



Artist's Impression

Environmental Impact Statement – Appendix K: Aboriginal Cultural Heritage Assessment Report

Warragamba Dam Raising

Reference No. 30012078
Prepared for WaterNSW
10 September 2021

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**Aboriginal Cultural Heritage Assessment Report
Warragamba Dam Raising Project
Warragamba NSW**

Wollondilly LGA

Prepared for SMEC Australia Pty Ltd

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Executive Summary

WaterNSW, a NSW state owned corporation, is seeking project approval for the Warragamba Dam Raising Project. WaterNSW is seeking approval for the Project under Division 5.2 of Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (State Significant Infrastructure). The Secretary's Environmental Assessment Requirements were issued on 30 June 2017 and re-issued on 13 March 2018. The SEARs define the scope of the assessment presented herein.

The study area for this Aboriginal Cultural Heritage Assessment Report includes:

- the area potentially impacted by the construction of the project around Warragamba Dam.
- the area that falls within the Project Upstream Impact Area (PUIA) (the net incremental area that will likely be periodically temporarily inundated as a result of the project).
- an area above the PUIA that will be subject to very infrequent and short duration (hours, not days) inundation as a result of the Project.

The aim of this report is to respond to the Secretary's Environmental Assessment Requirements by documenting the Aboriginal cultural heritage values of the study area and its surrounds. This report summarises detailed information presented in a separate Archaeological Report (Appendix 1) and an Aboriginal Cultural Values Assessment Report (Appendix 2).

Six strands of distinct but interrelated cultural values have been identified within the study area:

- Gurrangatch-Mirrigan Dreaming Track.
- Buru (Kangaroo) Dreaming Story Places.
- Living Places (history of occupation and use).
- Cultural Places (ritual life).
- Archaeological Sites (tangible record of traditional occupation and use).
- Waterways (the Wollondilly, Nattai, Warragamba, and Coxs Rivers and their tributaries).

The Archaeological Assessment involved background research, consultation with RAPs to agree on an appropriate methodology for assessment and 76 days of field survey covering a total area of 2,655 ha within the study area and adjoining lands. Approximately 33% survey coverage of the impact area was achieved within the Project Upstream Impact Area (PUIA), an area of 1,401 ha of which 464 ha were surveyed. The archaeological assessment found 334 cultural heritage sites within the study area and adjoining land. Using a predictive model, it was estimated that there would be a total of 174 archaeological sites within the PUIA.

The Cultural Values Assessment involved background research and limited consultation with the RAPs, the majority of who were not willing to participate in the formal assessment process or nominate knowledge holders. The RAPs unwillingness to participate is the result of the legacy of dispossession and loss from the original Warragamba Dam project and distrust of NSW government and processes of assessment. The Cultural Values Assessment nevertheless documented the above six strands of cultural values that contribute to the cultural landscape which the Project is situated within. There were 32 cultural value places identified in the study area, 29 of which are already impacted and would be subject to partial impact

from the Project with the remaining three subject to infrequent inundation. These locations of cultural value cannot be considered comprehensive.

The study area sits within a cultural landscape that is rare in eastern Australia for its preservation of detailed Dreaming stories and a combination of associated sites and places, including sites of archaeological and historical value, existing in a visually striking “natural” environment that imbues a strong sense of place.

The cultural landscape is assessed to be of very high significance

No sites or places of Aboriginal cultural heritage value were identified around the previously impacted construction footprint of the Warragamba Dam and its immediate surrounds. As such, the impacts from the Project are associated with the upstream periodic, temporary inundation of the sites and places of the cultural landscape that are within the PUJA, and for much more infrequent flooding above the PUJA.

Impacts from the proposal include:

- Harm to the cultural landscape through the periodic temporary flooding of 43 known archaeological sites (and an additional predicted 131 archaeological sites) and 11 cultural places within the PUJA.
- Cumulative harm to the intangible values of the cultural landscape through extension of previously unmitigated impact on cultural values from the construction of the Warragamba Dam and flooding of the Burratorang Valley and its tributary valleys.

A total of seventeen combined recommendations have been made in relation to Aboriginal cultural heritage values within the study area. The recommendations made here are all indirect mitigation measures, if the Project proceeds the limitations of the proposed activities mean that there is no capacity for directly applied management measures for the avoidance or minimisation of harm. The recommendations relate to consultation, management, access to Country, site recording, cultural values recording and education. Detailed discussion of the recommendations is contained in the Archaeological Report (Appendix 1: Archaeological Report) and Cultural Values Assessment Report (Appendix 2: Cultural Values Assessment). These recommendations were shaped by feedback received from the RAPs during the consultation process, however, it has been clearly communicated by the RAPs that they do not support the Project. The Project is understood as a continuance of the dispossession and loss of cultural heritage initiated by the original development of the Warragamba Dam in the 1950s.

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Glossary and abbreviations

Term	Definition
Aboriginal object(s)	The legal definition for material Aboriginal cultural heritage under the NSW <i>National Parks and Wildlife Act 1974</i> .
ACHA	Aboriginal Cultural Heritage Assessment
ACHMP	Aboriginal Cultural Heritage Management Plan
AHIMS	Aboriginal Heritage Information Management System
AR	Archaeological Report
BP	BP. Years before the year 1950. This used to describe radiocarbon dates.
Construction footprint	The impact footprint of the Project's construction activities around the dam wall (105 ha)
CVAR	Cultural Values Assessment Report
DAWE	The Commonwealth Department of Agriculture, Water and the Environment
EIS	Environmental Impact Statement
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EUIA	Existing Upstream Impact Area (EUIA): The area that includes Lake Burragorang and up to 2.8 m (RL 119.5 mAHD) above Full Supply Level.
FSL	Full Supply Level
GBMWSHA	Greater Blue Mountains World Heritage Area
Harm	With regard to Aboriginal objects and Places this has the same meaning as the NSW <i>National Parks and Wildlife Act 1974</i> .
ICOMOS	International Council on Monuments and Sites
ILUA	Indigenous Land Use Agreement
Impact area	In the Cultural Values Assessment and this Aboriginal Cultural Heritage Assessment an area that includes the Construction footprint and the PUIA
LALC	Local Aboriginal Land Council
LGA	Local Government Area
NNTT	National Native Title Tribunal
NPW Act	The NSW <i>National Parks and Wildlife Act 1974</i> .
NTS Corp	Native Title Services Corporation Limited, the Native Title Representative Body in NSW.
PEAA	<i>Protection of the Environment Administration Act 1991</i>
PMF	Probable Maximum Flood level
PUIA	Project Upstream Impact Area (PUIA): The area between 2.8 m (RL 119.5 mAHD) above FSL and 10.3 m (RL 126.97 mAHD) above FSL. This area covers 1,401 hectares and is the area that will be temporarily inundated by the Project
RAP	Registered Aboriginal Party
The Project	The Warragamba Dam Raising Project
SEARs	The Secretary's Environmental Assessment Requirements
Study Area	This area is the proposed footprint of works at the Warragamba Dam wall construction zone and the area within the probable maximum flood (PMF). The upstream potential flooding area between the full supply level (FSL) and the Project PMF covers approximately 5,280 hectares
Subject Area	This area comprises the construction study area; the PUIA and the area above the PUIA within the upstream study area
UNESCO	United Nations Educational, Scientific and Cultural Organization

1. Introduction

1.1 Overview

WaterNSW, a New South Wales (NSW) state owned corporation, is seeking project approval for the Warragamba Dam Raising Project (the Project). This approval is being sought under Division 5.2 of Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) as State Significant Infrastructure (SSI). Niche Environment and Heritage Pty Ltd (Niche) was commissioned by SMEC Australia Pty Ltd (SMEC) on behalf of WaterNSW to produce an Archaeological Report (AR) and an Aboriginal Cultural Heritage Assessment Report (ACHA). Niche commissioned Waters Consultancy Pty Ltd (Waters Consultancy) to produce a Cultural Values Assessment Report (CVAR).

This ACHA has been produced by Niche incorporating the findings of the AR and the CVAR to form part of the environmental impact statement (EIS) for the Project which will be assessed and determined in accordance with Division 5.2 of Part 5 of the EP&A Act. The purpose of the assessment was to address the Secretary's Environmental Assessment Requirements (SEARs) for the project.

1.2 The Project

Warragamba Dam Raising is a project to provide flood storage capacity in the Lake Burragorang catchment (Warragamba Catchment) to facilitate flood mitigation, and to provide environmental flows downstream of Warragamba Dam. The proposed activity involves increasing the height of Warragamba Dam for temporary storage in a dedicated flood mitigation zone above the current Full Supply Level (FSL) of the dam. The proposed activity would result in incremental inundation of country surrounding Lake Burragorang during flood mitigation events (Figure 2).

The Project site is located at the Warragamba Dam and the waters of Lake Burragorang water storage, approximately 65 km west of the Sydney Central Business District in the Wollondilly Local Government Area (LGA). Warragamba Dam was constructed between 1948 and 1960 in a narrow sandstone gorge of the Warragamba River. The flooded gorge and tributaries are now a water storage reservoir called Lake Burragorang. To the north and west of the Project site is the Blue Mountains National Park and to the east and south various National Parks and State Conservation Areas which make up the catchment of Lake Burragorang. To the east of the Project site are the Warragamba and Silverdale townships and surrounding rural residential areas (Figure 1).



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 Project Number: 3531 Date: 8/10/2021
 Project Manager: RR
 Drawn by: GT

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The location of the Project and Study Area

Warragamba Dam Raising ACHA

FIGURE 1

The Project is part of the Hawkesbury-Nepean Valley Flood Risk Management Strategy to reduce flood risk to life, property, and social amenities from floods in the Hawkesbury-Nepean Valley from now and into the future. The strategy announced by the NSW Government includes a number of infrastructure, policy and other planning actions to achieve this objective. Proposed actions from the Project that would impact cultural heritage include increasing the height of Warragamba Dam to create 'airspace' in a dedicated flood mitigation zone above the current FSL of the dam (the Project allows for temporary storage of floodwater but does not provide for more water supply storage).

The Project aims to provide temporary flood storage capacity in the Lake Burragorang catchment to facilitate flood mitigation. The key aims of the proposal are to:

- Increase the height of Warragamba Dam to create a dedicated flood mitigation zone above the Warragamba Dam's current full supply level.
- Enable the dam to capture and temporarily hold floodwaters from the Lake Burragorang catchment behind the dam wall.
- Provide infrastructure to allow for environmental flows to be released from the Warragamba Dam.

The project proposes to:

- Increase the crest level of the central spillway by around 12 metres and the auxiliary spillway by around 14 metres above full supply level.
- Increase the dam abutments (including access road) by 17 metres to be resilient to the future impacts of climate change.

The Project would include the following main activities and elements:

- Demolition;
- thickening and raising of dam abutments;
- thickening and raising of central spillway;
- modifications to the auxiliary spillway;
- other infrastructure and elements; and,
- environmental flow infrastructure.

The dam wall construction footprint includes temporary construction facilities and areas that would be disturbed by construction (Figure 3). The operation of the Project will result in temporary inundation of areas around the lake upstream of Warragamba Dam (Figure 2). Upstream operational impacts of the Project would impact the Lake Burragorang catchment and tributaries which flow into Lake Burragorang. This includes areas of National Parks, State Conservation Areas and the Greater Blue Mountains World Heritage Area (GBWHA). The operational impacts and benefits of the Project downstream of Warragamba Dam would include the Warragamba River, the Hawkesbury-Nepean River and its floodplain and some of the tributaries of the Hawkesbury-Nepean River (e.g. South Creek) which experience backwater impacts from the flooding of the river.

The project is currently in the detailed design environmental planning approval stage, and this ACHA Report has been prepared to support the project EIS to be submitted. The Minister for Planning is the approval authority for all SSI applications. The Minister must evaluate the merits of an SSI Project against the

matters in Section 5.19 of the EP&A Act and may approve the project (subject to modifications or conditions) or disapprove of it. The expected assessment process timeframes are:

- SEARs issued & commence EIS preparation 2017
- EIS commence public exhibition September 2021
- Respond to submissions March 2022
- DPIE assessment report September 2022
- Project determined by Minister October 2022

Should the Project be approved and proceed, principal mitigation measures and activities would be planned to begin immediately, and be substantially completed before completions of construction, noting that many of the measures could run concurrently with construction. Commencement of pre-construction and construction activities is expected to have a duration to completion of approximately 5 years, as indicated in Chart 1.



Chart 1. Preliminary construction program (reproduced from Chapter 5 of the EIS).

1.3 The Study Area

The EIS for the Project is assessing the Project’s potential impact footprint which is defined as the area of works at the Warragamba Dam wall and the Project Upstream Impact Area (PUIA). The Project’s impact footprint sits within the larger Study Area for the Project which was defined as the area below the Projects ‘probable maximum flood’ (PMF¹) event, and includes an area around Lake Burragorang, totalling approximately 5,280 ha above full supply level (an incremental increase of 2,345 ha).

The focus of assessment for this ACHA is the Project’s potential impact footprint that consists of the area impacted by the construction works at the dam wall and the PUIA (Figure 2 and Figure 3). The PUIA is 1,401 ha and sits above the Existing Upstream Impact Area (EUIA), or current area subject to likely inundation around Lake Burragorang and is defined as the location between these two height contours:

- Existing Upstream Impact Area (EUIA) – the area that includes Lake Burragorang and up to 2.8 m (RL 119.5 mAHD) above FSL. This is the area inundated by the existing dam.
- Project Upstream Impact Area (PUIA) – the area between 2.8 m (RL 119.5 mAHD) above FSL and 10.3 m (RL 126.97 mAHD) above FSL. This is the additional area above the EUIA most likely to be inundated by the Project.

¹ The PMF is an engineering concept used for dam design and modelling of dam failure; it is not based on realistic weather or flood events that would ever occur

The PUIA is the incremental area likely to be temporarily inundated should the Project go ahead. Diagram 1 presents a schematic illustration of the PUIA and EUIA.

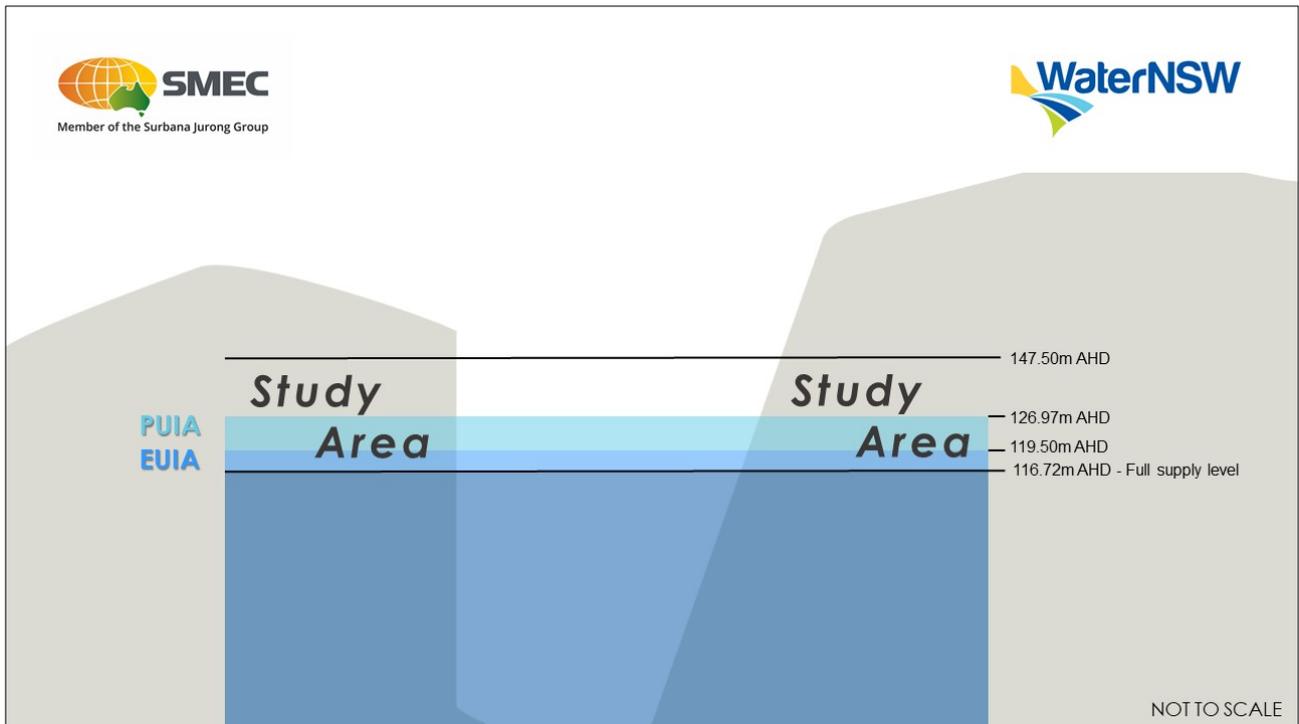
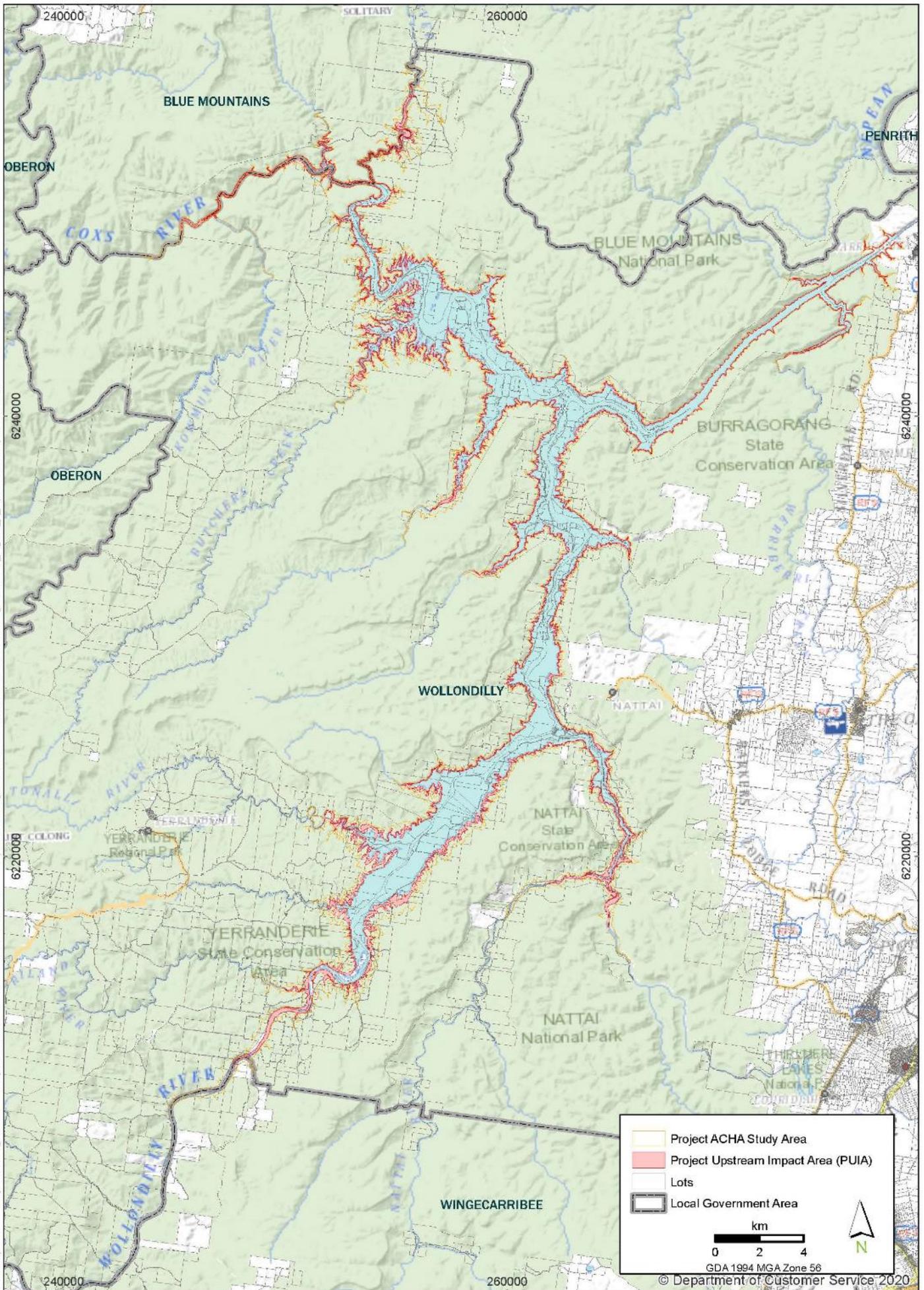


Diagram 1. Illustration of the Study Area.

At the dam wall proposed activities will take place on Lot 1, DP 87998 and Lot 1124, DP1159978, being Farnsworth Avenue and Weir Road, Warragamba. The PUIA encompasses hundreds of individual Lots and DPs in the area surrounding the current shore of Lake Burragorang.

Drawn by: GT Project Manager: RR Project Number: 3531 Date: 8/10/2021 T:\SpatialWorking\6127 WDR Submissions Phase\IR Figures\3531_Figure_2_UpstreamStudyArea\IR.mxd



Project Study Area and Project Upstream Impact Area (PUIA)

Warragamba Dam Raising ACHA

FIGURE 2



Construction Footprint
 Warragamba Dam Raising ACHA

FIGURE 3

Imagery: (c) Maxar 2019-04-08

1.4 The Purpose of this Report

This ACHA has been prepared to address the project SEARs and will form part of an EIS which will be assessed and determined in accordance with Division 5.2 of Part 5 of the EP&A Act. Table 1 outlines the requirements relevant to this assessment and where they are addressed in the report. It should be noted that SEAR 2 is not presented in the table below as it is not relevant to Aboriginal Heritage. SEAR 2 is addressed in the Non-Aboriginal Heritage Assessment.

Table 1: Sections of the Aboriginal Cultural Heritage Assessment report that responds to the SEARs and OEH's Standard Requirements

Secretary's Environmental Assessment Requirements	
SEARs Requirement 10. Heritage	
The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places.	
SEAR Requirement	
1. The proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of:	
Requirement	Section of the report²
Aboriginal places and objects, as defined under the <i>National Parks and Wildlife Act 1974</i> and in accordance with the principles and methods of assessment identified in the correct guidelines	Section 1 and Appendix 1
Aboriginal places of heritage significance, as defined in the Standard Instrument- Principal Local Environment Plan	Section 1, Appendix 1
Environmental heritage, as defined under the <i>Heritage Act 1977</i>	Appendix 1
Items listed on the National and World Heritage lists. Investigations including surveys and identification of cultural heritage values should be conducted in consultation with OEH and regional officers	Appendix 1
SEAR Requirement	
2. Where impacts to State or locally significant heritage items are identified, the assessment must:	
Requirement	Section of the report
(a) Include a statement of heritage impact for all heritage items (including significance assessment)	Artefact 2020
(b) Consider impact to the item of significance caused by, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant)	Please refer to Artefact 2020, and Chapter 17 of the EIS

² Relevant sections of this report that respond to OEH's requirements of Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW).

(c) Outline measures to avoid and minimise those impacts in accordance with the current guidelines; and	Please refer to Artefact 2020, and Chapter 17 of the EIS
(d) Be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed, the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria).	Please refer to Artefact 2020, and Chapter 17 of the EIS

SEAR Requirement

3. Where archaeological investigations of Aboriginal objects are proposed, these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the Code of Practices for Archaeological Investigation of Aboriginal objects in NSW (DECCW 2010). Consultation with Aboriginal people must be undertaken prior to investigations. Significance of cultural heritage values for Aboriginal people who have cultural association with the land must be documented in the EIS.

Requirement	Section of the report
A description of the development area and proposed Activity Area	Section 1, Section 2 and Section 6
A description of Aboriginal objects and declared Aboriginal places located within proposed Activity Area	Section 1, Appendix 1 and Appendix 6
A description of the environment, including geology, soils, landforms, topography, waterways, vegetation, past land use and disturbance.	Section 2, Section 3 and Appendix 1
A description of Aboriginal land use in the Activity Area	Section 3, Appendix 1 and Appendix 2
An outline of the statutory and legislative context in which the assessment is occurring.	Executive Summary and Section 1.5
A description of how the requirements for consultation with Aboriginal people, as specified in clause 8OC of the <i>National Parks and Wildlife Regulation 2009</i> , have been met	Section 6, Appendix 3 and Appendix 11
The views of those Aboriginal people regarding the likely impact of the proposed activity on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and WaterNSW's response.	Section 6, Appendix 3 and Appendix 11
The assessment methodology and sampling strategy for the ACHA.	Appendix 1 and Appendix 4
A preliminary ACHA that provides the results of a pedestrian survey of the project.	This document
An archaeological report in accordance with the <i>Code of Practice for Archaeological Investigations in NSW</i> that provides the results of subsurface assessment of Potential Archaeological Deposits to establish its nature, extent and significance: with a sample of sites, surface and subsurface tracked spatially within the Activity Area and likely options.	Appendix 1
A description of the cultural heritage values, including the significance of the Aboriginal objects and any declared Aboriginal places, which exist across the whole Project Area that will be affected by the proposed activity, and the significance of these values for the Aboriginal people who have a cultural association with the land	Section 7, Section 8, Appendix 1 and Appendix 2

A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity with reference to the cultural heritage values identified.	Section 9 and Appendix 1
A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.	Section 11
Completed Aboriginal Site Recording Forms and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each Aboriginal site that is recorded during archaeological investigations completed for these environmental assessment requirements	This document. To be completed after consultation with RAPs.
A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.	Section 11
SEAR Requirement	
4. Where impacts to Aboriginal objects and/ or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines	
Requirement	Section of the report
Stage 1- Notification of the project proposal and registration of interest	Section 6.1, Appendix 3 and Appendix 11
Stage 2- Presentation of information about the proposed project	Section 6.2, Appendix 3 and Appendix 11
Stage 3- Gathering information and cultural significance	Section 6.2, Appendix 3 and Appendix 11
Stage 4- Review of draft cultural heritage assessment report	Section 6.3, Appendix 3 and Appendix 11
SEAR Requirement	
5. Any objects recorded as part of the assessment must be documented and notified to OEH	
Requirement	Section of report
Section 89 of the NPW Act <i>A person who is aware of the location of an Aboriginal object that is the property of the Crown or, not being the property of the Crown, is real property, and does not, in the prescribed manner, notify the Director-General thereof within a reasonable time after the person first becomes aware of that location is guilty of an offence against this Act</i>	Will be completed when sites are registered on AHIMS
SEAR Requirement	
6. Where land is declared wilderness under the Wilderness Act 1987 or on the World Heritage List as part of the Greater Blue Mountains World Heritage Area (GBMWhA) and lands declared as Wild Rivers under the NPW Act and the Proponent:	
Requirement	Section of the report
Must define the area and extent of the impact on such lands	Section 8.9 and Appendix 1
Provide evidence that the proposal is consistent with the Wilderness Act 1987 and the management principles for wilderness areas	Section 1.5, see Chapter 15 of the EIS

This ACHAR addresses the Aboriginal heritage requirements identified in the project SEARs in accordance with the following guidelines:

- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (NSW Department of Environment and Conservation [DEC] 2005a).
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRs) (NSW Department of Environment, Climate Change and Water [DECCW] 2010a).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b).
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010c).
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011).
- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia International Council on Monuments and Sites [ICOMOS] 2013).
- *Engage Early* (Commonwealth Government, 2016), and
- *NSW National Parks and Wildlife Regulation, 2019* (NPW Regulation).

The objectives of this ACHA, in consideration of the SEARs and the requirements of the above guidelines and regulations, are as follows:

- Identify and describe Aboriginal cultural values located within the study area.
- Identify and describe the sensitivity (in relation to cultural heritage) of different landforms present within the study area.
- Identify and describe the cultural heritage values, including the significance of the Aboriginal objects that exist across the whole area that will be affected by the Project, and the significance of these values for the Aboriginal people who have a cultural association with the land.
- Describe how the requirements for consultation with Aboriginal people as specified in Clause 80C of the NPW Regulation have been met.
- Present the views of those Aboriginal people regarding the likely impact of the Project on their cultural heritage, including a copy of any submissions received and a response as necessary.
- Identify and describe the actual or likely harm posed to Aboriginal objects or declared Aboriginal places from the Project with references to the cultural heritage values identified.
- Provide a description of any practical measures that may be taken to protect and conserve those Aboriginal objects.

- Provide a description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm, or if this is not possible, to manage (minimise) the harm, and
- Provide documentation of discussions with the Registered Aboriginal Parties regarding commitments from WaterNSW related to social, economic and/or conservation gains to offset any loss of cultural heritage.

1.5 Statutory Context

1.5.1 The Environmental Planning and Assessment Act 1979

Approval for the Project will be sought under Division 5.2 of Part 5 of the EP&A Act as the project is State Significant Infrastructure. The EP&A Act requires that land use planning considers environmental impacts, including impacts on Aboriginal and European heritage. Where development approval is to be determined under Part 5 (Division 5.2) of the EP&A Act, further approvals or permits to disturb or destroy Aboriginal objects and places under the National Parks and Wildlife Act 1974 are not required. In those instances, management of Aboriginal heritage follows the applicable Aboriginal heritage requirements specified in the environmental assessment requirements SEARs for the proposed development issued by the Secretary of the Department of Planning Industry and Environment, and subsequent Conditions of Consent. The SEARs for the Project were initially issued on 30 June 2017 – and were subsequently re-issued on the 13 March 2018 (Section 1.4).

1.5.2 The National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by Heritage NSW in the Department of Premier and Cabinet (DPC), is the primary legislation for the protection of some aspects of Aboriginal cultural heritage in NSW. The National Parks and Wildlife Regulation 2019 (NPW Regulation) gives effect to some of the provisions contained within the NPW Act. One of the objectives of the NPW Act is: ‘the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including but not limited to (i) places, objects and features of significance to Aboriginal people ...’ (s.2A(1)(b)).

Under s.85 of the NPW Act, the Director General (DG) of the DPC is responsible for the protection of Aboriginal objects and places in NSW. In particular, the DG is responsible for the preservation and protection of any Aboriginal objects or places on land reserved under the NPW Act, and for the proper restoration of any such land that has been disturbed or excavated in accordance with an AHIP. Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm or desecrate them. Harm means ‘... any act or omission that destroys, defaces or damages an object or place or, in relation to an object, moves the object from the land on which it had been situated’ (s.5).

1.5.2.1 Aboriginal Place Nomination within the study area

Section 84 of the *National Parks and Wildlife Act 1974* allows the Minister for the Environment to declare an area of land to be an Aboriginal Place if this land is or was of special significance with respect to Aboriginal culture (OEH 2017)

The majority of the Study Area has been nominated by the Gundungurra Aboriginal Heritage Association Inc. to be gazetted as an Aboriginal Place. The Aboriginal Place nomination was submitted to HeritageNSW on 18 July 2018.

The nomination covers the Gundungurra creation story or creation Song line, ‘The Journey of Gurangatch and Mirrigan’. Some details and the importance of the story and cultural landscape it creates and describes are discussed in the CVAR (Appendix 2). The story documents the creation of two of the main rivers in Gundungurra Country, the Wollondilly River and Coxs River, with several of their associated tributaries such as the Kedumba River and Jenolan River. It also includes the creation of landscape features along the Great Dividing Range.

As of September 2021, the nomination of the Aboriginal Place was yet to be determined or declared by the Minister for the Environment.

1.5.3 The Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legislative framework for the protection and management of matters of national environmental significance such as heritage places of national and international importance. Heritage places are protected through their inscription on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List (WHL), Commonwealth Heritage List (CHL) or the National Heritage List (NHL) (EPBC Act 1999). As discussed further in the EIS, the study area is located partially within the curtilage of the GBMWA and is inscribed on both the UNESCO WHL (Place ID 105127), and the NHL (Place ID 105999).

The EPBC Act stipulates that a proposed impact or an action that will, or is likely to, have a significant impact on a site that is listed on the WHL, NHL, or CHL, must be referred to the relevant Minister (hereafter the Minister). The Minister will then determine if the proposed impacts require approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on the findings of this assessment (EPBC Act 1999).

Impacts to places listed on the World, National, and Commonwealth heritage lists are assessed under the guidance of the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (Department of the Environment, Water, Heritage and the Arts (C’th) 2013). A significant impact is defined as ‘an impact which is important, notable, or of consequence, having regard to its context or intensity.’ The significance is based on the sensitivity, value and quality of the environment that is to be impacted, and the duration, magnitude, and geographic extent of the impact. If the action is to be undertaken in accordance with an accredited management plan, approval is not needed, and the matter does not need be referred to the Minister (<https://www.environment.gov.au/heritage/about/world/notification-development-proposals>).

While Aboriginal heritage has not been identified as one of the key values of the GBMWA listing, it has been identified as an associated important value in the Strategic Plan for the area.

1.5.3.1 The Greater Blue Mountains World Heritage Area

The Greater Blue Mountains World Heritage Area is an area of unique biodiversity and cultural value that encompasses the sandstone plateaux of the Sydney Basin. The GBMWA is located immediately to the south, west and north of the urban area of Sydney. Iconic features of the GBMWA include the instantly recognisable sandstone plateaux, escarpments and gorges, Aboriginal cultural sites - particularly rock art sites, eucalypt forests, the Wollemi Pine, and wild rivers. Lake Burragorang and the study area occur in the southern part of the GBMWA (Diagram 2).

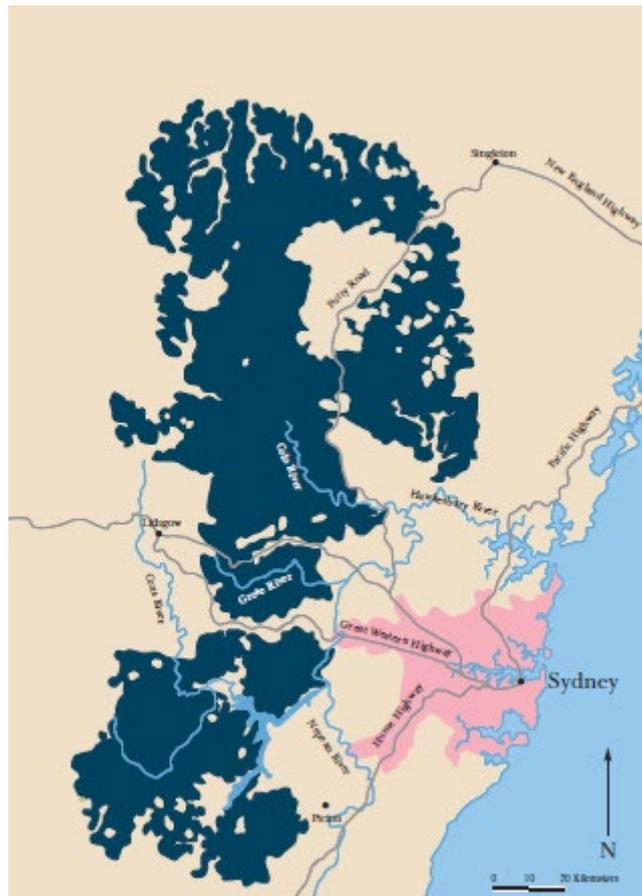


Diagram 2. This extract from the GBMWA nomination shows the location of the Burragarang Valley and Warragamba Dam in relation to the entire GBMWA. The Lake Burragarang area of the GBMWA is of cultural value because it is an intact, storied cultural landscape.

About 304 hectares of the GBMWA occurs within the PUIA (Figure 5). This represents about 0.03% of the total 1,032,649 ha area of the GBMWA. For the most part the overlap of the PUIA and GBMWA occurs in the southern parts of the study area, on the south-east shore of Lake Burragarang (formerly the lower and midslopes of the valley above the Wollondilly River) and also around the confluence of the Nattai River and Little River.

The cultural heritage surveys conducted for the archaeological assessment for the Project, as detailed in the AR, covered approximately 173 ha (57%) of the GBMWA area within the PUIA. Whilst not exhaustive the survey coverage provided a good sample of the GBMWA land that may be affected by the Project. There are 8 known cultural heritage sites located within the GBMWA - PUIA, comprising 7 open sites containing stone artefacts, and one site with axe grinding grooves. There were no known sites or places of value identified in the CVAR in the GBMWA, however, as noted above the cultural landscape is of very high significance.

1.5.4 Native Title Act 1993

The *Native Title Act 1993* recognises the rights and interests of Aboriginal and Torres Strait Islander people in land and waters according to their traditional laws and customs. The Act overturned the fiction of *terra nullius* and established that Aboriginal and Torres Strait Islander rights and interests in their traditional lands transcend colonisation to be accepted in common law. The Act establishes a framework for the

recognition of the bundle of rights that comprise Native Title, and the legal expression of these through ownership and access to land, and compensation for the impediment or extinguishment of Native Title.

1.5.4.1 Gundungurra Indigenous Land Use Agreement (20 June 2014)

An Indigenous Land Use Agreement (ILUA) exists between the Gundungurra and the NSW Government including WaterNSW. The Agreement provides a framework for consultation and participation of the Gundungurra people in the management of the ILUA area which incorporates the Study Area.

The Gundungurra ILUA will be considered when implementing management and mitigation measures forthcoming from the Project.

2. Landscape Context

2.6 Overview

The proposed project sits to the west of the area of Greater Sydney, in southern part of the Blue Mountains region. Part of the Great Dividing Range the Blue Mountains are generally considered to be the area between the NSW Southern Highlands in the south, the Wolgan and Coxs rivers in the north, the Hawkesbury-Nepean River in the east, and as far west as Lithgow. The Blue Mountains are an internationally renowned area of natural and cultural heritage conservation significance, and the region comprises the Blue Mountains National Park, Wollemi National Park, Yengo National Park, Nattai National Park, Kanangra-Boyd National Park, Gardens of Stone National Park and Thirlmere Lakes National Park, as well as other dedicated conservation areas. Of these the Blue Mountains National Park and Nattai National Park are partly within the PUIA. The GBMWhA is an area of 1,032,649 ha within the region; the Lake Burratorang area sits in the southern part of the GBMWhA with approximately 304 ha of the GBMWhA located within the PUIA.

Lake Burratorang covers a vast surface area of 75 km² and has a shoreline of approximately 354 km. As such a large area the environment and topography of the PUIA is diverse, incorporating broad, large valleys in the south and increasingly steeper more narrow valleys and gorges to the north. Such a large area comprises a diverse set of landforms, which range through broad flats and gentle slopes, steeper slopes and very steep to precipitous slopes and cliffs and talus fields with large boulders.

Around the larger rivers the country is generally flatter, while the shorter tributaries are more steeply incised into the plateau. The gentler slopes and flats contain soils derived from colluvial or alluvial sources and are characterised by river flats and footslopes in the valley bottom and lower slopes. Prior to flooding by the Warragamba Dam the broad, rich flats of the Wollondilly and Coxs Rivers and their primary tributaries formed the Burratorang Valley (Plate 2).

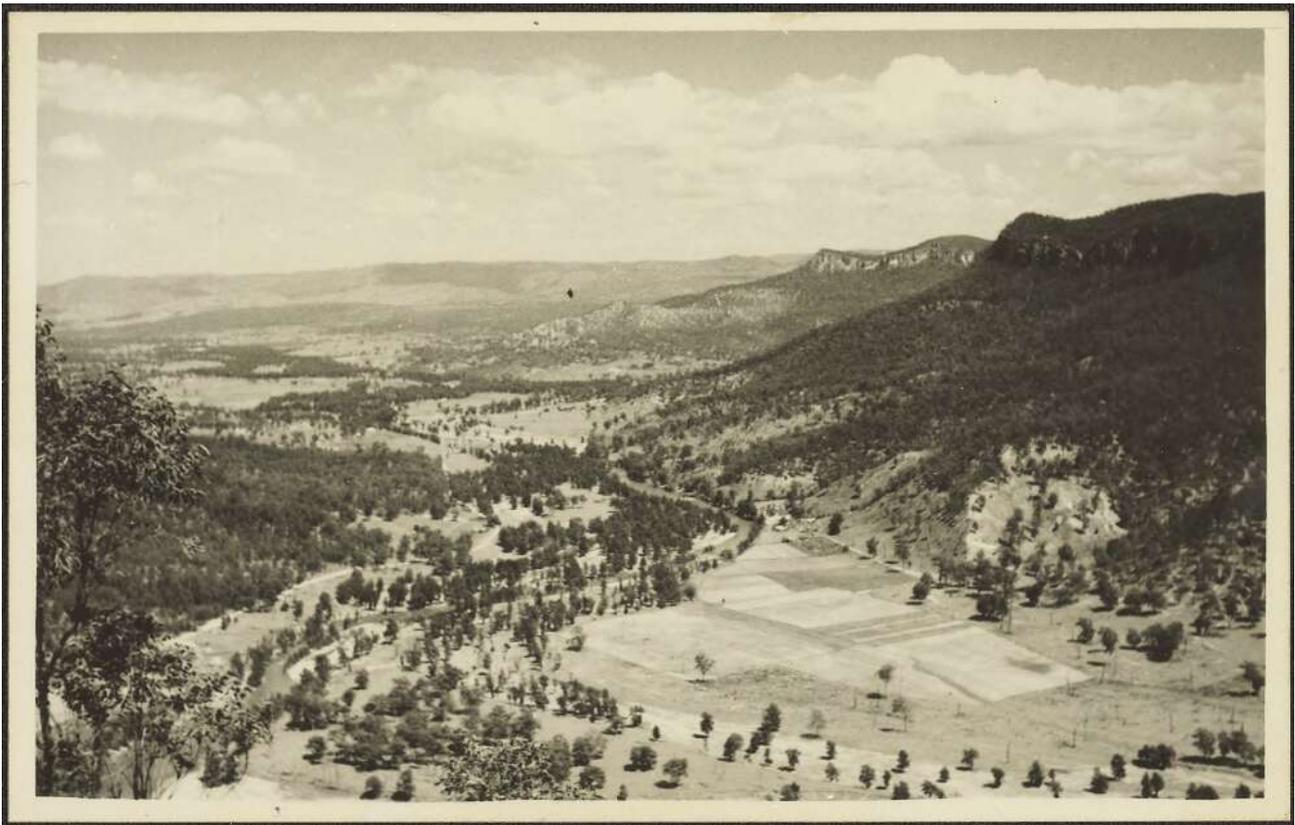


Plate 1. A view in the 1930s of the Burratorang Valley at the junction of the Wollondilly River and Nattai River, the partially cleared land showing the broad alluvial plains in the valley bottom that were traditionally abundant with resources. This was later cleared of all trees in the 1940s and flooded in the 1950s (Source: National Library of Australia).

2.7 Geology

Geologically the southern Blue Mountains comprises an incised sandstone plateau, with sandstone valleys, gorges, hills, and cliffs that are highly representative and emblematic of the region (Plate 2).

The Study Area is within the deeply incised sandstone gorges of the Burratorang physiographic subregion of the Sydney Basin. The geology of the Burratorang area is dominated by Permian and Triassic sandstone with limited basalt caps. Within the Study Area sandstone is the most common rock type, with siltstone also being present in the northern, eastern and central parts of it. Upstream of Warragamba Dam the inflow of two major river systems form Lake Burratorang, the Cocks River in the north and the Wollondilly River in the south. A major tributary of the Cocks River is the Kowmung River; other tributaries in the Study Area are Kedumba Creek, Butcher Creek and Green Wattle Creek. A major tributary of the Wollondilly River is the Nattai River with smaller associated streams such as the Tonalli River, Byrnes Creek and Jooriland Creek feeding Lake Burratorang.

The incised tableland landscapes of the Burratorang typically have cliff features above broad, moderately steep escarpment slopes. The cliff lines generally indicate the break in geology: with Triassic sandstones above and the more weatherable Permian sandstone, shale and siltstone below.



Plate 2. Lake Burragarang surrounded by the sandstone cliffs and eucalypt forests of the Blue Mountains (Source: WaterNSW).

2.8 Soil Landscapes

Soil landscapes are a way of describing country with particular reference to the local topography and soils that are present. The AR (Appendix 1) presents a detailed discussion of the soil landscapes that have been defined by Bannerman *et al.* (2010), DPIE (2008), Hazelton and Tille (1990) and King (1994) in the study area.

The soil landscapes around Lake Burragarang are derived from the following formation processes, which are important in understanding the types of cultural heritage sites, particularly archaeological sites, that may be present and provide a useful way to characterise such a large area in general:

- alluvial landscapes.
- colluvial landscapes.
- erosional landscapes.
- residual landscapes.
- a small portion of the PUIA is also mapped as “water”.

The following brief discussions of each of these landscapes provides a “snapshot” of the different environments of the Study Area as context for this assessment report.

Alluvial landscapes are areas where soils are built up by being deposited by rivers and streams. The waters of Lake Burragorang now cover most of the alluvial landscapes that were present in the area, however some are still mapped in the PUIA in the upper reaches of the larger tributaries of the lake, such as the Wollondilly River, Coxs River and Kowmung River. Alluvial soil landscapes may have deep soils, and will have flat to gently undulating topography, with rivers or streams meandering across. These areas make up 8% of the PUIA and they are likely to contain traditional and post-contact living places/archaeological sites (open sites), living places and cultural places.



Plate 3. A photo from the survey showing an area of alluvial soil landscape. These areas are indicative of the rich plains of the Burragorang Valley that were flooded by Warragamba Dam, and were the choicest places to live both pre- and post-contact.

Colluvial soil landscapes are areas where mass movement is the dominant landscape formation process. These areas have the characteristic features of the Blue Mountains such as exposed sandstone cliffs, scarps, and talus slopes. The topography in these areas is rugged and steep. Colluvial soil landscapes make up 36% of the PUIA, and are most common in the northern, steeper parts of the PUIA. These areas are likely to have traditional and post-contact living places/archaeological sites (especially rockshelters with ancient living deposits and art) and cultural places.



Plate 4. An example of the colluvial soil landscapes of the study area, in this case a scarp that straddles the PUIA and EUIA. Examples of overhangs/rockshelters can be seen to the left and right of the photo centre.

Erosional landscapes are areas where water is the primary weathering source and are areas of generally moderate to steep undulating slopes, with shallow soils. Sometimes isolated sandstone tors and benches will be present. These landscapes make up 53% of the PUIA and are most common in the southern parts of the PUIA, where slopes are relatively less steep. In these areas traditional and post-contact living places/archaeological sites (including open sites and rockshelter sites), scarred trees and cultural places may be found.



Plate 5. An example of an erosional soil landscape from the survey, showing the bare area below FSL, and above it the EUIA and PUIA. These landscapes make up the majority of the PUIA area, and consist of timbered slopes with shallow soils, with occasional sandstone geological features as can be seen in the right of the photo.



Plate 6. A closer look at the erosional soil landscape type, at the top of the full supply level.

Residual soil landscapes are areas where there are often deep soils, formed in place from weathering of parent materials. These areas are generally flat to undulating and make up less than 1% of the PUIA, being only a very small part of the PUIA near the Warragamba dam wall. These areas are likely to preserve traditional and post-contact living places/archaeological sites, scarred trees and cultural places. Because of this landscape's proximity to the dam wall it has been subject to high levels of previous disturbance, which will have removed tangible traces of these sites.

As noted above, approximately 2% of the PUIA is classified as "Water" in the soil landscape mapping, in this case the areas in question will be the same soil landscape as those directly adjacent.



Plate 7. An example of an area mapped as residual soil landscape (which makes up a very small proportion of the study area). Occurring only near the dam wall and visitor's centre this soil landscape has been extensively modified.

3. Historical Context

The Study Area for the ACHA spans the traditional country of the Tharawal (Dharawal), Darug and Gundungurra Aboriginal peoples. Tindale (1940, 1974) observed that the Gundungurra occupied the Nattai and Burragorang Valleys and the Ranges as far west as Bathurst. The Darug occupied the Cumberland Plain between Appin in the south, the Hawkesbury River in the north, west of the Georges River and Parramatta. The Tharawal (Dharawal) ranged from the south side of Botany Bay, the Georges River to the Liverpool and Campbelltown Area (Attenbrow 2010, 34; SA Museum 2010). Attenbrow (2010, 35) pointed out that such boundary mapping is only indicative at best because it was undertaken in the nineteenth century. Gundungurra, Tharawal and Darug peoples would have regularly communicated, moved, traded and participated in ceremonies between their country and neighbouring areas. It is likely that family groups or clans would ‘intermingle and interact along both physical and social boundaries’ rather than be strictly confined to the ‘tribal’ borders that were artificially imposed by European anthropologists (Organ 1990: xliii).

Aboriginal people have lived in the Blue Mountains and the study area for at least 26,000 years. A time span of continuous occupation since such ancient times will have taken place against the backdrop of a changing climate and environment, as the drier and colder era of the last ice age ameliorated through the last 10,000 years to the climatic conditions we live in today. While all regions have “micro-climates” that effect temperatures and conditions at a local level the climate of the study area is temperate with usually mild summers and winters. While there may be some extremes in weather, overall, these would not have constrained Aboriginal land use in any significant way in the last 10,000 years. Contemporary records nearby at Badgerys Creek present average winter temperatures of between 7°C and 21°C with the lowest extreme being -4.5°C and average summer temperatures between 15°C and 28°C, with an extreme high of temperature of 44.6°C (Australian Bureau of Meteorology records 1995-2021).

Records taken at Warragamba weather station record an average annual rainfall of 681 mm. Over the recorded period February and March are the wettest months on average, with around one-third of annual average rainfall coming in these months (Australian Bureau of Meteorology records 2005-2021). In summary conditions and temperatures are wide ranging, especially considering the length of time Aboriginal people have lived in the area. Extremes of weather and conditions such as snow, heatwaves and wildfire will have occurred at times in the past but would not have hindered the year-round Aboriginal land use of all parts of the region.

Within the region of the study area, the extensive and continued occupation of the Sydney Basin has left a vast amount of accumulated archaeological material. The oldest reliable date for the earliest occupation around the region comes from excavations across a source bordering dune overlooking the Hawkesbury River and indicates occupation of the region by at least 36,000 years ago (Williams, Atkinson, Lau, & Phillips, 2014). The earliest occupation in the Lower Blue Mountains dates back well into the Pleistocene period to 12,000 Before Present (BP) (Bowdler 1981 and Johnson 1976), and dates of 26,000 – 30,000 years before present have been documented at the Kings Table rockshelter, near Blackheath (Stockton 2009). With such ancient dates preserved nearby to the Study Area it stands to reason that Aboriginal people have been living in the Burragorang Valley and the valleys of its tributaries for the same duration of time.

In 1905 the ethnographer R.H. Matthews collected a large body of information about language, ceremony, mythology, and social organisation from Gundungurra, Tharawal (Dharawal) and Darug people in the wider

region. Gatherings of varying size were held in the region for reasons of ceremony and lore. Large gatherings were timed to share seasonally abundant resources including predictable seasonal events such as bird migrations. Interaction between groups in the wider region varied with the seasons and the availability of resources, technology, and knowledge. This is reflected in the relatively homogenous cultural features observed in the Sydney region (McDonald 1992).

The Aboriginal peoples who lived in the hinterland were hunters, gatherers and fishers who utilised and managed the rich freshwater and terrestrial animals and plant resources of the area. Animals such as wallabies, kangaroos, possums, flying foxes as well as parrots, water birds, reptiles, freshwater fish and yabbies would have made up part of the diet of the inland dwelling hinterland peoples. With the abundance of permanent water sources in the area, there would have been plentiful resources to sustain multiple campsites.

The arrival of the First Fleet at Sydney Cove in 1788 was followed the next year by a smallpox epidemic, which spread to the neighbouring regions and, although the exact effects are not known, it killed over half the Aboriginal population of the areas affected (Organ 1990: 5). Being close to the first settlements of Sydney and Parramatta, the lives of the people in the Burratorang Valley would have been swiftly impacted following the arrival of the British. The earliest European incursions into the Blue Mountains were made in Gundungurra country, with Francis Barrallier crossing the Nepean and reaching the Tonalli Valley and Burratorang Valley in the closing days of 1802 (Parsons 1966). Barrallier made observations of Gundungurra and nearby communities' life, although even at this early stage of contact traditional economic systems would likely have been very stressed and not functioning as they had been twenty years prior.

Early in the nineteenth century European graziers began taking land in the south of the Cumberland Plain and the coastal plains around Wollongong, with cedar clearing being conducted in the narrower northern coastal plain and rainforest areas of the escarpment (DEC 2005). Access to traditional and everyday resources (such as water) and clearing the land of trees would have had a major impact on the ways in which Aboriginal people were living. This also caused significant social disruption between Aboriginal groups and pressure between Aboriginal people and the growing European population. Drought and the competition for resources between the Europeans and Aboriginal people who were adapting to the massive changes that were so quickly upon them, led to several years of conflict. Organ (1990) documents the various skirmishes, killings and reprisals between Europeans and the Aboriginal people of this Country during the 1814 – 1815 period in the Cowpastures, Camden and Appin districts. Eventually this sporadic bloodshed would lead to larger scale conflict, with Governor Macquarie implementing a sustained punitive action against the Aboriginal population in the district. This resulted in the Appin Massacre of 17 April 1816, in which Aboriginal people were shot and driven over the steep cliffs, somewhere near Broughtons Pass, during a surprise night attack by a detachment of the 46th Regiment.

Despite the massive changes that were so quickly brought to the Aboriginal people of the region, they maintained a sense of community, traditional customs and practices, cultural knowledge and continued to care for significant sites and the land in general. Today there are many thousands of Aboriginal people living in the Cumberland Plain and the Blue Mountains. They continue to be custodians of the land, whilst traditional owners maintain cultural knowledge (DEC 2005).

For the PUIA and the land immediately surrounding it there has been little historical land use and impact away from the alluvial flats of the valley bottoms. This is because of the rugged nature of much of this hilly

escarpment and slope area, and its relative unproductivity and desirability from an economic point of view. Originally the valley bottoms were rich areas of aquatic and terrestrial biodiversity. The rich alluvial plains of the Burratorang Valley were selected for agricultural and pastoral enterprise by the European colonists and were cleared of timber and used for agriculture and pasture during the nineteenth century and first half of the twentieth century. As with many parts of rural NSW Aboriginal people in the Burratorang Valley were involved in the agricultural and pastoral industries in the valley. The contribution Aboriginal people have made to the pastoral and agricultural industry of NSW – both directly and indirectly – has begun to receive increasing recognition over the last 20 years (Harrison 2004). The local shared history from these early days of the agricultural and pastoral industry is an important part of New South Wales and Australian history, being some of the earliest established examples and being so close to the primary European settlements of Sydney and Parramatta. In the Study Area this phase of history saw traditional owners remain on their land and continue cultural associations and maintenance of the cultural landscape well into the twentieth century. This is rare and remarkable given the proximity to urban Sydney.

Around the Warragamba Dam wall the notable land use history is the building of the dam itself in the 1950s and 1960s. The immediate area around the dam wall, though not all of it, has been heavily impacted by the construction activities and the broad footprint required to construct the wall, spillways and ancillary infrastructure. In the mid twentieth century the valleys were cleared entirely of timber and flooded by the waters of Lake Burratorang behind the Warragamba Dam. Local Aboriginal people formed a larger part of the labour force, and were especially involved in the felling of all trees below the high water mark (Smith, 2016). Since the construction of the Warragamba Dam land-use of the Study Area and surrounds has been dedicated as Special Water Catchment Area, and seen little further impact other than roads and linear infrastructure.

The construction of the Warragamba Dam from 1948 to 1960 profoundly affected the Aboriginal people of the region who saw many of their key Dreaming places, cultural sites including significant art sites and burials of known community figures, and historical living places flooded, or their access and use restricted. The flooding of the Burratorang Valley is a part of the oral history of Aboriginal communities across the greater Sydney region, the South Coast, and the Bathurst Plains. The Aboriginal people of these areas all have links with the Burratorang Valley as part of the wider regional interlocked network of Aboriginal community and kinship. In the culturally shared understanding, the building of the Warragamba Dam represents the long history of colonial dispossession of Aboriginal people in the Burratorang Valley, a process that began long before its construction.

In the period from the dam construction to the present day the Aboriginal people of the region continue to use the valley for cultural practises where possible. This includes but is not limited to spending time camping as well as leading and participating in walks through country to interact with cultural heritage sites in the cultural landscape. Despite the social and cultural dislocation effected by European invasion and colonisation many Darug and Gundungurra people continue to live in the regions surrounding the study area and continue to visit and care for country and make decisions on the management and maintenance of cultural heritage sites and matters, as evidenced through the consultation process of this project.

The energy of the Valley is so strong, a place where the ancestors walk beside us. It's the most beautiful place on earth and its where we feel most at peace.

Ms Taylor Clark Gundungurra Woman from the Burratorang Valley (Smith 2016)

3.1 Impacts of Prior Land Use

Traditional Aboriginal owners of the land modified and maintained their Country through clearing of living areas, practices that propagated important cultural plants, practical and mythological increase activities, and the use of cultural burning. These are important and integrated aspects of the cultural landscape.

The rugged nature of large parts of the Study Area and surrounds, making them extraordinarily rich in biodiversity but unsuitable for agricultural or pastoral development after European invasion, has meant large areas remain untouched by recent impacts.

Non-traditional land use impacts in the study area and surrounds include:

- Clearing of vegetation on alluvial flats and valley bottoms to facilitate farming
- Creation of Warragamba Dam and flooding of Lake Burragorang
- Installation of roads, tracks and services (for example power lines and pipes)
- Prospecting and mining activity, such as in nearby areas like Yerranderie

The majority of the Study Area has been subject to very limited modification and disturbance. For the most part, with the exception of the heavily developed area around the Warragamba Dam wall, the PUIA and areas above it are an undisturbed environment. Below this, in the EUIA the effects of long term and semi-permanent water inundation are visible as denuded flats and slopes (Plate 5 and Plate 6).

In 1989 the NSW Water Board commissioned an archaeological and cultural heritage assessment *Warragamba Dam – Archaeological study Sample Investigation of Areas Upstream to be Affected by Increased Water Retention*. The findings of this report, prepared to inform an earlier potential raising of the Warragamba Dam wall resulted in a number of management proposals, principally the recommendation for the development and implementation of a Plan of Management for Aboriginal cultural heritage including the:

“Appointment to the Water Board of an Archaeological Project Manager and assistant from the local Aboriginal community for 12-18 months to develop, on the basis of further investigation, a Plan of Management. A steering committee should be appointed to oversee its implementation, which is likely to involve a 2-3 year salvage project. Local Aboriginal communities retain strong links with the area and should be represented on the committee.”

This recommendation was not acted on by the NSW Water Board in the intervening decades and WaterNSW is now confronting the legacy of this lack of action during this proposal.

3.2 Fires and burning

The eucalypt forests and woodlands of south-east Australia have evolved in response to both naturally occurring fire and the managed use of fire by Aboriginal people. Environmental records from Gooches Crater in the GBMWhA near Lithgow have provided a fire history for the region dating back to 14,000 years ago. The Gooches Crater fire history suggests a complex relationship between Aboriginal people, climate and the occurrence of fires in the Blue Mountains. Climate appears to be the dominant factor in the relative occurrence of fires over these long times scales (Black and Mooney 2006), and at shorter time scales there is an ‘invisible mosaic’ of interdependent environmental and climatic fire conditions (Hammill *et al.* 2013). However, greater Aboriginal influence on the overall fire history, interpreted as a more intense Aboriginal occupation of in the Blue Mountains is suggested to have occurred and continued from 5,000 years ago as

the climate stabilised and more or less took on the conditions that persist to this day (Black and Mooney 2006; Mooney and Martin 2009). Across this time the fire history is documented as quite dynamic, with fire frequency, size and intensity fluctuating within the boundaries of prevailing climatic conditions, with Aboriginal populations likely being one of the agents of change at a more granular level (Mooney and Martin 2009: 38).

The most significant changes to the fire regime of the region have occurred since European incursion (Mooney and Martin 2009). Fire likelihood and hazard has increased as rural and urban development has taken place adjacent to and within the forests of the Blue Mountains (Cunningham 1984). Despite incomplete records from the nineteenth century there were 33 fire seasons between 1804 and 1982, with a fire season defined as a summer when wildfires start in late winter or early spring, and burn continuously for weeks or months (Cunningham 1984: 13-14). In summary, since European incursion the Blue Mountains were subjected to serious fire events every 4-5 years.

The study area has been regularly burnt by bushfires, with 97 instances of fire known to have affected the study area since 1962 (DPIE 2020). These fires included prescribed burns and wildfires. Wildfires occurred in 23 of the 58 years since 1962, as summarized in Table A.

Decade	Number of wildfires	Area of study area affected (ha)
1960s	4	3721
1970s	3	373
1980s	4	345
1990s	7	2694
2000s	3	1111
2010s	2	5575
Total	23	

Table 2. Summary of wildfires that have affected the study area since 1962

During the 2019-2020 fire season the Green Wattle Creek, Erskine Creek, Kowmung River and Ruined Castle wildfires combined to burn 5572 ha of the study area (a small fire in 2012 burnt only 3 ha of the study area). Historically the 2019-2020 fire event stands out for its size, having burned an area equivalent to 70% the size of all previous fires from the preceding 50 years combined (Table A). Wildfires have the potential to cause changes to Aboriginal cultural heritage sites, in particular sites of historical and archaeological significance. Intense heat from fires can cause cracking and exfoliation of rock surfaces that may have art on them, either on platforms or in rockshelters (Rosenfeld 1985). Scarred trees are self-evidently vulnerable to fire, as are stone artefacts on the ground surface and structures or their remains or ruins at historical sites.

Of the fires that have recently occurred in the study area those of the summers of 2001-2002 and 2006-2007 have been classed as high severity (Hammill et al. 2013). The severity of the 2019-2020 fires in the study area was predominantly medium-low severity, as summarised in Table B (DPIE 2021).

Fire severity class 2019-2020 wildfires	Proportion of study area effected by 2019-2020 fires (%)
Unburnt	27
Low	28
Medium	36
High	5
Extreme	5

Table 3. Severity of burning in the study area from the 2019-2020 wildfires

In the Blue Mountains fires of extreme severity are known to have the greatest impact on vegetation structure, the survival of native animals and ‘increased soil impacts such as sediment movement and loss of organic matter’ (Hammill et al. 2013), the latter of which may affect Aboriginal archaeological sites through erosion and loss of deposit. The 2019-2020 wildfires are frequently cited as an unprecedented event, and this is certainly the case in terms of the duration and size of the fires, which were the most costly natural disaster ever recorded. Preliminary assessment of the recent fires effect on swamp ecosystems in the Blue Mountains has shown areas subject to high and extreme severity fires have suffered catastrophic impact to vegetation, and are at risk of enhanced erosion and sediment mobilisation (Fryirs *et al* 2021: 299).

Fieldwork for the Project assessment was conducted prior to the 2019-2020 wildfires, and it was not possible to conduct further survey after the fires. Some preliminary work subsequent to the 2019-2020 wildfires has been conducted and this has shown the fires to have had a variable heritage impact which is dependent on site type, landscape location and fire severity. In some cases sites remain relatively untouched, while in another vegetation loss around a rockshelter has caused accelerated erosion of archaeological deposits (ABC 2020).

It is not possible to quantify the effects of the 2019-2020 wildfires on Aboriginal heritage values or individual sites or places in the study area. The relatively lower severity of the 2019-2020 fires in the study area compared to the northern parts of the Blue Mountains, and the fires in the east and south-west of the study area respectively in 2001-2002 and 2006-2007 (Hammill *et al.* 2013); the long fire history documented for the study area; and, the resilience of the cultural landscape suggest the latest fires have not had an impact that would result in a material effect to this assessment. The cultural landscape consists of a multi-layered series of strands and contributory elements. The values associated with the cultural landscape have existed with fires for millennia, and have survived the dispossession of Gundungurra people from their land and the flooding of their valley.

4. Archaeological Context

For a more detailed discussion of the archaeological context see the AR (Appendix 1: Archaeological Report). The Study Area falls within the Blue Mountains Plateau and the Hawkesbury and Nepean River systems, which include the Coxs River and Wollondilly River systems. This area has been of archaeological focus for some time due to the high frequency of sandstone rockshelters. Over the past few decades there has been a large number of archaeological investigations across the Cumberland Plain generated by the urban development of the area. Notable investigations include the works of Lambert (1966, 1971), Megaw (1965, 1968), Moore (1970, 1981), Kohen et al. (1984) and Nanson et al. (1987) and Stockton and Holland (1974) in the Blue Mountains. All these investigations aimed to understand the history and behaviour of past Aboriginal use and occupation in the region. These large data sets have enabled analysis of past spatial and occupational patterns of Aboriginal groups in the region. Key studies have been undertaken on the major river systems of the Sydney Basin; the Parramatta River, Georges River, Hawkesbury-Nepean and Hunter River/Wollombi Brook. These investigations have demonstrated the presence of Pleistocene, and often Last Glacial Maximum (LGM) occupation (AHMS, 2015; Hughes et al., 2014; McDonald, 2008). Investigation of the wider Cumberland Plain has been extensive. One of most important was by McDonald (1995) at Rouse Hill Infrastructure Project. This provided the first large-scale systematic study of lower order drainage lines, including Second Ponds Creek and Killarney Chain of Ponds. This investigation demonstrated the intensification of occupation during the last few thousand years.

While there is early evidence that the Sydney region has been occupied for over 36,000 years (Williams et al. 2014), archaeological research indicates the earliest evidence for occupation in the eastern Blue Mountains is 12,000 years Before Present (BP) from Walls cave, Lyre Bird dell and Kings Table. The earliest date recorded at Kings Table of 22,000 years BP has been rejected due to a lack of clarity on associated taphonomic processes (Johnson 1979). Previous researchers have indicated that the occupation of these shelters is around 12,000 years BP and was consistent with a pattern of earlier but not very intensive occupation. Occupation evidence continues to be sporadic up until about 5000-4500 BP where an increasing and continued use of shelters has been identified (Attenbrow 1981). See AR Section 4.2 and 4.3 for further discussion.

The majority of the archaeological assessments that have been undertaken within close proximity to the dam were for the 1995 EIS for a proposed dam wall raising (Brayshaw and McDonald 1988 and 1989). Other small surface surveys relating to dam infrastructure on the periphery of the dam area have been undertaken by, Brayshaw (1992, 1995 and 1999) and AHMS (2005). Due to the Study Area being a water catchment Special Area and/or National Park/State Conservation Area for the past 70 years, there has been previous limited archaeological investigations as the area is protected from development.

Searches of the Aboriginal Heritage Information Management System (AHIMS) returned a result of 55 Aboriginal heritage sites, 31 of which were within the Project study area. The cultural heritage survey work undertaken to inform the project assessment found 303 cultural heritage sites, and revisited 31 known sites resulting in a total of 334 Aboriginal heritage sites considered for the assessment. The site assemblage is summarised in Table 4.

Site Type	Frequency
Aboriginal Ceremony and Dreaming	1
Aboriginal Resource and Gathering	4
Axe Grinding Grooves	8
Open sites (artefacts, grinding grooves, multiple features)	228
Scarred Tree	5
Rockshelters site (art, grinding grooves, artefacts, multiple features)	83
Stone Arrangement	2
Water Hole	3
Total	334

Table 4. AHIMS search and assessment survey results

The Project study area and survey activities took in an area greater than the proposed impact footprint of the Project. The agreed archaeological methodology employed a sampling strategy resulting in a total survey effort of 2,655 ha in the study area and adjoining land; 464 ha of the 1,401 ha PUIA being surveyed but consistent feedback from some RAPs and knowledge holders has been that, in their view, a culturally valid assessment of the cultural landscape for the purposes of informing an impact assessment would require the entire PUIA to be surveyed. The Project’s impact footprint is defined as the area of works around the dam wall, and the PUIA. Within this area there are 43 known Aboriginal heritage sites (Table 5) and a predicted total of 174 Aboriginal heritage sites.

Site Type	Number
Aboriginal Resource and Gathering	1
Axe Grinding Grooves	4
Open sites (artefacts, grinding grooves, multiple features)	23
Rockshelters sites (art, grinding grooves, artefacts, multiple features)	8
Stone Arrangement	1
Isolated Artefact	6
Total	43

Table 5. Summary of Aboriginal heritage sites known to be within the PUIA.

5. Cultural Values Context

For a more detailed discussion of the archaeological context see the CVAR (Appendix 2: Cultural Values Assessment). The understanding and perception of cultural landscapes expressed by Aboriginal cultural knowledge holders, and by the Aboriginal community more broadly, is of an area traversed by an interconnecting network of physical, social, and spiritual meanings. The term ‘associative cultural landscape’ has come to be used within the international heritage profession to refer to such complex understandings of landscape. The World Heritage Convention of UNESCO defines an associative cultural landscape as one that has ‘... powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent.’

The inscription of meaning onto the landscape, a process partially captured in the term ‘Dreaming’, is not restricted to a distant and mythological past but is a continuous cultural process within which people are empowered to create new meanings (see Appendix 2: Cultural Values Assessment).

The methodology for the cultural values assessment was only able to be completed via desktop because Aboriginal cultural knowledge holders have chosen not to participate at this point in time, and the majority of RAPs declined to nominate Aboriginal cultural knowledge holders on the basis that they did not trust the intent of the Proponent or the assessment process. The capacity to map specific cultural values has been limited to available documentary sources due to the decision of RAPs and identified Aboriginal cultural knowledge holders not to directly engage in the cultural values assessment process.

An analysis of the available documentary material, with reference to previous research and reports relating to Aboriginal community understandings and knowledge of the region, allows for the identification of six strands of distinct but interrelated cultural value within the study area:

- Gurrangatch-Mirrigan Dreaming Track
- Buru (Kangaroo) Dreaming Story Places
- Living Places (history of occupation and use)
- Cultural Places (ritual life)
- Archaeological Sites (tangible record of traditional occupation and use)
- Waterways (the Wollondilly, Nattai, Warragamba, and Coxs Rivers and their tributaries)

These six elements highlight different aspects of the cultural values of the study area and illustrate the understanding in all Aboriginal societies, traditional and contemporary, that landscape or Country is inherently cultural, having been formed and animated by the actions of mythological beings and maintained by the ongoing actions and interactions of Aboriginal people over many generations.

Site Type	Frequency
Dreaming Places	21
Living Places	10
Cultural Places	14
Total	45

Table 6. Summary of Aboriginal cultural sites known to be within the Study Area.

Site Type	Frequency
Dreaming Places	1
Living Places	7
Cultural Places	3
Total	11

Table 7. Summary of Aboriginal cultural sites known to be (partially) within the PUIA and dam wall area.

It is recognised that within each of these categories there are places of cultural value that have not been referred to in this report, some of which will only be known to Aboriginal cultural knowledge holders. The many Waterways within the Study Area hold cultural value throughout their extent. The ecology of the region, the plants and animals, hold complex cultural values as an integral element of Country.

6. The Aboriginal Community Consultation Process

In administering its statutory functions under Part 6 of the NSW *National Parks and Wildlife Act 1974*, HeritageNSW requires that proponents consult with Aboriginal people about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and/or places within any given development area; in accordance with Clause 80C of the NPW Regulation and the ACHCRs (DECCW, 2010a). State Significant Infrastructure that is authorised by a development approval granted under Division 5.2 of Part 5 of the EP&A Act is exempt from requiring an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the NSW *National Parks and Wildlife Act 1974*. Consequently, it is also exempt from compliance with the consultation process in Clause 80C of the NPW Regulation, however, consultation with the Aboriginal community for this ACHA has nonetheless been undertaken in compliance with the requirements of these legislative instruments and the following guidelines:

- Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005)
- ACHCRs (DECCW 2010a)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010b)
- Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011);
- The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS 2013)
- NSW National Parks and Wildlife Regulation, 2019 (NPW Regulation)

HeritageNSW maintains that the objective of consultation with Aboriginal communities about the cultural heritage values of Aboriginal objects and places is to ensure that Aboriginal people have the opportunity to improve ACHA outcomes by:

- providing relevant information about the cultural significance and values of Aboriginal objects and/or places
- influencing the design of the method used to assess cultural and scientific significance of Aboriginal objects and/or places
- actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal objects and/or places within the proposed study area
- commenting on draft assessment reports before they are submitted by the proponent to HeritageNSW

To assist proponents through the required consultation process, the DECCW (2010a) has prepared a guidance document, namely the ACHCRs. Consultation in the form outlined in the ACHCRs is a formal requirement where a proponent is aware that their development activity has the potential to harm Aboriginal objects and/or places. Heritage NSW also recommends that these requirements be used when the certainty of harm is not yet established but a proponent has, through some formal development mechanism, been required to undertake a cultural heritage assessment to establish the potential harm their proposal may have on Aboriginal objects and places.

The ACHCRs outline a four-stage consultation process that includes detailed step by step guidance as to the aim of each stage, how it is to proceed and what actions are necessary for it to be successfully completed. The four stages are:

- Stage 1 – Notification of Project proposal and registration of interest
- Stage 2 – Presentation of information about the proposed Project
- Stage 3 – Gathering information about the cultural significance
- Stage 4 – Review of draft cultural heritage assessment report

The document also outlines the roles and responsibilities of Heritage NSW, Aboriginal parties including Local and State Aboriginal Land Councils, and proponents throughout the consultation process. To meet the requirements of consultation it is expected that proponents will (DECCW 2010a):

- bring the Registered Aboriginal Parties (RAPs) or their nominated representatives together and be responsible for ensuring appropriate administration and management of the consultation process
- consider the cultural perspectives, views, knowledge and advice of the RAPs involved in the consultation process in assessing cultural significance and developing any heritage management outcomes for Aboriginal objects and/or places
- provide evidence to HeritageNSW of consultation by including information relevant to the cultural perspectives, views, knowledge and advice provided by the RAPs
- accurately record and clearly articulate all consultation findings in the final cultural heritage assessment report
- provide copies of the cultural heritage assessment report to the RAPs who have been consulted

The consultation process undertaken for this Project to seek active involvement from relevant Aboriginal people followed the current NSW framework, namely, the ACHCRs and Clause 80C of the NPW Regulation. Section 1.3 of the ACHCRs describes the guiding principles of the document. The principles have been derived directly from the Australian Heritage Commission’s *Ask First: A guide to respecting Indigenous heritage places and values* (Australian Heritage Commission 2002). Both documents share the aim of creating a system where free prior informed advice can be sought from the Aboriginal community.

The following sections outline the process and results of the consultation conducted during the preparation of this ACHA to ascertain and manage the Aboriginal cultural heritage values of the study area.

6.1 Community protocols observed during this project

As a result of the outlined Aboriginal community consultation activities the following assessment, reporting and field assessment protocols were observed:

- Members of the Gundungurra Tribal Council Aboriginal Corporation and the Gundungurra Aboriginal Heritage Association during the initial meeting on 17 August 2017 requested that Michael Jackson of Jackson Ward Archaeology assist with the field assessment.
- During further meetings with all 22 RAP groups for the project a request for all photographs that were taken to be provided to them for review as part of the consultation process. These were provided on USB’s during the meeting held at the Tharawal Local Aboriginal Land Council on 22 July 2019. Additional USB’s were sent to any RAPs that were not present at the meeting.
- During discussions with all RAP groups during the project it has been requested:
 - that all Aboriginal Cultural Heritage sites be registered on AHIMS as Restricted Sites, further consultation is currently underway to determine who will be the nominated knowledge holder for this restricted information.
 - any photographs that relate to Aboriginal objects and site locations should be placed in an Appendix that would be redacted from public versions of the Project documents. No photographs of locations of cultural or archaeological sites should not be included in any public facing documents.

- All figures that relate to the location of Aboriginal objects, Dreaming sites and locations of areas of intangible value should be placed in an Appendix that would be redacted from the public document. No locations should be included in any public facing documents.
- All documents relating to RAP group specific consultation should be placed in an Appendix that would be redacted from the public version documents, to protect any cultural knowledge or personal details included within this correspondence.

6.2 Stage 1 – Notifications and Registration

This stage of the consultation process is used to identify, notify and register any Aboriginal people or groups who may have a cultural interest in and/or possess cultural knowledge relevant to determining the cultural significance of Aboriginal objects or places within the study area. In accordance with Section 4.1.2 of the ACHCRs, Project notifications were sent on 9 October 2017 to the following organisations:

- Blacktown City Council
- Blue Mountains City Council
- Camden Council
- Central Tablelands Local Land Service
- Deerubbin Local Aboriginal Land Council
- Gandangara Local Aboriginal Land Council
- Greater Sydney Local Land Services
- Hawkesbury City Council
- The Hills Shire Council
- Illawarra Local Aboriginal Land Council
- Liverpool City Council
- Metropolitan Local Aboriginal Land Council
- Native Title Services Corporation Limited (NTS Corp Limited)
- Oberon Council
- Office of Environment and Heritage
- Office of the Registrar, *Aboriginal Land Rights Act 1983*
- Penrith City Council
- Pejar Local Aboriginal Land Council
- South East Local Land Services
- Tharawal Local Aboriginal Land Council
- Wollondilly Shire Council
- National Native Title Tribunal (NNTT)

Responses to the Project notifications were received from the following organisations:

- National Native Title Tribunal (10 October 2017)
- Wollondilly Shire Council (20 October 2017)
- Darug Custodian Aboriginal Corporation (21 October 2017)
- The Hills Shire Council (24 October 2017)
- Blue Mountains City Council (24 October 2017)
- Office of the Registrar, *Aboriginal Land Rights Act 1983* (24 October 2017)
- Camden Council (24 October 2017)

- Hawkesbury City Council (25 October 2017)
- Office of Environment and Heritage (18 October 2017)

As a result of the responses received, a total of 83 individuals and organisations were identified as potential knowledge holders for the study area. A full record of all correspondence received from and sent to the Aboriginal community and the abovementioned organisations is contained in Appendix 3, while copies of all relevant correspondence is provided in Appendix 11.

The National Native Title Tribunal advised that 1 Native Title Claim covered the study area:

- Warabinga – Wiradjuri #7

An Indigenous Land Use Agreement exists within the study area with the following stakeholders:

- Gundungurra Aboriginal Heritage Association Inc.
- Gundungurra Tribal Land Council Aboriginal Corporation

The Office of the Registrar, *Aboriginal Land Rights Act 1983* advised that there were no Aboriginal owners pursuant to Division 3 of the NSW *Aboriginal Land Rights Act 1983*.

In accordance with Sections 4.1 and 4.2 of the consultation requirements outlined in the ACHCRs, all 83 individuals and organisations identified through the above correspondence were contacted in writing on 6 and 7 November 2017 and were invited to register an interest in the Project. Advertisements inviting the registration of Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the study area were published in the following newspapers (cross ref):

- Blacktown Sun (7 November 2017)
- Blue Mountains Gazette (8 November 2017)
- Camden Advertiser (8 November 2017)
- Hawkesbury Gazette (8 November 2017)
- Hills News (9 November 2017)
- Liverpool Champion (8 November 2017)
- Oberon Review (9 November 2017)
- Penrith Gazette (9 November 2017)
- Wollondilly Advertiser (8 November 2017)

As a result of the above consultation, 22 individuals and organisations were registered as RAPs to the Project during the registration period (6 November 2017 – 25 November 2017). A copy of the list of the 22 RAPs, along with a copy of the written notifications and advertisements, were provided to the Metropolitan Office of Environment and Heritage, Deerubbin Local Aboriginal Land Council (DLALC), Illawarra Local Aboriginal Land Council (ILALC) and Tharawal Local Aboriginal Land Council (TLALC) on 28 February 2017, in accordance with Section 4.1.6 of the ACHCRs. A list of the RAPs for the project is provided in Table 6.

Registered Aboriginal Parties (registered during the registration period 6 November 2017 – 25 November 2017)

Name	Name	Name
A1 Indigenous Services	Amanda Hickey Cultural Services	Biamanga
Cullendulla	Corroboree Aboriginal Corporation	Cubbitch Barta
Darug Custodian Aboriginal Corporation	Darug Land Observations	Duncan Falk Consultancy
Darug Aboriginal Land Care	Goobah Developments	Gundungurra Aboriginal Heritage Association Inc.
Gundungurra Tribal Council Aboriginal Corporation	Illawarra Local Aboriginal Land Council	Kamilaroi Yankunytjatjara Working Group
Koolkuna Elders	Muragadi Heritage Indigenous Corporation	Murra Bidgee Mullangari Indigenous Corporation
Murramarang	Kazan Brown and Taylor Clarke	Tharawal Local Aboriginal Land Council
Widescope Indigenous Group		

Table 8: Summary of Registered Aboriginal Parties for the Project

A consultation log detailing all Aboriginal community consultation undertaken for the Project is provided in Appendix 3. A copy of all relevant written correspondence sent and received during Project consultation is provided in Appendix 11.

6.3 Stages 2 and 3 – Presentation of Project Information and Gathering Information about Cultural Significance

6.3.1 Proposed Methodology and Information Session

Information regarding the Project, as well as an invitation to attend two information sessions, a copy of the Proposed Methodology (Appendix 4) for review and comment, request for valid insurances and questionnaire to assist with field team selection was provided to the RAPs on 5 March 2017, in accordance with the ACHCRs (DECCW 2010a). A minimum of 28 days was allowed for RAPs to provide input in regard to the following aspects:

- the nature of the proposed methodology.
- any Aboriginal objects or places of cultural value within the study area, or issues of cultural significance.
- any restrictions or protocols considered necessary in relation to any information of sensitivity that may be provided.
- any other factors considered to be relevant to the ACHA to be adopted into the information gathering process and assessment methodology.

Three information sessions were held for the proposed project methodology. The first was at Berry St, North Sydney on 20 March 2018 and the second was held at the Warragamba Visitors Centre on 4 April 2018. In addition, an information session was held with the Indigenous Land Use Agreement Committee consisting of the Gundungurra Aboriginal Heritage Association Inc. and Gundungurra Tribal Land Council Aboriginal Corporation on 27 March 2018 at the NPWS Katoomba office. At the information sessions, a representative of WaterNSW and Infrastructure NSW provided a presentation on the nature and scale of the Project, an overview of the impact assessment process, critical timelines and milestones for the

completion of assessment activities and delivery of reports, a discussion of the roles, functions and responsibilities of participants and protocols for the management of any sensitive cultural heritage information. The information session also provided RAPs with an opportunity to raise any cultural issues or comments/perspectives and assessment requirements (if any) regarding the Project or the Proposed Methodology.

As described above, WaterNSW recorded that the proposed Project information had been presented to the RAPs. This record (i.e. the proposed methodology provided to the RAPs [Section 3.2.1] and the information session presentation [Appendices 2 and 3] also provided to all RAPs) includes any agreed outcomes and contentious issues that required further discussion to establish mutual resolution (where applicable). A copy of this record, along with a list of the RAPs who attended the information session, is provided in Appendix 5.

This information sessions provided an opportunity for the RAPs to provide comments on the proposed methodology. Questions raised during this information session in regard to the proposed methodology are listed in Section 3.2.2 and Table 4 below. A full copy of the minutes from this meeting have been provided in Appendix 11.

6.3.2 Responses to Comments Received on Proposed Methodology and Information Sessions

As described in Section 3.2.1, a copy of the proposed methodology was provided to all RAPs for their review and comment on 5 March 2018, with comments requested by 9 April 2018, allowing for a minimum of 28 day review period. Due to the second information session falling outside the minimum 28 day project information consultation period, it was extended by a further 7 days to allow for sufficient time for the RAPs to provide comments from the information session and the methodology.

The proposed methodology provided an opportunity for the RAPs to provide comments on the project, and the proposed assessment methods for the Aboriginal cultural heritage assessment. A summary of the comments on the methodology, grouped into most common themes, from the information sessions and consultation period are provided in below. A full copy of the comments received are provided in Appendix 11. The majority of the feedback agreed with the proposed methodology; however, the following common themes and areas of concern were identified in the majority of the feedback received:

- That the survey coverage should not be a sample but should be extended to encompass the entire impact area.
- Concerns that the methodology was not coordinating survey coverage based on known Dreamtime stories of the study area.
- Concerns that the cultural history of the study area was not provided in enough detail to understand the Aboriginal occupation of the study area.

In response to these comments an additional 45 targeted survey locations were added to the proposed field program, with an objective to more fully sample and understand the cultural landscape. The additional survey objectives consisted of sites and areas related to the Gundungurra Dreaming stories, and sites also related to the more recent history of the area such as farming selections.

Information regarding some cultural history had been left out of the draft methodology as it contained sensitive information and full consent hadn't been available from all RAPs. It was agreed that this information would be provided in future assessments, using different secondary sources.

The additional survey work proposed resulted in the survey covering a greater sample of the study area, but did not result in a program to survey the entire area.

6.3.3 Aboriginal Cultural Heritage Assessment Surveys

6.3.3.1 Survey Engagement Application Process

All RAPs were invited to participate in the field surveys. The invitation described the requirements that WaterNSW needed applicants to satisfy for engagement in regards to fitness for work, drug and alcohol policy and requirements for health and safety.

The invitation included an opportunity for RAPs to provide an Expression of Interest to participate in the cultural heritage surveys via a *Field Survey Engagement Application Form* which sought responses on:

- cultural, social and historical connections to the study area
- traditional knowledge of the study area
- previous experience in ACHA survey
- copies of current insurances

Expressions of interest were received from the following RAPs:

- A1 Indigenous Services
- Amanda Hickey Cultural Services
- Corroboree Aboriginal Corporation
- Cubbitch Barta
- Darug Aboriginal Land Care
- Darug Custodian Aboriginal Corporation
- Darug Land Observations
- Gundungurra Aboriginal Heritage Association Inc.
- Kamilaroi Yankunytjatjara Working Group
- Muragadi Heritage Indigenous Corporation
- Murra Bidgee Mullangari Indigenous Corporation
- Widescope Indigenous Group

6.3.3.2 Engagement for Surveys

Subsequently representatives from the above 12 RAPs were rostered to form part of the field team for the surveys.

6.3.3.3 Aboriginal Heritage Surveys

The purpose of the Aboriginal cultural heritage survey was to satisfy the goals stated in the agreed methodology developed for the Cultural Heritage Assessment:

- Visit sites and locations associated with the Gurrangatch-Mirrigan Dreaming Track.
- Visit other known archaeological/cultural sites of high significance and/or identified importance.
- Focus survey attention for unknown sites in areas of the landscape likely to contain rockshelter archaeological/cultural sites (as these are likely to be of high value).

Aboriginal cultural heritage surveys were conducted by representatives from the Registered Aboriginal Parties and Niche Environment and Heritage (including Jackson Ward Archaeology in the 2018 surveys). A full list of Registered Aboriginal Party representatives who conducted the survey is presented in Appendix 10. The surveys were conducted over approximately year with a combined total of 76 days of survey during the following periods:

- 24 May to 6 July 2018

The majority of the survey work aimed at achieving the goals in the agreed methodology was completed in June and July 2018.

- 27 September to 2 October 2018
- 9 October 2018 to 10 October 2018
- 25 October 2018 to 26 October 2018

Additional surveys were conducted in September and October to assess changes in the construction footprint for the dam wall.

- 19 November to 27 November 2018
- 16 January to 5 February 2019
- 11 March to 15 March 2019
- 26 March to 1 April 2019
- 21 May to 24 May 2019
- 27 May to 31 May 2019
- 3 June 2019

Additional surveys were conducted between November 2018 and June 2019 to achieve the level of survey sampling indicated in the proposed methodology (Appendix 4: Warragamba Dam Wall Raising: Assessment Methodology).

Noteworthy constraints to the surveys were weather conditions sometimes restricting access to the Special Areas due to rainfall and fire danger. Access to some areas of the survey area was also limited due to the low level of Lake Burragorang which made boat access to upper dam areas difficult. In all cases of constraints surveys were conducted at later dates.

Full details of the cultural heritage survey and the survey coverage are provided in the AR (Appendix 1: Archaeological Report), and a full record of contributors and advisers during the survey are provided in Appendix 11: Consultation Records.

6.4 Stage 4 – Review of Draft Report

6.4.1 First draft report

In accordance with the Consultation Guidelines, a draft of this ACHA was provided to all RAPs listed in Table 3 for review and comment on 4 July 2019. The closing date for comments was 5.00 pm 16 August 2019. The written responses received are included in their entirety in Appendix 1 of this report. During the draft ACHA review period, all RAPs were invited to attend an information session at the Tharawal Local Aboriginal Land Council on 22 July 2019.

There was a meeting held prior to the release of the draft report to discuss the nature of information that would be released with the draft ACHAR.11 April 2019 and 27 June 2019 presentation to ILUA committee.

6.4.2 Comments received on first draft report and their consideration

Comments on the first draft ACHA received during the 42-day review period (Section 5.3) included those from the following RAPs:

- Corroboree Aboriginal Corporation
- Cubbitch Barta Native Title Claimants
- Darug Custodian Aboriginal Corporation
- Darug Land Observations
- Gundungurra Aboriginal Heritage Association Inc.
- Illawarra Local Aboriginal Land Council
- Koolkuna Elders
- Muragadi Heritage indigenous Corporation
- Murra Bidgee Mullangari Indigenous Corporation
- Kazan and Taylor Brown

The comments received are summarised in Appendix 7: Written comments by RAPS in regards to the ACHA and full copies of the submissions are included in Appendix 11: Consultation Records.

As part of the review process of the ACHA the offer of one-on-one face to face meetings and telephone conferences to discuss the draft report and aspects of the project with the RAPs was made.

There were two RAPs who were supportive of the Aboriginal cultural heritage assessment, however the majority of the comments received from the RAPs were unsupportive of the Project and the Aboriginal cultural heritage assessment that had taken place. The main issues raised in the comments are summarised below:

- The Project represents a cumulative impact and continuation of the loss of values from the original Warragamba Dam construction and flooding of the Burragorang Valley.
- Given the size and scale of the Project, and the length of the Aboriginal Cultural Heritage Assessment Report not enough time was allowed for review.
- The cultural heritage survey did not cover enough of the potentially impacted area.
- Inaccessible areas should be accessed for appropriate survey coverage to be achieved.
- The Draft Report failed to capture the high significance of the area, and the relationships of sites to each other and the landscape.

- Culturally important objects should be left on country, not moved off country.
- Mitigation of harm via contribution to the broader communities understanding of the Aboriginal heritage of the Burraborang Valley was not appropriate.
- The Draft report failed to convey the importance of the cultural landscape and its values.

In response to these comments, it was agreed that further cultural heritage survey would be required prior to the Project proceeding. A more detailed cultural values assessment was undertaken and is summarised herein and included in full as Appendix 2: Cultural Values Assessment Report.

6.5 Consultation for Cultural Values Assessment

In September 2020 Waters Consultancy were engaged to undertake an (intangible) cultural values assessment. On 19 October 2020 the proposed cultural values assessment methodology was sent to the twenty-two RAPs for review and comment by 2 November 2020. One verbal and six written responses to the proposed cultural values assessment methodology were received and these were addressed in the finalised methodology. On 4 November 2020 Waters Consultancy sent an email to all RAPs including a summary of the comments provided on the proposed cultural values assessment methodology, the finalised cultural values assessment methodology as an attachment, and a request for nomination of Aboriginal cultural knowledge holders by 13 November 2020. On 12 November 2020 Waters Consultancy sent an email to all RAPs acknowledging NAIDOC Week and extending the timeframe for the nomination of Aboriginal cultural knowledge holders to 20 November 2020. Telephone and/or email contact was made with the RAPs between 19 October and 13 January 2021 with conversations occurring in relation to the proposed cultural values assessment methodology, the nomination of Aboriginal cultural knowledge holders, and wider concerns regarding the assessment process and the Project.

On 13 January 2021 in a further attempt to facilitate engagement Waters Consultancy sent an email to all RAPs stating that the CVAR was due to be produced and while respecting the concerns raised regarding control of cultural knowledge any contribution that RAPs wished to make to the assessment process would be very welcome. The majority of RAPs declined to nominate Aboriginal cultural knowledge holders on the basis that they did not trust the intent of the Proponent or the assessment process. Those individuals nominated as Aboriginal cultural knowledge holders chose not to participate due to the wider concerns regarding the Proponent and the assessment process.

Despite the decision not to actively engage with the assessment process, it is important to note that the majority of the RAPs expressed their high level of concern regarding the potential impacts of the Project and their understanding of the Project as situated within a cultural landscape with a very high level of significance in relation to both intangible and tangible cultural values.

The draft CVAR, produced through an assessment of available documentary materials, was provided to all RAPs for review on 6 April 2021 with the comment periods closing on 4 May 2021. Two written comments were received on the draft CVAR. In addition, feedback was received from RAPs at a face-to-face meeting on 1 June 2021. The comments and feedback received resulted in amendments to the recommendations, revision of significance assessment for one cultural theme, further research on one identified cultural place, additional consideration of ecological values.

6.6 Continuation of the consultation process

Since the initial review of the draft ACHA report the consultation process has continued throughout the project. Project updates have been sent to the RAPs on 16 April 2020, 21 September 2020, 11 February 2021 and 31 March 2021 to ensure the groups are kept up to date with how the Project assessment process is continuing.

Further to the afore mentioned face to face meetings in relation to the methodology and the Draft ACHA report for the Project, WaterNSW invited all the RAPs to attend a facilitated site visit for 16 December 2020. This site inspection was coordinated as a courtesy by WaterNSW to provide RAPs the opportunity to visit the Warragamba Special Area since the bushfires and for those RAPs who may not have access consents. Due to the catchment being closed following a rain event the visit was rescheduled to 6 February 2021. Four RAP groups confirmed that they would attend, however only Gundungurra Traditional Owner Kazan Brown attended on the day, and the boat trip proceeded to the upstream sites nominated by Kazan.

6.7 Review of revised draft report

A copy of the draft report was made available to all RAPs on 29 April 2021, the close off date from this review was 16 June 2021. As per the consultation guidelines there was a period of at least 28 days (48 days were used) for review and comment on the report. A meeting was held at Warragamba Dam Visitors Centre on 1 June 2021 to discuss the latest draft report. The attendees of this meeting were:

- Kazan Brown and Taylor Clark - Gundungurra Traditional Owners
- Cubbitch Barta Native Title Claimants
- Wori Woilywa
- Kamilaroi Yankuntjatjara Working Group

During this meeting an overview of the project and its status was presented before an open discussion was held regarding the details and recommendations presented in the Draft ACHA, Draft AR and Draft CVAR. Details of what was discussed at this meeting are included in Appendix 11.

The following additions/amendments to this Aboriginal Cultural Heritage Assessment Report were agreed at the meeting:

- Inclusion of a clear statement that the Registered Aboriginal Parties do not support the project
- Updated detail in the final recommendations of the report

6.7.1 Review of final report

A copy of the final ACHA Report, AR and CVAR will be made available to all RAPs.

6.8 Continuing consultation

Consultation with the RAPs is planned to continue throughout the assessment period of the Warragamba Dam Wall Raising Project EIS.

During this period WaterNSW will continue to consult with and work with all RAPs with regard to the Project, providing the opportunity for further review and additional comment on the final ACHA Report as well as any other part of, or matter arising from the Project EIS.

7. Summary and analysis of background information

The assessment has confirmed that Aboriginal people and communities maintain a strong cultural relationship with their traditional lands and the sites, places and connections that form the cultural landscape within which the study area is situated. Places and sites associated with the area and discussed in this assessment are presented in Figure 4, Figure 5 and Figure 6.

Six strands of distinct but interrelated cultural value were identified during the cultural values assessment:

- Gurrangatch-Mirrigan Dreaming Track
- Buru (Kangaroo) Dreaming Story Places
- Living Places (history of occupation and use)
- Cultural Places (ritual life)
- Archaeological Sites (tangible record of traditional occupation and use)
- Waterways (the Wollondilly, Nattai, Warragamba, and Coxs Rivers and their tributaries)

As well as these six unifying themes the CVAR also identified 45 locations or sites of cultural value in the Study Area. These included:

- 19 locations relating to the Gurrangatch-Mirrigan Dreaming Track
- 2 locations relating to the Buru (Kangaroo) Dreaming Story
- 10 living places including former Aboriginal Reserves, a school, farm selections and camping places
- 14 cultural places including burial sites, story sites and archaeological site complexes

The AR details the Aboriginal archaeological sites and cultural places that were located during the project survey activities, and the archaeological sites recorded prior to the Project on the AHIMS register. Appendix 9 presents some representative photographs of the types of sites present in the Study Area. There were 334 sites recorded within the Study Area and adjoining lands, comprising:

- 1 Aboriginal Ceremony and Dreaming site
- 4 Aboriginal Resource and Gathering site
- 2 stone arrangement
- 1 waterholes
- 2 water hole and ceremony and dreaming site
- 241 archaeological sites in an open context
 - 8 sites with axe grinding grooves only
 - 21 open sites containing a single artefact
 - 195 open sites containing between 2 and (an estimated) 100s of artefacts
 - 5 scarred trees
 - 12 open sites with multiple features (either some or all of artefacts, grinding grooves or scarred trees)
- 83 archaeological rockshelter sites
 - 3 rockshelters with art only
 - 31 rockshelters with art and other features (either some or all of artefacts, axe grinding grooves or deposit)

- 49 rockshelters with either one, some or all of the features artefacts, deposit, axe grinding grooves and tool marks

In addition to these results, based on the 2,655 ha survey of the study area the AR estimated there would be a total of 174 archaeological sites within the PUIA and 370 above the PUIA, and 578 sites within the EUIA, including below the FSL of Warragamba Dam. The survey sampled an area of 464 ha of the 1,401 ha PUIA (approximately 33% sample coverage of the impact zone). Notably, in their previous consideration of a proposal for further inundation of the area, Brayshaw McDonald (1989: 32) recommended that:

To determine accurately the extent and composition of the [tangible cultural heritage] resource it would be necessary for further field survey to be carried out, achieving coverage to the order of >30% of the impact zone. This would provide the basis for a management strategy for the area.

The proportion and distribution of these predicted sites would be expected to be similar to the 334 sites that are known, with open sites being present across the whole area but more frequent in the less hilly country of the south of the study area, and rockshelters similarly being present across the study area, but more frequent in the northern parts (Figure 4).

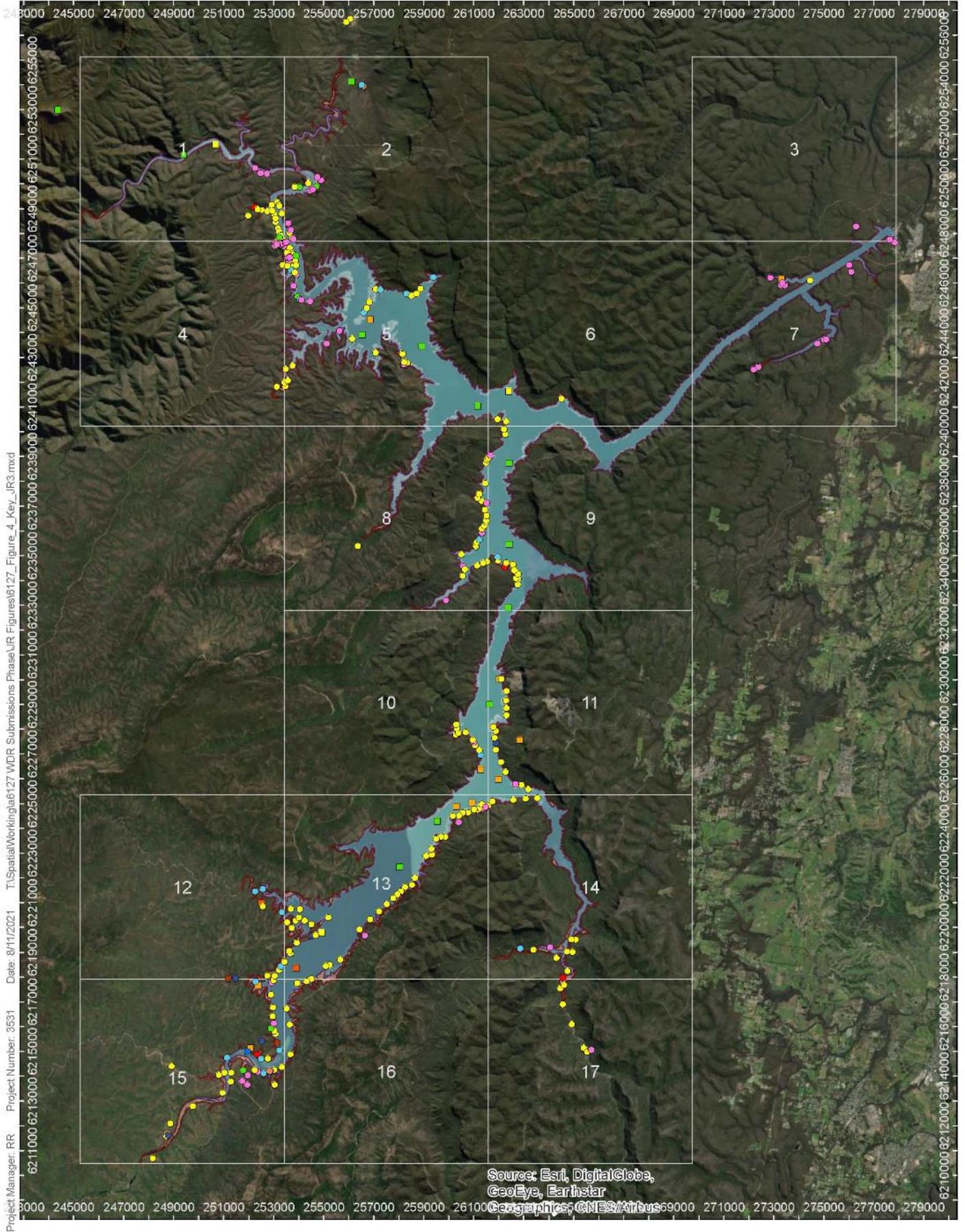
The AR presented an archaeological landscape predictive analysis. This analysis extrapolated the survey results at a landscape scale using the frequency of known site occurrence on mapped soil landscape units. Open sites and rockshelters were the focus of this predictive analysis because other sites such as scarred trees, axe grinding grooves and stone arrangements, for example, did not have enough known examples to allow confident prediction. Rather, it should be assumed that scarred trees, axe grinding grooves, stone arrangements and resource and gathering sites may be expected to be present across the Study Area, in similar frequencies to the known examples. A summary of the predictive model from the AR is presented in is reproduced in Table 9.

	EUIA*		PUIA		Above PUIA	
	Open sites	Rockshelters	Open sites	Rockshelters	Open sites	Rockshelters
Total (includes known sites)	458	109	117	51	285	80
Other known archaeological site types	11		6		5	
Archaeological site prediction for area (includes known sites)	578		174		370	

*This prediction includes the area below FSL, hence the large number of predicted sites

Table 9. Summary of the archaeological landscape predictions made in the Archaeological Report

There are 43 known archaeological sites are within the PUIA, which will be affected by the project should it proceed. Based on the sample derived from the archaeological survey it is estimated there are a further 131 predicted archaeological sites in the PUIA, resulting in a predicted total of approximately 174 archaeological sites within the entire PUIA.



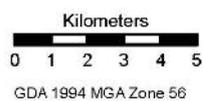
Drawn by: GT

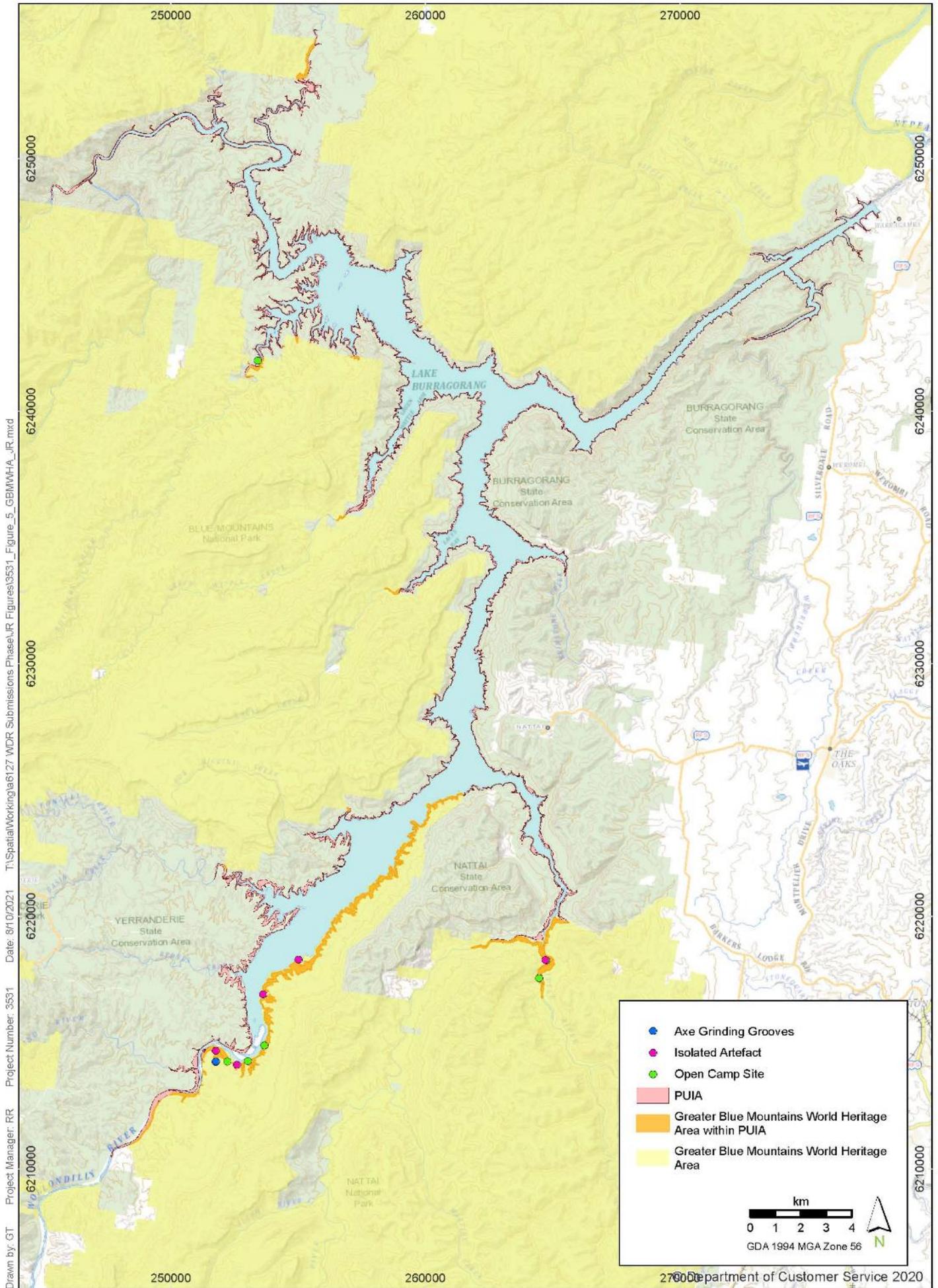
Map Key for Appendix 6

Aboriginal cultural heritage sites and places in relation to PUIA and EUIA

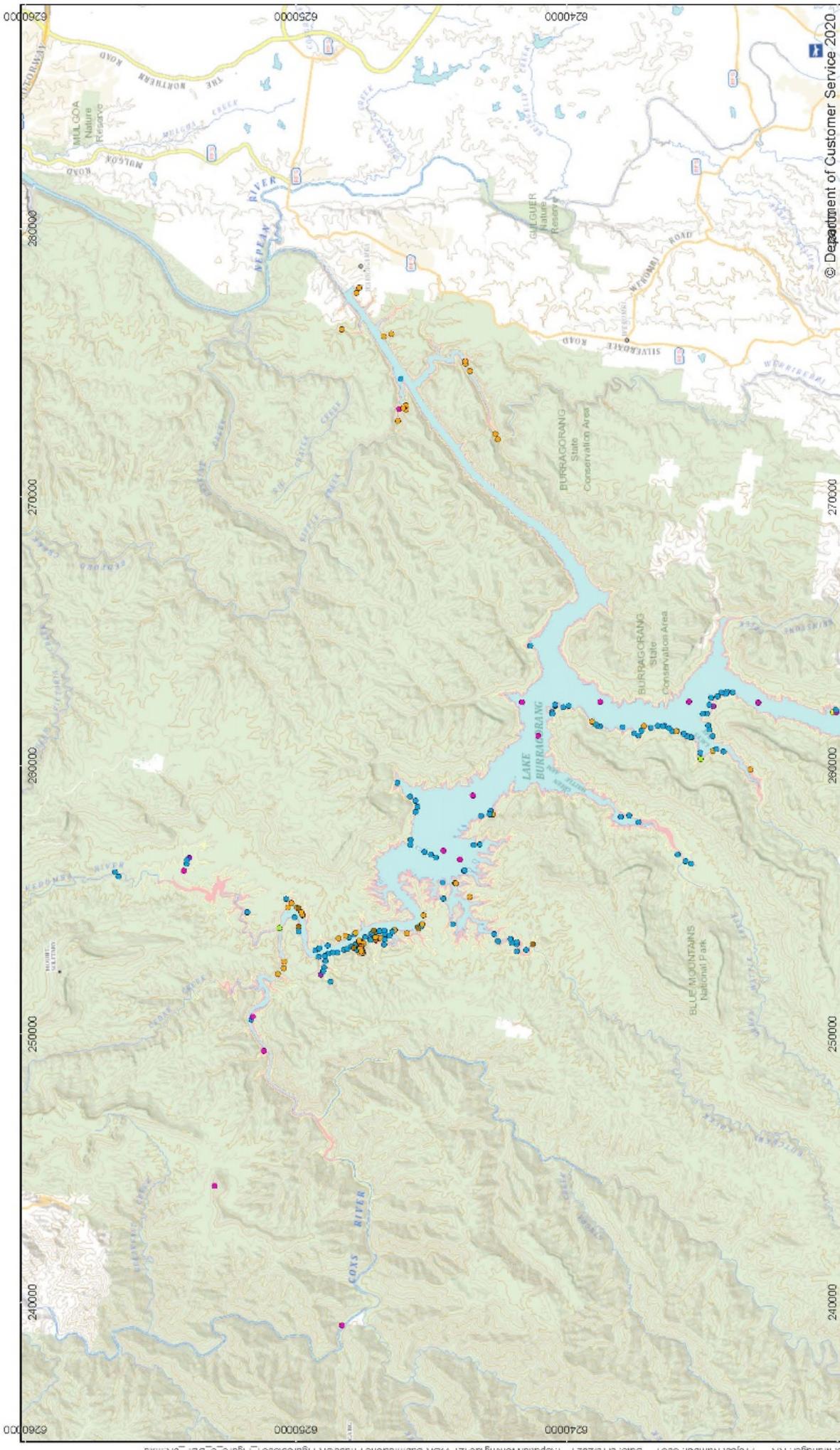
Warragamba Dam Raising ACHA

FIGURE 4





The PUIA and the Greater Blue Mountains World Heritage Area



© Department of Customer Service 2020
GDA 1984 MGA Zone 56

Aboriginal Heritage Sites (AHS)

- Aboriginal Resource and Gathering
- Art (Pigment or Engraved)
- Open sites (artifacts, grinding grooves, multiple features)

Aboriginal Heritage Sites

- Axe Grinding Grooves
- Aboriginal Ceremony and Dreaming
- Aboriginal Resource and Gathering

Cultural Values Assessment sites and places

- Axe Grinding Grooves
- Open sites (artifacts, grinding grooves, multiple features)
- Rockshelter sites (art., grinding grooves, artifacts, multiple features)
- Water Hole

Cultural Values Assessment sites and places

- Cultural Values Assessment sites and places
- PUIA
- Study Area

km
0 1 2 3 4 5

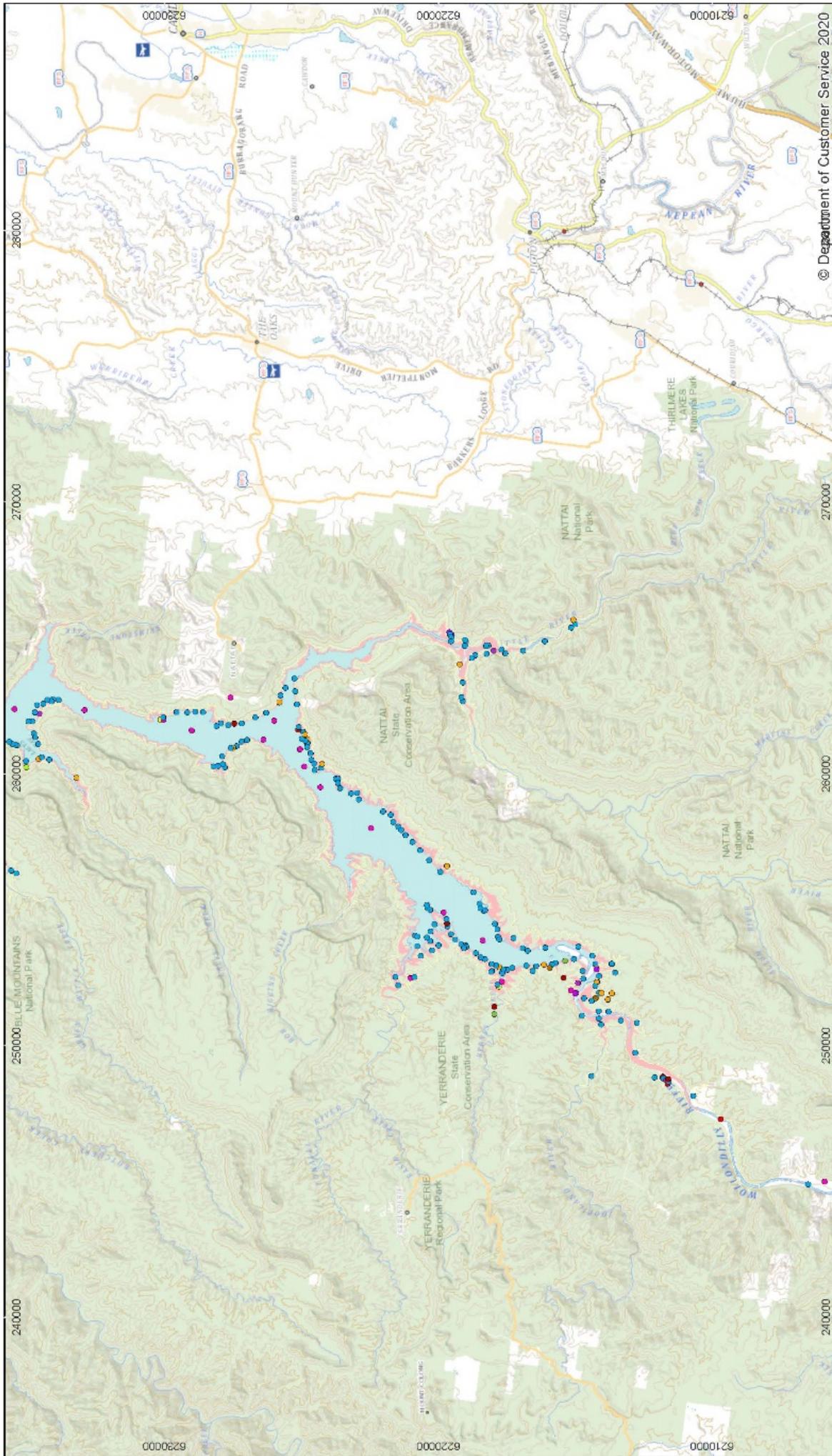
North Arrow

Aboriginal Cultural Heritage Sites, the Study Area and the PUIA

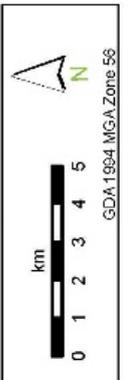
Warragamba Dam Raising ACHA

FIGURE 6 :1





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- Aboriginal Heritage Sites (AHIMS)**
 - Aboriginal Resource and Gathering
 - Art (pigment or engraved)
 - Art (relief or engraved)
 - Open sites (artefacts, grinding grooves, multiple features)
 - Burial
- Aboriginal Heritage Sites**
 - Axe Grinding Grooves
 - Scared Tree
 - Water Hole
 - Aboriginal Resource and Gathering
- Cultural Values Assessment sites and places**
 - Axe Grinding Grooves
 - Open sites (artefacts, grinding grooves, multiple features)
 - Scared Tree
 - Rockshelter sites (artefacts, grinding grooves, multiple features)
 - Stone Arrangement
- Cultural Values Assessment sites and places**
 - Water Hole
 - Cultural Values Assessment sites and places
 - PUJA Study Area

Aboriginal Cultural Heritage Sites, the Study Area and the PUJA
 Warragamba Dam Raising ACHA
FIGURE 6 : 2



Drawn by GT Project Manager: RR Project Number: 3531 Date: 8/10/2021 T:\spatial\work\6at127 WDR Submissions Phase\UR Figures\3531_Figure_6_DDP_JR.mxd

The information collected during the assessment records the deep connection and continuous use of the landscape by Gundungurra people. The cultural landscape history is contributed to by the Gurrangatch-Mirrigan and Buru (Kangaroo) Dreaming Stories. As described in the CVAR:

The patterns of movement of mythological beings and of Aboriginal people, traditionally and historically, create a complex interlinked series of places and cultural routes or pathways. Cultural routes or pathways link together nodes in the landscape that are related to resource rich areas, mythological movement patterns, and places of ceremonial and spiritual importance. Cultural routes or pathways extend through the Country of neighbouring groups, linking people and places together in a complex network of social and ceremonial connection.

There are many sites and locations associated with the Dreaming Stories that are reflective of these nodes in the cultural landscape. Within the study area waterholes (many within the EUJA) describe the creation of Country, the activities of Ancestral, while also transmitting ‘a depth of detailed social, cultural, ecological, and religious information about this Country’. This information is vital to the cosmological and utilitarian use of the landscape by Aboriginal peoples.

Archaeological evidence demonstrates that Aboriginal people have been in the Sydney area for many tens of thousands of years (Attenbrow 2010: 21). The oldest archaeological sites in the Blue Mountains are similarly ancient. The Kings Table rockshelter site near Wentworth Falls has been dated to approximately 26,000 – 30,000 years before present (22,300 +/- 1900 radiocarbon years ago). This is a time during the height of the last ice age when the environment was much drier than today, although the Blue Mountains would have still received comparatively greater rainfall than surrounding areas (Stockton and Merriman 2009). While there are no dates in closer proximity to the study area, there is no reason at all not to expect that the Burratorang Valley and the major rivers feeding it would have been being occupied by Aboriginal people at this time.

Archaeological evidence from the study area and surrounds highlights the social (rock art sites and dreaming sites) and utilitarian use and occupation of the slopes and sandstone shelter formations within the Burratorang Valley, above the drainage lines which for the most part is now submerged under the EUJA. A diverse assemblage of sites and features is present: rockshelters with art, archaeological deposit, axe grinding grooves as well as open sites containing stone artefacts and scarred trees. Appendix 9: Representative photos of Aboriginal cultural heritage sites contains illustrative pictures of some of the archaeological sites visited by the survey team during the archaeological assessment.

Interpretation of the archaeological evidence indicates that Aboriginal people were living in the area for many millennia and over the course of this time conducting day-to-day utilitarian activities in the landscape traversed by the study area. The archaeological sites present within the study area and surrounds inform us about day-to-day activities like hatchet sharpening, the manufacture of wooden tools and items and of course the gathering, processing and sharing of food (grinding grooves, grinding patches within shelters, stone artefacts and scarred trees and in particular hatchets such as those found at Warragamba-288 are all evidence of these aspects of daily life). In addition, the archaeological sites, and the cultural sites and stories remind us of the ceremonial and other socially important aspects of life that were happening across this time: artistic expression, indicating ceremonial or other socially and culturally important purposes, such as education and the sharing of knowledge contained within the story of the Gurrangatch- Mirrigan Dreaming Track.



Plate 8. An 1826 travelling party in south-east NSW. While obviously depicted from the coloniser's perspective, such vignettes add a dimension to archaeological interpretation. In this instance there are examples of material culture that does not preserve archaeologically (huts/shelters, spears and clothing) and things we see in the archaeological record today and that are part of the cultural landscape (scarred trees, a stone hatchet, remains of fireplaces, the importance of waterways) (Source: State Library NSW).

8. Cultural heritage values and statement of significance

8.1 Overview

The cultural heritage values and statement of significance presented below are derived from the CVAR (Appendix 2: Cultural Values Assessment) and the AR (Appendix 1: Archaeological Report). This part of the report does not restate detailed information on individual sites or places (this detail is contained in the CVAR and AR) but rather aims to summarise and present the reasons why places are of value, and how these places are woven together to form the cultural landscape within which the Project is situated.

Six strands of cultural value have been identified within the study area, as described in the CVAR. These individual strands of value share dynamic inter-relationships which speak to the formation, maintenance and on-going significance of the cultural landscape the study area transects. Each of the six strands of value are contributory aspects of the cultural landscape, and each strand variously incorporates tangible and intangible values. The six stands of cultural value identified are:

- Gurrangatch-Mirrigan Dreaming Track
- Buru (Kangaroo) Dreaming Story Places
- Living Places (history of occupation and use)
- Cultural Places (ritual life)
- Archaeological Sites (tangible record of traditional occupation and use)
- Waterways (the Wollondilly, Nattai, Warragamba, and Coxs Rivers and their tributaries)

These strands of value demonstrate that the Burratorang Valley, including the project study area which intersects it, is a rich cultural landscape of interwoven tangible and intangible cultural heritage values. It is a cultural landscape actively occupied by Aboriginal people, their ancestors and their Dreaming and despite the permanent flooding in the 1960s it continues to be spiritually and physically occupied by Aboriginal people today.

The cultural landscape within which the study area and its surrounds sit are of great importance to the contemporary Aboriginal community.

We are representatives of the Riley family from the Burratorang Valley, descendants of Dundowra (George Riley) a Gundungurra man and his wife an Aboriginal woman named Ellen. Their son John Joseph Riley lived on a selection at burnt flat before moving and settling at Gungarlook in upper Burratorang valley, with his many children. Many branches of the family lived, worked and died at Gungarlook farm. Many of us have had an unbroken connection with the valley, continuing to visit areas important to our family to this day. After construction of the dam our grandfather Johnny Riley continued to visit the valley with male members of the family, where they camped, learnt stories and the way of the Gundungurra men. Since then, we have collected reeds for weaving at Reedy creek, visited burnt flat and the "birthing rock" where many of John Josephs children were born on and visited the valley at every chance we have had. My children have been told the dreaming stories of the valley while visiting. Our connection today is strong and continuous.

Ms Kazan Brown Gundungurra Woman from the Burratorang Valley

All of the sites are of high cultural significance to the Aboriginal people who have a connection to the Valley, and beyond. They give us our connection to our ancestors and their way of life. We are still here today because of them. All of these sites tell stories of our ancestors, there is more than one story in that landscape, and the right people will be able to tell those stories. These stories are our culture and our lore, they are what Aboriginal people live their lives by.

Mrs Glenda Chalker Cubbitch Barta Native Title Claimants



Plate 9. An evocative and highly representative view of the study area taken during the survey. A sandstone escarpment sits above the eucalypt forest on the mid and lower slopes, and the interface of the PUIA and EUIA – which sits above the living treeline.

The information from this project is highly significant to the Darug people as once these sites are lost, there is no other evidence of the sites or connections. The continued occupation and the complex of very significant sites shows the significance of this landscape to the Darug people. The archaeology and oral history demonstrates that Darug people stayed in the area for thousands of years ago to the present time.

Ms Justin Coplin-Darug Custodian Aboriginal Corporation

The tangible and intangible values contained within the area represent our history, spirituality and our very being. Flooding this landscape not only destroys individual sites but harms us and continues the process of dispossession.

Ms Kadi Khan Kamilaroi- Yankuntjatjara Working Group

8.2 Archaeological significance

The AR assessed the scientific significance of each individual site covered by the project, using the principles set out in the *Burra Charter* and the framework provided in the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NSW NPWS 1997). The assessment of significance is summarised below and explained fully in the AR.

For the entire assemblage of 334 sites considered by the assessment (this includes sites in the PMF, the EUIA, the PUIA and adjoining lands):

- 40 sites were assessed to be of high archaeological (scientific) significance (including 1 on adjoining land)
- 22 sites were assessed to be of moderate archaeological (scientific) significance (including 1 on adjoining land)
- 272 sites were assessed to be of low archaeological (scientific) significance (including 16 on adjoining land)

For the 43 sites within the PUIA:

- 5 sites were assessed to be of high archaeological (scientific) significance
- 3 sites were assessed to be of moderate archaeological (scientific) significance
- 35 sites were assessed to be of low archaeological (scientific) significance

While individual, site specific assessments of scientific significance are useful for identifying and managing sites with high apparent and contributory values they do not always translate directly to a contribution to the wider cultural landscape (Guilfoyle 2006). The RAPs for this project have consistently said that all archaeological sites hold cultural values in addition to, and in most cases beyond, what may be expressed using a scientific framework. These further values of the archaeological sites are discussed and considered in a more wholistic cultural landscape in the significance assessments below.

8.3 Cultural value significance

The CVAR did not provide individual statements of significance for sites and places identified within the study area. Rather, in its consideration of both tangible and intangible values the CVAR seeks to assess: *“The cultural landscape, or Dreaming Country,... understood as a whole rather than a series of disconnected points.”* The cultural values assessment was informed by the principles of the *Burra Charter* and the five qualities of values identified therein: aesthetic, historic, scientific, social and spiritual, noting that for Aboriginal cultural heritage assessment the key values are the social, spiritual and historic. The identified cultural values were grouped into six strands that include within them multiple specific locations of cultural value.

The Gurrangatch-Mirrigan Dreaming Track

Very High Significance

The Gurrangatch-Mirrigan Dreaming Story tells of the two Ancestral Beings, Gurrangatch and Mirrigan, whose travels created the Wollondilly and Coxs Rivers, as well as creeks, waterholes, and caves in the region. The Gurrangatch-Mirrigan Dreaming Story is an elucidation of the creation of the landscape through which they travelled. The Dreaming Track consists not only of the specific waterholes and locations but of the entirety of the Wollondilly River and Coxs River valleys as the rivers were themselves formed through the actions of Gurrangatch and Mirrigan. The entirety of the current Project is located within the cultural landscape created by the travels of the Ancestral Beings of Gurrangatch and Mirrigan. The Gurrangatch-Mirrigan Dreaming Track maps those elements of the Gurrangatch-Mirrigan Dreaming Story that are located in or adjacent to the Study Area. The Gurrangatch-Mirrigan Dreaming Story holds cultural value for contemporary Aboriginal communities across a wide region stretching from the coast through the Blue Mountains and onto the inland plains. The Gurrangatch-Mirrigan Dreaming Story is an exceptional example of a well-documented traditional Dreaming Story with multiple known cultural locations and on-going transmission and active cultural value for the Aboriginal communities of the wider region.

The Buru (Kangaroo) Dreaming Story Places and the associated areas of the Burragorang Valley

Very High Significance.

The Buru (Kangaroo) is the source of the Burragorang Valley's name. The Valley is associated with a Buru (Kangaroo) Dreaming Story that tells of a battle between the Great Kangaroo and two Ancestral Beings and is linked to the Kangaroo Waterhole in the Wollondilly River where the Great Kangaroo hid. There is also a Buru (Kangaroo) Dreaming Story that tells of the creation of the Kangaroo and is linked to the area running west from the Wollondilly River towards Yerranderie and Alum Hill. The Burragorang Valley area is also a place that was known as an important resource area for Kangaroos and associated with the maintenance of the species.

The Living Places

High Significance

The Living Places as a group are of High Significance in illustrating the history of Aboriginal people's occupation and use of the area. The locations identified as Living Places illustrate aspects of the history of Aboriginal people's occupation of the Study Area. They include an important traditional living place and a number of Aboriginal reserves with distinct histories that contribute to our understanding of the complex patterns of Aboriginal people's attempts to remain on Country in the face of dispossession and of those communities' engagement with European communities, religious organisations, and government agencies. Assessment of the varied levels of cultural value and significance that apply to individual Living Place locations cannot be undertaken without input from the Aboriginal community. However, a number of the Living Places can be highlighted for their broader historical significance. Place 1 is amongst the small group of reserves created in the 1870s in New South Wales as a result of Aboriginal people's active pursuit of rights to land and as the location of an Aboriginal community into the early 1900s. Places 4 and 5 exemplify the successful engagement of Aboriginal families in small-scale farming within their own Country and aspects of the shared Aboriginal-European history of a small agricultural community. Places 6 and 7 provide an insight into an Aboriginal community's interaction with Catholic officials and community, the development of a small independent Aboriginal farming community in the late 1800s, and the ongoing fight by Aboriginal people to retain rights to land. Place 8 is an example of a large-scale traditional living place

that continued to be utilised in varying residential forms into the 1900s that is also linked to William Russell as a significant historical figure.

The Cultural Places

High Significance

Description: The locations identified as Cultural Places illustrate aspects of the traditional cultural life and activities of Aboriginal people in the region. They include Story or Dreaming places, art sites, and burial sites and illustrate the depth of cultural values that are present within the study area. They are indicative examples taken from the available documentary record and it is considered that engagement from Aboriginal cultural knowledge holders would identify further Cultural Places. Assessment of the varied levels of cultural value and significance that apply to individual Cultural Place locations cannot be undertaken without input from the Aboriginal community. However, a number of points can be made regarding the cultural values of the mapped locations. Places 1, 2, 3, 4, and 5 are burial sites with traditional ritual features and as such are considered to be of marked cultural value. Place 9 is a shelter site with seventy to one hundred art motifs on its walls and ceilings; these artworks provide a direct visual link with the rich cultural life of the Aboriginal people who created it. Places 10 and 11 are a landform that is rich in the material traces of Aboriginal people's occupation of the area, including multiple art sites, and is likely associated with ritual activities. Place 13 includes six scarred trees, a form of modified cultural object, that hold significant cultural value to contemporary Aboriginal people.

The Archaeological Sites

High Significance

The Archaeological Sites are understood as a group as being of High Significance as a tangible record of traditional Aboriginal occupation and use of the landscape, particularly in the period prior to European invasion and influence on the Gundungurra lands. In a report commissioned over thirty years ago by the NSW Water Board, the agency then responsible for the management of the Warragamba Dam catchment, the archaeologist Helen Brayshaw made a number of management proposals in relation to a potential raising of the Warragamba Dam wall including the, *"Appointment to the Water Board of an Archaeological Project Manager and assistant from the local Aboriginal community for 12-18 months to develop, on the basis of further investigation, a Plan of Management. A steering committee should be appointed to oversee its implementation, which is likely to involve a 2-3 year salvage project. Local Aboriginal communities retain strong links with the area and should be represented on the committee."* The Archaeological Assessment for this project has documented 334 sites within the immediate area of the project and estimated that over 1,200 archaeological sites would be present in the immediate cultural landscape. The archaeological record of the area includes a diverse assemblage of sites and features, from individual stone artefacts and scarred trees in open country to more 'complex' sites such as rockshelters and open sites with combinations of archaeological and cultural features. All archaeological sites hold some level of cultural value for the Aboriginal people whose Country they are located in. This reflects the cultural understanding of Aboriginal peoples that the archaeological sites are the material traces of their ancestors' presence and cultural activities. The linking of the archaeological material in the study area with a history of ongoing Aboriginal occupation and connection to the area, dating back to at least the last ice age, as well as with extant knowledge of cultural routes and Dreaming Stories, acts to increase its cultural value and significance.

The Waterways

Very High Significance

Water and Waterways are central to the cultural values of Country. In an exploration of the role of water in defining complex attachments to place, the anthropologist Sandy Toussaint stated: *“That a hydro- and ecological change in how a water source is used can lead to a change in how people relate to it encompasses a range of culturally complex issues, including that water is engendered with a variety of meanings. Identity formation and kinship affiliation can also be determined through research on water, as can knowledge about contested usage, and patterns of migration to and from temporary and permanent water places.... local groups become attached to sources of water beyond water’s obvious nourishing, life-giving force. This is especially the case when water sources are endangered, and cultural ideas, beliefs and activities collide.”* Successful traditional occupation of this Country required detailed knowledge of waterways, their seasonal and long-term changes, and the flora and fauna associated with and dependent on them. Water and waterways governed Aboriginal people’s choice of living places, travel routes, and gathering places for cultural and ceremonial activities. Riverine resources were a vital element of the traditional Aboriginal economy of the region and continued to be utilised throughout the historical period and into the present day. The waterways of the area are central elements of the cultural landscape; the Gurrangatch- Mirrigan Dreaming Story that tells of the creation of this Country is focused on the waterways.

8.4 The Greater Blue Mountains World Heritage Area heritage values

The Burratorang Valley is surrounded by the GBMWhA. The GBMWhA is inscribed as world heritage based on outstanding universal values associated with significant ecological and biological processes, and the in-situ conservation of natural habitats and biodiversity, including threatened species (Criteria IX and X). Australia’s nomination of the GBMWhA to World Heritage List also included the identification of cultural values, including Aboriginal heritage values associated with the Burratorang area.

The Burratorang Valley comprises the southern part of the GBMWhA. This southern part is of particular importance in the context of the wider GBMWhA and its associated cultural values. This is because oral histories from this region have survived invasion and continue to tell the stories of the cultural landscape, contributing to the mosaic of individual but interrelated components (as also identified in the CVAR):

Gundungurra, Daruk and Darkinjung are languages originally spoken in the nominated area. Each group had stories to explain the creation of humanity, local flora and fauna and their country’s landscapes. Only the Gundungurra stories were recorded in any detail. The Gundungurra tale of the epic journey of Gurrangatch (Rainbow Serpent) and Mirrigan (a quoll) explains the origin of the great valleys of the Wollondilly and Coxs Rivers whose catchments form most of the southern portion of the nominated area. (GBMWhA Nomination)

The associated cultural values of the GBMWhA are within the scope of what is identified within the CVAR and AR for the project. In addition, however, the World Heritage Values identified and extending from the natural environment protected within the GBMWhA also contribute to this cultural value. As with the heritage value captured in the Waterways strand of value in the CVAR the maintenance and enhancement of high biodiversity and a healthy natural environment within the protected areas of the GBMWhA is of high cultural importance to the RAPs. An added and important cultural dimension, particularly in the case of the Burratorang Valley, is that it is part of a cultural landscape which was known for its abundance of

resources and capacity to host large, important gatherings of Aboriginal people, thus playing a valuable social and cultural role in peoples' lives.

To the Gundungurra Aboriginal people, their cultural heritage is inseparable from individual plants and animals to ecosystems...the land and waterways which are associated with dreaming stories and the spirituality and cultural learning that link Aboriginal people with who they are and where they belong.

Ms Kazan Brown Gundungurra Woman from the Burratorang Valley

While the PUIA contains only 304ha of GBMWSHA land (a proportion of 0.03% of the total GBMWSHA area) it contributes overall to the GBMWSHA cultural values as it is a cultural landscape with a rare and representative example of the interconnectedness of tangible and intangible values.

Further details relating to the GBMWSHA are presented within the EIS.

8.5 Statement of Significance

The statement of significance brings together the identification and assessment of values from the AR and CVAR, along with a consideration of the World Heritage Values, to produce a concluding statement of significance in accordance with *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*, OEH 2011.

8.5.1 Social and Cultural Significance

The study area is of very high social and cultural significance to the Aboriginal community. There are multiple strands to the social and cultural values of this landscape that include the Dreaming Stories that carry religious and cosmological meaning, the values and meanings of the Waterways and ecology of the region, the long history of traditional occupation and use of Country, and the more recent history of ongoing attempts to maintain connection to Country in the face of dispossession. These aspects weave together to create a broad associative cultural landscape that is of very high significance to the Aboriginal communities of the region and to the wider understanding of Aboriginal cultural heritage and history. As part of the Blue Mountains and Greater Blue Mountains World Heritage Area the study area also has social significance for non-Aboriginal stakeholders.

8.5.2 Aesthetic Significance

The aesthetic values of the study area are high. The values are demonstrated by the area's environmental intactness, its status as a world-renowned tourist destination and World Heritage Listing. This environmental intactness is due to the ruggedness of the landscape precluding historical development, the protection of the area by surrounding National Parks and other protected lands and the area forming part of the WaterNSW catchment area of the greater Sydney region (noting that this protection came at the expense of flooding the Burratorang Valley and tributaries). The study area's cultural landscape is located within the internationally emblematic and striking natural landscapes of the Blue Mountains: sandstone escarpments, eucalypt forest and wild rivers. This aesthetic landscape is an ever present, unmistakable and evocative setting when visiting the study area, contributing a strong sense of natural beauty and place, and forming a distinctive interwoven element of the Aboriginal cultural values of the area.

8.5.3 Historic Significance

The landscape surrounding the Warragamba Dam is of high historic significance for Aboriginal and European cultural heritage. The Burratorang Valley demonstrates several representative aspects of historic

importance including the history of colonial interactions between Aboriginal peoples and the British. The deep history of occupation and use of this Country by Aboriginal people is evident in the archaeological record, oral histories, and Dreaming Stories. The study area provides a rare example of a shared history of Aboriginal and European occupation and community interaction within the intensively settled east coast of Australia in the nineteenth and twentieth centuries. The recent history of ongoing occupation and use of the area by Gundungurra and neighbouring peoples illustrates the continuance and nurturing of culture and connection to Country despite the impacts of dispossession including the original construction of the Warragamba Dam.

8.5.4 Scientific (Archaeological) Significance

The study area has high scientific (archaeological) significance. There were 334 identified Aboriginal archaeological and cultural heritage sites in the Study Area and adjoining lands. The assemblage of archaeological sites was diverse, with sites ranging from places with individual features (such as individual artefacts or scarred trees) through to complex sites with multiple features present at places (rockshelters with art, grinding grooves, archaeological deposit). It was estimated that the study area and surrounds would contain a total of 1,122 archaeological sites, including an estimated 174 within the PUIA. Individual assessment of sites resulted in 272 sites being of low archaeological value (approximately 81%), with 22 sites of moderate archaeological value (approximately 7%) and 40 sites of high archaeological values (approximately 12%). However, the archaeological value of the Study Area lies not solely in the potential of the sites to provide information as individual places, but rather as a suite of places and features that are interwoven with the cultural landscape. Unlike some parts of the Blue Mountains the PUIA and surrounds does not contain an extensive or diverse assemblage of rock art. It is rare in south-eastern Australia for such an intact cultural landscape and an extensive archaeological record to co-exist such as exists in the Study Area. The Burragorang Valley was a noted area of rich traditional and historical resources, and archaeological places and features may contribute to the picture of land-use of where and how this richness facilitated the social aspects of life in the past. The PUIA and its surrounds has high research potential to yield information that would contribute to a further understanding of both the local area and the region. In particular, the nature of past Aboriginal land-use of the Lake Burragorang valleys, as interpreted through archaeological evidence and the lens of the highly intact cultural landscape.

9. Impact Assessment

9.1 Summary of proposed impacts

The Project Study Area is the construction footprint at and around the Warragamba Dam wall and the area around the edge of the lake to be temporarily inundated during flood mitigation events (the PUIA). The PUIA sits above the current flood high water mark of Lake Burragorang, between height contours RL 119.5 mAHD and RL 126.97 mAHD (Figure 2 and Figure 3). The study area does not include any areas downstream of the Warragamba Dam. Modelling assessments demonstrate that raising the dam wall height for flood mitigation will not increase regional inundation levels downstream. Aboriginal cultural heritage sites below the dam on the Hawkesbury-Nepean floodplain will have been subject to inundation from past flood events, both prior to and subsequent to the dam's construction.

The proposal will harm the cultural landscape within which it is located, including Aboriginal objects at archaeological sites; sites and places associated with Dreaming stories; cumulative impacts on waterways of cultural value; and living and cultural places within the study area. The entirety of the land adjacent to the PUIA (particularly above the PUIA) is considered to be a cultural landscape of very high significance, and demonstrably contains many thousands of objects and many places of significance to the Aboriginal community. There are no proposed areas of exclusion from harm within either the dam wall construction site or the PUIA.

9.2 Potential impacts from works at the dam wall

Construction activities at the Warragamba Dam wall and area surrounding will involve direct ground disturbance activities associated with both early works construction programs. Examples of ground disturbance activities include:

Early works

- further investigations including surveying, geotechnical studies, building and utility condition and location surveys, and other studies as required to assist in the design and construction of the Project.
- installation of security fencing and site environmental controls including heritage item protection/relocation, water management, soil management, and noise management measures.
- establishment of temporary site offices, and worker facilities.
- clearing of vegetation.
- adjustment and provision of utilities for construction facilities.
- minor road works and establishment of site access roads including a temporary access bridge downstream of the dam.
- establishment of areas for stockpiling of materials such as aggregate and fly ash.

Enabling works and demolition

- establishment of batching plants on site so concrete can be poured almost immediately after batching to maintain adequate concrete placement temperatures.
- hardstand area with drainage to environmental control ponds.
- concrete testing and geotechnical laboratory.
- weighbridge and office.
- materials storage bins and sheds (for aggregates, sand, fly ash, and other materials).
- silos, mixers, conveyors, above ground tanks, control facilities and dust control facilities.
- water and material chilling plant.

- connections to communication, power and water supply services.
- other environmental controls if required (for example, noise walls).

Main construction works

- excavation and earthworks at the base of the dam wall to provide a key for the concrete buttress used to increase the thickness of the dam wall.
- excavation and removal of material for about 30 metres east of the left abutment at the raised dam crest location.
- excavating the spillway foundations to allow the tie in of the new works.
- removal of the existing earth/rock embankments (fuse plugs) in the crest of the auxiliary spillway
- preparation of the existing bedrock for the foundations of the new auxiliary spillway crest including grouting.
- constructing a new uncontrolled concrete spillway crest across the width of the auxiliary spillway. Most of the spillway would consist of mass concrete, however, reinforced concrete sections would be required on top of the crest of the spillway.
- additional scour protection would be required downstream of the auxiliary spillway. Activities would include removing soil, excavation of rock to the required level (including blasting if needed) and installation of rock scour protection, concrete and anchor bars.

There are no known Aboriginal cultural heritage sites within the proposed construction footprint at the dam wall, and much of the proposed construction activity will take place in areas that were previously developed during the original dam construction.

The proposed surface infrastructure avoids all rockshelters, grinding grooves and natural landscape features and therefore there would be no potential surface disturbance impacts to any of these site types or any sites with moderate or high scientific significance.

The Aboriginal Heritage Information Management System (AHIMS) registered site Foley Creek (AHIMS ID# 45-5-0638) is registered within close proximity to the exclusion zone around the Fountain Batch Plant 2 and laydown area (Figure 3. Construction Footprint). During the survey this site was not relocated and further analysis of the AHIMS site card highlights that this site is not located here because its location co-ordinates have been transcribed incorrectly on AHIMS. An amendment will be forwarded through to Heritage NSW of Foley Creek's site card so that AHIMS can be updated.

9.2.1 Potential impacts from temporary inundation

The Project will cause a temporary increase in the height of the waters of Lake Burrangorang and flooding in tributaries of the lake. The extent of inundation is controlled by the peak flood level at the dam wall and the topography across the upstream catchment. Steep terrain extends upstream from the dam wall for at least 20 km, so that the extent of land inundated changes at a relatively small rate with increasing magnitude floods. However, the rate of change and inundated area increases as terrain flattens about where the Wollondilly River and Coxs River enter Lake Burrangorang (Diagram 3).

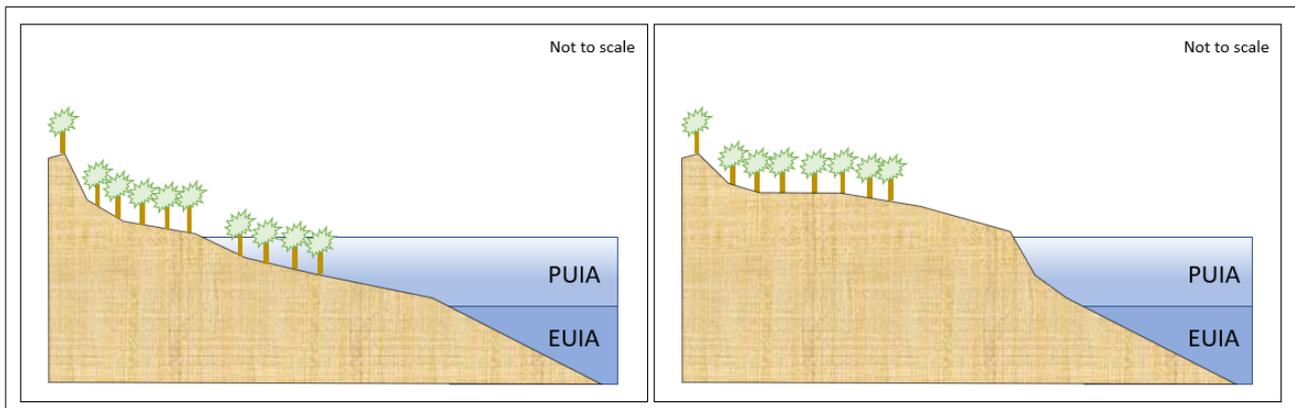


Diagram 3. How the extent of land inundated changes with terrain gradient. Where topography is flatter a larger area of land is flooded (left); whereas in steeper terrain a smaller surface area is flooded (right).

Flooding upstream of Lake Burragarang can result from inundation as the lake level rises due to flood inflows, from local catchment runoff, or a combination of the two. Flooding due to inundation is generally restricted to the area around the lake perimeter with flooding due to local catchment runoff being the more dominant cause of flooding further up the catchment. Flooding beyond the Project study area is due to local catchment runoff. Where the Wollondilly River and Coxs River enter Lake Burragarang the terrain is relatively flat, and the inundated area and the rate of inundation are both greater than they are in the steeper terrain further upstream, nearer the Warragamba Dam wall. Modelling produced for the Project has looked at the changes in the likely duration of inundation at the dam wall:

- For a 1 in 5 chance in a year event the inundation length increases from 2.8 to 4.6 days with the depth increased from 0.7 to 2.9 metres.
- For a 1 in 20 chance in a year event the inundation length increases from 4 to 8.6 days with the depth increased from 1.9 to 8.2 metres.
- For a 1 in 100 chance in a year event the inundation length increases from 4 to 10 days with the depth increased from 4.8 to 10.5 metres.

Project impact assessment has focused on the study area (PUIA), which covers 1,401 hectares between RL 119.5 mAHD and RL 126.97 mAHD. Based on historical flood records and detailed flood modelling, this is the area most likely to be impacted by the Project (the flood event of November 1961 reached a height of RL 119.51mAHD, nearly three metres above FSL). The EUIA comprises the area below RL 119.5 mAHD, including below the full supply level (FSL) (with all sites below FSL already impacted by the existing dam). Above the FSL there is potential for the Project to increase duration and depth of flooding within the EUIA. There is a lower likelihood that larger and infrequent flood events would impact on areas above the PUIA. Impacts above the PUIA would not only be very infrequent but would also involve inundation of a maximum duration of hours, not days.

Aboriginal heritage sites and places were divided into the three areas described above reflecting different elevations in the upstream area, and which are described as follows:

1. Sites that are within the existing dam flooding footprint (EUIA) –this area contains sites below the FSL (the maximum water level of Lake Burragarang which will not change with the Project) and sites between the FSL and the PUIA. Sites below the FSL experience regular and prolonged inundation as they are below the permanent maximum water level of the existing dam.

2. Sites within the study area (PUIA) – these sites have a lesser risk of being impacted by existing flooding compared to sites in the EUIA. This risk would increase with the Project and, for the purpose of the assessment, a precautionary approach has been adopted and it has been assumed there would be a total loss of values for sites in this area.
3. Above the PUIA – these sites have a much lesser risk of being impacted by flooding, with flooding in this area predicted to be very much less frequent, and if it were to occur to be of a much shorter duration of several hours maximum.

To assess the risk of inundation to each site within the PUIA, the height of each site was cross-referenced to flooding scenarios. Height of sites was given through spot heights taken at relevant points of each site, and therefore provide the average height above datum for large open sites (some of which extend above and below the current EUIA, over several hundred square meters). For smaller sites (such as those comprised of rockshelters), this measurement is more specific. It was the case for many larger open sites that appear below the current EUIA, that part of these sites was also yet to be impacted by inundation. These heights were targeted so as to capture any potential risk of inundation to each site.

The sites were assessed to be impacted (total loss of value regardless of degree of impact) if there was any level of flooding under any of the flooding scenarios (both current and predicted).

Of the 334 new and previously registered on AHIMS Aboriginal cultural heritage sites identified during this assessment a total of 43 sites are located within the PUIA. The site types and numbers impacted are outlined in detail in the AR, and CVAR.

9.2.1.1 Sites and places within the EUIA

There are 183 known sites identified in the AR as being within the EUIA and there are 29 known sites and places identified within the CVAR as being within the EUIA. This total of 212 known sites that are either partially (submerged some of the time) or fully (submerged all or most the time) is indicative of the impact of the original dam construction and flooding of the Burraborang Valley and tributaries (Figure 4). The sites within the EUIA are summarised in Table 7.

Source	Site or Place Category	Frequency
Archaeological Assessment	Aboriginal Resource and Gathering	2
	Aboriginal Ceremony and Dreaming	1
	Axe Grinding Grooves	3
	Waterhole	2
	Open sites (artefacts, grinding grooves, multiple features)	152
	Rockshelter sites (art, grinding grooves, artefacts, multiple features)	23
Cultural Values Assessment	Dreaming Track	11
	Dreaming Story Place	2
	Living Places	6
	Cultural Places	10
	Total	212

Table 10. Aboriginal sites and places of cultural value that were fully or partly impacted by the original Warragamba Dam project (sites and places in the EUIA)

In addition to the 212 known cultural heritage sites and places within the EUIA (including below the FSL) the AR predicted that there would be a further 366 sites in the EUIA. The total predicted number of archaeological sites in the EUIA (including below the FSL) was 458 open sites and 109 rockshelters and at least 11 other sites. The total known and predicted number of archaeological sites in the EUIA is estimated to be 578.

9.2.1.2 Sites and places within the PUIA

There are 43 known sites identified within the AR as being within the PUIA and therefore potentially subject to risk of harm from the Project. There are 11 sites and places identified within the CVAR as being within the PUIA and therefore potentially subject to risk of harm from the Project (Figure 4). These are collectively summarised in Table 11.

Source	Site or Place Type	Frequency
Archaeological Assessment	Aboriginal Resource and Gathering	1
	Axe Grinding Grooves	4
	Open sites (artefacts, grinding grooves, multiple features)	29
	Rockshelter sites (art, grinding grooves, artefacts, multiple features)	8
	Stone Arrangement	1
Cultural Values Assessment	Dreaming Story Place	1
	Living Places	7
	Cultural Places	3
	Total	54

Table 11. Aboriginal sites and places of cultural value that are at potential risk from the Project (sites and places in the PUIA)

In addition to the 54 known cultural heritage sites and places within the PUIA the AR also predicted a total of 174 archaeological sites in the PUIA. The AR's landscape based model predicted that these would be

made up of 117 open sites, 51 rockshelters and at least 6 other sites in the PUIA. The total known and predicted archaeological sites within the PUIA is estimated to be 174.

9.2.1.3 Sites and places above the PUIA

There are 29 known sites identified within the AR as being above the PUIA but within an area of potential risk as they are within the Project's 1 in 100-year flood event modelling. There are 3 sites and places identified within the CVAR as being above the PUIA but within an area of potential risk as they are within the Project's 1 in 100-year flood event modelling. The risk of harm to sites identified in this area above the PUIA is very much less than that for sites within the PUIA as inundation events are expected to be far less frequent and of much less duration (lasting only hours) than what will be experienced in the PUIA (Figure 4). These are collectively summarised in Table 12.

Source	Site or Place Category	Frequency
Archaeological Assessment	Aboriginal Resource and Gathering	1
	Axe Grinding Grooves	1
	Open sites (artefacts, grinding grooves, multiple features)	19
	Rockshelter sites (art, grinding grooves, artefacts, multiple features)	5
	Scarred Tree	3
Cultural Values Assessment	Dreaming Track	1
	Cultural Places	2
	Total	32

Table 12. Aboriginal sites and places of cultural value that are at very low risk from the Project (sites and places above the PUIA)

As well as the 32 known cultural heritage sites and places in the 1 to 100-year flood event modelling area above the PUIA the AR made predictions for the entire study area above the PUIA. The AR predicted there would be a total of 370 archaeological sites, made up of 285 open sites, 80 rockshelters and at least 5 other archaeological site types in the study area above the PUIA.

9.2.2 Potential impacts to the Greater Blue Mountains World Heritage Area

The boundary of the GBMWhA generally does not correspond with the boundaries of Lake Burragarang and its tributaries or Lake Burragarang's FSL. In most locations around Lake Burragarang there is a strip of land which is not part of the GBMWhA. However, at the southern bank of the Wollondilly River arm of Lake Burragarang the GBMWhA and the Nattai National Park boundary extends down to the FSL of the dam (Figure 5). Other areas where the GBMWhA boundary extends to the Full Supply Level or to the bank of a potentially impacted waterway include smaller areas of land at:

- Nattai River near the Little River confluence (Nattai National Park).
- A small reach of the Kedumba River (Blue Mountains National Park).
- Reaches of the Kowmung and Coxs Rivers about 3 km upstream of their confluence (Blue Mountains National Park).
- A number of minor tributaries which flow directly into Lake Burragarang (Blue Mountains National Park).

There are 304 ha of the GBMWH within the PUIA, which were relatively well surveyed during the Project assessment. The GBMWH and PUIA overlap of land contains 8 known cultural heritage sites comprising 7 open sites containing stone artefacts, and one site with axe grinding grooves.

9.3 Impacts of temporary inundation on Aboriginal heritage sites and places

The type of Aboriginal heritage site or place that is potentially being impacted by the Project is an important consideration. Temporary inundation will affect different types of sites in different ways and the impact to significance may also vary. This is because the physical features from which value is derived are often represented in different frequencies and combinations at Archaeological sites, Living Places and Cultural Places. For example, temporary inundation may cause changes to soil cohesion, which in turn may result in erosion and movement of Aboriginal stone artefacts in an otherwise stable archaeological deposit. In other local conditions temporary inundation may result in deposition of sediment and could cover-over an axe grinding groove site. Again, depending on local conditions inundation or proximity of water could cause harm to rock art through changed atmospheric or weathering conditions. For intangible heritage of the cultural landscape a change to a pre-existing environmental process, such as a natural water flow, may result in a loss of cultural value if there are changes in accessibility or cumulative changes in the local environment such as sedimentation or erosion.

9.3.1 Impacts of temporary inundation on archaeological sites

Brayshaw McDonald (1989: 30-31) attempted to provide a consideration of the likely affects and impacts of inundation on different types of archaeological sites, however as they admitted at the time it was largely speculative as there was a lack of detailed studies of the effects of temporary inundation. For any site or place, and assemblage of sites or places in a particular locality or region, there will be many variables which will be critical to the prediction of the effects of temporary inundation. These variables will range from, for example: the type of site and features being inundated; slope gradients; energy of the water column; length of duration; and cohesiveness and erodibility of the soils. From this point of view then, the following broad discussion of potential affects and impacts from periodic temporary inundation is presented.

To summarise examples of impacts, include:

- stone artefact sites will be subject to changed ground conditions such as waterlogging, movement of objects or erosion of archaeological deposits (sandstone derived soils on slopes in the PUIA are skeletal and erode readily (Hazelton and Tille (1990)).
- sandstone rockshelter sites will be subject to altered conditions that may erode or move deposits and detrimentally effect rock art preservation (acceleration of weathering and granular loss, loss of pigments, intrusion of micro- or macro-vegetation).
- scarred trees will be subject to more frequent flooding.
- axe grinding grooves and engravings will be more frequently submerged, altering natural conditions and possibly their preservation (acceleration of granular loss or weathering of the rock surface such as case-hardening and delamination of the rind).
- Aboriginal Ceremony and Dreaming sites and Aboriginal resource and gathering sites will have their accessibility altered, and physical aspects of the sites may also change.
- the alteration of existing environmental conditions may cause impacts to the cultural landscape values and to the capacity to such as how it may be interpreted, enjoyed, and maintain those ed by the community.

The AR, drawing on the Project's geomorphological technical assessment, discusses the potential types of changes at the ground surface that may be expected from temporary inundation. The primary determinant of the type of change that may be expected from temporary inundation is the local slope gradient. This is because the gradient of the local slope, and nature of the local environment effects the speed with which the water rises and recedes, the amount of sediment suspended in the water, and the stability of soils at the location. In some cases, there will be no soils naturally present, such as rock shelves, rock faces or rock ledges.

The main potential impacts noted for open sites (summarised from the Project's geomorphology technical assessment 'Warragamba Dam Raising EIS' completed by BECA (2021)):

- translocation of sediments on flat and gentle slopes.
- erosion above the shoreline and banks.
- erosion of the shoreline and banks.
- effects to soil cohesion from water logging.

These impacts could potentially affect Aboriginal cultural heritage sites that occur across different terrain types within the PUIA.

The translocation of sediment features, for example in the Coxs and Wollondilly Rivers, may result in the deposition of sediments on Aboriginal cultural heritage sites that are on flats or very gentle slopes such as axe grinding groove sites and open sites with stone artefacts during temporary inundation events (Plate 10). Because of the relative low energy of inundation, the sediments will consist of fine particles (silts not sands) and a proportionate amount of the sedimentation load transported during inundation events will subsequently be washed back into the main body of the lake as floodwaters recede. The main area of sediment deposition is likely to be on the existing foreshore up to the EUIA, which is already denuded and contains little vegetation.



Plate 10. In the upper reaches of the catchments local conditions of flooding will remain the dominant process, however increased temporary inundation from the Project may result in increased erosion and/or deposition of sediments and changes to bank structure.

Erosion and effects to soil cohesion because of temporary inundation events may result in impact on Aboriginal cultural heritage sites and places, particularly those located on moderate to steeper slopes. This may include both open sites and sandstone rockshelter sites, but less so sites such as axe grinding grooves. In these cases, in the PUIA, erosion and waterlogging could result in the destabilisation and removal of sediments that contain Aboriginal artefacts (archaeological deposits). Generally the soils of the PUIA are shallow and skeletal, because they are, for the most part derived from parent sandstone and the PUIA traverses mid- and lower-slopes. Any change to the current inundation regime will result in attrition through bank scour with prolonged wave undercutting leading to erosion and exposure of benches and unstable soil (BECA 2021:86). In some circumstances temporary inundation, as noted in the geomorphology technical assessment, increases waterflow which in turn will temporarily increase stream power resulting in increased the rate of erosion of banks and shorelines (BECA 2021:114).

Areas that are comprised of steep sandstone cliffs with riparian vegetation are less not likely to be adversely affected by erosion caused by temporary inundation. These colluvial landscape environments weather rapidly at a landscape scale and are geomorphologically active with erosion including rockfall and landslides expected to continue without noticeable additional impact from temporary inundation of the PUIA (BECA 2021: 106). However, any Aboriginal heritage site within steep terrain in the PUIA would be affected changed local conditions or erosion of sediments at the site-specific level.

The PUIA is not expected to become a denuded landscape like the area below the FSL in the EUIA (BECA 2021:110), as it is going to be subject to infrequent inundation rather than prolonged flooding. Over the

years flooding, most recently in 1961 and March 2021, inundated an area above the current FSL shoreline of Lake Burragarang (Table 13). These floods have left no discernible change in the upper area of the EUIA, certainly it has not left the upper part of the EUIA as a scalded surface lacking vegetation (Plate 11).

Event	Peak dam level (mAHD)	Inundation depth above FSL (m)
November 1961	119.51	2.79
June 1964	118.89	2.17
June 1975	118.15	1.43
March 1978	118.01	1.29
April 1988	118.06	1.34
August 1990	118.72	2.00
March 2021	118.26	1.54

Table 13. Historical floods that have inundated some or all of the EUIA.



Plate 11. The shoreline and FSL of Lake Burragarang, and behind it the interface of the EUIA and PUIA. The Project is not expected to result in a denuded landscape like that which currently exists below the Full Supply Level of Lake Burragarang. The upper parts of the EUIA, which experienced temporary inundation of various depths and durations since the dam was built remain vegetated. However, there may be some erosion and deterioration of soil cohesion which would affect Aboriginal heritage sites in a similar environment to this.

However, increased inundation and hence increased erosion and deposition in any form will harm the Aboriginal cultural heritage sites present within the PUIA. The harm is the result of either direct action such as the reduction of soil cohesion, or removal or deposition of sediment including archaeological deposit, or the changing in conditions on a rock surface where rock art is present.

In addition to the harm to tangible aspects of the cultural values such as cultural and archaeological sites, the project will harm the cultural landscape and associated values as it is regarded by the RAPs as a continuation of the dispossession and significant harm that occurred with the original construction and flooding of the Warragamba Dam.

9.3.2 Impacts of temporary inundation on cultural values

The cultural landscape of Country must be understood as a whole rather than as a series of disconnected points. Despite the clear difficulties of aligning this understanding of Country with regulatory regimes it is an essential element in achieving an assessment of cultural significance and impact that reflects Aboriginal cultural values. The potential impacts are temporary in their physical duration as they relate directly to flooding events, however, they have the potential to cause permanent harm through physical impacts to the sites (as discussed in 9.2.4) and potential alterations to the waterways and ecology of the Study Area. In line with Aboriginal cultural paradigms, it is considered that these potential impacts should be understood as harmful to the identified cultural values and as cumulative in nature (as discussed in 10.1).

9.3.2.1 Gurrangatch-Mirrigan Dreaming Track

The original construction of the Warragamba Dam in the period from 1948 to 1960 resulted in the flooding of part of the Gurrangatch-Mirrigan Dreaming Track including multiple specific waterholes that are key locations in the Gurrangatch-Mirrigan Dreaming Story. The Project involves the potential for increased impacts on the cultural landscape that forms the Gurrangatch-Mirrigan Dreaming Track and for specific locations within it. The potential impacts are temporary in their physical duration as they relate directly to flooding events. It has not been possible to assess the impacts in consultation with Aboriginal cultural knowledge holders; however, based on the material considered and in line with Aboriginal cultural paradigms it is considered that these potential impacts will be understood as harmful to the identified cultural values.

9.3.2.2 Buru (Kangaroo) Dreaming Story Places

The Project involves the potential for increased impacts on elements of the cultural landscape that are related to the Buru (Kangaroo) Dreaming Story Places. The potential impacts are temporary in their physical duration as they relate directly to flooding events. It has not been possible to assess the impacts in consultation with Aboriginal cultural knowledge holders; however, based on the material considered and in line with Aboriginal cultural paradigms it is considered that these potential impacts will be understood as harmful to the identified cultural values.

9.3.2.3 Living Places (history of occupation and use)

Most of the living places identified are in the lower, richer parts of the valleys and near to waterways and as such are either entirely within or partially within the EUIA. Nevertheless, there is potential for increased impact because of the Project due to longer periods of inundation. The potential impacts are temporary in their physical duration as they relate directly to flooding events. It has not been possible to assess the impacts in consultation with Aboriginal cultural knowledge holders; however, based on the material considered and in line with Aboriginal cultural paradigms it is considered that these potential impacts will be understood as harmful to the identified cultural values.

9.3.2.4 Cultural Places (ritual life)

The Project presents the potential for increased impact through longer flooding events within the EUIA and very short-term rare flooding events above the PUIA. The potential impacts are temporary in their physical

duration as they relate directly to flooding events, however, particularly in relation to the artworks at Kerswell Hill, Oaky Creek Site Cluster and the Ripple Creek Site Cluster there is the potential for permanent damage. It has not been possible to assess the impacts in consultation with Aboriginal cultural knowledge holders; however, based on the material considered and in line with Aboriginal cultural paradigms it is considered that these potential impacts will be understood as harmful to the identified cultural values.

9.3.2.5 Archaeological Sites (tangible record of traditional occupation and use)

The Project has the potential to harm archaeological sites and places due to temporary inundation from flood events. There are 43 archaeological sites and places within the PUIA and a further 29 above the PUIA. The archaeological report predicts there are an estimated 174 archaeological sites and places within the PUIA, and an estimated 370 archaeological sites and places above the PUIA. Sites and places within the PUIA consist mostly of open sites containing a range of archaeological features, but principally stone artefacts. There is a single rockshelter site, which contains art, within the PUIA and a further 7 rockshelters with archaeological deposit. Above the PUIA a similar assemblage of sites is represented, as well as scarred trees. Sites and places within the PUIA will be subject to temporary inundation of waters for a period of up to 11 days. Sites and places above the PUIA will be subject to very infrequent inundation, lasting for shorter periods of time. For those sites within the PUIA impacts will potentially include the erosion of archaeological deposits at both open sites and rockshelter sites due to the inundation having a deleterious effect on soil cohesion. Changes in local conditions at rock surfaces where there is art are also likely to occur and have unpredictable but negative impacts to the preservation of the art present (either directly through wetting-drying cycles and changed conditions for preservation, or indirectly through changed weathering or deposition of sediment). While the changes predicted to occur within the PUIA are not so dramatic as to result in a denuded landscape like the area below Lake Burragarang's FSL, they will nevertheless result in harm to Aboriginal objects and cultural values.

9.3.2.6 Waterways (the Wollondilly, Nattai, Warragamba, and Coxs Rivers and their tributaries)

The Project involves the potential for increased impacts on Waterways including the Wollondilly River, Nattai River, Warragamba River, Coxs River, Kedumba River, Tonalli River, Jooriland River, Butchers Creek, Ripple Creek, Oaky Creek, Green Wattle Creek, Lacys Creek, Brimstone Creek, Bob Higgins Creek, Byrnes Creek, Colemans Creek, Reedy Creek, and Werriberri Creek. The potential impacts are temporary in their physical duration as they relate directly to flooding events. It has not been possible to assess the impacts in consultation with Aboriginal cultural knowledge holders; however, based on the material considered and in line with Aboriginal cultural paradigms it is considered that these potential impacts will be understood as harmful to the identified cultural values.

10. Ecologically Sustainable Development and Potential Cumulative Impacts

Ecologically Sustainable Development (ESD) requires the integration of economic and environmental considerations (including cultural heritage) in decision-making processes. The principles of ESD are defined in Section 6 of the NSW *Protection of the Environment Administration Act 1991* (PEAA). In the context of Aboriginal cultural heritage the two relevant principles are:

- the precautionary principle—namely, that 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.
- inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

In the context of Aboriginal cultural heritage intergenerational equity can be assessed in terms of cumulative impact to Aboriginal objects, places, and cultural values in a region. Intergenerational equity is maintained by the continued dissemination of cultural knowledge and the ability to access Country and sites and places of cultural value into the future. It is detrimental to future generations if cultural knowledge and access to Country is lost by the current generation.

While conservation is the best approach when considering Aboriginal cultural heritage, due to the requirements and nature of the proposed activities the avoidance of all Aboriginal archaeological sites within the Study Area is not possible if the Project proceeds (see discussion in Section 11). As a result, the Project would cause cumulative impact and loss of values on the Aboriginal cultural heritage of the region and local area.

The Aboriginal cultural heritage of the area has had significant negative impacts from pastoral and agricultural land use, the original development of the Warragamba Dam and the flooding and water storage of Lake Burragorang. The original development of the Warragamba Dam and the ongoing use of the area as a water catchment for the past 60 years has resulted in:

- sites around Warragamba Dam being impacted by the original construction of the dam due to vegetation clearance and earthworks for the development of the existing dam wall, boat ramp, spillways, and associated infrastructure.
- sites within the FSL of Lake Burragorang (EUIA) being impacted through flooding for long periods of time when lake water levels are high.

The construction works at the dam wall will not harm any known Aboriginal sites. While the Aboriginal archaeological sites located within the existing dam footprint (EUIA) are already impacted they may experience a greater duration of temporary inundation if the Project proceeds. The 43 known Aboriginal cultural heritage sites, and the additional estimated 131 Aboriginal cultural heritage sites, will experience temporary inundation if the Project proceeds. There are a further 29 known Aboriginal archaeological sites above the PUIA but within the Project's 1 in 100-year flood event modelling and at potential risk. Scientific confidence regarding the condition, nature and extent of the sites has been achieved through archaeological investigations which have included both systematic survey and predictive modelling. The AR

has concluded that considered against the precautionary principle the potential impacts of the Project on archaeological scientific values can be considered relatively minor due to prior or existing impacts.

The capacity to map specific elements within the cultural landscape that hold cultural values was limited due to the lack of active engagement of Aboriginal cultural knowledge holders. Nonetheless analysis of the available ethnographic and historical sources has identified six key elements or themes that hold cultural value and significance within the Study Area. The places of cultural value that have been mapped within each of the six themes are not comprehensive, nonetheless the CVAR mapped 29 known sites and places within the EUIA, 11 sites and places within the PUIA and 3 sites and places above the PUIA. While the places of cultural value located within the existing dam footprint (EUIA) are already impacted they may experience a greater duration of temporary inundation if the Project proceeds. The 11 places of cultural value within the PUIA will experience temporary inundation if the Project proceeds. The 3 places of cultural value above the PUIA are at potential risk of temporary inundation as they lie within the Project's 1 in 100-year flood event modelling.

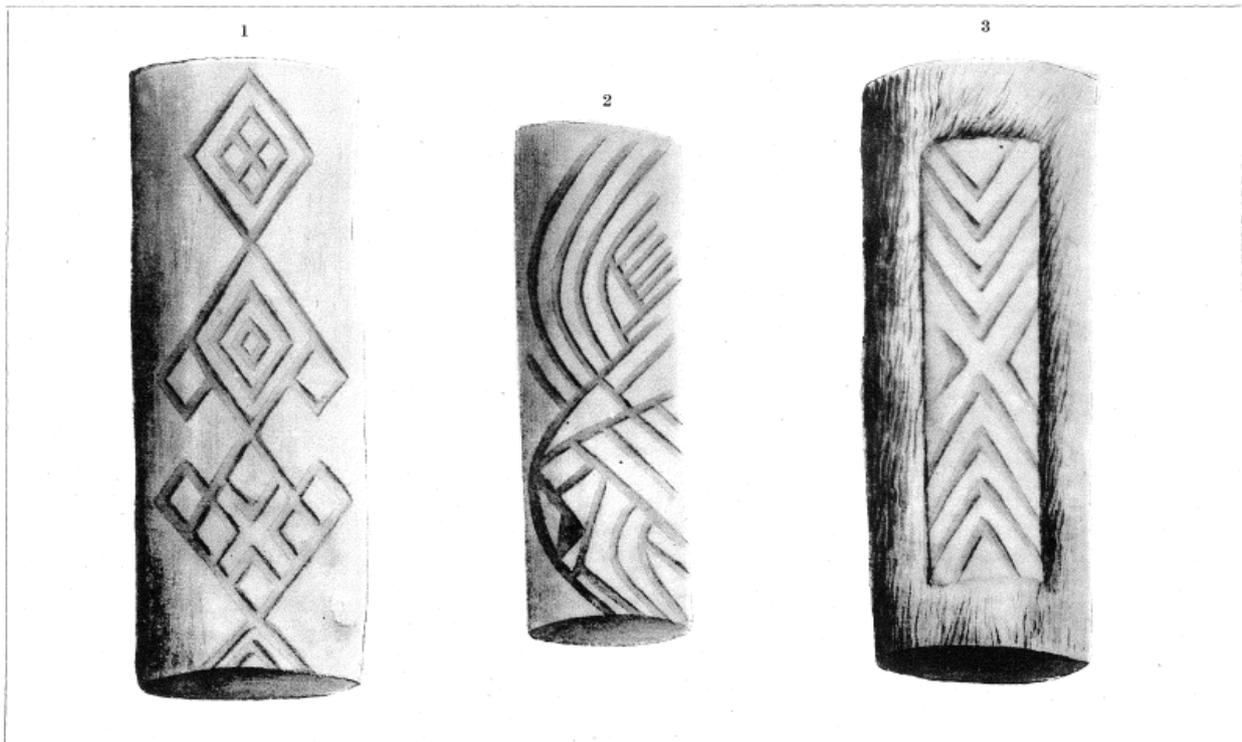
Any future proposed impact must be considered as a cumulative impact on what has already been lost under the waters of Lake Burragorang. The reality of dispossession and forced removal from traditional and historical lands, and the loss of heritage values (encompassing tangible and intangible heritage sites and places and harm to the storied landscape) has been communicated by the RAPs in very strong terms during the consultation for the Project. The Project is an incremental addition to a previous project (the dam construction) that has caused cultural trauma and significant loss of cultural heritage values.

As examples of the cultural heritage values that were lost as a result of the original dam construction, the following sites now sit permanently or temporarily under the waters of Lake Burragorang (these are detailed in the CVAR and AR):

- Water holes associated with the Gurrangatch-Mirrigan Dreaming Track.
- Ghungarlook Farm and St Josephs Farm.
- Tommy Bundles burial site, Tarlo Jacks burial site and 'Chiefs' burial site.
- Burial tree sites (carved trees) (Plate 12).
- Hands on the Rock archaeological site.
- Byrnes Creek archaeological site (a regionally rare engraved art site).

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PLATE XIII.



G. H. BARROW, del.

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Plate 12. Sketches of carved trees from the Burragorang Valley. These culturally important sites and features are an example of the tangible heritage that has been lost in the valley (Etheridge 1893).

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PLATE XII.

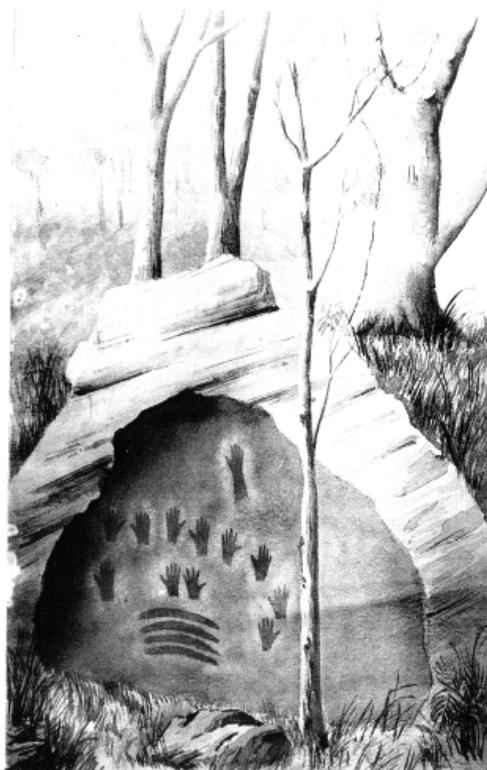


Plate 13. Hands on the Rock, an art site that is now frequently below the waters of Lake Burragorang (only one rock art site lies in the Project impact footprint).

As the Project involves construction around the dam wall (an already heavily modified landscape, with no known heritage sites in the footprint) and temporary inundation of the PUIA for less than 11 days there is no significant restriction of access to the cultural landscape, and there is not expected to be significant changes to the tangible heritage sites present in the PUIA (as discussed in Section 6.3.2).

The effects of the Project will not result in an overall reduction in the cultural heritage significance of the study area (it will remain of very high cultural heritage significance) but will nevertheless have a deleterious effect on the cultural heritage values. The deleterious effect is via incremental loss of sites and places in the PUIA and additional injury to the wounds of previous dispossession and loss.

Through the aggravation of previous harm the Project will have a detrimental effect to quality or benefit that the cultural landscape – and its intangible and tangible contributory values – may provide to the Aboriginal community and will result in a reduction in the inter-generational equity afforded by the cultural landscape of the Study Area and its surrounds.

The RAPs have advised through the submission process that the Study Area and all sites within and surrounding it have high cultural significance. The Project is seen by the RAPs as a further accumulation of impacts to Aboriginal cultural heritage that has previously been affected by the original development of the Warragamba Dam.

Some RAPs consider the impacts to the cultural heritage values from the Project as acceptable if the management and mitigation measures presented in this ACHA are applied. However, the majority of the RAPs consider the proposal to raise the Warragamba Dam wall for the temporary storage of flood waters to be an unacceptable impact to Aboriginal cultural heritage values.

Submissions from the RAPs made the following points:

- The first recommendation would be not to proceed with the proposed project, and hoping that common sense will prevail, and it will not go ahead.
- We do not agree with the raising of the Warragamba Dam. Survey of just 25% of the area has shown that there are many Aboriginal sites throughout the area and that it is very significant to us.
- We would like this record of our history and culture to be protected and not be flooded with water. Many of our sites have already been lost because of the dam and because of development across Western Sydney and there is an opportunity to protect this very significant area for the Darug people and future Australians.
- Many recorded and unrecorded sites would be lost or damaged by raising the dam.
- The project should not go ahead due to the enormous amount of unavoidable destruction to our heritage and environment.
- We would like to record our objection to this development proceeding due to the significant cultural and environmental damage that would occur. We would also like to draw attention to the fact that the Aboriginal community, and I am sure the wider community generally does not believe that the destruction of Aboriginal cultural heritage on such a significant level is in keeping with the expectations and values we hold as a society.
- We would contest that the impact which will be attributed to this project does not align with the cost that will be borne by the Aboriginal community in the loss of such a significant heritage area.

These submissions outline the high level of concern that RAPs have for the future preservation of tangible and intangible connections to their Country and its cultural landscape and the calls from many RAPs for an immediate stop to the Project.

11. Management Recommendations

The object of assessment is to quantify and understand the heritage values of a landscape, a place, a site, or an object and exhaust avenues of avoiding harm to those values (*Burra Charter*; OEH 2011:12). If harm cannot be avoided, then there must be consideration and implementation of strategies to minimise harm (OEH 2011:13). The general hierarchy for consideration regarding management strategies, in order of preference from a conservation perspective is:

- Avoidance and in-situ conservation of sites, places, and fabrics.
- Partial avoidance and partial in-situ conservation.
- Harm/impact caused with mitigating circumstances.
- Unmitigated harm/impact.

The management and mitigation measures have been prepared as far as possible in consideration of comments received from the RAPs during the consultation process. However, as noted elsewhere in this report the RAPs have clearly communicated that they do not support the project. The RAPs were not willing to engage in the formal cultural heritage values assessment process for this project due to the legacy of dispossession and contemporary distrust of the Proponent and the broader government apparatus of the consultation, assessment, and planning processes.

There are no Aboriginal cultural heritage sites within the footprint of the construction impact zone around the Warragamba Dam wall. Impacts at the dam wall will include clearing of vegetation and earth disturbance works for construction activities. The remaining impact zone for the Project is the area above the current flooding extent of the existing dam that will be inundated by higher water levels in Lake Burragorang during flood mitigation. For Aboriginal heritage sites and places within the PUIA the Project will result in infrequent temporary inundation for durations of up to 11 days. This temporary inundation is not predicted to cause significant ground disturbance but may result in increased erosion and changes in local conditions that are detrimental to the preservation of sites, places and the features that contribute to their value. Above the PUIA there are sites, places and features that will experience very infrequent inundation for durations of no longer than 11 days.

For the purposes of assessment all sites, places and features within the PUIA were considered by the AR and the CVAR to be at least partially impacted and to have a total loss of value. This is consistent with the precautionary principle (see discussion in *Ecologically Sustainable Development and Potential Cumulative Impacts*) and the view expressed by Brayshaw McDonald (1989: 31) to “expect the worse” given the significant levels of previous impact and loss of cultural values in the Burragorang Valley.

The harm that will result from the Project sits within an historical and contemporary context of dispossession and loss for the Aboriginal community. Harm to the cultural landscape of the Burragorang Valley caused by the original Warragamba dam project in the mid-twentieth century impacted archaeological sites, historical sites and living places and cultural and story sites related to the Gurrangatch-Mirrigan Dreaming Track and the Buru (Kangaroo) Dreaming Story.

Because the impact zone for the Project is the PUIA there is no feasible alternatives that can implemented at a local level to avoid or directly minimise harm to sites, places and heritage features. For the Project to operate it must capture higher water levels behind the proposed modified dam, inundating the PUIA. Options and alternatives to the Project are presented in Chapter 3 of the EIS, these include:

- Non-structural strategies: these do not alter flood levels but reduce the effects of downstream flooding.
- Floodplain works: localised physical works in the downstream floodplain to divert floodwaters from properties (levees, for example).
- Drainage strategies: lowering flood levels by assisting floodwaters to escape from the downstream floodplain.
- Flood detention strategies: these temporarily store floodwaters on contributing rivers and thereby lower peak levels downstream.
- Combined strategies: these combine some of the above approaches.

During previous assessment for potential inundation of the PUIA Brayshaw McDonald (1989: 32) considered that a field survey achieving >30% coverage of the impact zone would be a basis on which to develop management strategies for the area. Similarly recognising the limitations for the implementation of direct mitigation measures to avoid harm Brayshaw McDonald envisaged a program of archaeological salvage requirements, supported by a management strategy, a dedicated [WaterNSW] employee to oversee the strategy, and an implementation that would take 12-18 months, resulting in a Plan of Management and salvage program of 2-3 years.

In the absence of directly applied management measures for the avoidance or minimisation of harm, should the Project proceed attempts to mitigate the loss of cultural value must be made through other strategies. As noted above harm or impact with mitigating circumstances is one of the least preferred options for management of cultural heritage values as it does not achieve a conservation outcome, and therefore is not aligned with the principles of inter-generational equity.

The indirect mitigation measures presented in the recommendations below include measures to contribute to intergenerational equity through the recording of Aboriginal cultural knowledge and history of the Burragorang area, an audit of collections institutions to identify cultural materials removed from Country, and improving the Aboriginal community's ability to access, manage and maintain the tangible and intangible aspects of the cultural landscape in the Study Area. The mitigation measures will not remove the potential for harm, they may however provide opportunities for improved Aboriginal community access to an area of great cultural value to the community, and in doing so support renewed interaction and engagement with the cultural landscape impacted by the earlier flooding of the valley.

11.1 Recommendations

The following recommendations are made regarding the management of Aboriginal heritage values within the Study Area. The recommendations made here are all indirect mitigation measures as should the Project proceed the limitations of the proposed activities mean that there is no capacity for directly applied management measures for the avoidance or minimisation of harm. Detailed discussion of the recommendations is contained in the AR (Appendix 1) and CVAR (Appendix 2). It is important to note that though these recommendations were shaped by feedback received from the RAPs during the consultation process it has been clearly communicated by the RAPs that they do not support the Project.

Consultation

- WaterNSW should continue consultation and engagement with the Registered Aboriginal Parties for the duration of the Project (AR).
- An independent facilitator to work with the RAPs and the wider Aboriginal community to develop an Aboriginal advisory group to guide the implementation of Recommendations 8 to 11 (CVAR).

Management

- An Aboriginal Cultural Heritage Management Plan (ACHMP) should be developed for the Project and implemented as part of the Construction Environmental Management Plan (CEMP). The ACHMP should be developed and managed in consultation with the RAPs and relevant regulatory authorities. The AHMP should provide specific guidance on measures and controls to be undertaken to avoid and mitigate impacts on Aboriginal cultural heritage during construction (AR and CVAR).
- Prior to the operation of the Project WaterNSW to review its assessment processes for works within the upstream catchment to include awareness to personnel undertaking an activity on its behalf of any potential Aboriginal cultural heritage values and objects in the area (AR).
- Develop a cultural heritage awareness and cultural competency training package to be delivered to all WaterNSW staff. The training package should include a site-specific module developed in consultation with the relevant Aboriginal communities and RAPs (CVAR).
- The site-specific Aboriginal cultural heritage awareness training package to be delivered as part of the site induction for all employees, contractor(s) and maintenance personnel involved in the construction works and ongoing site management and activities in the catchment of Lake Burragorang (AR and CVAR).
- Develop a formal agency-specific process and policy for undertaking cultural heritage assessments and engaging with the Aboriginal community in line with those developed by other state government agencies (CVAR).
- Consider engaging an in-house archaeological specialist support in line with other state government agencies (CVAR).

Access to Country

- WaterNSW to develop and implement a policy to improve access for Aboriginal community members to Country they have cultural connections with that are under WaterNSW management (CVAR).
- WaterNSW to facilitate bi-annual on-country visits open to Aboriginal community members with cultural connections to the area (CVAR).

Site Recording

- The unsurveyed portion of the PUIA should be surveyed well prior to construction should the Project be approved (survey should include provision for detailed recording of all shelter sites, including 3D photogrammetry, planning, detailed photography and scale drawing of any art or other features present) (AR).
- The unsurveyed portion of the area above the PUIA should be sample surveyed to identify sites and places of high significance prior to construction should the Project be approved (survey should include provision for detailed recording of all shelter sites, including 3D photogrammetry, planning, detailed photography and scale drawing of any art or other features present) (AR).
- Further detailed impact assessment and recording of all Aboriginal cultural heritage sites and places that are located within the PUIA, sites of high significance in the area above the PUIA, and all art sites within the PMF, should be completed. This recording to include 3D photogrammetry and high resolution digital photographic records and should include the landscape context of sites and site complexes to capture archaeological and cultural values (AR and CVAR).

Cultural Values Recording & Education

- A comprehensive specialist research audit of the holdings of national and international collection institutions to identify cultural materials removed from Country in the Study Area. WaterNSW to facilitate an access visit for Aboriginal community members to any cultural materials identified in Sydney and Canberra based collection institutions (CVAR).
- In consultation with the RAPs and the Aboriginal community, develop interpretative materials on the Aboriginal cultural values and history of the cultural landscape of the Study Area including: a permanent exhibition at the Warragamba Dam Visitor Centre; interpretative signage and audio posts within the Warragamba Dam grounds; and facilitate the provision of Aboriginal-led cultural events (i.e. tours and talks) through the Warragamba Dam Visitor Centre (CVAR).
- In consultation with the RAPs and the Aboriginal community, develop a cultural values project to record the Gurrangatch-Mirrigan Dreaming Story route through the photographic recording of specific cultural locations within the Study area (prior to any further impacts), oral history recordings with Aboriginal community members, and documentary research (CVAR).
- In consultation with the RAPs and the Aboriginal community, undertake a heritage study of the Aboriginal traditional and historical occupation of the Study area through photographic recording of specific sites (prior to any further impacts), historical documentary research, and oral history interviews (CVAR).

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Impact assessments
Development and activity approvals
Rehabilitation
Stakeholder consultation and facilitation
Project management

Environmental offsetting

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Accredited BAM assessors (NSW)
Biodiversity Stewardship Site Agreements (NSW)
Offset site establishment and management
Offset brokerage
Advanced Offset establishment (QLD)