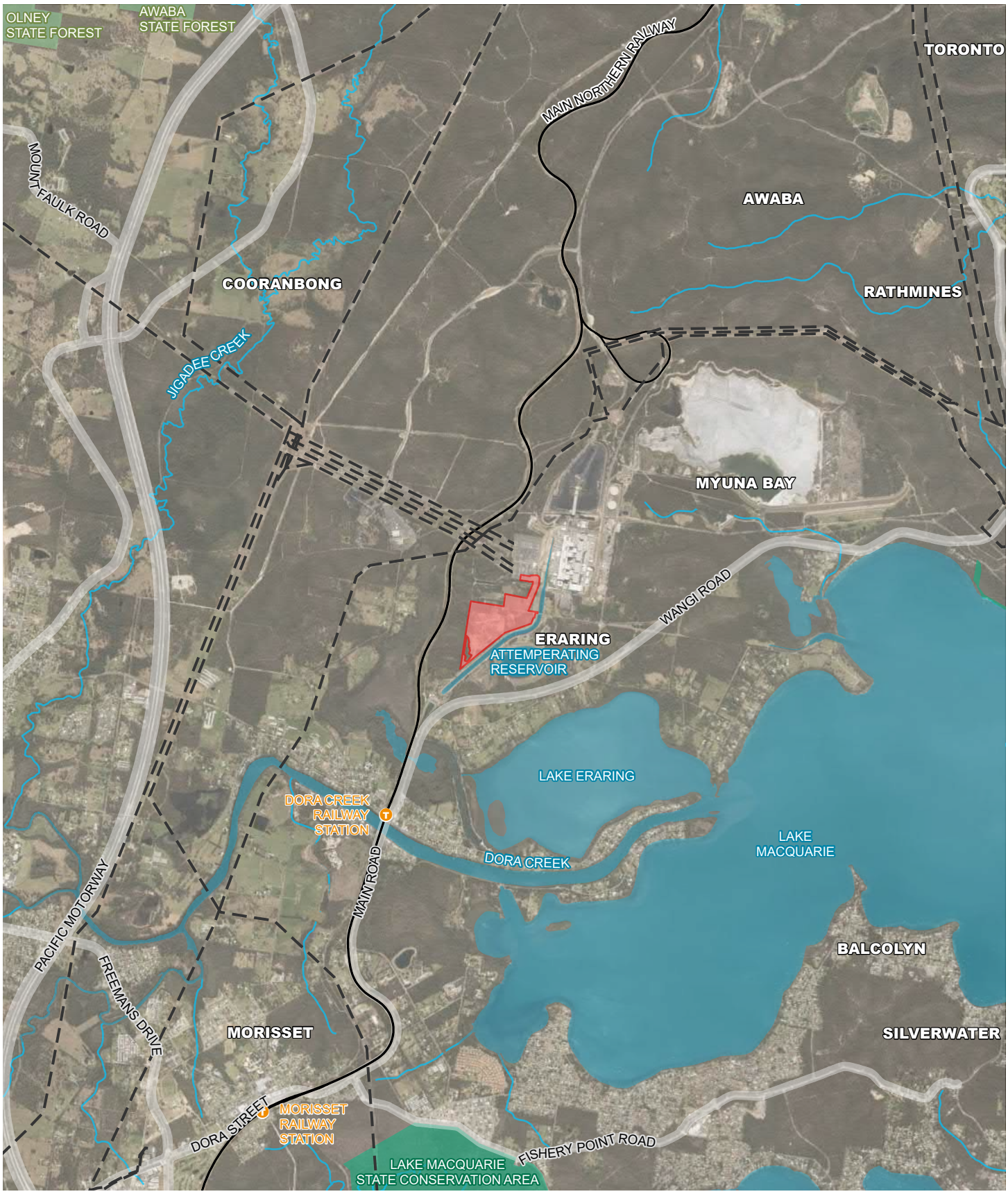


Figure 1-1 Project location

1.6 Report structure

The report structure is as follows:

- Section 1 provides the Project background and briefly describes the Project location;
- Section 2 provides a summary of the Project description;
- Section 3 describes previous archaeological investigations in the vicinity of the Project area and details the predictive modelling of Aboriginal site patterning;
- Section 4 describes the methods for the archaeological survey;
- Section 5 describes the results of the archaeological survey;
- Section 6 provides a discussion of the findings of this report within the local and regional archaeological context;
- Section 7 provides an assessment of archaeological significance;
- Section 8 provides an assessment of proposed impacts to Aboriginal heritage;
- Section 9 provides details for the recommended management measures based on the findings of this report; and
- Section 10 summarises the results and recommendations of this report.

2. Project Description

2.1 Overview

Origin is seeking regulatory and environmental planning approval for the construction and operation of a grid-scale BESS with a discharge capacity of 700 MW and storage capacity of 2,800 MWh at the Project area. The Eraring BESS would be among the largest battery projects in NSW and Australia in terms of peak power output and discharge duration. The Project would provide energy storage and key network services that would facilitate long term emissions reduction in the NEM while supporting the delivery of secure and reliable electricity for consumers and businesses.

The Project would be situated within the Origin landholding associated with the EPS located on the western shore of Lake Macquarie. EPS is approximately 40 km south of Newcastle and approximately 120 km north of Sydney in NSW. The total area of the Origin's landholding is approximately 1,200 hectares (ha), including EPS operational areas, Eraring Ash Dam and surrounding buffer lands consisting of bushland and grassland interspersed with roads, water management and electricity transmission infrastructure. The Project area is about 25 ha and is shown in Figure 2-1.

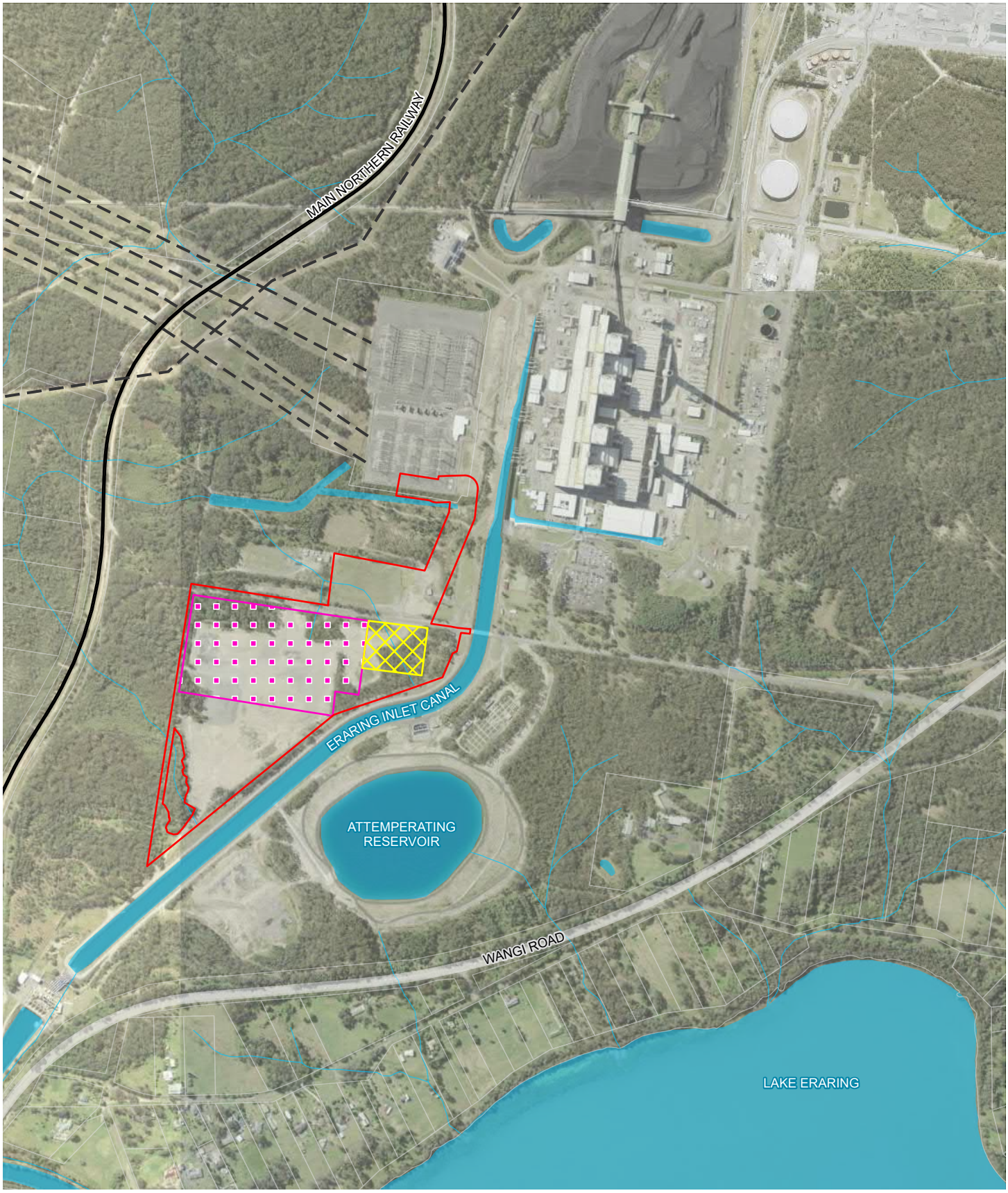
The Project would include the construction and operation of:

- BESS compounds comprising of rows of enclosures housing lithium-ion type batteries connected to associated power conversion systems (PCS) and high voltage (HV) electrical reticulation equipment;
- A BESS substation housing HV transformers and associated infrastructure;
- Approximately 400 m of overhead 330 kilovolt (kV) transmission line connecting the BESS substation to the existing 330 kV TransGrid switchyard; and
- Ancillary infrastructure and facilities including safety protection systems and site ancillary facilities such as laydown areas and site offices.

A full description of the Project is included in Section 3 of the EIS.

The BESS will be capable of providing Energy Frequency Control Ancillary Services (FCAS), System Restart Ancillary Services (SRAS), as well as Fast Frequency Response (FFR) and synthetic inertia - security services currently under consideration in the NEM.

The Project maximum disturbance area is approximately 25 ha in size with permeant infrastructure likely to cover half this area. Construction may require temporary compounds or laydown areas outside the permanent footprint but within the Project area and would be located in existing vacant areas of the EPS site as illustrated in Figure 2-1.



Project area
Battery Energy Storage System
Substation
Electricity transmission line
Railway
Major hydroline
Major water body
Cadastre

0 300 m

1:12,000
GDA94 MGA56

Data sources

Origin 2021
Aerometrex 2020,
© Department Finance, Services and Innovation Dec 2020
© Department of Customer Service 2020

Figure 2-1 Project layout

2.2 Battery system

The BESS technology provider is not yet confirmed; however, the batteries are likely to consist of modular Lithium-ion type racks, housed within battery enclosures containing protection, control and heating, ventilation and air conditioning.

Other infrastructure within the BESS compound will include:

- PCS comprising of inverters and battery transformers;
- HV reticulation including ring main unit (RMU), cables and switchboards; and
- Switch rooms and control rooms.

The PCS will be four-quadrant bidirectional type, with capability for both charge/ discharge in leading and lagging reactive power scenarios. The PCS will also have grid forming capability to allow islanded operation and SRAS where required.

2.3 Network connection

The Project would take advantage of the close proximity to the existing TransGrid owned 330 kV switchyard which has sufficient spare capacity for the size of the proposed BESS. The Project's connection will be electrically separate to that of EPS, so it can be operated independently of the existing site.

The following components are required to connect the BESS to the NEM:

- 33/330 kV transformers in a bunded transformer area;
- Overhead steel structure lattice towers complete with insulators and conductor(s) spanning the distance between The Project area and the existing TransGrid 330 kV switchyard; and
- Associated protection and control systems.

Connection works into the TransGrid switchyard is targeting existing vacant connection bays but allowance is made for bench extension and installation of additional infrastructure.

2.4 Construction works

The construction methodology for the Project will be developed in more detail during the preparation of the detailed design. However, it is expected to involve:

- Installation and maintenance of environmental controls including drainage and sediment controls;
- Upgraded construction access track from existing internal access road to battery location;
- Vegetation clearing;
- Cut and fill to level areas and establish a hardstand pad and construction laydown areas;
- Structural works - slabs to support battery modules, power conversion systems and transformer structures;
- Delivery, installation and electrical fit-out of battery modules, power conversion systems and transformers;
- Installation of 330 kV overhead cabling from the battery transformers to the TransGrid switchyard;
- Testing and commissioning activities; and
- Removal of construction equipment and rehabilitation of construction areas.

2.5 Construction workforce

The Project will involve the recruitment and training of a construction workforce and ongoing operations and maintenance roles. The Project will also provide localised upskilling and training in the region in relation to the

deployment of batteries. Major contractors will be asked to demonstrate their commitment to using a regional workforce and creating Indigenous and equal opportunity employment.

2.6 Operation

Operation will be 24 hours/365 days per week and will respond to market demand, fluctuating from discharge at full capacity for up to four hours or partial capacity for a longer duration. Maintenance activities will be ongoing (landscaping, asset protection zones, water management infrastructure, access tracks and inspection, testing and replacement of components). Operation life is expected to be between 20 to 30 years. Component replacements and/or upgraded may extend this timeframe.

2.7 Decommissioning

Following the end of economic life, above ground components would be removed and, where possible, re-purposed. Land rehabilitation will be undertaken where necessary to achieve acceptable conditions as far as reasonably practicable.

3. Desktop Assessment

3.1 Methodology

The aim of the archaeological desktop review is to:

- Identify any known Aboriginal heritage sites or Aboriginal cultural places with potential to be impacted by the Project, and
- Identify areas within the Project area where there are likely to be previously unknown Aboriginal heritage sites with potential to be impacted by the Project.

The desktop assessment was designed to fulfil the requirements 1-4 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b).

The preparation of current heritage and spatial data relating to the Project area included:

- A search and review of the Aboriginal Heritage Information Management System (AHIMS);
- Heritage data from previous archaeological assessments, including areas of PAD, Aboriginal heritage sites and Aboriginal cultural places;
- Heritage data from previous archaeological assessments; and
- Aerial imagery.

3.2 Historic records of Aboriginal material culture

Aboriginal people were recorded within the Hunter region as utilising a variety of bark and wood resources. Bark and wood were harvested from a variety of Stringybark species (Stringybark, White Stringybark, and Thin-leaved Stringybark), Tea-Tree (Melaleuca quinquenervia), Grass Trees (Xanthorrhoea australis), Cabbage-tree (Livistona australis), River Gum, Kurrajong (Brachychiton populneus), Iron Bark (Eucalyptus crebra or E paniculata) and Swamp Mahogany (Eucalyptus robusta) (Dillion 1989; Neal and Stock 1986). The extraction of bark from the Nettle Tree (Urticaceae) and the Giant Fig Tree (Ficus sp.) was also recorded for use in shield making (Threlkeld cited in Gunson 1974). Bark and timber were used to make canoes; spears, clubs, and shelter, among many other items were crafted from bark and timber resources. They were also used in burial practices (Neal and Stock 1986).

Up to four different types of spears have been recorded for the region, and these could be thrown up to a distance of 36.6 m (Dawson 1830 cited in Thomas 2008). Spears were crafted from the stem of Grass Trees. The fish spear – the 'Kul-là-ra' and 'Mo-ting' – was approximately 1.83 m in length, with four pieces of hardwood at the base, which added approximately an extra 0.61 m to the length. The hardwood pieces were fastened with bark-thread covered with Grass Tree gum, and held apart through small wedges, also smeared with gum. The wooden points were fire hardened and had gum-fastened bone barbs at the tips. The hunting spear, or the 'wa-rai', had one hardened joint of wood at the base. The battle spear was also constructed similarly, although it had pieces of quartz stuck along one side of the wooden joint and were likened to the teeth of a saw. Following European settlement, glass was substituted for quartz (Threlkeld and Browne cited in Gunson 1974; Thomas 2008). Spears were thrown using a 'wom-mur-rur', which was tapered at the end where the barb was fixed and were 1.22 m in length and half an inch thick. Spears were traded for possum skin cloaks and 'hanks of line, spun by hand from the fur of animals of the opossum tribe' further inland (Threlkeld cited in Gunson 1974; Thomas 2008).

Canoes were observed at Maitland (Threlkeld cited in Gunson 1974; Heritage Alliance 2008; Thomas 2008), and described as being from 1.17 m in length, up to 3.66 to 4.27 m in length and 0.91 to 1.22 m wide (Threlkeld cited in Gunson 1974; Barrallier 1802 cited in Heritage Alliance 2008). Three types of canoe have been recorded, one made from a strong strip of gum bark, which was scraped and fire hardened. The second type was made from bark that was closed and pointed at both ends, sometimes kept taut by wedges, with the third type ('mooten'), crafted from fire. A log would be selected that was still aflame, and Aboriginals would control the fire to form a canoe (Dillion 1989).

Other implements known to have been used included – waddies (often crafted from ironbark), yamsticks (up to 2 m long and 40 millimetres (mm) in diameter), fire sticks, wooden bowls (crafted from tree burls), bark water carriers with twig handles, shields (oval and up to 0.91 m long, 0.46 m wide and painted white with two red bands or stripes), clubs, boomerangs, baskets (made from palm leaves), and lances (up to 5.48 m to 6.70 m in length) (Scott cited in DEDJTR 2015; Threlkeld cited in Gunson 1974; Barrallier 1802 cited in Heritage Alliance 2008; Neal and Stock 1986; Thomas 2008). Plant fibres (and fur cords) were also used to make fishing nets and twined dilly bags (Threlkeld cited in Dillion 1989; Gunson 1974; Thomas 2008). Women were described as making string from bark and also being the crafters of fishing nets (Dawson 1830 cited in Dillion 1989; Thomas 2008).

Few ethnographic references describe the stone artefacts used by Aboriginal people in the Hunter region (Thomas 2008), however, stone axes were observed, and an Australian Museum collection of implements included 'primitive flaked celts' made from chert (Thorpe 1928 cited in Dillion 1989; Thomas 2008). Stone axes had ground edges and were often made from basalt or diorite, with the stone fastened to a handle with gum. The handle was crafted from vines or saplings, which were heat treated (Mathews 1894 cited in Dillion 1989; Thomas 2008). Stone axes were used for cutting saplings, peeling bark, and cutting notches into trees (Threlkeld cited in Gunson 1974; Thomas 2008). Axe grinding grooves have been described as being indicative of a large scale manufacturing industry (Dillion 1989).

While not specified as being made from stone, Mathews (1894 cited in Thomas 2008) stated that the 'largest knives' were used for skinning and dressing prey. Barrallier (cited in Heritage Alliance 2008) also noted the use of a fish weir at Newcastle. Near Merewether, chert (silicified tuff) was described as being abundant (Thorpe 1928 cited in Thomas 2008). The toolkit included stone artefacts that could be used as chisels, scrapers, gravers and rasps (Dillion 1989).

Shell was used to make fish hooks and tools. Fish hooks were made from oyster shell, while shell tools could be used to sharpen spears (until the advent of glass) (Threlkeld cited in Dillion 1989; Gunson 1974; Neal and Stock 1986; Thomas 2008). Kangaroo bones were made into combs or awls, the latter of which were used for sewing kangaroo and possum skin, belts and headbands (Heritage Alliance 2008; Neal and Stock 1986; Thomas 2008). Shell and glass were traded for possum skins, yarn and headbands (Dawson 1830 cited in Thomas 2008). According to Thorpe (1928 cited in Dillion 1989), shell middens extended from Port Waratah to Sandgate along the Hunter River. The sheer volume and size of the middens indicated a population of thousands (Dillion 1989; Gillison 1974).

3.3 Previous Archaeological Investigations

Previous archaeological investigations within the Lake Macquarie region have allowed for an understanding of traditional Aboriginal occupation within the area as well as the process of deposition. These assessments demonstrate a focus of activity and resource utilisation on the Lake Macquarie shoreline, with the identification of numerous sites including shellfish middens. Sites are also located upstream on freshwater creek lines that feed into the saltwater lake. These previous assessments also demonstrate that the area has been subject to past disturbance during the post-contact period, which has probably impacted the Aboriginal heritage of the area and reduced the overall number of sites. Their findings are as follows:

Table 3-1: Previous relevant archaeological investigations within the Project area

Reference	Location	Summary
HLA (2006)	Eraring Power Station - Ash Dam Located approximately 1.8 km north east of Project area	No sites were identified in the footprint of the proposed works, which lacked an *in situ* soil profile and consisted of a series of slopes far from a permanent waterbody. It was assessed that the area was a landscape unsuitable for Aboriginal Settlement. The assessment of known sites in the region demonstrated a high correlation midden sites with the Lake Macquarie Shoreline and tributaries.

Reference	Location	Summary
Donlon (1991)	Eraring Power Station – Coal Receiving Facility Located approximately 600 m north of Project area	No sites were identified in a 12 ha area surveyed including areas of clear disturbance from vehicle tracks, electricity easements and vegetation clearing.
HLA (2007)	Eraring Power Station Located approximately 1.8 km north east of Project area	No sites were identified in the footprint of the proposed works. Identified occupation sites were commonly focused in two areas on the western side of Lake Macquarie: the Lake Macquarie foreshore and the slopes of the Wattagans (Great Dividing Range). The Lake Macquarie foreshore typically includes artefact scatters and shell middens, while sites within the Wattagans consist of artefact scatters, grinding grooves, ceremony and Dreaming sites and rock shelters. Migration routes between the two areas suggest regular travel associated with major watercourses, in particular Wyee, Dora, Cockle, Kilabeen and Wallarah Creeks.
AECOM (2018)	Eraring Power Station Located within southern section of Project area	No sites or objects were noted during the assessment, with archaeological sensitivity low due to the high level of disturbance from previous construction and earthworks.
Dyall and Bentley (1975)	Swansea Located approximately 14 km east of Project area	On the eastern shore of Lake Macquarie, a site including the remains of 21 individuals was excavated. The site demonstrated multiple occupation units and was interpreted as a site of frequent occupation. The radiocarbon dates for the basal deposits are approximately 7,850 years BP. The multiple occupation layers indicate a continuous occupation of the Lake Macquarie region throughout the Holocene.
Umwelt (2003)	Lake Macquarie LGA Aboriginal Heritage study Includes Project area	The Lake Macquarie Aboriginal Heritage study identified areas of Aboriginal archaeological potential. These areas are concentrated on the Lake foreshore and the Lakes tributaries. The study identified that subsurface archaeological deposits are unlikely on slopes due to their erosional nature.

3.4 Database searches

Alison Lamond (Senior archaeologist, Jacobs) carried out a search of AHIMS on 2 March 2021. The wider Origin landholding associated with the EPS and a 3 km buffer zone was used as the search area. This buffer zone is not proposed for impact, it is included to provide information on the archaeological context of the area.

There are 109 previously recorded sites identified in the AHIMS search (refer to Table 3-2 and Figure 3-2). Two restricted sites were identified during the search, however, David Gordon (Senior Heritage Information Officer) of AHIMS confirmed that the two restricted sites will not be impacted by works in the Project area via email on 8 March 2021. The complete list of AHIMS site records is provided in Appendix A.

The nature and location of the registered sites reflects the past Aboriginal occupation from which they derive, but is also influenced by historical land-use, and the nature and extent of previous archaeological investigations. Although Aboriginal occupation covered the whole of the landscape, the availability of fresh water, and

associated resources, was a significant factor in repeated and long-term occupation of specific areas within the landscape. Certain site types, such as culturally modified trees, are particularly vulnerable to destruction through historical occupation, while others, such as stone artefacts, are more resilient.

Overall, the majority of the AHIMS recorded sites are associated with major waterbodies and areas of remnant vegetation. It is therefore likely that Aboriginal objects will be identified within close proximity to waterways on intact landforms. The Project area is not located within close proximity to a major waterbody of on land featuring remnant vegetation. Based on the current distribution of AHIMS sites, it is unlikely that Aboriginal objects will be present within the study area.

Table 3-2: AHIMS Search Results

Site Type	Description	Number of Sites
Isolated Find	A single stone artefact	4
Artefact Scatter	Multiple stone artefacts	30
PAD	Potential archaeological deposit	4
Artefact Scatter with PAD	Multiple stone artefacts visible on the surface with a potential archaeological deposit	1
Scarred Tree	A tree modified by Aboriginal people	15
PAD with Scarred Tree	A tree modified by Aboriginal people with a potential archaeological deposit.	1
Grinding Groove	An outcrop of stone that has been modified through the grinding of a stone implement.	1
Habitation structure	Habitation structure	1
Water Hole	Water Hole	4
Shell Midden	A deposit of shells created by Aboriginal people	10
Shell midden with Artefacts	A deposit of shells created by Aboriginal people with visible stone artefacts.	32
Grinding Groove and Shelter with Deposit	An outcrop of stone that has been modified through the grinding of a stone implement associated with a rock shelter with a potential subsurface Archaeological deposit.	1
Aboriginal Place (Natural and Mythological)	Natural Mythological or Ritual area	1
Restricted site	Sites that have their details restricted	2
Sites no longer valid	Site record deleted or declared not a site	2
Total		109

3.5 Environmental context

The geology of the Project area consists of the Late Permian to early Triassic aged Munmorah Conglomerate. The Munmorah Conglomerate is characterised by conglomerate, pebbly sandstone and grey to green shale.

The Project area is located within the Doyalson Soil landscape, with the northern section located on disturbed terrain (ESPADE 2021). The Doyalson Soil landscape consists of gently undulating rises with broad crests and long gently inclined slopes. The Doyalson Soil landscape is generally comprised of a moderately deep (0.5–1.5

m) deposit of Yellow Earths. However, deposits associated with the Doyalson Soil Landscape are typically shallow (approximately 500 mm deep) soil deposits overlying bedrock.

The Project area is located approximately 1 km north east of Lake Eraring, which feeds into Lake Macquarie. The drainage line that crosses the project area (highly modified) drains west into Muddy Creek. The Project area also includes several unnamed drainage lines associated with Muddy Creek. As a result, it is likely that the Project area would have been subject to going erosion, through seasonal inundation that would have removed the upper layers of the shallow Doyalson Soil landscape and reduced the archaeological potential of the Project area.

Typical vegetation for the Doyalson soil landscape consists of scribbly gum (*Eucalyptus haemastoma*), red bloodwood (*E. gummifera*) , brown stringybark (*E. capitellata*), smooth barked apple (*Angophora costata*), grey gm (*E. punctata*), hill banksia (*Banksia spinulosa*), banksia (*Banksia oblongifolia*)and mountain devil (*Lambertia Formosa*).

From 1910 until the 1980s the land encompassing The Project area had been used for agricultural farming and orchards. The EPS and its construction was announced in 1973. Although previously used for farming and orchard practices, Eraring was perfectly suited for a power station due to the availability of land, the proximity of Eraring Lake for cooling water, and its proximity to coalfields. Confirmation of the power station was granted in 1973 and construction began in 1975 (Lake Macquarie and District Historical Society 2008; Lake Macquarie City Library 2021b). The power station was the fifth power station designed and built by Elcom, after Wallerawang, Vales Point, Munmorah, and Liddell Power Stations.

Due to historic land clearance, as well as agricultural and industrial use, the Project area has been subject to considerable disturbance. This historic clearance of vegetation is likely to have contributed to erosional processes across the Project area and a reduction of archaeological potential.

Figure 3-1: Location of EPS (Lake Macquarie City Library 2021b)

Redacted for public display

Data sources

Origin 2021
Aerometrex 2020,
© Department Finance, Services
and Innovation Dec 2020
© Department of Customer Service 2020

Figure 2-1 AHIMS search results

3.6 Predictive modelling

Predictive modelling is used to determine the archaeological sensitivity of particular landforms within the Project area. The predictive model used to identify areas of archaeological sensitivity for this desktop assessment is based on a 'land system' or 'archaeological landscape' model of site location. This type of modelling enables the prediction of site location based on known patterns of site distribution in similar landscape regions or archaeological landscapes.

The predictive model was developed based on:

- A review of previous models developed for the area;
- An assessment of the results of the previous archaeological assessments reviewed in Section 3;
- The interpretation of the distribution patterns of known sites in the Project area; and
- A study of previous impacts to the Project area and the potential effects of these impacts on the archaeological record.

The survival, degree of preservation or intactness will vary dependent on historical and current land use and the nature of the site. It is noted that the Project area is heavily disturbed as a result of its use as a coal fired power station since the 1980s which will reduce the chances of site preservation. A review of previous archaeological assessment and search of the AHIMS database indicate that Aboriginal objects within the local context are likely to be associated with remnant vegetation and close proximity to waterbodies. As the Project area does not meet this criterion, it is unlikely that Aboriginal objects will be present.

4. Archaeological Survey

4.1 Survey aims

The aim of the archaeological survey was to cover the entire Project area with particular focus on the proposed areas of impact to identify any archaeological objects or PADs.

4.2 Timing and personnel

The archaeological survey was carried out on the 3 May 2021. Details of fieldwork activities and the participation of nominated Site Officers are provided in Table 4-1.

Table 4-1: Archaeological survey personnel

Fieldwork Representative	Organisation
Brandon Water	Lower Hunter Aboriginal Corporation
Kyle Howie	Awabakal Traditional Owners Aboriginal Corporation
Steven Hickey	Widescope
Denzil Cutmore*	Veolia
David Ahoy*	Veolia
Matt Davies	Origin
Gemma Dobson	Origin
Alison Lamond (archaeologist)	Jacobs

* Aboriginal persons who work at EPS through Veolia undertaking environmental rehabilitation projects

4.3 Survey methodology

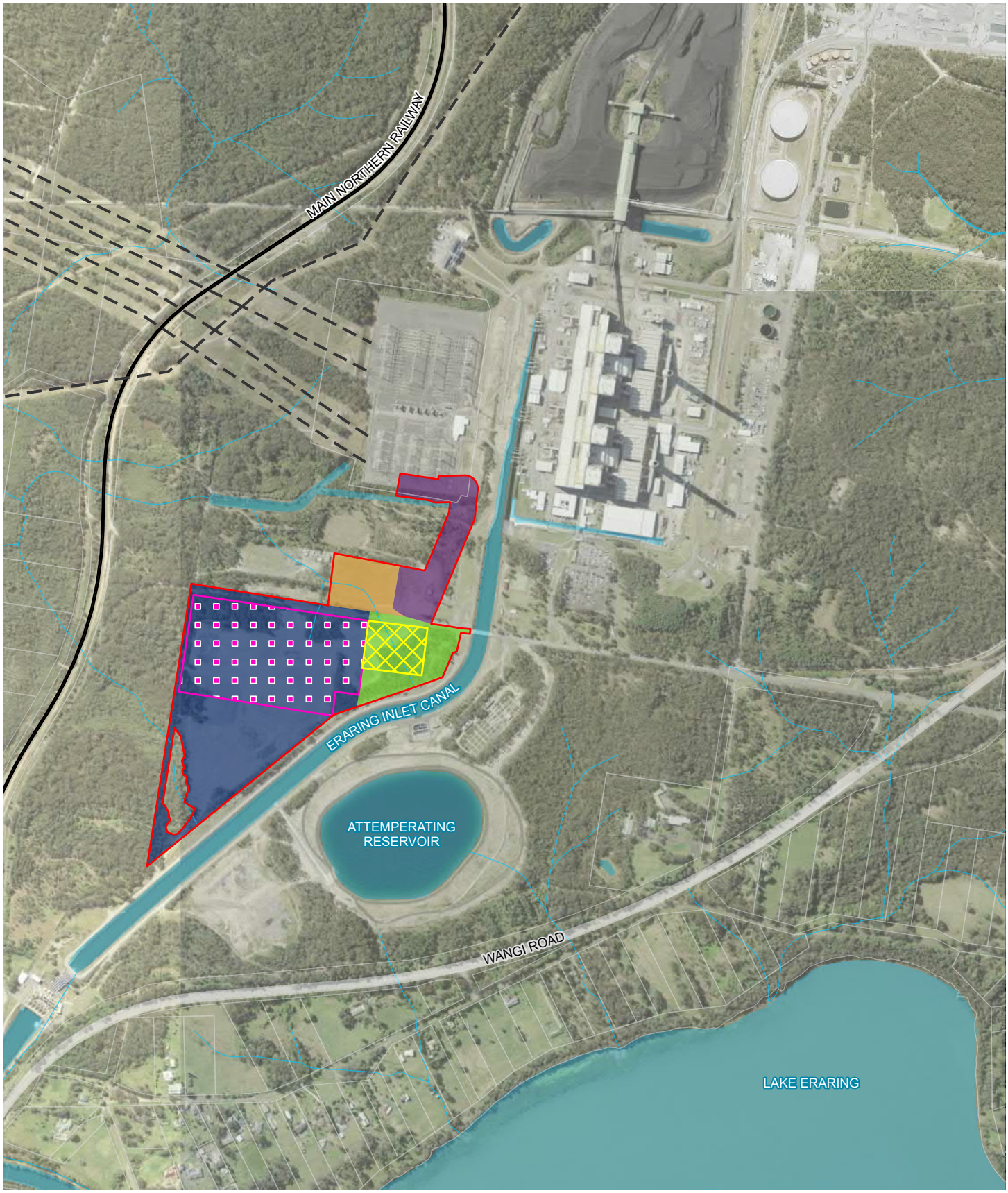
The ground survey team consisted of an archaeologist as well as Aboriginal representatives (see Table 4-1). The field survey aimed to locate Aboriginal objects and areas of PAD, these being areas with the potential to contain subsurface archaeological material. The Project area was divided into four survey units, based on landform and access (see Figure 4-1). The overall strategy was to complete a full coverage survey, but this was not practical due to dense impenetrable vegetation and low surface visibility. As a result, each survey unit was subject to a sample survey, which included as much intensive investigation as was practicable.

These survey units were surveyed on foot and data was captured using iPad notebooks, handheld GPS, and compact digital cameras. Standard measuring tools such as tape measures and callipers were used.

An Aboriginal site is generally defined as material evidence of Aboriginal land use, such as stone tools, scarred trees or rock art. One or more of the following criteria must be used when recording material traces of Aboriginal land use:

- The spatial extent of the visible objects, or direct evidence of their location;
- Obvious physical boundaries where present, e.g., mound site and middens (if visibility is good), a ceremonial ground; and /or
- Identification by the Aboriginal community on the basis of cultural information.

The survey recorded land disturbance, survey coverage variables (ground exposure and archaeological visibility) and landform types across the Project area.



Project area
Battery Energy Storage System
Substation

Survey Unit
Survey Unit 1
Survey Unit 2
Survey Unit 3
Survey Unit 4

Cadastre
Electricity transmission line
Railway

0 300 m

1:12,000
GDA94 MGA56

N

Data sources

Origin 2021
Aerometrex 2020,
© Department Finance, Services and Innovation Dec 2020
© Department of Customer Service 2020

Figure 4-1 Survey units

4.4 Description of survey units

The results of the survey are provided below. Maps showing the location of survey units can be found in Figure 4-1.

4.4.1 Survey Unit 1: Grid Connection 330 kV works area

Survey Unit 1 (SU1) is located on the western side of the canal between the existing electrical switchyard and the proposed substation. The proposed works involve surface impacts and very limited subsurface impacts for the installation of electricity transmission towers.

The area consists of a modified slope and crest. The northern gently sloped section consists of a sealed access track, overhead power line, areas of introduced gravel and dense revegetation. Subsurface utilities also cross the area (see Figure 4-2). The introduced gravel and vegetation limit general ground visibility to 10% with occasional exposures. A highly modified small drainage line with concrete sections crosses the survey unit.

The southern section is located on the moderate slope and crest is grassed and includes a helipad and subsurface utilities (see Figure 4-3). The grass limited general visibility to 10% with no exposures.

SU1 has been subject to clear disturbance at the surface and subsurface in multiple areas. This highly disturbed nature limits the archaeological potential of the area. Therefore, the proposed minor impacts are unlikely to impact any Aboriginal objects.

No Aboriginal sites or PADs were identified within this survey unit.

Figure 4-2: SU1 subsurface utilities in revegetated area (Source: Jacobs 2021)

Figure 4-3: SU1 View south to Helipad (Source: Jacobs 2021)

4.4.2 Survey Unit 2: Laydown Area

Survey Unit 2 (SU2) is located within a currently disused cricket oval on the northern side of Rocky Point Road. The proposed impacts consist of introduction of fill to the surface to create a hard stand area, with no impacts at depth.

The area has been subject to earthworks to create the current level surface and is covered in dense grass (refer to Figure 4-4). General ground surface visibility is limited to 0% with no exposures.

SU2 has been subject to clear disturbance at the surface and within the upper soil profile for the construction of the oval. Therefore, the proposed minor impacts to the surface are unlikely to impact any Aboriginal objects.

No Aboriginal sites or PADs were identified within this survey unit.

Figure 4-4: SU2 view to the west across disused oval (Source: Jacobs 2021)

Figure 4-5: SU3 gently sloped vegetated area, view to the south (Source: Jacobs 2021)

Figure 4-6: SU4 Revegetated former stockpile

4.4.3 Survey Unit 3: Substation

Survey Unit 3 (SU3) consists of a heavily vegetated area to the south of Rocky Point Road. The proposed impacts to the area consist of construction of a level surface (cut and fill) and installation of services (trenching).

The area slopes up from a low-lying area crossed by the road constructed on fill. The survey unit includes both moderate and gently sloping areas (refer to Figure 4-5 above). Vegetation, thick leaf litter and bark limit general ground surface visibility to 0% with rare erosion exposures with 20% visibility.

The sloping nature of SU3 is a landform with low archaeological potential due to their erosional nature.

No Aboriginal sites or PADs were identified within this survey unit.

4.4.4 Survey Unit 4: Battery Footprint

Survey Unit 4 (SU4) is located on a highly modified area used for stockpiling during the construction of the Dam to the south. Veolia representatives reported, during the survey, that they had been working on the revegetation of the area for a couple of years and when they started the area was clay fill with no top soil (refer to Figure 4-6 above).

The area includes introduced gravel access tracks and has been highly disturbed as a result of earthworks.

The proposed impacts to the area consist of construction of a level surface (cut and fill) and installation of services (trenching).

The prior impacts to this landform both to its original soil profile and the current presence of large fill deposits of the surface are evident and therefore the landform has low archaeological potential.

No Aboriginal sites or PADs were identified within this survey unit.

4.5 Survey coverage

A summary of survey coverage, in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b), is outlined in Table 4-2 and Table 4-3 below.

Table 4-2: Survey coverage

Survey Unit	Landform	Survey Unit area (sq m)	Visibility (%)	Exposure (%)	Effective coverage area (sq m)	Effective coverage (%)
SU1	Slope and crest	32,330	10	10	323	1
SU2	Modified	16,300	0	0	0	0
SU3	Slope	30,000	0	10	0	0
SU4	Modified	155,000	0	0	0	0

Table 4-3: Landform coverage

Landform	Landform area (sq m)	Area effectively surveyed (sq m)	% of landform effectively surveyed	Number of sites
Slope and crest	25,300	323	1	0
Modified	171,300	0	0	0
Slope	30,000	0	0	0

No previously recorded sites existed within the Project area (refer to Section 3.2). No new Aboriginal sites or PADs were identified within the project area.

4.6 Assessment of archaeological potential

4.6.1 Ground disturbance

Archaeological potential is closely related to the levels of ground disturbance within a given area. However, other factors are also taken into account when assessing archaeological potential, such as whether artefacts were located on the surface, and whether the area is within a sensitive landform unit according to the predictive statements.

This assessment has identified that a large portion of the Project area has been subject to past ground disturbance. The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) defines what comprises disturbed land:

> *"(4) For the purposes of this clause, land is disturbed if it is has been the subject of human activity that has changed the lands surface, being changes that remain clear and observable.*
>
> *Note: Examples of activities that may have disturbed land include the following:*
>
> *(a) soil ploughing,*
>
> *(b) construction of rural infrastructure (such as dams and fences),*
>
> *(c) construction of roads, trails and tracks (including fire trails and tracks and walking tracks),*
>
> *(d) clearing of vegetation,*
>
> *(e) construction of buildings and the erection of other structures,*
>
> *(f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure),*
>
> *(g) substantial grazing involving the construction of rural infrastructure*
>
> *(h) construction of earthworks associated with anything referred to in paragraphs (a)-(g)."*

The Project area has been subject to extensive land disturbance activities as described by the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a).

4.6.2 Analysis of archaeological potential

The archaeological potential of an area is determined by its landform, its location, and the level of disturbance. Certain landforms, such as gentle slopes, are conducive to Aboriginal occupation while others, such as steep slopes, are not. The location of appropriate landforms in relation to natural resources, in particular their proximity to a permanent water source, increases levels of potential. Correlations between site location and proximity to a water source have been proven in previous archaeological investigations where the number of sites and their densities is highest in close proximity to a water source.

In areas where there is high level of disturbance however, the archaeological potential is lowered. It is unlikely that surface finds in these areas are in their original context and it is unlikely that subsurface archaeological deposits are intact. The archaeological potential of an area is rated high, moderate or low, based on all of the above considerations.

- High - Intact archaeological material is likely to be found in this area;
- Moderate - Intact archaeological material may be found in this area; and
- Low - It is unlikely that intact archaeological material will be found in this area.

Based on this background information, Aboriginal site distributions in the region, and known levels of disturbance at the site, it is considered that the Project area has a low potential to contain Aboriginal objects or archaeological deposits.

5. Analysis and discussion

Overall, the results of the archaeological survey were consistence with the predictive model and no Aboriginal objects or areas of PAD were identified within the Project area. Based on the findings of the desktop assessment, it is likely that stone artefact and shell middens would be the most common site types within the local context. These site types would be associated with areas of remnant vegetation within close proximity to waterbodies.

Previous archaeological investigation found that the primary factor in assessing archaeological potential is the degree of prior land-use disturbance of soils. Therefore, areas that have a low level of land-use disturbance should be considered to have archaeological potential because archaeological deposits may survive intact within undisturbed portions of topsoil in such areas. Conversely, areas with a high level of disturbance should be considered to have nil to low potential because any archaeological deposits have either been removed or heavily disturbed (meaning they have little or no archaeological value).

The Project area has been utilised for industrial and agricultural purposes for over 100 years. Disturbance of the Project area has therefore been extensive. It is therefore considered that the survival of intact archaeological deposits within the Project area is unlikely. This is likely to be exaggerated by the nature of the under-lying (shallow) soil profile, with minor disturbance likely to have caused significant impact to any Aboriginal objects that may have been present.

6. Assessment of scientific value

An assessment of the cultural heritage significance of an item or place is required in order to form the basis of its management. The OEH (2011) provides guidelines for heritage assessment with reference to the Burra Charter (Australia ICOMOS 2013) and the Heritage Office guidelines (2001). OEH requires consideration that includes the following:

- Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential: does the subject area contain teaching sites or sites that might have teaching potential?

The survey did not result in the identification of any Aboriginal sites or areas of PAD. No particular areas of cultural significance were identified by the Registered Aboriginal Parties (RAPs) present on site. Therefore, the Project area is of no archaeological significance.

7. Impact assessment

7.1 Potential impacts to Aboriginal heritage

No Aboriginal places or objects were identified within the Project area. Due to the highly disturbed nature of the Project area, intact archaeological deposits are not likely to be present below the ground surface. Therefore, the proposed works are unlikely to pose an impact to Aboriginal objects or potential Aboriginal archaeological deposits.

As no impacts to Aboriginal sites, places or archaeology associated with the project have been identified, direct and/or indirect impacts (including cumulative impacts and visual impacts) to Aboriginal places or objects are considered unlikely.

8. Management measures

The proposal is unlikely to impact any Aboriginal objects therefore no further archaeological investigation or mitigation is required.

An unexpected finds policy would be implemented in the event of any unexpected finds of Aboriginal sites, objects or archaeological deposits being identified during construction. An unexpected archaeological finds policy would involve the following actions:

- Stop work within the affected area, protect the potential archaeological find, and inform environment staff or supervisor.
- Contact a suitably qualified archaeologist to assess the potential archaeological find.
- If Aboriginal archaeological material is identified, works in the affected area should cease, and NSW Heritage, DPC should be informed. Further archaeological mitigation may be required prior to works recommencing.
- If human remains are found:
  - Immediately cease all work at the particular location.
  - Notify site manager and project archaeologist.
  - Notify NSW Police.
  - Notify Heritage NSW on the Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location.
  - Do not recommence any work at the location until cleared.

To comply with the requirements of the SEARs, an ACHAR will be completed, and a copy of this report included as an appendix.

9. Summary and recommendations

Previous archaeological assessments within the Project area and vicinity have not identified any sites or PADs. The long post-contact history of development in the area has resulted in destruction of most of the natural landforms.

A search of the AHIMS database of the footprint of the Project area (refer to Section 3.2) and included a 3 km buffer zone identified no sites within the Project area.

The following specific predictive points are noted for the landforms within the Project area:

- Flat and gently inclined landforms associated with freshwater tributaries of Lake Macquarie have high archaeological potential.
- The most common site type will be surface and sub-surface scatters of stone artefacts and middens.
- There is low potential for grinding grooves, ceremonial site and rock shelters as the project area is not located on the slopes of the Wattagans.
- There is potential for scarred trees in areas that have not been subject to vegetation removal.

The archaeological survey was conducted on the 3 May 2021. On-site consultation with nominated Site Officers from the RAPs contributed to the development of management and mitigation recommendations, including recommendations for any further assessment (refer to the ACHAR).

The Project area demonstrates extensive disturbance, and all proposed works are limited to this disturbance or located on landforms of low archaeological potential. No previously recorded sites existed within the Project area. No new Aboriginal sites or PADs were identified within the project area. It is therefore recommended that:

- No further assessment is required as no known Aboriginal objects or areas of PAD will be impacted by the project.
- An unexpected finds policy would be implemented, as outlined in Section 8.
- This report should be finalised and appended to the ACHAR.

10. References

AECOM (2018). Ash Dam Augmentation Project, Environmental Assessment. Report prepared for Origin Energy.

DECCW 2010a. The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales

DECCW 2010b. The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW

Donlon, D (1991). Archaeological Survey of Proposed Coal receiving facility at Eraring Power Station. Unpublished report to Connell Wagner Pty Ltd.

Dyall, L. and Bentley, F. (1975). Excavations at Swansea. Report to National Parks and Wildlife Service.

HLA (2006). Environmental Assessment – Proposed Upgrade to Eraring Power Station Rocky Point Road, Dora Creek. Report prepared for Eraring Energy.

HLA (2007). Environmental Assessment Upgrade and Expansion of the coal Combustion Product Management System, Eraring Power Station. Report prepared for Eraring Energy.

Lake Macquarie and District Historical Society (2008). *History of Eraring – July 2008*. Retrieved 14 June 2021 from https://lmdhs.md1729.com/2019/01/29/history-of-eraring-july-2008/.

Lake Macquarie City Library (2021a). *Eraring*. Retrieved 14 June 2021 from https://history.lakemac.com.au/page-local-history.aspx?pid=1085&vid=20&tmpt=narrative&narid=36.

Lake Macquarie City Library (2021b). *Eraring Power Station site: Photo Ref: 2504*. Retrieved 14 June 2021 from https://history.lakemac.com.au/page-local-history.aspx?pid=1085&vid=20&tmpt=showmedia&objid=2504.

Umwelt (2003). Aboriginal Heritage Study, Stage 1B. Report to Lake Macquarie Council.

Appendix A. AHIMS data

Redacted for public display