

NEW PUBLIC SCHOOL, 9 WORRIGEE ROAD,
WORRIGEE, NEW SOUTH WALES

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

Report to School Infrastructure New South Wales

LGA: Shoalhaven

March 2026





Apex Archaeology acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation and in whose land this assessment took place, and to the continuation of cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander peoples.

Aboriginal people are advised that this report may contain reference to deceased people. Further, this report may include high level discussions of sites which may be culturally sensitive, including gender-based restricted sites.

DOCUMENT CONTROL

The following register documents the development and issue of the document entitled '9 Worrigee Road, Worrigee, New South Wales: Aboriginal Cultural Heritage Assessment Report', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared by	Reviewed by	Comment	Issue Date
1 – Draft	Peta Rice & Leigh Bate	Jenni Bate	Draft issued to client	7 Nov 2025
2 – Draft	Jenni Bate	SINSW	Revised draft to client	20 Nov 2025
3 – Draft	Peta Rice	SINSW	Issued for RAP review	28 Nov 2025
4 – Final	Jenni Bate	RAPs	Issue of final	15 Jan 2026
5 – Final	Jenni Bate	SINSW	Minor updates	24 March 2026



EXECUTIVE SUMMARY

Apex Archaeology have been engaged to assist School Infrastructure (SI) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed new public school and public preschool at 9 Worrigee Road, Worrigee, New South Wales (NSW). The project is located within the Shoalhaven Local Government Area (LGA).

This ACHA has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011) (the Guide); the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, April 2010) (the ACHCRs), and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice). It details the results of the archaeological assessment completed in accordance with the Code of Practice and the consultation undertaken with the Aboriginal community in accordance with the ACHCRs.

The proposed works include the construction of a new primary school and preschool within the study area. The new school will provide capacity for 552 mainstream students plus three support classes, and a new 60-place preschool. The new primary school will be master planned to enable the expansion to 750 students should this be required in the future.

The proposed works will include the demolition of the existing residence, as well as modification to the natural landscape through subsurface excavation and trenching to cater for services such as telecommunications, water and electricity. The works will occur in three stages:

- Stage 1: New 60-place preschool
- Stage 2: New medium primary school (550 students)
- Stage 3: Expansion to large primary school (750 students – dependent on future growth in the area)

The southern portion of the study area comprises a residential allotment with one residence, a pool and an orchard. The northern portion of the study area consists of an open paddock. It is bound by Greenwell Point Road to the north, Worrigee Road to the west, Booligal Road to the south and residential allotments to the east. The study area comprises the entirety of Lot 1 DP576975, with the Preschool site located in the south east corner of the lot, and the School site comprising the remainder of the lot.

A total of 12 Aboriginal people and organisations registered an interest in being consulted for the project. The following list comprises the registered Aboriginal parties (RAPs) for the project:

- Guntawang Aboriginal Resources Incorporated
- Jason Davidson
- Tungai Tonghi



- Woronora Plateau Gundungara Elders Council
- South Coast Culture and Heritage
- Turtle Dreaming
- Meryhuiela
- South Coast People
- Marri Culture & Heritage
- Yurwang Gundana
- Southern Native
- Nowra LALC

Consultation with the RAPs has been conducted in accordance with the ACHCRs.

A Preliminary Indigenous Heritage Assessment and Impact Report (PIHAI) was prepared for the school site by Apex Archaeology in 2025, which identified the study area was located within a landform considered to have potential for subsurface archaeological deposits to be present. No surface artefacts were identified during the preparation of the PIHAI, but this is not necessarily considered a reliable indication of subsurface archaeological potential.

As the study area was considered to have potential for subsurface archaeological deposits to be present, further assessment in the form of an Aboriginal Cultural Heritage Assessment (ACHA) was considered necessary. This report presents the results of this assessment.

Due to the presence of potential archaeological deposits (PAD) within the study area, test excavations were completed across much of the site. A total of 37 test pits were excavated. No stone artefacts were recovered from any of the test pits. However, three pieces of culturally flaked glass were identified within a single test pit, and were considered to represent the Aboriginal occupation of the area in the post-contact era, following the settlement of the area by colonists.

Flaked glass pieces are relatively rare in the archaeological record, making any such find archaeologically significant. However, the lack of other archaeological material in conjunction with the flaked glass suggested that the study area was unlikely to have been utilised prior to the arrival of colonists, with no evidence of previous occupation noted during the test excavation. This was originally considered to be possible due to the topographic location of the site being in one of the locally highest points, as well as the site's proximity to Brundee Swamp and known sites associated with resource gathering in the swamp and its fringes.

The test pit containing the flaked glass is not able to be avoided by the proposed works for the new School, and as such requires an application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to the area to occur. However, the flaked glass pieces can be retained on site, reducing the overall impact to the cultural values associated with the glass items.

The Preschool site is not considered to have archaeological potential and works in this area can proceed with caution.



Based on the results of the cultural heritage and archaeological assessments, the following recommendations have been made for the Preschool site:

RECOMMENDATION 1: NO FURTHER ARCHAEOLOGICAL ASSESSMENT REQUIRED

This report details the archaeological potential of the Preschool site, which has been assessed as negligible. No further archaeological assessment is required for the Preschool site prior to the commencement of proposed development activities. No application for an Aboriginal Heritage Impact Permit (AHIP) is necessary for this portion of the overall study area.

RECOMMENDATION 2: TEMPORARY PROTECTION OF AHIP AREA

Although located outside the works area for the Preschool site, the AHIP area must be protected and avoided during construction works to prevent inadvertent impact occurring. Temporary fencing will be provided around the outside of the proposed AHIP area indicated in Figure 12 of this report, with no vehicle access and ground disturbance to occur within that area until an AHIP is provided for impacting the site for the Worrigee Public School project. This temporary protection area will be provided in all environmental and construction plans for the project.

The following recommendations apply to the Primary school site:

RECOMMENDATION 3: APPLICATION FOR AHIP REQUIRED

This report details the Aboriginal archaeological potential of the new School site. A total of one newly recorded site is located within the School study area. This site cannot be avoided by the proposed works associated with the School development. Application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to this site is required, and should include permission for unmitigated impact.

RECOMMENDATION 4: LONG TERM MANAGEMENT OF FLAKED GLASS

It is recommended that the three flaked glass pieces comprising NPS-AD-01 (AHIMS #52-5-1199) should be retained on site, via reburial in a location that will not be impacted in future.

An Aboriginal Site Impact Recording Form (ASIRF) will be required to be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) registrar to record the permanent location of the flaked glass pieces once reburied within the site.

RECOMMENDATION 5: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs



when an AHIP application is lodged, and also in the event an AHIP is issued.

Consultation undertaken for this project must be maintained at least every six months in order to maintain validity prior to application for an AHIP. It is the Proponent's responsibility to ensure consultation remains valid. In the event a gap of more than six months occurs between consultation events, it may be necessary to restart the consultation process to support any AHIP applications that are necessary.

The following recommendations relate to both the Preschool and Primary school sites:

RECOMMENDATION 6: DEVELOPMENT BOUNDARIES

The proposed development works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas should be completed to assist in managing Aboriginal objects and places which may be present in an appropriate manner.

RECOMMENDATION 7: STOP WORK PROVISION

Should unanticipated Aboriginal archaeological material be encountered during site works, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan (CEMP) and workers' induction process developed for the site.



RECOMMENDATION 8: REPORTING

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the Primary school project, along with required supporting documentation.

One digital copy of this report should be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.



GLOSSARY OF TERMS

Aboriginal Object	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
ACHA	Aboriginal Cultural Heritage Assessment
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHCRs	<i>Aboriginal cultural heritage consultation requirements for proponents 2010</i>
AHIMS	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW
AHIP	Aboriginal Heritage Impact Permit
ASIRF	Aboriginal Site Impact Recording Form
BP	Before Present, defined as before 1 January 1950.
Code of Practice	The DECCW September 2010 <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i>
Consultation	Aboriginal community consultation in accordance with the DECCW April 2010 <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> .
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DECCW	The Department of Environment, Climate Change and Water (now Heritage NSW)
Disturbed Land	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
Due Diligence	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the <i>National Parks and Wildlife Act 1974</i> and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
Due Diligence Code of Practice	The DECCW Sept 2010 <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
GIS	Geographical Information Systems
GSV	Ground Surface Visibility
the Guide	<i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i>
Harm	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
Heritage NSW	Heritage NSW within the Department of Climate Change, Energy, the Environment and Water; responsible for overseeing heritage matters within NSW
ka	Kiloannus, a unit of time equating to 1,000 years
LALC	Local Aboriginal Land Council
LGA	Local Government Area
NPW Act	<i>NSW National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
OEH	The Office of Environment and Heritage (now Heritage NSW)
PAD	Potential Archaeological Deposit
PIHAI	Preliminary Indigenous Heritage Assessment and Impact report
RAPs	Registered Aboriginal Parties



CONTENTS

1.0	Introduction	1
1.1	Study Area	1
1.2	Project Brief	1
1.3	Objectives of the Aboriginal Cultural Heritage Assessment	4
1.4	Project Proponent	5
1.5	Investigators and Contributors	5
1.6	Limitations.....	5
1.7	Report Structure.....	6
2.0	Statutory Context.....	7
2.1	Commonwealth Legislation.....	7
2.1.1	Aboriginal and Torres Strait Islander Heritage Protection Act 1984	7
2.1.2	Environment Protection and Biodiversity Conservation Act 1999	7
2.1.3	Native Title Act 1993.....	8
2.2	New South Wales Legislation	8
2.2.1	National Parks and Wildlife Act 1974	8
2.2.2	National Parks and Wildlife Regulation 2019	9
2.2.3	Environmental Planning & Assessment Act 1979	9
2.2.4	Shoalhaven Local Environmental Plan 2014.....	9
3.0	Aboriginal Consultation Process	11
3.1	The Consultation Process	12
3.2	Stage 1 Consultation: Commencement	12
3.3	Stage 2 & 3 Consultation: Presentation and Gathering of Information	16
3.4	Stage 4: Review of Draft Report.....	12
4.0	Aboriginal Cultural Heritage	14
4.1	Existing Environment.....	14
4.1.1	Geology	14
4.1.2	Soil Landscapes.....	14
4.1.3	Hydrology	14
4.1.4	Flora and Fauna	15
4.2	Ethnohistory	16
4.2.1	Raw Materials	18
4.2.2	Procurement.....	21



4.2.3	Manufacture	21
4.3	Land Use History	22
4.3.1	Indigenous Occupation	22
4.3.2	Post Contact Occupation	24
4.3.3	Historical aeriels.....	29
4.4	Archaeological Context	32
4.4.1	AHIMS Results	32
4.5	Literature Review	34
4.5.1	Local Heritage Assessments.....	34
4.5.2	Summary	44
4.6	Predictive Model	45
4.6.1	Regional Site Patterning.....	45
4.6.2	Application to Study Area	46
5.0	Field Work.....	50
5.1	Sampling Strategy	50
5.2	Site Inspection.....	50
5.3	Survey Coverage.....	50
5.4	Survey Results	53
5.5	Test Excavation Results.....	57
5.6	Sites Identified within the Study Area	59
6.0	Report on Glass and Stone Objects	62
6.1	Glass Objects	62
6.1.1	Issues relating to the identification of glass pieces as Indigenous objects	62
6.1.2	The Glass Objects at TP14	64
6.2	Stone Objects.....	67
7.0	Aboriginal Cultural Heritage Significance Assessment	70
7.1	Introduction	70
7.2	Criteria	70
7.3	Significance Assessment	71
7.4	Cultural Significance Assessment	73
7.5	Statement of Archaeological Significance	73
8.0	Impact Assessment	74



8.1	Proposed Development.....	74
8.2	Potential Impact	74
8.3	Justification.....	74
8.4	Ecologically Sustainable Development (ESD)	74
8.4.1	Intergenerational Equity.....	75
8.4.2	Cumulative Impacts.....	75
8.5	Aboriginal Community Input	76
9.0	Management, Mitigation and Recommendations	77
9.1	Guiding Principles.....	77
9.2	Harm Avoidance or Mitigation	77
9.2.1	Mitigation Measures	77
10.0	Permit Requirements	79
10.1	Permit Area.....	79
10.2	Permit Type.....	79
10.3	AHIMS Numbers	79
10.4	Previous AHIPs.....	79
10.5	Restricted Information and Confidentiality	79
10.6	Copyright	80
10.7	Artefact Management	80
11.0	Recommendations	82
12.0	Bibliography.....	85

APPENDICES

Appendix A: Correspondence Log

Appendix B: Step 1 Letters and Responses

Appendix C: Step 2 Letters and Responses

Appendix D: Advertisement

Appendix E: Methodology, Cover Letters and Responses

Appendix F: Draft Report Emails and Responses

Appendix G: AHIMS Search Results

Appendix H: Test Pit Records

Appendix I: Cultural Heritage Awareness Training



FIGURES

Figure 1: Study area in its regional context.....	2
Figure 2: Study area in its local context	3
Figure 3: Detail of Shoalhaven LEP 2014 Heritage Map. Study area outlined in red (Source: Shoalhaven LEP 2014 Heritage Map Sheet HER_019C).	11
Figure 4: Study area (red star) within the South Coast People, Tribunal No NC2017/003 Native Title Claim boundary	15
Figure 5: The Strahler system (Source: Department of Planning and Environment 2016).	15
Figure 6: AHIMS sites within a five kilometre search radius of the study area.....	33
Figure 7: Survey transect within the study area.....	52
Figure 8: Identified area of moderate sub surface archaeological potential within the study area.	58
Figure 9: Test pit locations within the study area.	59
Figure 10: Newly identified Aboriginal site locations within the study area	61
Figure 11: Average density of stone objects in test pits with stream order and distance from water.	68
Figure 12: AHIP boundary.....	81



1.0 INTRODUCTION

Apex Archaeology have been engaged to assist School Infrastructure (SI) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for proposed construction of a new public school and public preschool at 9 Worrigee Road, Worrigee, NSW. The project is located within the Shoalhaven Local Government Area (LGA).

This report has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011) (the Guide); the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, April 2010) (the ACHCRs); and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice). It details the results of the archaeological assessment completed in accordance with the Code of Practice and the consultation undertaken with the Aboriginal community in accordance with the ACHCRs.

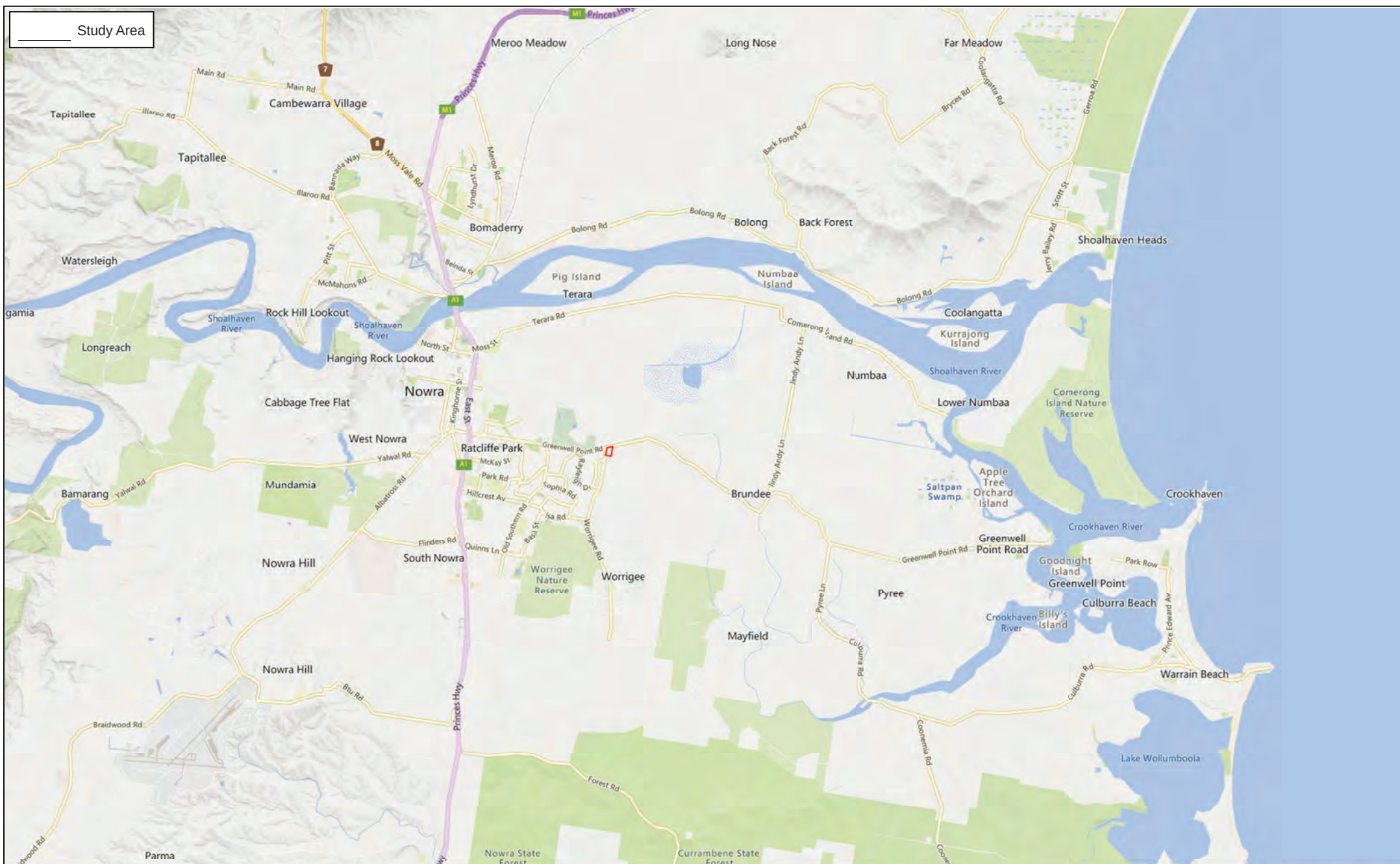
1.1 STUDY AREA

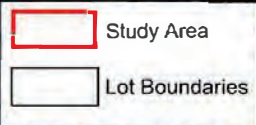
The study area is located within the suburb of Worrigee, approximately 124 km south west of Sydney, within the Shoalhaven Local Government Area (LGA). The study area comprises an existing rural residence and cleared grounds of approximately 2.0ha (Figure 1 and Figure 2). The study area is legally defined as Lot 1 DP576975.

1.2 PROJECT BRIEF

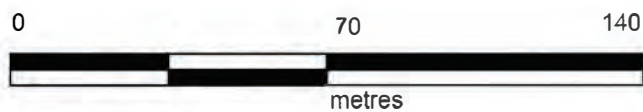
The study area is located within Worrigee which is a rapidly developing suburb in Nowra NSW. In April 2025, SI engaged Apex to complete a Preliminary Indigenous Heritage Assessment and Impact report (PIHAI) for the same study area. The PIHAI identified an area of Potential Archaeological Deposit (PAD) within the study area, and as such an ACHA report is required to assess the extent and presence of Aboriginal archaeological material within the study area.

For this proposal, the determining authority in this instance is the Department of Education, who will determine a Review of Environmental Factors (REF) for the project under Part 5 of the EP&A Act.





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 NEW SOUTH WALES 2541



Projection:
 MGA Zone 56 (GDA 94)
 Base Map:
 Near Maps 2025
 Image Date: 05/04/2025
 Final - Version 1

Figure 2: General location of study area in its local context.





1.3 OBJECTIVES OF THE ABORIGINAL CULTURAL HERITAGE ASSESSMENT

The archaeological investigation was undertaken to meet the requirements of the Code of Practice and ACHCRs.

The purpose of the archaeological investigation is to understand and establish the potential harm the proposed development may have on Aboriginal cultural heritage within the study area, both tangible and intangible.

Aboriginal community consultation was undertaken for the project with the aim of:

- Identifying the Aboriginal community members who can speak for Country within which the study area is located;
- Involving the Aboriginal community in making decisions about the management of their cultural heritage;
- Identifying, assessing and recording Aboriginal heritage values within the study area;
- Preparing an assessment of the cultural heritage values in consultation with the Aboriginal community;
- Identifying the potential impact of the proposed development on the assessed cultural heritage values; and
- Developing conservation and mitigation strategies for these values, with the aim of minimising impacts to cultural heritage wherever possible.

In addition, this report provides a significance assessment of the identified Aboriginal heritage values, as defined by the registered Aboriginal stakeholders (RAPs) for the project. Aboriginal people are the primary determinants of the significance of their cultural heritage and therefore Apex Archaeology cannot make a determination on the cultural significance without the input of the RAPs.

Any development works which disturb the ground surface have the potential to impact Aboriginal archaeological deposits and therefore an assessment of whether the study area contains such deposits is required prior to the commencement of construction works. An assessment of whether the proposed development would impact these deposits (if present) is also necessary, and identification of to what extent the deposits would be impacted is also required. The degree of impact which may be allowable is determined, in part, with consideration of the level of cultural significance attributed to the cultural values of the study area, both tangible and intangible.

This assessment considers existing and newly identified sites within the study area and determination of whether these could be avoided by any further works within the study area, as well as detailing consultation with the Aboriginal community in order to determine the cultural significance of the area.



1.4 PROJECT PROPONENT

The proponent for the project is School Infrastructure. The School Infrastructure Delivery team oversaw the project on behalf of School Infrastructure.

1.5 INVESTIGATORS AND CONTRIBUTORS

This archaeological assessment was commissioned by School Infrastructure. Apex Archaeology thanks the School Infrastructure team for their assistance with the project. Thanks are also extended to the registered Aboriginal groups for their participation and assistance with the project.

This report has been prepared by Peta Rice, Archaeologist with Apex Archaeology and Leigh Bate, Director and Archaeologist with Apex Archaeology. The report was reviewed by Jenni Bate, Director and Archaeologist with Apex Archaeology. Peta has over four years of archaeological consulting and fieldwork experience in NSW. Leigh and Jenni have over eighteen years of archaeological consulting experience within NSW. Analysis of cultural objects identified during the test excavation program was undertaken by Dr Beth White, who has over 30 years of artefact identification experience. Project team roles and qualifications are shown in Table 1.

Table 1: Project team roles and qualifications

Name	Role	Qualifications
Leigh Bate	Project Manager; Field Inspection; GIS; Test Excavation	B.Arch; Grad. Dip. Arch; Dip. GIS
Jenni Bate	Report Review	B.Arch; Grad. Dip. CHM
Peta Rice	Primary Report Author, Test Excavation	B. Arts, History, Archaeology & Ancient History.
Cat Fenech	Test Excavation	BA (CA/VA; Arch); MA (Arch)
Dr Beth White	Archaeologist/Lithic Specialist	BA(Hons); MPhil; PhD; MAACAI

1.6 LIMITATIONS

This report relies in part on previously recorded archaeological and environmental information for the wider region. This includes information from the Aboriginal Heritage Information Management System (AHIMS), which is acknowledged to be occasionally inaccurate, due to inaccuracies in recording methods. No independent verification of the results of external reports has been made as part of this report.

Field investigations for this report included survey and test excavation. The results are considered to be indicative of the nature and extent of Aboriginal archaeological remains within the study area, but it should be noted that further Aboriginal objects and sites which have not been identified as part of this assessment may be present within the wider study area.

It is recognised that Aboriginal people are the primary determinants of the significance of their cultural heritage, and as such, Apex Archaeology have relied on the Aboriginal community to provide cultural knowledge regarding the site, where they are willing and able to share such knowledge. However, there may be occasions



where RAPs are unwilling or unable to share cultural knowledge regarding the site and thus our assessment of significance relies on scientific assessment only.

This report assesses Aboriginal cultural heritage matters only. No assessment of historical heritage has been made as part of this ACHA.

1.7 REPORT STRUCTURE

This report addresses the requirements of the Guide, the Code of Practice and the ACHCRs. The Guide provides guidance as to what must be contained in an ACHAR. The following tables outline the requirements of both the Guide and the Code of Practice, and how they have been addressed in this report. The report has also been prepared in accordance with Requirement 11 of the Code of Practice.

Section 1 of this report outlines the study area, project brief, details of the proponent, and investigators and contributors to this report.

Section 2 outlines the statutory context and applicable legislation to Aboriginal heritage assessment and management.

Section 3 details the consultation undertaken with the Aboriginal community in accordance with the requirements of the ACHCRs and the NPW Regulation 2019.

Section 4 reviews existing knowledge, including landscape context, previous archaeological work, and provides a predictive model of Aboriginal occupation, in accordance with Requirements 2, 3 and 4 of the Code of Practice.

Section 5 provides details of the fieldwork undertaken for the project, in accordance with Requirements 5, 7, 8, 9 and 10 of the Code of Practice.

Section 6 details the assemblage analysis undertaken following test excavations within the study area.

Section 7 makes an assessment of significance for the project, in accordance with Section 3.4 of the Guide and Section 4.3 of the ACHCRs.

Section 8 details the impact assessment of the proposed works on Aboriginal cultural heritage, in accordance with Section 2.5 of the Guide.

Section 9 provides management and mitigation measures to avoid or minimise harm in accordance with Sections 2.6 and 2.7 of the Guide.

Section 10 outlines the requirements of the AHIP, and Section 11 details the recommendations made for the project.



2.0 STATUTORY CONTEXT

Heritage in Australia, including both Aboriginal and non-Aboriginal heritage, is protected and managed under several different Acts. The following section presents a summary of the applicable Acts which provide protection to cultural heritage within NSW.

2.1 COMMONWEALTH LEGISLATION

2.1.1 ABORIGINAL AND TORRES STRAIT ISLANDER HERITAGE PROTECTION ACT 1984

This Act provides for the preservation and protection of injury and/or desecration of areas and objects in Australia and its waters that are of significance to Aboriginal people, in accordance with Aboriginal tradition.

Under this Act, the responsible Minister has provision to make both temporary and/or long-term declarations, in order to provide protection to areas and objects which are at threat of injury or desecration. In some instances, this Act can override State or Territory provisions, or be invoked if State or Territory provisions are not enforced. An Aboriginal or Torres Strait Islander individual or organisation must invoke the Act.

No items within the study area are listed or protected under this Act.

2.1.2 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The EPBC Act provides protection to environmental sites of national significance, including places with cultural heritage values that contribute to Australia's national identity. The Act aims to respect the role of Indigenous peoples in the conservation and ecologically sustainable use of Australia's biodiversity, and to enhance the protection and management of important natural and cultural places. Additionally, the Act is designed to promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

The National Heritage List (NHL) provides a listing of natural, historic and Indigenous places of outstanding significance to the nation, while the Commonwealth Heritage List (CHL) details the Indigenous, historic and natural places owned or controlled by the Australian Government.

The Register of the National Estate (RNE) is a former statutory register that is no longer in force; however, listings can still be searched. The listings on the RNE did not automatically transfer to the NHL.

Under the EPBC Act, approvals are required if any action is proposed that will have (or is likely to have) a significant impact on the National Heritage values of a National Heritage place. Therefore, actions must be referred to the Australian Government Minister for the Environment and Heritage. A decision will be made as to whether the



proposed action will have a significant impact on any matters of national significance.

A search of both the NHL and the CHL did not identify any items within the study area.

2.1.3 NATIVE TITLE ACT 1993

The *Native Title Act 1993*, as amended, provides protection and recognition for Native title. Native title is recognised where the rights and interests of over land or waters where Aboriginal and Torres Strait Islander people practiced traditional laws and customs prior to the arrival of European settlers, and where these traditional laws and customs have continued to be practiced.

The National Native Title Tribunal (NNTT) was established to mediate native title claims made under this Act. Three registers are maintained by the NNTT, as follows:

- National Native Title Register
- Register of Native Title Claims
- Register of Indigenous Land Use Agreements.

Searching the NNTT registers allows identification of potential Aboriginal stakeholders who may wish to participate in consultation.

A search of the above registers identified a Native Title claim by the South Coast People over the study area and surrounds. This claim has been accepted for registration but has not yet been determined.

2.2 NEW SOUTH WALES LEGISLATION

2.2.1 NATIONAL PARKS AND WILDLIFE ACT 1974

The *National Parks and Wildlife Act 1974* provides protection for all Aboriginal objects and places within NSW. Aboriginal objects are defined as the material evidence of the Aboriginal occupation of NSW, while Aboriginal Places are defined as areas of cultural significance to the Aboriginal community. All Aboriginal objects are protected equally under the Act, regardless of their level of significance. Aboriginal Places are gazetted if the Minister is satisfied that the location was and/or is of special significance to Aboriginal people.

Following amendments to the NPW Act in 2010, approval to impact Aboriginal cultural heritage sites is only granted under a Section 90 Aboriginal Heritage Impact Permit (AHIP), which is granted by Heritage NSW of the Department of Climate Change, Energy, the Environment and Water.



2.2.2 NATIONAL PARKS AND WILDLIFE REGULATION 2019

Part 5, Division 2 of the *National Parks and Wildlife Regulation 2019* addresses Aboriginal objects and places in relation to the NPW Act 1974, and outlines how compliance with relevant codes of practice can be met.

Clause 58(1) outlines the defence of low impact acts or omissions to the offence of harming Aboriginal objects, which includes maintenance works on existing roads and fire trails, farming and land management work, grazing of animals, activities on land that has been disturbed that is exempt or complying development, mining exploration work, removal of vegetation (aside from Aboriginal culturally modified trees), seismic surveying or groundwater monitoring bores on disturbed ground, or environmental rehabilitation work (aside from erosion control or soil conservation works such as contour banks).

Clause 58(4) outlines the definition of ‘disturbed land’, as land that “has been the subject of a human activity that has changed the land’s surface, being changes that remain clear and observable”.

Clause 59 relates to the notification of Aboriginal objects and sites and Clause 60 relates to the requirements for the consultation process to support an AHIP application. The regulation sets out the requirements broadly in line with those outlined in the ACHCRs.

2.2.3 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

Under the EP&A Act, it is necessary to consider environmental impacts, including impact to cultural heritage, as part of the land use process. Local Environmental Plans (LEPs) and Development Control Plans (DCPs) are also required to be prepared by Local Government Areas (LGAs) in order to provide guidance on the applicable level of environmental assessment. LGAs are required to maintain a list of locally significant heritage items as part of their LEP.

Under the EP&A Act, Part 3 describes the planning instruments at both local and regional levels; Part 4 relates to development assessment and consent processes, and Part 5 refers to infrastructure and environmental impact assessment.

The project will be assessed under Part 5 of the EP&A Act and the Consent Authority is the Department of Education.

2.2.4 SHOALHAVEN LOCAL ENVIRONMENTAL PLAN 2014

Part 5 of the *Shoalhaven Local Environmental Plan 2014* (Shoalhaven LEP 2014) provides specific provisions for the protection of heritage items and relics within the Shoalhaven region LGA.

Clause 5.10(2) (e) identifies that no buildings may be erected on land within a heritage conservation area or which contains an Aboriginal object, without first obtaining development consent. Further, Clause 5.10(2) (c) states that



archaeological sites may not be disturbed or excavated without development consent. Exceptions to the requirement for development consent are detailed by Clause 5.10(3) and include low impact activities, or activities for the maintenance of a heritage item. Clause 5.10(8) requires that the effect of any development on an Aboriginal place of heritage significance must be considered, and the Aboriginal community must be notified of any proposed developments.

An 'Aboriginal place of heritage significance' is defined in the Shoalhaven LEP 2014 as:

an area of land, the general location of which is identified in an Aboriginal heritage study adopted by the Council after public exhibition and that may be shown on the Heritage Map, that is:

- (a) The site of one or more Aboriginal objects or a place that has the physical remains of pre-European occupation by, or is of contemporary significance to, the Aboriginal people. It may (but need not) include items and remnants of the occupation of the land by Aboriginal people, such as burial places, engraving sites, rock art, midden deposits, scarred and sacred trees and sharpening grooves, or*
- (b) A natural Aboriginal sacred site or other sacred feature. It includes natural features such as creeks or mountains of long-standing cultural significance, as well as initiation, ceremonial or story places or areas of more contemporary cultural significance.*

There are no Aboriginal heritage items or Aboriginal places of heritage significance listed in this schedule, although a number of other heritage items are listed in relatively close proximity (Figure 3). Further assessment of historical significance is beyond the scope of this report.

The above must be considered as part of the assessment.

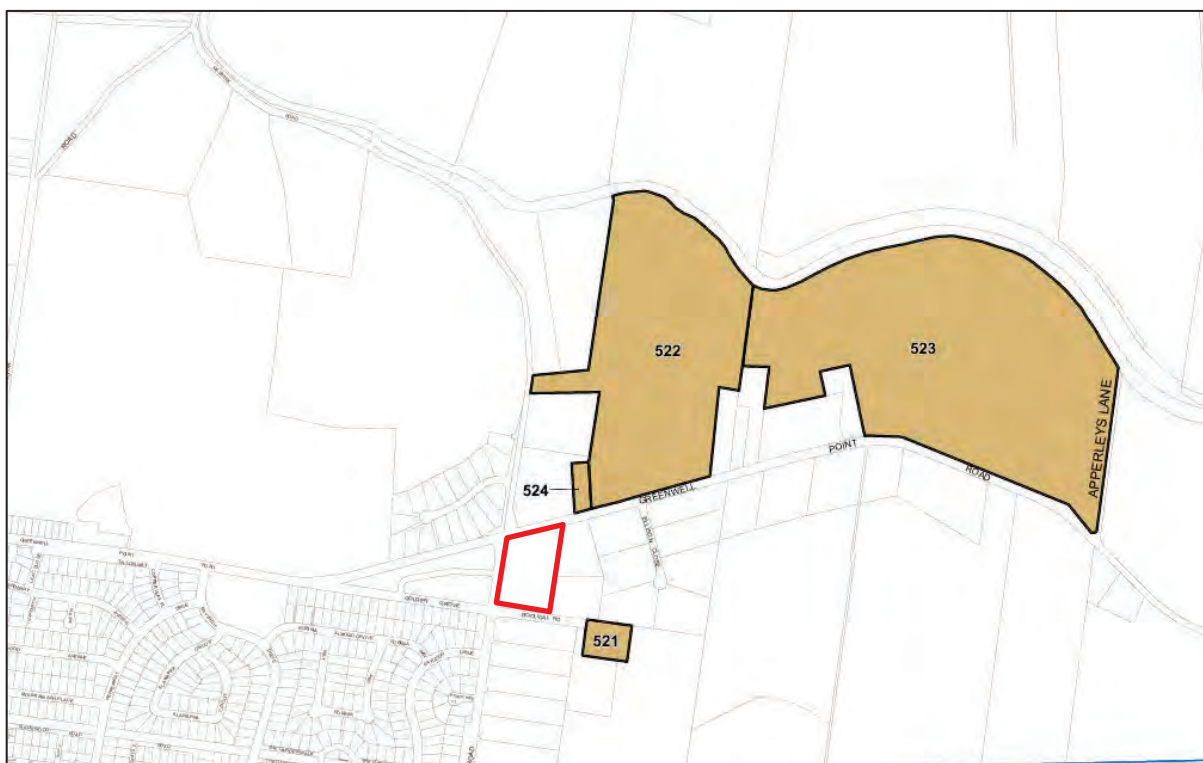


Figure 3: Detail of Shoalhaven LEP 2014 Heritage Map. Study area outlined in red (Source: Shoalhaven LEP 2014 Heritage Map Sheet HER_019C).

3.0 ABORIGINAL CONSULTATION PROCESS

This section details the Aboriginal community consultation undertaken to assist in the heritage assessment of the study area. Aboriginal consultation in accordance with the ACHCRs was undertaken by Apex Archaeology for this project.

Aboriginal community consultation is a requirement in order to make assessments of Aboriginal cultural values, as Aboriginal people are the primary determinants of the significance of their cultural heritage and therefore Apex Archaeology cannot make a determination on the cultural significance without the input of the RAPs. Aboriginal people often have a strong connection to their Country, and to their ancestors, both past and present.

Material evidence of past Aboriginal occupation of an area is a tangible link to the intangible traditions, lore, customs, beliefs and history. These intangible values provide a sense of belonging for Aboriginal people, and cultural heritage and cultural practices are kept alive through being incorporated into everyday life, which helps maintain a connection to the past and to the present. It is a vital part of the identity of Aboriginal people.

Therefore, it is important that Aboriginal people are afforded the opportunity to understand, comment on and have input into projects that may impact areas which



may be culturally sensitive, or damage items of cultural significance. The process of Aboriginal community consultation provides this opportunity, and this ACHAR details the results of the consultation undertaken for this project.

3.1 THE CONSULTATION PROCESS

The ACHCRs provide the process for undertaking consultation with the Aboriginal community. This process includes identification, registration, engagement and consultation with those Aboriginal people who may have cultural knowledge which is relevant to determining the cultural significance of Aboriginal objects and places which may be within the study area.

The ACHCRs detail a number of stages for consultation, as follows:

- Identification of those people who should be consulted for the project
- Inviting Aboriginal people to register their interest in being consulted for the project
- Providing information regarding the nature and scope of the project to the Aboriginal people who have registered an interest in being consulted – the registered Aboriginal parties (RAPs)
- Providing opportunities for RAPs to comment on the proposed methodology for cultural heritage consultation
- Presenting information about the potential impacts of the proposed development for the RAPs to comment on
- Providing opportunities for RAPs to comment on the cultural significance of the proposed development area
- Providing opportunities for RAPs to comment on the draft reports detailing the results of the archaeological and cultural assessments for the project

A log of all correspondence undertaken as part of the assessment must be maintained. This log is attached as Appendix A.

3.2 STAGE 1 CONSULTATION: COMMENCEMENT

Stage 1 requires a list of Aboriginal people who may have cultural knowledge relevant to the area to be prepared from several sources of information. The first step requires enquiries to be made of certain statutory bodies regarding whether they are aware of Aboriginal people or organisations that may have an interest in the study area, and their contact details. Any Aboriginal people or organisations identified in this step must be contacted and invited to register an interest in the project. In addition, a notification must be placed in local print media requesting Aboriginal people or organisations to register their interest in the project. A list of those who register an interest must be compiled. A minimum of 14 days from the date of the letter or newspaper advertisement must be allowed for registrations of interest.



As a result of the Stage 1 activities, a list of Aboriginal people who wish to be consulted for the project is developed. These Aboriginal people become the registered Aboriginal parties – the RAPs – for the project.

Letters requesting the details of Aboriginal people who may hold cultural knowledge relevant to the study area and who may wish to be consulted for the project were sent to several statutory agencies on 11 July 2025. Copies of these letters and responses are attached in Appendix B. These Step 1 letters were sent to the following agencies:

- Heritage NSW
- South East Local Land Services (SE LLS)
- Shoalhaven Council
- Nowra Local Aboriginal Land Council (NLALC)
- Office of the Registrar, *Aboriginal Land Rights Act 1983 (NSW)* (ORALRA)
- Native Title Services Corp (NTS Corp)

Responses were received from Heritage NSW, SE LLS, NTS Corp, ORALRA and Shoalhaven Council. Heritage NSW provided a list of Aboriginal people and organisations, SE LLS responded stating that they are not the primary source for contacting or managing contact lists for Aboriginal communities or persons that may inform or provide comment on planning issues, NTS Corp responded registering the South Coast People Native Title Claimants for the project, and ORALRA as well as Shoalhaven Council responded suggesting that NLALC be contacted. These individuals and organisations identified in the above step were invited to participate in consultation for the project.

An online search of the National Native Title Tribunal (NNTT) identified a Native Title Application over the study area on behalf of the South Coast People (Figure 4). The application has been accepted for registration but not yet determined.

The Aboriginal people and organisations identified during this initial stage were contacted via letter (email if provided or via post if no email address given) on 25 July 2025, inviting them to register an interest in the project. Registrations were accepted until 8 August 2025. This is Step 2 of Stage 1 of consultation. Copies of these letters are attached in Appendix C.

In addition, an advertisement was placed in the *South Coast Register* on 19 July 2025, inviting registrations of interest from people who may have cultural knowledge of the project area. A copy of the advertisement is attached in Appendix D.

A total of 12 Aboriginal people and organisations registered an interest in being consulted for the project. The following list comprises the registered Aboriginal parties (RAPs) for the project:



- Guntawang Aboriginal Resources Incorporated
- Jason Davidson
- Tungai Tonghi
- Woronora Plateau Gundungara Elders Council
- South Coast Culture and Heritage
- Turtle Dreaming
- Meryhuiela
- South Coast People
- Marri Culture & Heritage
- Yurwang Gundana
- Southern Native
- Nowra LALC



Figure 4: Study area (red star) within the South Coast People, Tribunal No NC2017/003 Native Title Claim boundary



3.3 STAGE 2 & 3 CONSULTATION: PRESENTATION AND GATHERING OF INFORMATION

During Stage 2, information about the proposed project is provided to the RAPs, including location, scale, proposed development plans, timeframes, methodologies and any other relevant details relating to the project. This information can be provided in writing or at a meeting (or both), and an opportunity for the RAPs to visit the site may also be provided.

During Stage 3, RAPs are invited to share information about the cultural significance of the study area, which can assist in the assessment of the cultural significance of the Aboriginal objects and/or places within the study area. The cultural heritage assessment informs and integrates with the scientific assessment of significance and therefore can assist in the development of mitigation and management measures for the project. A methodology detailing how this information will be gathered must be provided to the RAPs for comment and a minimum of 28 days must be allowed for responses to be received. Any feedback must be considered and implemented as appropriate into the methodology.

Stage 2 and 3 can be undertaken concurrently. The information about the project and the methodology for seeking cultural knowledge can be provided in the same written documentation or at the same meeting.

Details of the proposed project and the proposed methodology for undertaking the cultural heritage and archaeological assessments for the project were provided in writing to each of the RAPs on 11 August 2025. Comments were accepted until 8 September 2025. Responses were received from the following groups or individuals:

- Guntawang Aboriginal Resources Inc
- Meryhuiela
- South Coast Culture and Heritage
- Yurwang Gundana Cultural Heritage Services

All responses were favourable and endorsed our proposed methodology. No alternatives to our methodology were suggested or requested. The RAP responses are attached in Appendix E and are detailed in Table 2.



Table 2: RAP responses to Information and Methodology document

RAP	RAP Response	Apex Archaeology Response
Guntawang Aboriginal Resources Inc	Thanks for the report. Guntawang support all of the processes of the ACHA of this project.	Noted with thanks.
Meryhuiela	I have read the project information and methodology for the above project, I agree with the recommendations.	Noted with thanks.
South Coast Culture and Heritage	I have read the project information and methodology for the above project, I agree with the recommendations.	Noted with thanks.
Yurwang Gundana Cultural Heritage Services	Acknowledgement of the Draft I've carefully reviewed the draft and acknowledge the effort that has gone into developing a structured methodology for site assessments and managing potential Aboriginal cultural heritage impacts. Inclusion in Consultation and Fieldwork I would like to formally request to be included in: • On-site surveys, assessments and excavations • Ongoing Aboriginal stakeholder consultations • Any decision-making processes relating to the management and preservation of cultural heritage in the project area. Ensuring that all relevant voices are included in these stages is vital to achieving respectful, culturally informed outcomes. Feedback on the proposed methodology While the methodology outlines several key processes, I'd like to highlight a few important points for consideration: Cultural Heritage Values – It is important to recognise that Aboriginal Heritage extends beyond recorded artefacts and includes broader cultural landscapes, songlines, and intangible knowledge tied to Country. Monitoring and Decision Making Cultural Monitors should be present for all ground disturbing works, including test excavation, construction and any unexpected finds. Management of Artefacts Any discovered artefacts or material should be managed collaboratively, with decisions made with Aboriginal stakeholders rather than solely by archaeological contractors. Knowledge Protection	Incorporated in report, responded with thanks for the information provided.



RAP	RAP Response	Apex Archaeology Response
	Any cultural information shared during this process must remain under the control of Aboriginal stakeholders and not be published or distributed without explicit consent. I look forward to working collaboratively to ensure the Worrigee Project honours and protects Aboriginal cultural heritage, values, and stories connected to this area. Please also keep me informed of any updates, revisions to the methodology, or upcoming opportunities for participation in cultural heritage management activities.	



No other comments were received from any of the other RAPs for the project, and no specific cultural information pertaining to the study area was received from any of the RAPs for the project during this stage of consultation.

3.4 STAGE 4: REVIEW OF DRAFT REPORT

Stage 4 sees the preparation of the draft ACHAR, which details the results of the cultural heritage assessment. The draft is provided to the RAPs for their review and comment. A minimum of 28 days to comment on the ACHAR must be allowed. All comments must be addressed in the final document and the proponent's response to RAP comments must be included. Copies of any submissions received from RAPs must be included in the final ACHAR.

The draft ACHAR was sent to all RAPs on 28 November 2025. Comments were accepted until 9 January 2026, which was an extended comment period to allow for the December holiday shutdown. One response was received from Guntawang Aboriginal Resources Inc, stating "Guntawang Aboriginal Resources Inc support the ACHA process for this Project at the New Public School – 9 Worrigeer Road Worrigeer NSW. We look forward to working with you". No other comments were received from any of the RAPs for the project. Copies of the consultation regarding the draft ACHA are attached in Appendix F.

Consultation with the Aboriginal community for this project has been conducted in accordance with the ACHCRs.



4.0 ABORIGINAL CULTURAL HERITAGE

An analysis of previous archaeological work within the study area assists in the preparation of predictive models for the area, through understanding what has been found previously. By compiling, analysing and synthesising the previous archaeological work, an indication of the nature and range of the material traces of Aboriginal land use is developed. An understanding of the context in which the archaeological assessment is vital, as development does not occur within a vacuum, but within a wider cultural landscape, and this must be considered during any archaeological assessment in order to develop appropriate mitigation and management recommendations.

This section presents information about both the physical and cultural landscape in which the study area is located, based on previous archaeological and ethnohistorical studies, to provide context and background to the existing knowledge of Aboriginal culture in the area.

4.1 EXISTING ENVIRONMENT

The study area is located within the Shoalhaven region of the South Coast of NSW. The study area is located within the Shoalhaven Plateaux, above and adjacent to the Shoalhaven River, which forms part of the Sydney Basin bioregion.

The study area has been disturbed by previous land use practices, including historic land and vegetation clearance, building, stormwater infrastructure and subsequent landscaping activities from residential use.

4.1.1 GEOLOGY

The underlying geology of the study area is located within the Quaternary alluvial deposits geological unit, which consists of current and recent mud, silt, sand and gravel deposited by river systems.

4.1.2 SOIL LANDSCAPES

The study area is situated within the Shoalhaven soil landscape which is described as a fluvial landscape characterised by level to gently undulating floodplains. Soils can be moderately to quite deep at around 50 cm to >100 cm and are subject to erosion in flood prone areas. The soils are acidic and generally brown to brownish black in colour with a fine sandy to light sand clay texture in the topsoil (A1) that overlays a dull yellowish-brown subsoil (A2).

4.1.3 HYDROLOGY

The nearest permanent fresh water source is Crookhaven Creek, located 755m north of the study area. Additionally, the Shoalhaven River is situated 3.1km north of the study area which likely would have been the primary water source for inhabitants in the area. Watercourse classification ranges from first order through to fourth order (and above) with first order being the lowest, i.e. a minor creek or ephemeral watercourse, and fourth or above being a large watercourse such as a river, as

defined by the Department of Planning and Environment (DPE; Figure 5). Crookhaven Creek is classified as a third order watercourse, while the Shoalhaven River is classified as an eighth order watercourse.

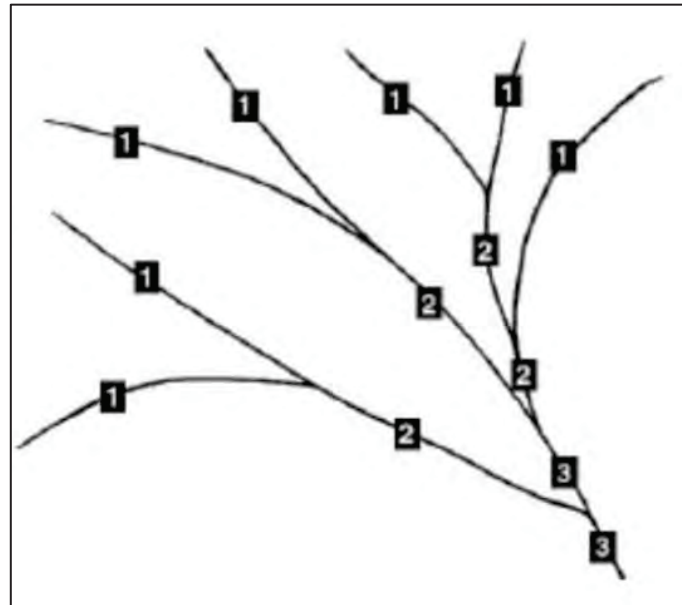


Figure 5: The Strahler system (Source: Department of Planning and Environment 2016).

4.1.4 FLORA AND FAUNA

The original vegetation within the area would have consisted scattered open woodland with occasional shrubs. Common species include turpentine (*Syncarpia glomulifera*), grey gum (*Eucalyptus punctata*), scribbly gum (*Eucalyptus sclerophylla*), Sydney peppermint (*Eucalyptus piperita*), thin leaved stringybark (*Eucalyptus eugenioides*), red bloodwood (*Eucalyptus gummifera*), forest oak (*Allocasuarina torulosa*) and blackbutt (*Eucalyptus pilularis*) with an understorey of flaky-barked tea-tree (*Leptospermum attenuatum*). Mountain devil (*Lambertia formosa*), hairpin banksia (*Banksia spinulosa*), pine-leaf geebung (*Persoonia pinifolia*) and burrawang (*Macrozamia communis*) spotted gum (*Eucalyptus maculata*), blackbutt (*Eucalyptus pilularis*), blue-leaved stringybark (*Eucalyptus agglomerata*), cabbage tree palm (*Livistona australis*), Illawarra flame tree (*Brachychiton acerifolium*), and wattle (*Acacia* sp.). Decorative paperbark (*Melaleuca decora*) would have also occurred in the drainage lines and terraces, along with swamp oak (*Casuarina glauca*), Illawarra flame tree (*Brachychiton acerifolium*), and various reeds in swamps.

Animals within the study area and surrounds would have included birds, possums, wombats, kangaroos, wallabies, snakes, lizards, frogs, and fish in the creeks.

Most of these natural resources would have provided resources for Aboriginal people, either for dietary needs or to provide tools and implements. For example; nuts from the burrawang plant would have first been leached of toxins then ground



into a flour for food; the various Eucalypts would have provided wood for shields, canoes and coolamons; gum from the wattle trees would have been collected and mixed with ash to make a strong resin to attach stone tools to wooden handles for spears and axes; fur from possums would have been sewn together using a needle made from animal bones and thread made from the sinew of animal's muscles.

4.2 ETHNOHISTORY

Ethnohistorical evidence is based on the reports of colonisers and do not tend to include the Aboriginal perspective, leading to a Eurocentric view of Aboriginality. Additionally, historical records can be contradictory and incomplete regarding the exact tribal boundaries and locations of ceremonial or domiciliary activities of Aboriginal people pre-contact within the South Coast region. Boot (2002:58) notes:

The problem associated with ethnohistoric documents include their tendency to record unusual, rather than everyday events, and their focus on religious behaviour to the exclusion of woman and children (Attenbrow 1976:34; Sullivan 1983:12.4).

As a result, there are several versions of the Aboriginal history prior to colonisation, mostly due to differing records made in the historical period. Howitt (1904) defined the Yuin tribal area as extending from Cape Howe in the south to the Shoalhaven River in the north.

In contrast, other historical records made by early colonists indicate the study area is located within lands traditionally occupied by the Wandandian people (Tindale 1974). The Shoalhaven River was considered to be a border between the Wodi Wodi and the Wandandian people. The Wodi Wodi spoke Dharawal, and the Wandandian spoke Dhurga. It is noted that the Wandandian people were considered to have occupied an area extending from the Shoalhaven River south to Ulladulla (Tindale 1974) while the Wodi Wodi lived in the area between the Shoalhaven River north to Wollongong, and as far inland as Moss Vale.

However, some members of the Aboriginal community dispute these associations and claim the area falls within the lands of the Jerrinja tribe, which extends from Crooked River in the north to the Clyde River in the south. The Jerrinja tribe have been referred to as the "Saltwater people of the Shoalhaven" (Penfold 2017).

As such, it is difficult to make definitive claims regarding the history of the people who once inhabited the area.

Regardless of the specific identity of the original inhabitants of the area, Aboriginal society in general was understood to be constructed of a hierarchy of social levels and groups, with fluid boundaries (Peterson 1976). The smallest group comprising a family of a man and his wife/wives, children and some grandparents, referred to as a 'clan' (Attenbrow 2010). The next level consists of bands, which were small groups of several families who worked together for hunting and gathering purposes



(Attenbrow 2010). The third level comprised regional networks with a number of bands, and these bands generally shared a common language dialect and/or had a belief in a common ancestor. Networks would come together for specific ceremonial purposes. The highest level is described as a tribe, which is usually described as a linguistic unit with flexible territorial boundaries (Peterson 1976); although Attenbrow (2010) argues that “these groups were not tribes in the current anthropological sense of the word”.

The traditional lifestyles of Aboriginal groups depended largely on the environment in which they lived. Whilst hinterland groups relied on freshwater and terrestrial animals and plants, coastal groups utilised marine and estuarine resources. Nowra falls within the coastal region, with access to both marine and inland resources. Animals such as kangaroos, wallabies, possums, gliders, bandicoots, wombats, quolls, fruit bats, echidnas, native rats and mice, emus, ducks, tortoises, snakes and goannas (Attenbrow, 2010), played a major role in the subsistence of coastal groups, while other resources included shellfish such as oysters, crustacea such as crayfish and crabs, and marine animals including dolphins, dugongs, fish, shark, eel, seals and whales (Boot 1994). Fishing was conducted from canoes with spears, or collected along the shore (Tench in Attenbrow 2010). Beached whales were eaten, as observed by the British settlers in the late 18th century.

The different environments of the Nowra area contain a diverse range of plant and animal species. On creek banks and surrounds, a wide variety of game would have been found. The vegetation communities along the creeks and gullies, primarily woodlands, would have provided shelter for numerous animal and plant species that could be eaten or used for other purposes such as providing shelter and medicines.

The Aboriginal people of the area would have utilised a range of hunting and gathering equipment, including fishing and hunting spears made of wood and barbed with shell, flaked stone blades, shark teeth, or sharpened bone; boomerangs and spear-throwers; fishing hooks made from bird talons, bone, wood and shell; ground stone axes; anvils and pounders; stone tools including blades and scrapers; shields, clubs and digging sticks made from wood; baskets made from bark; and wooden canoes (Attenbrow 2010).

Shelter is a basic need for any humans and historical records report either rockshelters or huts constructed from bark, branches and leaves were utilised for shelter. There is some discussion regarding whether Aboriginal people moved regularly from place to place, or whether they lived at one campsite for a longer period of time and ranged out for resources, returning to their home base as necessary, with Penfold providing oral histories stating the Jerrinja peoples tended to have multiple home bases for different seasons, and relied on gunyahs for shelter (Penfold 2017).



4.2.1 RAW MATERIALS

A wide range of raw materials were selected by Aboriginal people for flaking to create stone implements. Material types ranged from high quality to poor quality for flaking purposes, depending on the geology of the area and readily available material types. The following is a description of a range of raw material types known to have been utilised by Aboriginal people for the creation of stone artefacts.

BRECCIA

Breccias are coarse, angular volcanic fragments cemented together by a finer grained tuffaceous matrix.

CHALCEDONY

Chalcedony is a microcrystalline, siliceous rock which is very smooth and can be glossy. Introduction of impurities can produce different coloured versions of chalcedony, including yellow/brown (referred to as carnelian), brown (sard), jasper (red/burgundy) and multicoloured agate. It flakes with a sharp edge and was a prized material type for the creation of stone artefacts in parts of Australia (Kuskie & Kamminga 2000: 186).

CHERT

Chert is a highly siliceous sedimentary rock, formed in marine sediments and also found within nodules of limestone. Accumulation of substances such as iron oxide during the formation process often results in banded materials with strong colours. Chert is found in the Illawarra Coal Measures and also as pebbles and colluvial gravels. It flakes with durable, sharp edges and can range in colour from cream to red to brown and grey.

PETRIFIED WOOD

Petrified wood is formed following burial of dead wood by sediment and the original wood being replaced by silica. Petrified wood is a type of chert and is a brown and grey banded rock and fractures irregularly along the original grain.

QUARTZ

Pure quartz is formed of silicon dioxide, and has a glossy texture and is translucent. Introduction of traces of minerals can lead to colouration of the quartz, such as pink, grey or yellow. The crystalline nature of quartz allows for minute vacuoles to fill with gas or liquid, giving the material a milky appearance.

Often quartz exhibits internal flaws which can affect the flaking quality of the material, meaning that in general it is a low-quality flaking material (Kuskie & Kamminga 2000: 186). However, quartz is an abundant and widely available material type and therefore is one of the most common raw materials used for artefact manufacture in Australia. Flaking of quartz can produce small, very sharp flakes which can be used for activities such as cutting plant materials, butchering and skinning.



QUARTZITE

Formed from sandstone, quartzite is a metamorphic stone high in silica that has been heated or had silica infiltrate the voids found between the sand grains. Quartzite ranges in colour from grey to yellow and brown.

SILCRETE

Silcrete is a siliceous material formed by the cementing of quartz clasts with a matrix. These clasts may be very fine grained to quite large. It ranges in colour from grey to white, brown, red or yellow. Silcrete flakes with sharp edges and is quite durable, making silcrete suitable for use in heavy duty woodworking activities and also for spear barbs (Kuskie & Kamminga 2000:184).

TUFF/INDURATED MUDSTONE

There is some disagreement relating to the identification of lithic materials as tuff or indurated mudstone. The material is a finely textured, very hard yellow/orange/reddish-brown or grey rock. Kuskie and Kamminga (2000: 6, 180) describe that identification of lithic materials followed the classification developed by Hughes (1984), with indurated mudstone described as a common stone material in the area. However, Kuskie and Kamminga's analysis, which included x-ray diffraction, identified that lithics identified as 'indurated mudstone' was actually rhyolitic tuff, with significant differences in mineral composition and fracture mechanics between the stone types. They define mudstone as rocks formed from more than 50% clay and silt with very fine grain sizes and then hardened.

The lithification of these mudstones results in shale (Kuskie & Kamminga 2000: 181) and thus 'indurated mudstone', in the opinion of Kuskie and Kamminga, do not produce stones with the properties required for lithic manufacture. Tuff, however, forms from the tiny ash particles that are also released during volcanic explosions. When it cools it hardens into a fine-grained rock.

In 2011, Hughes, Hiscock and Watchman undertook an assessment of the different types of stones to determine whether tuff or indurated mudstone is the most appropriate terminology for describing this lithic material. The authors undertook thin section studies of a number of rocks and determined that the term 'indurated mudstone' is appropriate, with an acknowledgment that some of this material may have been volcanic in origin. They also acknowledge that precise interpretation of the differences between material types is difficult without detailed petrological examination, and suggest that artefacts produced on this material are labelled as 'IMT' or 'indurated mudstone/tuff'.

BASALT

Basalt, which is commonly referred to as 'blue metal', is solidified lava that was produced by now extinct volcanoes and diatremes that are spread-out within the Sydney Basin. If the lava cools quickly it results in fine-grained basalt that is easily flaked or ground to make tools, implements or weapons.



Basalt would have been either collected from the primary deposits formed during the eruption, which would require pieces to be broken off (quarried) or it was collected in cobble-form from a creek bed or shoreline. Cobbles are referred to as secondary sources as they are formed from pieces of rock that have been dislodged from their primary source and end up in creeks and/or river systems (Petrequin 2016; Attenbrow et al. 2017). The flow of water moves them around and smooths them into water-rolled cobbles that can be transported considerable distance from the original source. Basalt was often used to make axes which were either flaked into the desired shape from quarried stone, or from cobbles which quite often only required only one end to be ground into a sharp working edge.

Basalt cobbles can be found along the banks of rivers, and in bedrock quarries within the Hunter Region. Recent research undertaken by the Australian Museum and University of New England using portable XRF technology demonstrated that a number of stone axes held at the Australian Museum from the Hunter Valley area have been traced to these sources (Attenbrow et al. 2017).

NON-LITHIC MATERIALS

Following the arrival of colonists in NSW, new materials became available for use by Aboriginal people in contact with settlers. These materials included glass, ceramics, and porcelain, all of which can function similarly to fine grained stoned materials when flaked (Harrison 2002, 2006; Jones 2008; May et al 2017; Smith 2001; Veth and O'Connor 2005). Glass bottles were especially common for use as flaked items (Munt and Owen 2021; Ulm et al 2009). Porcelain from telegraph insulators was flaked to create spear tips (Jones 2008; Moyal 1984). Often, the physical attributes associated with flaking actions can be visible on glass items, particularly if a formal tool type is created (for example, Kimberley points). However, there are times when items made from non-lithic materials can be difficult to attribute as culturally flaked, and in these instances, context can provide further information regarding the use of non-lithic materials for flaking, as can microscopic use-wear analysis (Munt and Owen 2021).

The use of non-lithic items for traditional purposes, such as processing plant matter, working wood, and processing meat sources, leaves evidence of this use on the material – particularly if used repeatedly (Munt and Owen 2021). This use can result in polish on high points, edge scarring, and the working edge can become rounded (Kononenko 2011). Striations can also be visible microscopically and relate to the use-wear directionality (Walton 2019). Striations, scarring and edge rounding can often be visible under low power magnification or macroscopically (Munt and Owen 2021).

In some instances, accidental smashing of glass bottles can result in items suitable for use as tools without undertaking formal flaking activities. In these instances, a number of criteria are necessary for consideration to determine whether an item may have been used in a traditional manner (Goward 2011; Harrison 2000; Munt 2022; Richardson 2004; White 2018). These include the context in which the items



are found, the presence of contemporary materials, the age of the glass, the presence of usewear and/or residue, technological attributes, evidence of a reduction sequence, retouch, and evidence of unintentional damage.

For items made of glass, the age of the glass is important to assist in determining if the glass would have been available for use in flaking activities during the contact era. In order to date glass, it is necessary to consider a number of factors, such as the colour of the glass which can indicate the age of manufacture; as well as if any mouldings or other features are present.

The earliest glass vessels were brought to Australia following colonisation and consisted of pottery or imported glass, with the first Australian made glass appearing in 1812 (ASTHC 2000) but ceasing operations quite soon after. It wasn't until 1866 that further glass manufacture commenced in Australia (ASTHC 2000). Accordingly, the majority of the glass found in Australia prior to 1866 is likely to have been imported.

The colour of glass can assist in identifying its age, as different manufacturing processes resulted in different colours of glass. "Black glass", which is in fact a very dark green that appears almost black, was the most common type of glass for alcohol bottles during the 19th century (Burke et al 2017). Due to the lack of manufacturing facilities for glass in the earliest days of settlement, most glass was imported from Britain, where "black glass" was cheapest (Boow 1991; Burke et al 2017). Generally, "black glass" is considered to date to pre-1880 (Lindsey 2015; Burke et al 2017).

4.2.2 PROCUREMENT

Assemblage characteristics are related to and dependent on the distance of the knapping site from raw materials for artefact manufacture, and different material types were better suited for certain tasks than other material types. Considerations such as social or territorial limitations or restrictions on access to raw material sources, movement of groups across the landscape and knowledge of source locations can influence the procurement behaviour of Aboriginal people. Raw materials may also have been used for trade or special exchange between different tribes.

4.2.3 MANUFACTURE

A range of methodologies were used in the manufacture of stone artefacts and tools, through the reduction of a stone source. Stone may have been sourced from river gravels, rock outcrops, or opportunistic cobble selection. Hiscock (1988:36-40) suggests artefact manufacture comprises six stages, as follows:

1. The initial reduction of a selected stone material may have occurred at the initial source location, or once the stone had been transported to the site.
2. The initial reduction phase produced large flakes which were relatively thick and contained high percentages of cortex. Generally the blows were struck



by direct percussion and would often take advantage of prominent natural ridges in the source material.

3. Some of these initial flakes would be selected for further reduction. Generally only larger flakes with a weight greater than 13-15 grams would be selected for further flaking activities.
4. Beginning of 'tranchet reduction', whereby the ventral surface of a larger flake was struck to remove smaller flakes from the dorsal surface, with this retouch applied to the lateral margins to create potential platforms, and to the distal and proximal ends to create ridges and remove any unwanted mass. These steps were alternated during further reduction of the flake.
5. Flakes were selected for further working in the form of backing.
6. Suitable flakes such as microblades were retouched along a thick margin opposite the chord to create a backed blade.

Hiscock (1986) proposed that working of stone materials followed a production line style of working, with initial reduction of cores to produce large flakes, followed by heat treatment of suitable flakes before the commencement of tranchet reduction. These steps did not necessarily have to occur at the same physical location, but instead may have been undertaken as the opportunity presented.

Although probably less common than the process of flaking stone to modify it, the grinding technique was used within the Sydney Basin. This has been documented by early settlers particularly in the manufacture of axe heads where the end of a cobble was ground to achieve a working edge (Corkill 2005).

Similar techniques for flaking lithic materials were utilised in flaking items of non-lithic materials, such as glass, ceramic and porcelain. For glass items, once a piece was selected for use, it functioned as a core and was often heavily worked (Wallis 2019) with multiple flakes removed from a rotated core. Often the flaked pieces were very small at under 1cm in maximum dimension. There is also evidence of people smashing bottles and selecting appropriate fragments for use (Wallis 2019), with clear use wear and residues present on the pieces of glass but no evidence of deliberate flaking activity. Flakes were then utilised for a range of purposes, similar to those for lithic items.

4.3 LAND USE HISTORY

4.3.1 INDIGENOUS OCCUPATION

When Aboriginal occupation of Australia is likely to have first commenced, around 60,000 years ago (Mulvaney and Kamminga 1999; Bowdler *et al* 2003; Attenbrow 2010), sea levels were around 30-35m lower than present levels, and this further decreased to up to 130m lower than present sea levels (Attenbrow 2010). Sea levels stabilised around 7-6,500 years ago, and as a result many older coastal sites would have been inundated with increasing sea levels. It is possible that areas that are now considered "coastal" would once have limited resources available to Aboriginal



people, and as such would have been less likely to have been occupied or used for repeated habitation sites.

Archaeological work at the Madjedbebe site in Arnhem Land in the Northern Territory revealed evidence confidently dated to the period before 45-46 ka and possibly up to 50-55 ka (Clarkson et al 2015). In NSW, there is strong evidence available to support Aboriginal occupation of the Cumberland Plain region in the Pleistocene period (approximately 40 ka) and possibly earlier. Work in Cranebrook Terrace was dated to 41,700 years BCE by Stockton and Holland (1974), and a site in Parramatta within deep sandy deposits was dated to 25-30 ka (JMcDCHM 2005). Kohen's 1984 assessment of Shaws Creek in the Blue Mountain foothills yielded ages of 13 ka, while Loggers Shelter at Mangrove Creek was dated to 11 ka by Attenbrow (1987). Deeply stratified occupation deposits at Pitt Town were dated to 39ka (Apex Archaeology 2018). These ages are obtained from both radiocarbon and optically stimulated luminescence (OSL) dating.

Some experts have cast doubt onto the assessment of the items from Cranebrook Terrace as artefactual (Mulvaney & Kamminga 1999; McDonald 2008), although they do not doubt the results of the radiocarbon dates – it is the association of the artefacts with the dated deposits that is problematic, and Mulvaney and Kamminga (1999) consider that there are better examples of sites with more robust identification of age available. There has certainly been a great deal of research undertaken within the Sydney region in the intervening years.

Aboriginal people have occupied the NSW South Coast for at least 20,000 years (Boot 2002). Occupation sites dating to the Pleistocene period have been dated to c.20,000 Before Present (BP) at Burrill Lake (Lampert 1971) and c.17,000 BP at Bass Point (Bowdler 1970; 1976), with investigations suggesting a very low site occupation intensity during the Pleistocene era, with intensification of occupation commencing approximately 7,000 BP. The evidence at Burrill Lake came from a rockshelter, while Bass Point comprised an open context site on the gentle slopes of a ridgeline. Generally, the Pleistocene occupation of the South Coast is considered to have been sporadic and of low intensity, due to the low population levels postulated during this time (McDonald 2005).

Changing sea levels resulted in the ecological systems of the hinterland areas changing too, resulting in differing resources becoming available. This led to an increase in evidence of habitation of areas from around 6,500 BP, although it is unclear whether this relates to the survivability of more recent sites, or an increase in population. Hughes and Lampert (1982) suggested that a population increase is the only plausible explanation for the exponential increase in Holocene sites from 6,000 BP.

During the Holocene period around 6.5ka, sea levels increased and stabilised, which led to those groups on the coastal fringes turning inland (McDonald 2008). Prior to



this, the coast would have been further offshore than current coastlines, meaning any sites within this region would have been inundated as sea levels rose. Recent works off the coast of Western Australia have identified relatively intact inundated Aboriginal archaeological sites, dated to 7,000-8,500 years BP at inundation (Benjamin *et al* 2020), which confirms that archaeological sites can be detected below sea level and should be considered in any works which may impact these drowned landscapes.

Around 5,000 years BP a change in archaeological assemblages can be seen, with an emphasis on the use of locally available stone for artefact production. Around 4,000 years ago people began to decrease their residential mobility and inhabit certain biogeographic zone on a permanent basis (McDonald 2008).

4.3.2 POST CONTACT OCCUPATION

Following the establishment of the first European settlement at Sydney Cove, the need for additional agricultural land was identified, as Sydney Cove was considered unsuitable for farming. By November 1788, food supplies were running low for the settlement, and an expedition led by Governor Philip set off up the Parramatta River in search of arable land. An area known as Rose Hill (now Parramatta) was settled by a small group of 11 soldiers and 10 convicts. The grain crops at Sydney Cove failed, and the settlement at Rose Hill was ordered to be used for agriculture. These crops were luckily successful, and a further settlement comprising a convict farm was established at Toongabbie.

Exploration of the wider region continued, and in 1791, expeditions travelled the Hawkesbury and Nepean areas, identifying them as likely spots for agriculture. The Shoalhaven region had been sighted by Captain Cook in April of 1770, when he observed a protected bay which was later named Port Jervis, and he recorded evidence of smoke along the shoreline just before dark, which may have been related to Aboriginal campfires near the area now known as Bass Point.

Lieutenant James Grant recorded an account of an early meeting of Europeans and local Aboriginal people as being amicable (Grant 1801), with the Aboriginal people they encountered described as 'more robust than Sydney Blacks'.

James Meehan reached the Shoalhaven River in 1805 as part of his exploration of the region, and noted the extensive stands of red cedar along the lower reaches of the river (Antill 1982). The first official shipment of cedar left the Shoalhaven in 1811, and by the following year seven ships were transporting cedar out of the Shoalhaven.

The Cambewarra and Illawarra Ranges were first explored by Europeans in 1812, by surveyor George Evans. This included a survey of the Jervis Bay foreshores and Evans intended to return overland to Appin, but the difficulty of the terrain led to him abandoning this plan (Griffith 1978). In 1818, James Meehan and Charles Throsby were commissioned to find an overland route between Sydney and Jervis Bay, and



a route through Kangaroo Valley was identified with the assistance of two Aboriginal people from the Lake Illawarra region.

Alexander Berry explored the Shoalhaven River environs over several days in 1822, and, together with his business partner Edward Wollonstonecraft, was later granted 10,000 acres on the northern side of the Shoalhaven River with the aim of establishing a permanent settlement. Berry's settlement was located on elevated land at the foot of a hill now known as Coolangatta. By 1840, the estate had increased to around 32,000 acres, and was more than 40,000 acres by 1863 (Australian Dictionary of Biography 2022).

Dairying expanded in the Shoalhaven district throughout the 1850s, particularly from 1855 onwards when men began returning from the goldfields. Many of the farmers were tenants on the Berry Estate, but other landholders also kept dairy herds. Dairy farmers also kept pigs as an additional source of income. The pigs were fed on whey left over from the butter making process. Wheat, maize and potatoes were also cultivated by some of the smaller farmers. By the end of the 1850s, there was little productive land that was not occupied by farms, though not all of it was cleared (Bennett 2003).

Small villages in the Shoalhaven district were settled in the 1850s. Alexander Berry set aside land at Numbaa for a village and by 1855 there was a courthouse, church, post office, store, schoolhouse and a few houses. Nowra was the only government-planned town in the area. The first sale of land there occurred on April 2, 1855. By January 1857, it consisted of seven dwellings and forty-three inhabitants. A steam mill was also constructed in that year. In February 1859, there were sixteen buildings in the village. Later in the year, the Shoalhaven Municipality was established at Nowra, and at the end of the 1850s, there were three other villages close by, including Worrigea, Terara and Bomaderry (Bennet 2003:197). Worrigea was formerly known as 'Boston', which derived from the name "Boss Town" and named after Etienne de Mestre, who was the 'boss' to many people. It was situated on the southern end of the de Mestre grant of 1300 acres, also known as the Terara Estate (Plate 1). The study area is located within the south eastern corner of this grant. It is believed the name Worrigea is from the Aboriginal word meaning "Peppermint Tree" (Florence 2006).

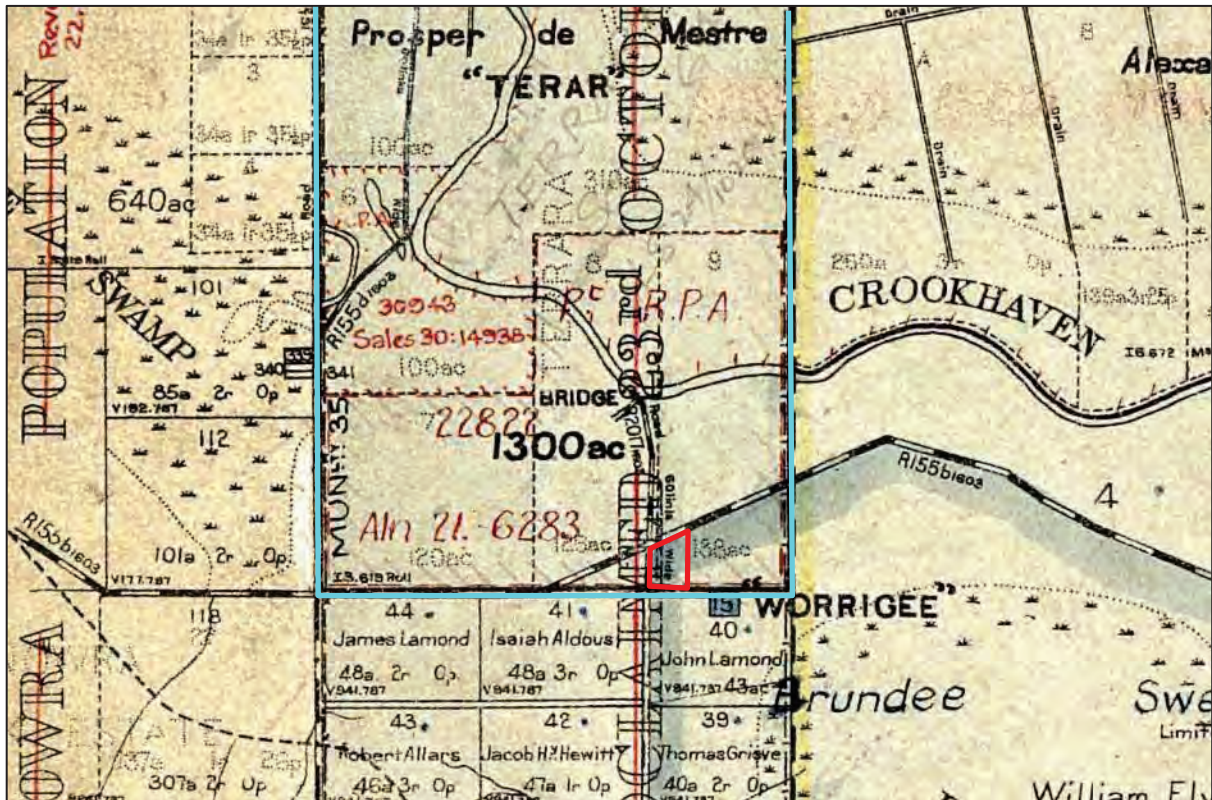


Plate 1: 1918 Parish of Numbaa map. Study area outlined in red. Grant of Prosper de Mestre outlined in blue.

In 1872 Mr Merriman, an Aboriginal man who was given the title of “King Merriman” by white authorities on the South Coast, began making formal submissions to secure land. In 1877 some land was registered by the colonial government as an Aboriginal reserve and was the first successful land claim on the South Coast. A subsequent 32 reserves were created in NSW between 1861 and 1884. Most of these reserves were set up before 1883 when the Aborigines Protection Board (APB) was established and recommended that a small amount of Crown land be reserved throughout NSW to which Aboriginal people were encouraged to move. Initially, the reserves were mainly managed by the people themselves, not by any church, and they were not controlled by the Protection Board but were “overseen” by the local policemen (Donaldson *et al* 2017).

The reserves operated by the APB provided rations for the children and the elderly. They consisted of flour, sugar, tea and sometimes meat, and were seldom sufficient to feed a household and fulfill basic nutritional needs. However, the rations were regular and made life a little easier, particularly during the Depression of the 1890s. Over the subsequent years quite a few people tired of the authoritarian nature of the APB reserves and walked off to set up their own camps. Free communities existed at the Cricket Ground at Wallaga Lake, at Currambine Creek near Huskisson, at Worrigee near Nowra and at Salt Pan Creek near Revesby. They were a refuge for



those who could no longer live under dictatorial white management (Donaldson et al 2017).

Research undertaken by Chittick and Fox (1997) and Florence (2006) detailed below, suggests the Worrigee camp was built on Crown Land, close to one of the Lamond estates.

There was a number of houses there at Worrigee, there was quite a few families. I don't actually know why they picked Worrigee to live. It was crown land, and they just started buildin' on it (Chittick & Fox 1997:74).

People liked living at Worrigee because of the peace and quiet, I suppose. I think people came there from Browns Hill. Browns Hill was a real old camping place but it was too close to town. It got taken over because houses came out that way, so they moved to Worrigee (Chittick & Fox 1997: 75).

At that time there was the bean picking all around, and peas. They started up in 1932 along the coast. Like, a big farm at Nowra was Lamond's and the main one was Bo Campbell...And this is when Worrigee was set up because the Lamond's wanted someone to do their pickin'. So they gave 'em that bit of property there at Worrigee. The Lamond's lived down Terara Lane and they got that land for the Littles around that time, and for the Hickeys and Williams. So we stayed there for a while at Worrigee, and other people came too...We'd go to Nowra tip and get the tin, plenty of tin around, and take it back out to Worrigee and built these new huts (Chittick & Fox 1997:89-91).

In Chittick and Fox, the chapter that focuses on Cliff Thomas, a man that grew up at Worrigee camp mentions that by 1968-69, the camp had been closed down:

Worrigee's all gone now. There used to be all huts and that and there's nothing now. They closed it down, see. Sad! Well, you blame that on the council, they moved everyone. That was about '68, '69. They just told them to leave or otherwise they couldn't get the houses pulled down. That's when a lot of people got houses in town - Nowra and Bomaderry. Silver City got knocked down too, but that was after people stopped living there (Chittick & Fox 1997: 76).

Florence (2006) states:

...the well for water still exists - it being the water for the Aboriginal families who occupied, and built more huts and houses.

And:

A fairly large population of Aboriginal people camped for years and were a source of labour for the surrounding farms as ploughmen, pea and bean pickers. It was here that old Mrs Hickey ruled with an iron hand and even built a church. It was also here that the Aboriginal singer Jimmy Little got his start singing.



Further information about Aboriginal people living in and around Worrigeer in the early and mid-20th century is detailed below:

There was a big community out there where we lived at Wooragee [sic]. We had our little shacks, but you know, we were happy (Chapter of Grace Coombs, NSW Department of Environment and Conservation 2004:12).

Mum had been on rations there for a while in the early part. But then she went out picking beans. She'd walk to the bean paddock there at Wooragee [sic]... Then came along the Housing Department, they came out to Wooragee [sic] with all their promises. I used to say they came out sticky beaking to see how we all lived. I remember when I got married, they still came out and they'd say, "Will you be happy if we give you a house and move you into town?" Well, I said "yes". But you know I had to wait for seven years before I got that house in town... So for all those years we lived in these shacks down there and my kids were still going to that same school in Terara (Chapter of Grace Coombs, NSW Department of Environment and Conservation 2004:12-13).

I can remember the floods and the year that Terara flooded because it was so flat out there, that was in the 50s... It came right up to Wooragee [sic] and jumped the fence but it didn't touch our shack at all. I don't know how we would manage now, out there, there were no supermarkets around. We'd cook our own bread and made our own damper... We had plenty of rabbit stew and duck. There were lots of sucks wandering around here in the swamp. There were no chickens then. We'd go fishing, we'd get a feed of fish. Mum would go out fishing for eels, fresh water eels. She'd bring them home, clean them, and cook them up... We lived pretty well (Chapter of Grace Coombs, NSW Department of Environment and Conservation 2004:14).

In 1962 the Shoalhaven Council appointed an Aboriginal Welfare Committee to investigate the welfare of Aboriginal people living in the area. Investigators were appointed to make inspections of places where Aboriginal families were being housed, including Roseby Park, Brown's Flat and Worrigeer. As a result, it appears that Aboriginal people were forced to move from Worrigeer to the Brown's Flat camp in the 1960s. In the late 1960s the president of Shoalhaven Shire worked with an Aboriginal elder and activist, Percy Mumbler, and others to have cottages that had been built for the Snowy Mountains Scheme relocated and erected on council land at Brown's Flat. Most of the houses were built in Mumbulla Street and were referred to by Aboriginal people as 'Silver City'. The introduction of new housing saw the end of the Worrigeer camp with people moved to 'Mumbler Street', approximately 3km to the south west of the current study area (Chittick and Fox 1997:195, cited in Feary and Moorcroft 2011).

The exact location of the Worrigeer camp is not clear, and as the camp consisted mainly of tin sheds and huts, any subsurface evidence of their remains is unlikely.

Based on the documentary sources mentioned, the camp was either within lands granted to Mr Lamond, or Crown land. The current study area was neither.

4.3.3 HISTORICAL AERIALS

The earliest available aerial imagery is from 1949, which shows the study area as a mostly uncleared parcel of land, with a potential dwelling in the north eastern portion of the site (although the resolution of the photograph is too low to make definitive statements regarding this potential item). The land surrounding the study area has been heavily cleared by this time, and the now heritage listed primary school established to the south east of the study area (Plate 2). In 1979, the study area remained in a similar condition to 1949, with much of the surrounding landscape also retaining its features from 1949 with no major additional development or land clearing (Plate 3).

By 1993, the current house within the study had been constructed, as well as the pool on the eastern side of the house. However, the remainder of the study area is still heavily vegetated, with no apparent agricultural activities occurring on site at this time (Plate 4). It wasn't until 2006 that the land was cleared of some vegetation and perhaps some agricultural activity was occurring (i.e. orcharding, cultivation). As of 2025, the study area has almost entirely been cleared of vegetation aside from a few clumps of trees in the north and trees that border the property on the southern and western fences. The land has been ploughed and used for cultivation in the northern portion and used for residential purposes and orcharding in the southern portion. As major vegetation clearance within the study area didn't occur up until 2006, the site, especially along the western and southern fence lines would have minimal ground disturbance.



Plate 2: 1949 historical aerial imagery of the study area (rough location outlined in red). Blue arrow pointing to potential dwelling within study area.



Plate 3: 1979 historical aerial imagery of the study area (rough location outlined in red).



Plate 4: 1993 historical aerial imagery of the study area (location outlined in red).



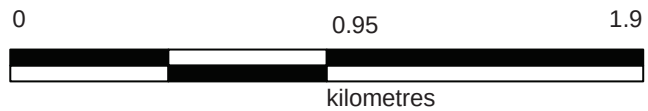
Plate 5: 2006 historical aerial imagery of the study area (location outlined in red).



Plate 6: 2025 aerial imagery of the study area (location outlined in red).



PO Box 236
NOWRA
NEW SOUTH WALES 2541



Projection:
MGA Zone 56 (GDA 94)
Base Map:
Near Maps 2025
Image Date: 05/04/2025
Final - Version 1

Figure 6: AHIMS sites within a 5km search radius of the study area





4.5 LITERATURE REVIEW

The archaeological work previously completed within the wider region is summarised here. There has been one archaeological assessment completed within the study area and several others across the surrounding areas, including a range of academic assessments, resource management studies and development impact assessments. All of these assist in informing the archaeological assessment of sites within the region.

4.5.1 LOCAL HERITAGE ASSESSMENTS

CORKILL 1986

Corkill's honours dissertation 'Gaining Ground: A predictive model for Holocene infill areas on the south coast of New South Wales' focused on the formulation of a predictive model for Holocene aged sites. Her research identified that within the Shoalhaven area sites were most commonly identified along Holocene estuarine shoreline ridges, dune sands and gravels. Specifically, Corkill was demonstrating that "the contraction of certain key resources, on a long term basis, should results in more sites close to those resources as they contract" (Corkill 1986:20). This meant that the thesis focused on shell middens or artefact concentrations, noting that "it is particularly the former that concern me here, and their relationship to the landform changes that took place during the infilling of embayments in the Holocene" (Corkill 1986:24).

The current study area is within the fluvial deltaic plain which is considered to include intertidal deposits. As such, it is considered likely that any archaeological sites within this area date to approximately 6,500 years ago at the earliest, and likely later.

NAVIN OFFICER ARCHAEOLOGICAL RESOURCE MANAGEMENT 1992

Navin Officer Archaeological Resource Management undertook an archaeological investigation for a development proposal at the Shoalhaven Mill site on the Shoalhaven River in Nowra, approximately 7 km north of the current study area. The investigation included a review of previous archaeological reports and the register for Aboriginal sites, which at the time was managed by the National Parks and Wildlife Service. A pedestrian survey was undertaken with a representative of the Nowra Local Aboriginal Land Council. Approximately 40% of the area was surveyed and only about 10% of the whole area had adequate surface visibility. The ground was noted to have been previously disturbed by agricultural practices and was prone to waterlogging. Two isolated finds were recorded; one was a ground-edged hatchet head made from a river cobble of fine-grained volcanic stone located within a drainage channel, and the other was a pebble with flake scars found in the same drainage channel. It was recommended that an application to permit the collection of the hatchet head be made as soon as possible to the National Parks and Wildlife Service. No other sites were found, nor were further recommendations made.



LAMPERT AND STEELE 1993

Lampert and Steele 1993 undertook an analysis of stone, shell, plant, and animal bones found during excavations within a rockshelter at Bomaderry Creek. The site is located approximately 800m north of the Shoalhaven River. The results found that the shelter was occupied at about 1,900 years ago and again at about 1,400 years ago. A variety of stone tools were found including backed artefacts, eloueras, scrapers, fabricators, axes, hammerstones, bone points. Utilised and unmodified flakes were also recovered. Apart from the basalt used for axes, the stone tools were made mainly from quartz, chert, and to a lesser extent, silcrete. The researchers proposed that the quartz can be found locally as isolated pebbles and in the sandstone bands; the chert can be found as cobbles in the creeks like Tapitallee Creek that rises in the Cambewarra range; and the silcrete can be found locally or around Ulladulla region some 45 km to the south.

Seventeen species of land animals were also identified, from mainly mammals, along with a variety of shellfish. Seed husks from the highly toxic *Macrozamia* plant that requires particular processing to eat was found, and resin from the *Xanthorrhoea* tree used to attach stone, shell or bone tools to wooden handles, was also found. The analysis demonstrated that the Aboriginal people that used the shelter utilised a large range of natural resources. They acquired the animal and plants locally, and the stones were procured both locally and further afield.

CLARKE AND KUSKIE (SOUTH EAST ARCHAEOLOGY) 2006

South East Archaeology undertook a staged Aboriginal Heritage and Cultural Mapping Project in the Lower Shoalhaven River Valley. Stage 4A of the project comprised archaeological predictive modelling for Aboriginal heritage sites within the Nature Reserves and Regional Park in the Lower Shoalhaven region. The aim of the project was to develop a spatial predictive model that included Aboriginal cultural values, including archaeological sites within the Shoalhaven region. The investigation included a review of 69 archaeological sites, as well as a large-scale pedestrian survey with members of the Aboriginal community. Seven conservation areas including the Brundee Swamp and Worrigee Nature Reserve, that border the current study area, were included in the study. An additional seven sites were also recorded during the survey. Clarke and Kuskie proposed that there were two main types of resource zones. This was determined through consideration of the geology, available natural resources, identified sites, previous archaeological and survey results. The resource zones area as follows:

- Primary resource zones that were in close proximity to the major Shoalhaven and Crookhaven Rivers had a higher probability of containing evidence for a wide range of occupation types including congregations of large groups of people, community base camps and nuclear/extended family camps. Occupation was likely to have been regular and potentially longer in duration in the primary zones.



- Secondary resource zones were defined in terrain units close in proximity to higher order creeks and/or wetlands, and their associated flats, slopes and terraces. These would have a high probability of containing evidence of nuclear/extended family base camps, camping by small hunting and /or gathering parties and transitory movement. Occupation is likely to have been sporadic and relatively short in duration.

Areas outside the primary and secondary resource zones included terrain units distant from higher order creek and /or wetlands, such as lower order drainage depressions and associated slopes and crests. Occupation in these areas is likely to have involved hunting and/or gathering and transitory movement and is likely to have been sporadic and very short in duration.

The study identified a large variety of sites within the Shoalhaven area including isolated stone artefacts, stone artefact scatters, art, burial, shell middens stone arrangements, scarred trees. However, the most common site type is stone artefact scatters and there is a potential for these to occur across virtually the entire study area, albeit typically in low density consistent with background discard, interspersed by occasional areas of higher density in which localised activity areas have occurred. With regards to rockshelter and grinding grooves which require outcropping sandstone to be present. It was predicted that these occur relatively frequently and larger rockshelters in close proximity to wide variety of resources may have served as base camps. Art sites and grinding grooves may occur in areas with suitable surfaces. Art sites may comprise several forms including paintings, drawings, pecked engravings and stencils. It was also predicted that burial, mythological/traditional, scarred/carved trees, lithic quarries and stone arrangement sites have either a low to very low potential to occur or to be readily identified within the study area.

It was suggested that further surveys be undertaken to cover a wider range of contexts in order to gain a more complete understanding of heritage resources potentially present in the area and further refine the predictive model.

KUSKIE (SOUTH EAST ARCHAEOLOGY) 2008

South East Archaeology was engaged to undertake an ACHA for a proposed Ethanol Plant Upgrade in Bomaderry, near Nowra. The study area was located on a 1,000 ha property that operated as an environmental farm. The assessment included a review of previous archaeological within the Shoalhaven and surrounding areas, a review of the Aboriginal Heritage Information and Management System, and a pedestrian survey. The survey investigated the areas of proposed works including along the river levee. The area was found to be heavily disturbed by previous earth and drainage works, construction activities and flooding. No previous Aboriginal heritage sites were identified, and none were found during the investigation. The assessment concluded that the potential for stone artefacts was low and other forms of Aboriginal heritage was negligible. It was recommended that provisions relating



to Aboriginal heritage (should any be found during construction) be included in an Environmental Management Plan for the project.

FEARY AND MOORCROFT 2011

Feary and Moorcroft were commissioned by the Bundanon Trust to produce a cultural heritage management plan for the protection and management of Aboriginal cultural heritage of the Bundanon Trust Properties. The plan included the archaeological evidence, the spiritual significance, associated memories, storylines and cultural traditions of Aboriginal people. The plan used main themes of cosmology, traditional life, cross cultural connections and contemporary life and demonstrated how they were expressed at Bundanon.

A survey was undertaken in partnership with the Shoalhaven catchment to identify any archaeological sites as none had been previously identified. No new sites were found and it was suggested that this part of the Shoalhaven catchment did not support a large Aboriginal population in traditional times. It was proposed that this may have been due to the location of the properties at the tidal limit of the river and close to a topographic boundary.

A review of the ethnographic and ethnohistoric literature demonstrates a substantial Indigenous presence in the area at white contact. Aboriginal workers had a critical role in the labour force on pastoral properties, particularly bean and pea picking. Farmers would transport pickers to and from reserves and fringe camps to their farms during picking time and seasonal work reached a peak in the 1950s and 1960s. However, harvesting machinery introduced in the 1970s, combined with a downturn in the coastal bean market, caused the work to gradually cease. According to Chittick and Fox (1997), the Aboriginal settlement at Worrigee included various Aboriginal families, who lived in tents and 'little shacks'.

KUSKIE (SOUTH EAST ARCHAEOLOGY) 2012

South East Archaeology was engaged to undertake an Aboriginal cultural Heritage Assessment for mixed-use subdivision at West Culburra approximately 20 km to the east of the current study area. The investigation area covered approximately 100 ha of land and the principal aims were to identify and record and Aboriginal evidence or cultural values within the investigation area and assess the potential impacts.

A field investigation was undertaken with representatives from the Jerrinja Local Aboriginal Land Council and Jerrinja Traditional Owners Corporation to investigate the area for Aboriginal heritage evidence. No Aboriginal heritage sites were identified within the study area but three sites were identified immediately adjacent to the study area.

It was concluded that the study area was outside of primary or secondary resource zones and potable sources were absent. As such it was suggested that the Aboriginal occupation of much of the investigation area would have generally been of a low



intensity and probably relate to transitory movement through the landscape and hunting/gathering by small groups of people.

ARTEFACT HERITAGE 2012

Artefact Heritage were engaged to prepare an Aboriginal and non-Indigenous heritage assessment in advance of the construction of the proposed Nowra 33kV feeder line 7501/1. The study area covered an area approximately 7km by 15m. four previously registered sites were identified within the vicinity of the easement for the power line. Two of these sites comprised rockshelters, and it was determined that these sites would not be impacted by the proposed works. Two previously recorded artefact scatters were also identified within the easement, although no artefacts were located during the survey. It was recommended that the location of these sites should be fenced during works to prevent any potential impact to the sites.

MARY DALLAS CONSULTING ARCHAEOLOGISTS 2018

Mary Dallas Consulting Archaeologists (MDCA) undertook an ACHA in advance of the proposed rezoning of a 75 hectare lot in North Nowra. The site was considered to have been subject to considerable historical disturbance likely to have reduced any potential for intact Aboriginal archaeological deposits to nil. Two disturbed low density artefact concentrations were identified within the lots and were not considered to have any subsurface potential. The two sites identified within the lot were not likely to be impacted by the proposed development and it was recommended that the proposed works could proceed with caution, although it was noted that any impact to the identified sites would require approval in the form of an AHIP.

BIOSIS PTY LTD 2018

Biosis was engaged to undertake an ACHA of a proposed subdivision at Taylors Lane in Cambewarra. Their background research identified one archaeological site (Moss Vale Road AFT1) in a report previously submitted by Kelleher Nightingale Consultancy as part of a DA. However, no details, including photos or descriptions were provided by KNC, nor was the site registered. In response to the DA, the Office of Environment and Heritage (OEH) advised Biosis that a test excavation was required. The site was found to have been heavily disturbed by landscaping, construction of buildings, farming practices and creation of artificial dams. A total of 14 test pits measuring 50 cm x 50 cm were excavated around the AHIMS #52-5-0880 site. The soil stratigraphy was found to be a relatively homogenous shallow clayey loam overlaying a clay base. The top layer was noted to be compacted which Biosis proposed was a result of ploughing.

No Aboriginal sites or objects were identified during the survey and test excavations. It was recommended that an AHIP be applied for to cover the entire study area for 20 years, and that a site impact recording form for the stone artefact that could *not* be relocated be submitted to OEH.

GML 2017

GML undertook an Archaeological due diligence assessment for 369 Worrigee Road, Worrigee.

Their assessment included a review of previous archaeological investigations surrounding the Worrigee area as well as a review of a previous assessment undertaken by New South Wales Archaeology also in 2017.

GML noted that the previous assessment undertaken by NSW Archaeology in August 2017 identified artefact scatters and PADs on site. However, NSW Archaeology did not register the sites on AHIMS, and they did not use historical photographs to assess previous disturbances and the impact these would have had on the PADs. NSW Archaeology concluded that apart from areas around buildings, vehicle tracks, modified drainage channels and trees, the disturbance would be unlikely extend below the top 10 – 20 cm of the ground surface.

GML undertook a field survey to relocate the sites identified by Dibden and Parkes (2017) and inspect the condition and integrity of the study area and its associated landforms. They then confirmed the analysis through historical aerial photography and the results of geological testing carried out across the study area. The investigation found that the majority of the study area had been subjected to profound natural and man-made impacts. These included estuarine flooding, erosion, and swamp formation, along with vegetation removal, sand mining and contouring of the golf course. As a result, 42.2% of the study area was assessed as being subject to disturbance and 40.6% had been subjected to high disturbance. These disturbances would have involved the removal and addition of soil, sand and fill and would have impacted the natural soil profile.

A total of six sites were identified and registered with AHIMS. The report noted that the area is located within a landscape which has the potential for deep, stratified and old soil profiles. It was also noted that the study area was on the edge of a late Holocene swamp landscape, with alluvial terraces, that would have been attractive for Aboriginal habitation activities.

ARTEFACT HERITAGE 2018A

Artefact Heritage was engaged to undertake an ACHA for a new bridge on the A1 Princes Highway over the Shoalhaven River. A previous archaeological survey also undertaken by Artefact Heritage identified five Aboriginal sites and five areas of PAD. A test excavation was conducted over 13 days of the PADs and four new artefact scatters and one habitation site/artefact scatter were identified across the study area. The results showed that all sites within the test excavation had been highly disturbed, and it was concluded that further excavations to determine the distribution of artefacts across the study area would not yield meaningful results.

However, five sites including a rock shelter, grinding grooves, scarred tree, and artefacts scatters with a diversity of material and artefact types, were considered to



be of high archaeological significance and part of the same archaeological complex. Another previously registered site (Graham Lodge) was also considered to be a highly significant 'contact site,' as Aboriginal artefacts made from European glass had been found and are considered very rare. It was recommended that all of these sites should be avoided, and if this was not possible an AHIP be sought for targeted salvage excavations, along with an Aboriginal Heritage Management Plan to manage potential heritage constraints.

KNC 2020A

Kelleher Nightingale Consulting (KNC) was engaged to undertake an archaeological salvage and community collection of stone artefacts for a new bridge on the A1 Princes Highway over the Shoalhaven River at Nowra, NSW. The excavated area included 113m² and comprised four of the previously identified sites in the ACHA undertaken by Artefact Heritage in 2018. The sites were located on both sides of the Shoalhaven River. The sites were across a variety of landforms including a raised flat area, clifftop, rockshelter and an alluvial floodplain. A total of 13,019 stone artefacts were collected and salvaged from the surface and subsurface.

The highest amount of stone artefacts (7,400) were excavated from two open areas within the Nowra Bridge 2 site (AHIMS #52-5-0853) on the clifftop. The next highest amount of stone artefacts excavated (4,958) was from the Nowra Bridge 8 (AHIMS #52-5-0876) site situated on the alluvial floodplain on the eastern side of Bomaderry Creek. Both these sites are located on the north side of Shoalhaven River. There were 61 artefacts retrieved from the rockshelter Nowra Bridge 7 (AHIMS #52-5-0875) site, and only 14 stone artefacts were collected from the surface within the Nowra Bridge 1 (AHIMS# 52-5-0852) site which is the only site on the south side of the river. The lowest artefact concentration of only eight artefacts were retrieved from Nowra Bridge 9 (AHIMS #52-5-0874) on the western side of Bomaderry Creek.

Three primary types of raw material were recovered from the salvage excavation: jasper (45%), quartz (25%), silcrete (11.5%), and to a lesser extent chert (8.7%). The majority of stone artefacts were identified as angular fragments (11,182) which KNC proposed was a result of using the bipolar reduction method and site disturbance. There were 73 cores and 131 artefacts that were considered to be a particular tool-type including 53 backed artefacts, eight scrapers and one hammerstone/anvil. There were 54 artefacts that had signs of usewear and eight had evidence they had been retouched (additionally flaking).

The assessment concluded that the amount, and type of artefacts found, are consistent with land use models that predict that areas within coastal lowlands and hill environments will have larger and more complex sites that are in close proximity to primary resource zones, including large rivers such as the Shoalhaven and Crookhaven Rivers, along with higher order creeks. The area was considered to have been used over time for regular and/or long periods.



KNC 2020b

KNC were engaged to undertake an Aboriginal due diligence assessment for a proposed boundary adjustment to support the construction of the Nowra Bridge. The study area consisted of a small area (approx. 50m x 100m) near the intersection of the Princes Highway and Bolong Road. No Aboriginal sites were identified and the area was considered to have been extensively modified with a very low likelihood of any intact archaeological deposit remaining within the study area. No further archaeological investigations were recommended.

AUSTRAL ARCHAEOLOGY 2021

Austral Archaeology undertook an ACHA at 126 Taylors Lane, Cambewarra, for a proposed residential subdivision. No previous Aboriginal cultural sites had been previously identified, but a site survey undertaken in conjunction with a sites officer from Nowra LALC identified two chert stone in the northern area of the study area (AHIMS #52-5-1047). Three additional stone artefacts were identified 10m to the east of this area but outside the study area, and an isolated stone artefact (AHIMS #52-5-1048) was located on sloping land near the middle of the eastern boundary. Based on these sites, two areas of potential archaeological deposit (PAD) were identified. One was considered 'high potential' around AHIMS #52-5-1047, and the other 'low potential', around AHIMS #52-5-1048. A subsequent test excavation was undertaken within these areas. Ten test pits were excavated in the 'High Potential' area and two test pits were excavated in the 'Low Potential' area. A total of 92 flaked stone artefacts were recovered and analysed, with 88 from the excavation and four from the surface.

The excavated artefacts were from five artefact-bearing test pits near AHIMS #52-5-1047. The majority of these were recovered from spit 1 (73%) and the remaining from spit 2. Over 80% of the artefacts were recovered from a single test pit with the next highest frequency of artefacts (9.85%) recovered from the adjacent test pit. Only one artefact was recovered in the 'Low Potential' area. The artefact analysis found that the assemblage was dominated by debitage which indicates an *in situ* knapping event. The artefacts overall comprised a variety of flake debitage, a single core, four complete backed artefacts and one distal fragment of a backed artefact. The presence of a broken backed specimen in association with a high frequency of debitage of the same material (chert) and the absence of macroscopic signs of use indicates that the backed artefacts were likely manufactured on-site and discarded due to breakage and/or not meeting design requirements for inclusion in tool kits. A quarter of the assemblage (n=23, 25%) preserved evidence of post-depositional impacts in the form of pot-lidding (caused by fire) and/or crazing on their ventral and/or dorsal surfaces.

It was proposed that the presence of backed artefacts means that it can be typologically dated to the mid-to-late Holocene (<5,000 years ago). However, the paucity of cores in the assemblage, the limited range of raw materials present, and



the amount of debitage indicates the artefacts are likely the result of short-term use of the site for an isolated manufacturing episode.

The area was assessed as being generally made up of unsuitable landforms for longer stays, except in the northern section that was flat and may have been comfortable for a more permanent stay as evident by the *in situ* knapping event. The study area was also assessed as having been impacted by past land use primarily in the top horizons with only minor impacts in the lower horizons. As the proposed works will impact on the registered sites it was recommended that an AHIP be applied for to salvage the 126 Taylors Lane AS site (AHIMS #52-5-1047) and that the artefacts be reburied on site at a nominated location.

AUSTRAL ARCHAEOLOGY 2022A

Austral Archaeology undertook an Aboriginal archaeological and cultural heritage assessment of land situated at 49 Hockeys Lane and 41 Main Road, Cambewarra, for a proposed subdivision development. Initial background research did not identify previously registered sites and none were identified during the field survey. However, an area on an alluvial flat was considered to have PAD and subsequent test excavations were undertaken that consisted of 75 test pits dispersed over three areas along 10 transects. A total of 46 artefacts were recovered, with six new artefact scatters and five isolated finds identified and registered as sites on AHIMS.

The artefacts were mainly retrieved from two test pits and the assemblage comprised flakes, one core, and four identifiable tools (backed geometric microlith, steep-edge scraper and two bladelets). The raw stone material was mainly chert (84%), followed by silcrete (33 %) then quartz, and one piece of petrified wood. The site was considered to have been disturbed by ploughing leading to an “homogeneous soil profile across the entire study area” with “only small variations occurring with depth of the horizons”. All of the sites were considered to be of ‘low’ Aboriginal cultural heritage value and ‘low’ scientific significance, except for AHIMS #52-5-1039 that was considered to have ‘moderate’ significance on both accounts.

It was concluded that the area generally had suitable landforms for short stays during periods of low rainfall, and that although much of the information that can be obtained from the lithic analysis had already been obtained, a salvage excavation was required to ascertain the true nature and extent of the site. Therefore, as the proposed works would impact on all registered sites, it was recommended that an AHIP be applied for that included all 11 sites and that a salvage be undertaken for the sites that had the highest artefacts count:

APEX ARCHAEOLOGY 2023A

Apex Archaeology were engaged to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for a proposed residential subdivision at 191 Bells Lane, Merroo Meadow. The land had been cleared, except for sections around drainage lines and a creek, and was being used as a dairy farm at the time of the investigation. Thirty



test pits were excavated across five areas and a total of 27 stone artefacts were retrieved from 18 of the test pits. The artefacts were made primarily of fine-grained silicious material, but also included some made from silcrete, quartz and quartzite. There was one identifiable tool (backed artefact), a possible broken backed artefact, and broken core. The remainder were flakes with recognised diagnostics and five pieces that lacked diagnostics but were believed to have been pieces of broken objects. The analysis did not identify any *in situ* knapping episodes that may represent more permanent campsites and it was proposed that at least some artefacts were most likely brought in from other areas.

It was suggested that as most artefacts were located in the deeper spits of the test pits, the topsoil had been subject to higher levels of disturbance than the deeper deposits, which were likely to be more intact than the upper spits.

It was recommended that an AHIP be sought for areas that could not be conserved within the nominated riparian conservation zone.

APEX ARCHAEOLOGY 2023B

Apex Archaeology were engaged by Umbene Pty Ltd to undertake an ACHA for a proposed residential subdivision at 23A Aldous Place and 369 Worrigee Road, Worrigee, NSW.

The site was subject to an Aboriginal due diligence assessment undertaken by GML Heritage in December 2017. The assessment included a review of previous archaeological investigations and the environment, and it also noted that a previous field survey had been undertaken in collaboration with the Aboriginal community in 2009. The investigation identified six Aboriginal sites including isolated stone artefacts, stone artefact scatters and areas of potential archaeological deposits (PADs) within the study area. As the impacts to these sites could not be avoided by the proposed works, it was recommended that all but one of the sites should be subject to archaeological test excavations and an application made for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to all of the sites.

The GML (2017) assessment concluded that the majority of the study area had been highly disturbed through estuarine flooding and swamp formation, along with historical impacts such as sand mining, flood mitigation and construction of the golf course. However, although these activities had stripped most of the upper soil layers of the study area, it was proposed that some locations could retain relatively undisturbed soil deposits that may be quite deep and have the potential to contain stratified archaeological deposits.

As such, an extensive series of test excavations were subsequently undertaken in February and March 2023 by Apex Archaeology, across five areas of PAD. A total of 112 stone artefacts were retrieved from 144 test pits. The artefacts tended to be concentrated in the northern section of the study area which is adjacent to the



existing Brundee Swamp and would have formed a marginal zone to the swamp prior to development occurring.

The stone artefacts were analysed by lithic specialist Dr Beth White (2022) who established that they were made primarily of duller silcrete/quartzite and glossier silcrete/quartzite (probably heat treated), but also included artefacts made from quartz, fine-grained silicious, chert, jasper, tuff and chalcedony. There were identifiable tools (backed artefacts), along with a small number of cores. The remainder were flakes with recognised diagnostics, and pieces that lacked diagnostics but were believed to have been pieces of broken objects. White proposed that there was possible stratified *in situ* stone artefact deposit within the northern area that warrants further geomorphological investigation to understand how and when the deposit formed.

During the assessment, it was found that:

- Six previously identified Aboriginal sites were located within the study area.
- The study area was considered to have potential for subsurface deposits to be present.
- One site was not identified as having Aboriginal objects present, either during this assessment or a previous archaeological assessment.
- Test excavations identified a low density artefact concentration within five separate locations within the study area.
- The six sites cannot be avoided by the proposed development.
- Mitigation measures have been proposed to minimise the potential impact of the works on the archaeological resource.

4.5.2 SUMMARY

In summary, the archaeological investigations within the Nowra/Worrigee area appear to confirm the predictive model proposed by Clarke and Kuskie in 2006; that artefactual evidence of more permanent stays by larger congregations of Aboriginal people in the Shoalhaven Region will be concentrated closer to primary resources areas. Some of the closest primary resource areas are located further north of the current study area, closer to Shoalhaven River and along sections of Bomaderry Creek. These areas have outcropping sandstone for rock shelters and platforms for art and grinding grooves. They are also within close proximity to permanent freshwater, marine resources, raw material and a diversity of flora and fauna.

This is particularly evident in the results of the salvage excavation at Nowra Bridge that uncovered thousands of stone artefacts, and in the analysis undertaken for Aboriginal cultural material remains of the Bomaderry Creek rock shelter that concluded that a wide-range of stone, animal and plant resources were sourced locally. However, as also noted by Clarke and Kuskie 2006, secondary resource areas such as those close to wetlands are also likely to contain evidence of Aboriginal visitation. These past visitations may have included a number of nuclear families



camped together for one to several days. There may be evidence of casual knapping, and processing of food and campfires. A reasonably broad range of artefacts and stone types may also have been discarded, although not as diverse as expected at a base camp. Therefore, the most like material evidence of these visitations within the current study area would be stone artefacts and carved/scarred trees.

4.6 PREDICTIVE MODEL

4.6.1 REGIONAL SITE PATTERNING

As part of the many archaeological investigations undertaken within NSW, over 5,000 archaeological sites have been recorded and registered on AHIMS. In general, the dominant site types identified within the Nowra region include rock shelters with archaeological deposit (including middens), rock shelters with art, pictographs (rock engravings), artefact concentrations in open contexts, grinding grooves and open middens. The nature and extent of individual sites is closely related to the environmental context in which they are found – for example, rockshelters are found within sandstone escarpments, while middens are generally located close to water bodies including marine, estuarine and freshwater contexts, and grinding grooves are found on flat sandstone platforms in close proximity to water sources.

Based on the results of previous archaeological investigations within the wider region, a number of predictions regarding Aboriginal use of the area can be made. These predictions focus on the nature, extent and integrity of the remaining evidence.

The landscape characteristics of the area influence the prediction of the nature of potential sites within the landscape itself. Site types associated with sandstone outcrops, such as grinding grooves, rock art sites, petroglyph (rock engravings) and sandstone rockshelters with art and/or archaeological deposit are not considered likely to occur within the study area. Cultural shell middens that are predominantly found to the east of the study area along the coast and in estuaries are not likely to be found this far from the coast. The study area is not associated with sand dunes, a landscape formation known to contain Aboriginal burials. Culturally modified trees are also considered unlikely within the study area due to the high levels of historical clearing which have occurred within the landscape.

Disturbance is the predominant factor determining whether artefacts made from stone or other materials are likely to be identified within a landscape.

Surface sites are likely to have been impacted by land clearing, and the construction and demolition of buildings. Natural actions such as bioturbation are likely to have impacted at least the upper levels of archaeological deposits, as are cultural activities such as excavation, construction, demolition, ploughing, clearing and planting. Whilst these actions may impact the integrity of stratigraphy within the



deposit, this does not necessarily mean associated archaeological objects will also be disturbed.

Previous archaeological investigations within the Nowra area suggest that the majority of archaeological material will be found along ridges, elevated terraces and flats and hillslopes, and the denser and more complex sites will be closer to the Shoalhaven River and higher order watercourses. Gently inclined footslopes and level to gently undulating plains are considered to contain the highest potential for archaeological material to be present in comparison to other landform elements.

4.6.2 APPLICATION TO STUDY AREA

In terms of the study area, the most likely archaeological material that may remain are isolated stone artefacts, and/or stone artefact scatters, which may occur anywhere across a landscape.

In general, Aboriginal use of an area is based on a number of factors, such as:

- Proximity to permanent water sources – generally permanent or areas of repeat habitation are located within approximately 200m of permanent water;
- Proximity to ephemeral water sources – generally sites near ephemeral water sources were utilised for one-off occupation;
- Ease of travel – ridgelines were often utilised for travel during subsistence activities; and
- The local relief – flatter, more level areas were more likely to be utilised for long term or repeat habitation sites than areas of greater relief, especially if the slopes are at a distance from water.

STONE ARTEFACTS

Stone artefacts can be identified on the ground surface or within subsurface deposits. Generally, artefact concentrations are representative of debris from knapping activities, which includes flakes, flake fragments, cores, and pieces likely to have been knapped but with no or inconclusive diagnostic features, referred to as flaked pieces. Modified artefacts can also be identified, including backed artefacts, scrapers, or edge ground axes, although these are generally a smaller proportion of the artefact assemblage. During excavation, very small debris (~3-5mm) can be identified within sieved material, and is referred to as debitage. This is indicative of *in situ* knapping activities.

As the detection of stone artefacts relies on surface visibility, factors such as vegetation cover and leaf litter can prevent their identification. Conversely, areas of exposure can assist in their identification. Within the rail extension corridor study area, artefacts were not identified on the ground surface due to heavy grass cover and disturbance throughout. However, it is considered unlikely that any evidence of artefacts would be present within the area due to the topography of the site comprising a waterlogged floodplain, which would be unlikely to retain any evidence



of Aboriginal occupation. Further, the area is highly disturbed in sections, further reducing the likelihood of archaeological material being present, and much of the area appears to contain fill.

The study area has been subject to minimal disturbance, limited to vegetation clearing and installation of minor irrigation piping. Although no surface artefacts were identified during the initial PIHA assessment, due to limited visibility within the site, the area is considered to have potential for subsurface archaeological deposits to be present.

QUARRY AND PROCUREMENT

Exposures of stone which can be exploited for the production of lithics are referred to as quarries or procurement sites. Quarries generally have evidence of extraction visible, while procurement sites can be inferred through the presence of artefactual material made from raw material sources present within the area.

The presence of quarry and procurement sites within the study area is considered unlikely due to the nature of the underlying geology, which is unlikely to provide access to raw lithic materials at the surface.

MIDDENS

Middens are concentrations of shell, and may also contain stone artefacts, bone and sometimes human burials. These sites are generally recorded along coastal areas. Middens are formed through the exploitation of locally available species by humans for resources, and accumulation of the shell material within a specific location. Middens can range in size from small, discrete deposits, to deposits covering a large area.

Generally, middens reflect the species available in the local area. In estuarine regions, estuarine species will dominate the composition of the midden, while around headlands, rock platform species tend to dominate.

The study area is considered unlikely to have potential for midden material to be present due to the distance from the coast and known watercourses.

BURIALS

Aboriginal people across Australia utilised a range of burial forms, which depended on the customs of the individual tribes. Common burial practices included inhumation, cremation, desiccation and exposure. Burials are known to occur within sandy contexts in the wider region. These are generally found within coastal Holocene sand bodies, and generally are not identified during field survey as there is usually minimal surface expression of this type of site.

To date, there are no records of burials being identified within the specific study area, but this does not preclude burials from occurring. Based on the available information, burials are not expected to occur within the study area.



ROCK SHELTERS

Rock shelters are formed by rock overhangs which would have provided shelter to Aboriginal people in the past. Often, evidence of this occupation can be found in the form of art and/or artefacts. Shell, midden material, grinding grooves, pictographs (rock engravings), artworks including stencils and paintings, and potential archaeological deposits (PAD) are common features of rock shelter sites.

The study area does not possess any sandstone rock overhangs that would constitute rock shelters. It is likely that this site type occurs closer to the Shoalhaven River.

GRINDING GROOVES

Grinding grooves are formed on sandstone exposures through the creation and maintenance of ground edge tools, such as axes and spears. Usually, stone was ground to form a sharp edge, although bone and shell were also ground to create sharp points.

Generally, fine grained sandstone was favoured for these maintenance activities, and the presence of a water source nearby or overflowing the sandstone was also favoured. Grinding grooves range from individual examples through to hundreds of grooves within an area, sometimes arranged in a specific pattern. Horizontal sandstone was generally preferred, although there are examples of vertical grooves.

No sandstone outcrops are present within the study area. As such this site type is unlikely to occur.

SCARRED AND CARVED TREES

Scarred and carved trees are created during the removal of bark from a tree for a range of reasons, both domestic and ceremonial. This type of site can be identified within areas containing trees of the correct species and appropriate age. Deliberately scarred trees can be difficult to differentiate from naturally occurring damage to trees, and specific criteria must be considered when assessing a scar for a cultural origin.

No mature trees with potential for cultural modification were noted within the study area. A number of mature trees with evidence of scars were noted within the site (refer Plate 14) but these were not considered to meet the criteria for cultural modification and were likely related to impact scars, either natural or as a result of human actions, but not cultural in relation to Aboriginal modification. It is considered that the presence of modified trees within the study area is unlikely.

CEREMONIAL SITES

Specific places were used for ritual and ceremonial purposes, including initiation and burial practices. Secret rituals were also undertaken at specific places by specific individuals, such as at water holes and by clever men.

The landscape itself was also considered to hold significance to Aboriginal people, and the understanding of this is referred to as a sacred geography. This includes



natural features which were associated with spirits or creation beings. The meaning attributed to the landscape provided Aboriginal people with legitimacy regarding their role as guardians of the places which had been created by the spiritual ancestors (Boot 2002).

Many areas along the South Coast of NSW are considered to be sacred to the original inhabitants. There are no known recorded sacred areas within the specific study area, although this does not preclude these values from existing within this location. It is acknowledged that there are oral histories of Aboriginal occupation within the Nowra area. However, it is considered unlikely that there are any sacred stories associated directly with the study area, and any proposed development would be unlikely to impact on any sacred values related to the Shoalhaven region as a whole.

CONTACT SITES

Contact sites contain evidence of Aboriginal occupation concurrent with initial colonisers in an area. This could include evidence such as flaked artefacts formed on glass, or burials containing non-Aboriginal grave goods. Often Aboriginal camps would form around newly built towns, allowing for employment (or exploitation) of the Aboriginal people by the colonists, and also for trade to exist between the two communities. Contact sites can also occur around Aboriginal mission sites, where Aboriginal children were taken from their families to raise in the European manner. Families often camped around the mission boundaries to try to catch a glimpse of their children.

It is known that an Aboriginal camp was established at Worrigee, and many Aboriginal people lived in the Worrigee area post-settlement of the area. Whilst the exact location of this camp is not clear from the documentary evidence, and the formal camp location is considered unlikely to be within the study area, it is likely that Aboriginal people traversed the study area and may have halted or established a once off campsite within the area in the years after colonisation. As there is no known habitation in the specific area post-colonisation, it is considered that there is limited potential for contact sites to be present within the study area.



5.0 FIELD WORK

5.1 SAMPLING STRATEGY

A sampling strategy was developed and provided to the RAPs as part of the consultation process completed for the ACHA. The strategy included assessment of all landforms within the study area that have the potential to be impacted by the Project. Areas considered likely to have archaeological potential were closely scrutinised, although the entire study area was considered.

The survey was conducted on foot for the purposes of discovering Aboriginal objects within the study area, including areas considered to have potential for subsurface objects to be present. During the survey completed by Apex Archaeology the study area was inspected for Aboriginal archaeological evidence.

5.2 SITE INSPECTION

A site survey was undertaken on 22nd August 2025 by Leigh Bate, Peta Rice and Cat Fenech of Apex Archaeology. Adrian Connolly from South Coast Culture and Heritage and Trudy Trindall of Nowra LALC assisted with the survey.

5.3 SURVEY COVERAGE

The survey was undertaken with five survey participants for the study area. The survey participants were responsible for inspecting a 2 m wide portion of the study area inspected. This meant that on each pass an area covering 4 m would be observed for archaeological material. Some areas of the site were inaccessible with high vegetation cover and no visibility, so areas of exposure were targeted as a priority.

Table 4: Survey units

Unit name	Landform Element	Number of participants	Total Length
ATU 1	Ridgeline	5	662m

An assessment of landform element and slope was made for the study area, with the results presented in Table 5.

Table 5: Survey unit results

Survey Area #	Landform Element	Slope	Vegetation	Detection Limiting Factors	Ground Disturbance
ATU 1	Ridgeline	Level-very gentle (<1.45°)	Cleared (Grassed)	Exotic grasses, weeds	Low to Moderate

The total survey coverage (meaning the areas physically inspected for archaeological evidence) was approximately 6,620 m². The total area of the development impact is approximately 20,000 m². A range of factors were considered and recorded during the survey, including the surface visibility (percentage of bare ground within a survey unit); archaeological visibility (amount



of bare ground within an area in which artefacts could be expected to be identified if present); exposure type (A or B soil horizon) and calculations of how effective the survey coverage was. The results of the survey coverage are presented in Table 6.

Table 6: Survey coverage results

Survey Area #	Total Area Surveyed (m ²)	Surface Visibility (%)	Arch Vis (%)	Exposure Type (A/B)	Effective Coverage (m ²)	% Total Effective Survey Coverage of Context
ATU 1	6,620	10	10	A	66.20	1

Surface visibility across the study areas was limited due to surface vegetation such as exotic pasture grasses, leaf litter and weeds. Total effective survey coverage of the survey transect was 1%. Total effective survey coverage for the entire study area was 0.33% (Table 7).

Table 7: Total effective survey coverage results

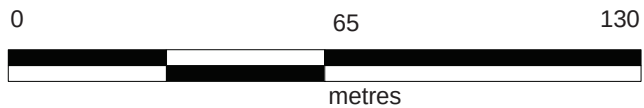
Survey Area #	Total Area of Study Area (m ²)	Total Area Effectively Surveyed (m ²)	Surface Visibility (%)	Arch Vis (%)	Exposure Type (A/B)	% Effective Survey Coverage of Context (Total Area)
ATU 1	20,000	66.20	10	10	A	0.33



- Study Area
- Lot Boundaries
- Survey Transect



PO Box 236
NOWRA
NEW SOUTH WALES 2541



Projection:
MGA Zone 56 (GDA 94)
Base Map:
Near Maps 2025
Image Date: 05/04/2025
Final - Version 1

Figure 7: Survey transect within the study area.



5.4 SURVEY RESULTS

A thorough inspection of the area was undertaken. No newly identified archaeological material was identified during the survey.

Ground surface visibility (GSV) was low throughout the study area. GSV was rated at 10% overall. No raw material sources were identified within the lot.

Ground disturbance was low throughout the study area due to historic vegetation clearance, subsequent landscape modification and landscaping activities relating to the residential development of the site. The study area is situated on a high point within the Worrigee area above Brundee Swamp to the east and Worrigee Swamp to the northwest. It is also approximately 700m south of the Crookhaven Creek. The study area is considered to have a moderate potential for sub-surface archaeological deposits to occur (Figure 8) based on the visual assessment and previous assessments within the area.



Plate 7: Looking east into the entry of the site.



Plate 8: Looking east along the southern boundary of the site.



Plate 9: View through central portion of the site.



Plate 10: Looking east through central portion of site, adjacent to residence.



Plate 11: Looking north along eastern boundary of the site.



Plate 12: General view north along western boundary of the site.



Plate 13: General view west along northern boundary of the site.



Plate 14: Mature tree on western boundary of site with non-cultural scarring.

5.5 TEST EXCAVATION RESULTS

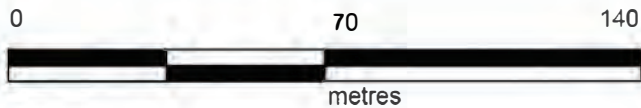
A total of 37 test pits were excavated within the study area. Details of all test pits are provided in Appendix H. Soils across the site were relatively consistent, with sandy silts present, overlying compact clay bases. Differing proportions of clay were noted across the site, but visual evidence of disturbance was limited in most pits. In general disturbance was limited to intrusion from grass and tree roots, although four test pits (TPs 27, 31, 35, and 36) in the northern portion of the site exhibited a thin layer of blue metal/road base material. It is not clear where this material came from or when it was placed, but it is approximately 10cm from the current ground surface in most of those pits and has clearly been buried beneath additional soil at some point.

Aside from this clear disturbance, the remainder of the pits were not considered to display evidence of significant disturbance due to past land use of the area.

No stone artefacts were recovered from any of the test pits. However, three post contact glass cultural objects were recovered from one of the test pits. The glass lithics are considered to represent the post-contact presence of Aboriginal people in the area.



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Projection:
MGA Zone 56 (GDA 94)
Base Map:
Near Maps 2025
Image Date: 05/04/2025
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Figure 8: Identified area of moderate sub surface archaeological potential within the study area.





The test pit from which the glass was recovered (TP14) generally appeared intact. Some charcoal flecking was visible throughout and may have been related to burning of tree stumps when the area was cleared of vegetation in the 1990s/early 2000s. No other modern material was recovered from this pit. There was no evidence to suggest the glass items recovered were associated with any other post depositional impact at this location.

5.6 SITES IDENTIFIED WITHIN THE STUDY AREA

The results of the test excavation and survey confirmed the presence of Aboriginal archaeological material within the study area, comprising subsurface material only. Results of the assessment are presented in Table 8 and shown on Figure 9.

Table 8: Details of confirmed archaeological deposits within the study area

Site Name	Site ID	Description
NPS-AD-01	52-5-1199	3 post contact glass artefacts recovered from one test pits within the southern portion of the study area within the PAD area.

The extent of site #52-5-1199 is registered as a 5m x 5m area centred over TP14. Overall, the remainder of the study area is not considered to retain Aboriginal archaeological potential.



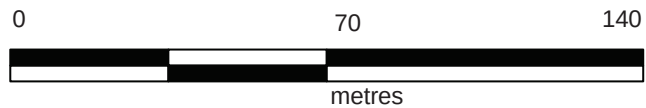
Study Area

Lot Boundaries

Test Pits



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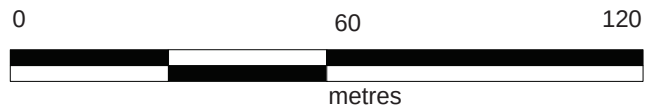
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Figure 9: Test Pit locations within the study area





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Base Map:
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Figure 10: Newly identified Aboriginal site location within the study area





6.0 REPORT ON GLASS AND STONE OBJECTS

The following section has been prepared by Dr Beth White of Beth White Archaeology.

6.1 GLASS OBJECTS

One retouched piece of dark olive green glass, and two other fragments of similar glass, were found in TP14 spit 2 (located at 283929E 6136428N). No stone objects were found by the test excavation.

6.1.1 ISSUES RELATING TO THE IDENTIFICATION OF GLASS PIECES AS INDIGENOUS OBJECTS

The identification of glass pieces as Indigenous objects dating to the historic phase is not straightforward for several reasons (Apex Archaeology 2022; Goward 2011; Munt 2022; Richardson 2004; White 2018):

- European materials used by Indigenous people in the early historic phase are of the same types of materials used by Europeans and found in historical contexts (i.e. glass, ceramics). Objects may date to the early historic phase, but could have been left on sites by people of either European or Indigenous culture/ancestry;
- Glass and ceramics can fragment accidentally, resulting in flaking or damage with some traits similar to those of deliberate flaking or tool use;
- Randomly smashing a bottle or ceramic item can result in edges suitable for use as tools; it was not necessary to flake or retouch glass or ceramics to obtain useable pieces;
- Microscopic use-wear and/or residues may identify glass or other fragments used as tools, but microscopic analysis will not identify unutilised materials which were by-products of flaking or breakage;
- Materials or objects used and discarded by Indigenous people probably formed low density scatters which accumulated over a relatively short time span, of less than c.100 years. Focused flaking or breakage activities would have resulted in larger numbers of objects but would probably be of limited spatial extent. Hence, most Indigenous sites from the early historic phase may not have been highly visible.

Criteria for identifying Indigenous glass or ceramic objects have been proposed and/or reviewed by several workers (Apex Archaeology 2022; Goward 2011; Harrison 2000; Munt 2022; Munt and Owen 2022; Richardson 2004; White 2018). Criteria included (not in order of importance):

1. Available historical evidence in the form of oral histories and historical documents, which supported the presence of Indigenous people at or near the location;

2. The presence of associated contemporary materials such as shell midden with recent age determinations, recent fish hook technology, rock art depicting European items, scarred trees, stone artefacts, burials;
3. Glass and/or ceramics dateable to the eighteenth and nineteenth centuries, based on method of manufacture, makers' mark, colour (especially black and olive green glass, blue-and-white transfer printed ceramics), imperfections (e.g. bubbles in glass);
4. Presence of use-wear and/or residues confirming use of glass or ceramics as tools;
5. Presence of technological attributes similar to those used to identify stone artefacts;
6. Evidence of a reduction sequence, such as cores and flakes, flakes with multiple dorsal scars indicating repeated flake detachments, worked and unworked fragments from the same bottle, refitting fragments;
7. Presence of convincing retouch, such as continuous retouch, regular scar size, scar location on functional edges, regular orientation and initiation of scars, relative age of scars (e.g. scars as weathered as original glass or ceramic surfaces), preference for thicker glass (bottle base or shoulder);
8. Absence of attributes related to unintentional damage, such as intermittent scars, large isolated scars, scars of irregular size, crushing on high points/parts of the piece, scars less weathered than the original surface of the glass or ceramic;
9. Context, including the absence of taphonomic processes related to incidental flaking such as animal trampling, vehicle traffic, agricultural activity, or construction work.

In addition, the probability of an item being an Indigenous glass object could be assessed, taking into account various information (Richardson 2004; White 2018). Glass or ceramic items had:

- No or low probability of being Indigenous objects if they were of materials which were manufactured too recently, no flaking or modification was present, scars were newer (less weathered) than the original surfaces, or if scarred edges were non-functional (located on the item in positions which would not have been practical for tool use, or for flake production), or were from accidental crushing of high points/ridges;
- Moderate probability if glass or ceramics were sufficiently old, and flaking resembled Indigenous stone objects (cores, tools, debitage);
- High probability if glass or ceramics dated to the eighteenth and nineteenth centuries, use-wear and/or tool use residues were present, flaking resembled Aboriginal stone objects (cores, tools, debitage) with convincing retouch and evidence of a reduction sequence was present. High probability would also be reinforced with historical evidence (oral and/or written) of Indigenous people in the local area during the historic phase.

These criteria were applied to the glass pieces recovered from the current test excavation.

6.1.2 THE GLASS OBJECTS AT TP14

The largest piece of glass (wall fragment from a bottle) was retouched with visible evidence of possible tool use (Plate 15). The glass piece measured 32 mm long x 21 mm wide (broken measure) x 4 mm thick, and weighed 5.9 grams. One notch 8 mm long was present along the shorter broken margin (Plate 16), and two notches (10.5 mm and 8 mm long) were present along the adjacent margin (Plate 17). Numerous parallel striations (scratches) occurred in patches on both the outer and inner surfaces of the glass, with some perpendicular to, and associated with, the notches (Plate 16 right image, Plate 17 right image). These striations may have resulted from use in functional tasks, although this has not yet been confirmed by microscopic analysis.

The two smaller pieces refitted to each other and were probably fragments of the same bottle, although they did not refit to the retouched piece. The two refitted pieces of glass together measured 21 mm long x 11 mm wide x 3 mm thick, and weighed 1.4 g. These pieces had striations on the outer surface of the glass; some striations aligned indicating that the break occurred more recently than the damage. Striations were not observed on the inner surface. These fragments were thinner than the retouched piece (3 mm and 4 mm respectively) indicating that the thicker piece had been selected for retouching. Given the refitting pieces were formed of the same glass as that of the retouched piece, it is considered likely that they were originally from the same bottle.

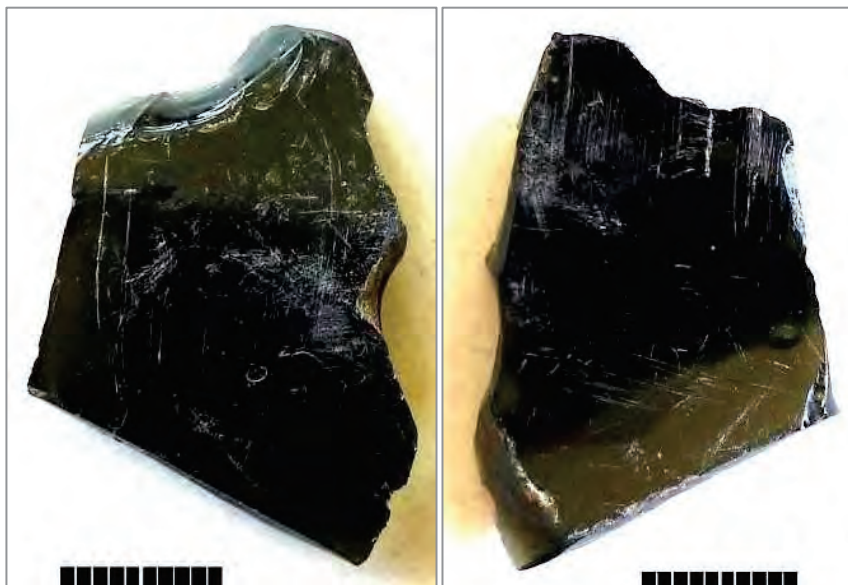


Plate 15: Retouched glass from TP14 spit 2. Not washed. Outer bottle surface left image. Inner bottle surface right image. Scale 10 mm long in 1 mm increments.

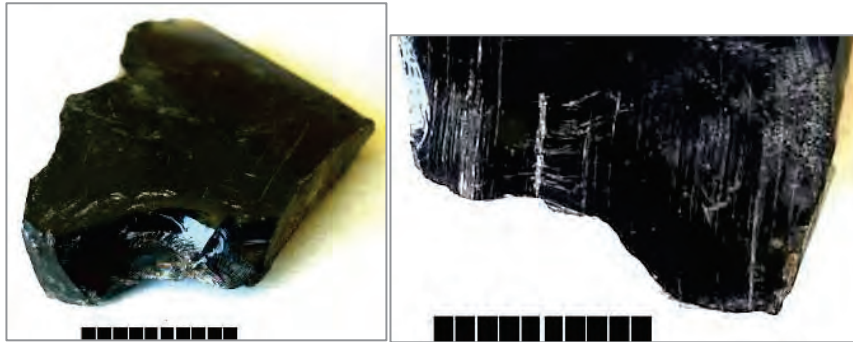


Plate 16: Retouched glass from TP14 spit 2. Left image is detail of flake scar at narrow end of glass shard. Right image shows striations on inner surface perpendicular to scar. Scale 10 mm long in 1 mm increments.

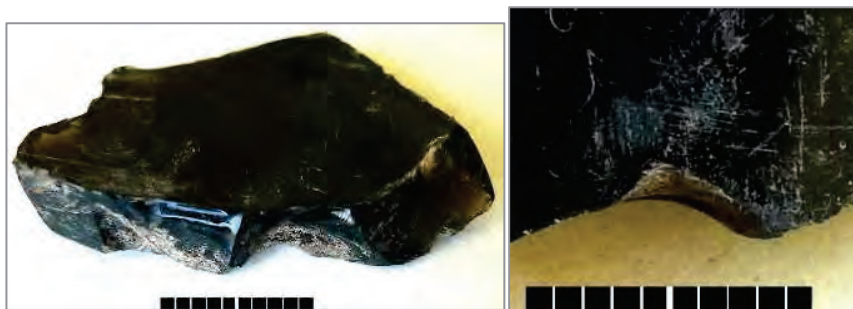


Plate 17: Retouched glass from TP14 spit 2. Left image shows adjacent notches on long margin of shard. Right image shows striations on outer surface perpendicular to scars. Scale 10 mm long in 1 mm increments.

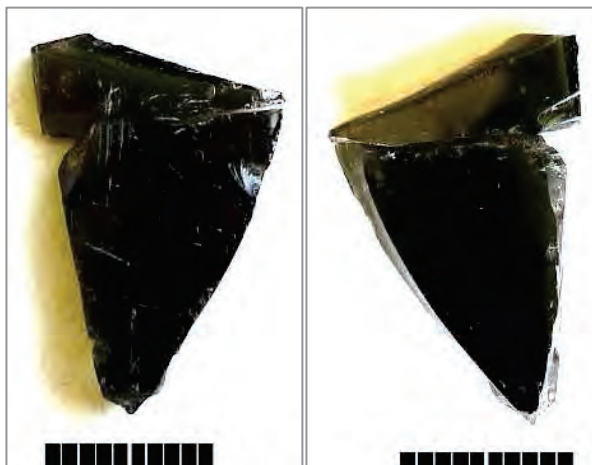


Plate 18: Refitted glass fragments from TP14 spit 2. Left image shows outer surface. Right image shows inner surface. Scale 10 mm long in 1 mm increments.

The retouched glass object had a high probability of being an Indigenous object because it met most of the criteria outlined above (Section 6.1.1). As the two refitting smaller fragments were probably from the same bottle, they were also probably objects.

- Criteria 1: There is ethnohistoric information about Aboriginal camps in the Worrigee area, although the exact location is not completely clear (e.g. DEC 2004; Chittick & Fox 1997; Florance 2007)

- Criteria 3: The dark olive-green glass with bubbles was sufficiently old, with this type of glass considered to have generally been produced prior to 1870 (e.g. Goward 2011; Lindsey 2021);
- Criteria 4: The presence of multiple parallel striations on all three pieces, perpendicular to scarred edges, suggested functional tool use, although this would need to be confirmed by microscopic use-wear analysis;
- Criteria 5 and 7: Regular notched retouch with scars of consistent shape/size (two measured 8 mm and one measured 10.5 mm in diameter) on the single retouched piece, were similar to notches on stone artefacts, were located on functional edges, and were as weathered as the glass surfaces;
- Criteria 6: The retouched piece was thicker than the two other refitting fragments, indicating selection of a more robust piece for modification. All three glass pieces are bottle wall fragments. A bottle may have been broken and a thicker wall fragment may have been selected for use. This approach to reduction and use of glass has been documented elsewhere (Harrison 2000; Goward 2011; Wallis 2019).
- Criteria 8: Limited evidence of accidental damage was present on the retouched glass piece, with only one small patch (2 mm in diameter) showing crushing on a non-functional edge. It is noted that the larger retouched piece of glass broke during or after the probably retouching and use, as broken margins intercept the scarred edges and marked surfaces. The breaks are as weathered as the scar surfaces, indicating that breakage occurred at a similar time as the scarring and surface damage. By comparison, retouched stone artefacts are also often broken; breakage during use being a likely explanation.
- Criteria 9: Air photos (archived in Historical Imagery Viewer, NSW government spatial services website) and satellite images in Google Earth Pro, show that trees were present in the vicinity of TP14 back until at least 1949 (the oldest image found), prior to tree removal and construction of current buildings elsewhere in the study area. The deposit within the test pit containing the glass was relatively intact, with minimal disturbance evident. The available information suggested that the site may not have been subject to vehicle traffic, agricultural activity or construction work, so increasing the likelihood that flake scars and striations were from deliberate Indigenous activities.

Criteria 2 was not met; contemporary stone or other kinds of traditional objects were not present. Three other modern items were found, comprising a piece of plastic and a piece of ceramic in TP28, and a piece of mechanically fractured quartz in TP36. These modern items were found in the northern part of the tested area, more than 100m from the glass pieces in TP14.

On the balance of evidence, with seven (perhaps eight) of nine criteria met, it was considered that the glass in TP 14 spit 2 had a high probability of being an Indigenous object.

6.2 STONE OBJECTS

No stone objects were found by the test excavation.

The study area was located on elevated ground c.10 to 11 m above sea level (height datum). It was located c.475 m from Brundee Swamp and c.560 m from Worrigee Swamp, and c.410 m from a drainage channel which flowed into Brundee Swamp. Being located on raised terrain in an otherwise low-lying and swampy landscape the study area could have been expected to have evidence of Indigenous visitation in the form of stone objects (e.g. Clarke and Kuskie 2006; Navin Officer 2013).

A review of the landscape setting of stone objects, as identified by systematic test excavations, was carried out by Apex Archaeology (2025). The data was revisited here with average density of stone objects per m² calculated and plotted in relation to water source for the following studies:

- Long Bow Point, Culburra Beach (Apex Archaeology 2025),
- APW/PADs (Apex Archaeology 2023),
- East Crescent, Culburra Beach (Dibden 2010),
- Nowra Bridge (Artefact 2018a, 2018b; KNC 2020),
- 25 Moss Vale Road, Bomaderry (Austral Archaeology 2022b)
- Taylors Lane PAD1, Bomaderry (Austral Archaeology 2021),
- PASA1 PAS2 and PASA52, Berry to Bomaderry upgrade (Navin Officer 2013).

Analysis was based on stream order, and coded as ordinal data as follows: 1 = first order, 2 = second order, 3 = third order, 4 = fourth order, 5 = fifth order, and 6 = the Shoalhaven River, the lower reaches of Bomaderry Creek within 300 m of the Shoalhaven River, swamps, former swamps and a lake.

Of the 18 sites in the analysis, only five had average densities of more than 10 objects/m², and three had average densities of 2.0 to 7.0 objects/m² (Table 9, Figure 11). Ten sites had average densities of less than 1.0 object/m². Only three sites more than 400 m from water had been tested; two had extremely low average densities and the third had a low average density of 2.4 objects/m².

While it may have appeared that the study area was ideally located on slightly elevated terrain in an otherwise low-lying landscape, the increased distance from Brundee and other swamps (more than 400 m) may have led to this area being less attractive for occupation prior to the historic phase.

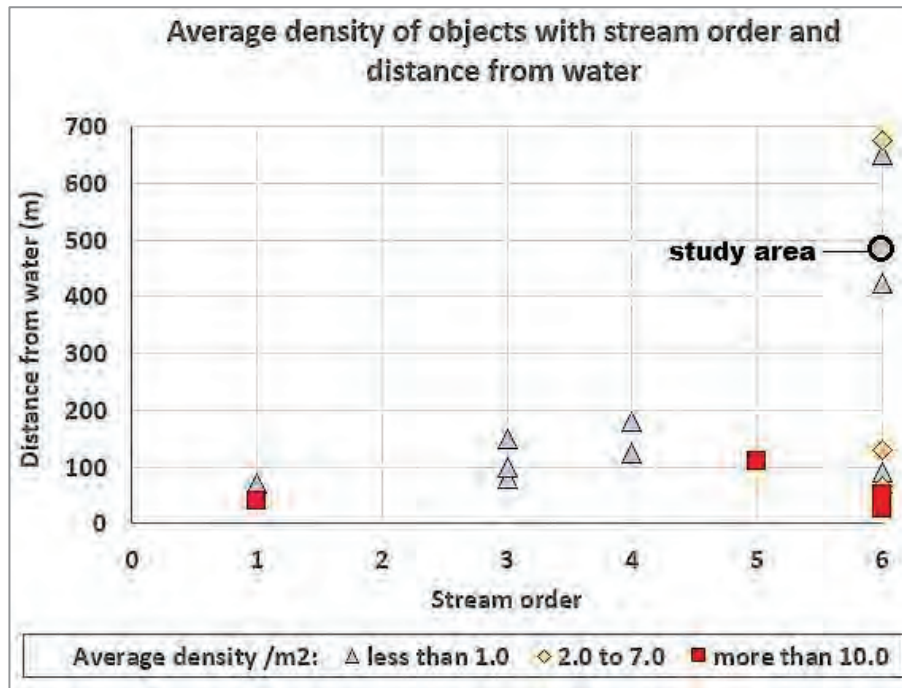


Figure 11: Average density of stone objects in test pits with stream order and distance from water.

**Table 9: Landscape setting and average density of objects from test excavations**

Site	Landform	Stream order	Stream no.	Distance from water	Total objects	Extent m2	Average density /m2
New Nowra Public School	Low Ridge	Swamps	6	410-560	0	9.25	0
25 Moss Vale Rd	Lower slope	Bomaderry Ck 5th	5	110	89	6.5	13.7
APW/PAD1/A	Rise above swamp	First & swamp	6	65	48	7	6.9
APW/PAD1/B	Rise above swamp	1st & swamp	6	130	16	7.25	2.2
APW/PAD2	Rise above swamp	Swamp	6	70	3	4.5	0.7
APW/PAD5	Rise above swamp	Third	3	80	7	7.75	0.9
APW/PAD6	Rise above swamp	Third	3	150	4	7.25	0.6
East Crescent 2010	Flat adjacent to bay	First & lake	6	50	526	4	131.5
Long Bow Point/B	Slope and spur	Lake	6	675	104	42.75	2.4
Long Bow Point/C	Ridge	Lake	6	650	20	40.5	0.5
Nowra Bridge 2	Cliff top	Shoalhaven River	6	25	465	10	46.5
Nowra Bridge 8	Raised alluvial flat & levee	Bomaderry Ck 5th	6	50	216	10	21.6
Nowra Bridge 9	Alluvial floodplain	Bomaderry Ck 5 th	6	90	8	12	0.7
Nowra Hill	Lower slope, poss flat	Fourth + First	4	125	18	25.25	0.7
PASA 1	Creek bank, flat, slope & ridge	Fourth	4	180	8	15.5	0.5
PASA 2	Creek bank, flat & slope	Third	3	100	9	13	0.7
PASA 52	Basal slope	First	1	70	2	6.5	0.3
Taylors Lane PAD1	Flat	First	1	40	92	2.5	36.8
West Culburra	Slope & ridge	Lake	6	425	16	45	0.4



7.0 ABORIGINAL CULTURAL HERITAGE SIGNIFICANCE ASSESSMENT

7.1 INTRODUCTION

The *Aboriginal cultural heritage consultation requirements for proponents 2010* acknowledge that:

- Aboriginal people have the right to maintain their culture, language, knowledge and identity
- Aboriginal people have the right to directly participate in matters that may affect their heritage
- Aboriginal people are the primary determinants of the cultural significance of their heritage

Undertaking consultation with Aboriginal people ensures that potential harm to Aboriginal objects and places from proposed developments is identified and mitigation measures developed early in the planning process.

7.2 CRITERIA

The Burra Charter is considered an appropriate framework for the assessment of cultural heritage, which can be made based on the following assessment criteria:

- **Social value:** Also referred to as cultural value, this criterion considers the spiritual, traditional, historical or contemporary associations an area or place has for Aboriginal people
- **Historic value:** the relationship between a place and people, events, phases or activities of importance to the Aboriginal community; specifically considering the “associations of a place with a historically important person, event, phase or activity in an Aboriginal community” (DECCW 2010)
- **Scientific value:** assessment under this criterion considered the ability of a landscape, place, area or object to inform scientific research and/or analysis and to assist in answering research questions
- **Aesthetic value:** the ability of a place, area, landscape or object to demonstrate aesthetic characteristics, or possess creative or technical values

Additionally, archaeological significance is assessed based on the archaeological or scientific values of an area. These values can be defined as the importance of the area relating to several criteria. Criteria used for determining the archaeological significance of an area are as follows:

- **Research or educational potential:** Can the site contribute to an understanding of the area/region and/or the state’s natural and cultural history? Is the site able to provide information that no other site or resource is able to do?



- **Representativeness:** is the site representative of this type of site? Is there variability both inside and outside the study area? Are similar site types conserved?
- **Rarity:** is the subject area a rare site type? Does it contain rare archaeological material or demonstrate cultural activities that no other site can demonstrate? Is this type of site in danger of being lost?
- **Integrity/Intactness:** Has the site been subject to significant disturbance? Is the site likely to contain deposits which may possess intact stratigraphy?

Further, an assessment of the grade of significance is made, based on how well the item fulfils the assessment criteria. The Department of Planning and Environment 2023 guideline *Assessing heritage significance: Guidelines for assessing places and objects against the Heritage Council of NSW criteria* defines the grading of significance as follows:

Table 10: Grading of significance, from DPE 2023

Grading	Justification
Exceptional (E)	Rare or outstanding element directly contributing to a place or object's significance.
High (H)	High degree of original fabric. Demonstrates a key element of the place or object's significance. Alterations do not detract from significance.
Moderate (M)	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the place or object.
Little (L)	Alterations detract from significance. Difficult to interpret.
Intrusive (I)	Damaging to the place or object's significance.

Whilst this was developed for the assessment of significance of historical items, the criteria are applicable to Aboriginal significance assessments as well. It is important to note that the below assessment is specific to Aboriginal cultural heritage and does not consider the non-Aboriginal significance of the site.

7.3 SIGNIFICANCE ASSESSMENT

The significance of the sites within the study area has been assessed and summarised in the following table, with discussion around the significance assessment for the study area as a whole following.

Table 11: Summary of significance for sites within the study area

Site	Social	Historic	Scientific	Aesthetic	Rep	Rarity	Intact	Overall
NPS-AD-01	H	M-H	L	L	M	H	L-M	M-H

SOCIAL VALUE

The Aboriginal community are best placed to make a determination of the social or cultural value of the study areas. No specific comments regarding the social value of the areas to Aboriginal people have been received from the RAPs to date,



although it is noted that all areas with evidence of Aboriginal occupation hold significance to Aboriginal people, and can be considered cultural landscapes.

However, it is noted that the site contains evidence of contact archaeology, albeit in a limited form. These sites are considered highly culturally significant as they show the interaction between colonists and Aboriginal people in the area, and that Aboriginal people persisted and adapted to a very different landscape and way of life to that lived pre-contact era.

It should be further noted that much of the significance of the items is vested in their physical form, and movement of the items would not reduce or impact their significance, once their original location is recorded.

HISTORIC VALUE

The study area contains evidence of post-contact occupation by Aboriginal people. This demonstrates a connection to a phase of specific importance to the local Aboriginal community, being the contact phase and demonstrating how Aboriginal people in the area were adapting to new materials and new ways of living following the arrival of settlers in the region. As such, the site is considered to have moderate to high historic value.

SCIENTIFIC VALUE

The study area itself is considered to have low scientific value, despite the presence of flaked glass artefacts. However, these specific items have limited potential to inform the archaeological record with regards to anything further than Aboriginal people were living in the area and adapting traditional tool-making methods to new materials.

AESTHETIC VALUE

Generally, aesthetic value is determined by the response evoked by a setting. The study area is considered to hold limited aesthetic significance with regards to Aboriginal heritage. However, the glass items are noted to demonstrate the application of traditional tool-making methods to new materials, which is an important achievement. In comparison with other sites containing glass items, the study area is considered to have low significance under this criterion due to the limited nature of the glass assemblage.

RESEARCH POTENTIAL

The study area is considered to possess limited research potential regarding Aboriginal heritage despite the presence of flaked glass artefacts. Almost the entirety of the study area was subject to test excavation with no artefacts recovered and cultural material contained within one pit only. Overall, the study area is not considered to have further archaeological research potential, and the flaked glass recovered has limited further research potential itself.



REPRESENTATIVENESS

The study area is generally representative of Aboriginal cultural values as it demonstrates evidence of continuity of occupation along the South Coast, including into the post-contact era, and thus connects these areas to the wider archaeological landscape. As such, it is considered to hold moderate significance under this criterion.

RARITY

Sites with evidence of contact archaeology are rare within the wider context and as such, the site has high significance under this criterion.

INTEGRITY/INTACTNESS

The study area is considered to be relatively intact, but contains minimal evidence of Aboriginal occupation over the area. As such, the study area is considered to have low to moderate integrity.

7.4 CULTURAL SIGNIFICANCE ASSESSMENT

Generally, all Aboriginal sites are of high significance and importance to the Aboriginal community, both locally and more broadly. The Aboriginal social or cultural value of the study area can only be determined by the Aboriginal community and to date, no comments have been received regarding the specific social significance of the study area.

It is acknowledged that the overall significance of a site is determined by both the cultural and scientific values of the area; with cultural values potentially extending beyond a specific study area and incorporating cultural landscapes in many cases. The cultural significance of an area can only be determined by the Traditional Owners of that area. Generally, all sites with evidence of Aboriginal occupation are considered significant to Aboriginal people as part of a larger cultural landscape.

7.5 STATEMENT OF ARCHAEOLOGICAL SIGNIFICANCE

The study area is considered to have moderate to high archaeological significance based on the presence of flaked glass artefacts within one test pit. However, these items are considered to have limited potential for further research due to their limited nature and the lack of other archaeological material identified within the study area. The items are rare in the archaeological record and represent the use of the area by Aboriginal people in the post-contact era. Overall, the flaked glass items themselves (ie AHIMS site #52-5-1199) are assessed as possessing moderate to high archaeological significance, while the remainder of the study area is considered to have negligible archaeological significance.



8.0 IMPACT ASSESSMENT

8.1 PROPOSED DEVELOPMENT

The proposed works include the construction of a new primary school and preschool within the study area. The new school will provide capacity for 552 mainstream students plus three support classes, and a new 60-place preschool. The new primary school will be master planned to enable the expansion to 750 students should this be required in the future.

The proposed works will include the demolition of the existing residence, as well as modification to the natural landscape through subsurface excavation and trenching to cater for services such as telecommunications, water and electricity. The works will occur in three stages:

- Stage 1: New 60-place preschool
- Stage 2: New medium primary school (550 students)
- Potential Stage 3: Expansion to large primary school (750 students – dependent on future growth in the area and not yet approved)

Some key design moves as part of the master plan for the site includes leveraging natural amenities, i.e. placing the field/oval area on the north eastern flat plain of the site to minimise cut and fill, as well as implementing street setbacks to encourage a regenerative landscape and to potentially include educational elements of Country, native flora and fauna.

8.2 POTENTIAL IMPACT

One post-contact Aboriginal site (NPS-AD-01, AHIMS #52-5-1199) has been identified in the southern portion of the study area. This site is located in the area where a bitumen carpark is proposed, and as such will be impacted by the development for the School site.

8.3 JUSTIFICATION

The works are required to develop the study area in line with the Illawarra Shoalhaven Regional Plan (2041), and to meet enrolment demand projections in the Nowra Primary School Community Group.

8.4 ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

It is a requirement of Section 2A(2) of the NPW Act to apply the principles of Ecologically Sustainable Development (ESD) when considering any impact to Aboriginal objects and places. ESD integrates economic and environmental considerations, which includes cultural heritage, into decision-making processes. In general, ESD can be achieved through consideration and implementation of two key principles, being intergenerational equity and the precautionary principle.



Intergenerational equity refers to the present generation having consideration for the health, diversity and productivity of the environment for those generations to come. In terms of Aboriginal cultural heritage, this relates to cumulative impacts to Aboriginal objects and places within a region. Intergenerational equity therefore relies on the understanding that a reduction in the number of Aboriginal objects and places within a region results in fewer opportunities for Aboriginal people to access their cultural heritage in the future. Thus, it is essential to understand what comprises the Aboriginal heritage resource, both known and potential, when assessing intergenerational equity within a region.

The precautionary principle relates to threats of serious or irreversible environmental damage, and that lack of scientific certainty regarding the degree of potential damage should not be a reason to postpone adequate reasonable measures to prevent harm to the environment. Regarding Aboriginal cultural heritage, the precautionary principle relates to where a proposed development may seriously or irreversibly impact Aboriginal objects or places, or their significance; and where there may be uncertainty relating to the integrity, rarity or representativeness of Aboriginal cultural values. The Code of Practice outlines that a precautionary approach should be taken to avoid or reduce damage to Aboriginal objects or places, with cost-effective measures implemented wherever possible. Additionally, a cumulative impact assessment should be completed to determine how the proposed development would impact the cultural resource in the wider region.

Consideration should be given to the significance of the sites present within an area, and whether they are able to transmit cultural information to future generations, or to act as teaching aids.

8.4.1 INTERGENERATIONAL EQUITY

The study area has been assessed as being of moderate to high archaeological significance. However, the surrounding area in which the flaked glass items were located is not considered to have potential for additional items to be present, and the glass items are considered to have limited research potential. The items should be retained on site, in a reburial location that will not be impacted in future, meaning the items would still be available for teaching purposes in future should this be desired by the Aboriginal community.

Overall, it is considered that the impact of the destruction of this site would be negligible with regards to the ongoing transmission of cultural knowledge to future generations, although it is acknowledged that destruction should be avoided where possible.

8.4.2 CUMULATIVE IMPACTS

The cumulative impact of the project on the Aboriginal cultural resource must be considered as part of an assessment, and managed appropriately and sensitively. Avoidance of impact is the best practice approach wherever possible, particularly for sites that are intact, contain high numbers of artefacts, or are considered significant to the community.



In terms of cumulative impact, the site contains evidence of Aboriginal occupation in a relatively undisturbed context, with high cultural significance. However, it is noted that movement of these items would not reduce their cultural significance, and as such, impact to the area in which they were identified is not considered likely to impact on their overall significance. The items were recovered from a localised area of the study area and movement of the items would not diminish their significance. Further, the remainder of the study area is not considered to have archaeological potential.

As such, it is considered that the cumulative impact of the proposed project on Aboriginal cultural heritage would be minimal.

8.5 ABORIGINAL COMMUNITY INPUT

How has the input of the RAPs been considered in this instance?

Consultation with the Aboriginal community has been undertaken for this project in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010*. The Aboriginal community have been afforded an opportunity to provide feedback regarding the proposed works and their potential impact on Aboriginal cultural heritage, and the views of the community, where shared, have been incorporated into the final ACHA.



9.0 MANAGEMENT, MITIGATION AND RECOMMENDATIONS

9.1 GUIDING PRINCIPLES

Wherever possible and practicable, it is preferred to avoid impact to Aboriginal archaeological sites. In situations where conservation is not possible or practicable, mitigation measures must be implemented.

The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013 (The Burra Charter) provides guidance for the management of culturally sensitive places. The Burra Charter is predominantly focussed on places of built heritage significance, but the principles are applicable to other places of significance as well.

The first guiding principle for management of culturally significant sites states that “places of cultural significance should be conserved” (Article 2.1). A cautious approach should be adopted, whereby only “as much as necessary but as little as possible” (Article 3.1) should be changed or impacted.

Mitigation measures depend on the significance assessment for the site. Cultural significance of sites should also be considered in consultation with the Aboriginal community during community consultation.

9.2 HARM AVOIDANCE OR MITIGATION

One site is located within the study area, comprising three flaked glass pieces identified within one test pit. This site is known as NPS-AD-01 (AHIMS #52-5-1199). No other sites were identified within the study area. NPS-AD-01 cannot be avoided by the proposed works for the new school.

9.2.1 MITIGATION MEASURES

FLAKED GLASS MANAGEMENT

It is recommended that no further archaeological work within the study area in the form of additional test excavation or salvage excavation is necessary as the study area is not considered to have further archaeological potential, and further works would be unlikely to result in additional information about the use of the area by Aboriginal people both pre- and post-colonisation. However, it is recommended that the flaked glass items are retained on site. This should be a reburial location within an area that will not be impacted in future as part of the development and on-going maintenance of the school. Consultation with both the RAPs and School Infrastructure is required to determine the appropriate location for the future location of the flaked glass pieces.

CULTURAL HERITAGE INDUCTION

All personnel engaged to undertake site works within the study areas should take part in a cultural heritage awareness site induction to ensure that they are aware of their responsibilities regarding Aboriginal cultural heritage and the cultural values in the area. Suggested wording for an induction is attached as Appendix G and could be incorporated into a toolbox talk or similar.



TEMPORARY PROTECTION OF AHIP AREA

The location of the flaked glass items must not be impacted until an AHIP has been obtained for the site (refer Section 10). The proposed works for the Preschool site will not impact on this site and it is recommended that the AHIP be obtained as part of the Primary school site. However, it is noted that there may be ancillary works associated with construction of the Preschool and thus potential to impact on this location. As such, avoidance of this site is required. Temporary fencing will be provided around the outside of the proposed AHIP area indicated in Figure 12 of this report, with no vehicle access and ground disturbance to occur within that area until an AHIP is provided for impacting the site for the Worrigee Public School project. This temporary protection area will be provided in all environmental and construction plans for the project.



10.0 PERMIT REQUIREMENTS

10.1 PERMIT AREA

An application for an AHIP under Part 6 of the *National Parks and Wildlife Act 1974* is required for the site located within 9 Worrigee Road, Worrigee, NSW, prior to the commencement of works on site. The study area is further defined as Lot 1 in DP 576975, and the proposed impact area is contained within these cadastral boundaries as a 5m buffer around the test pit containing the glass items. Figure 12 shows the proposed AHIP boundary, and Table 12 lists the grid references for the proposed AHIP boundaries in GDA/MGA 94, Zone 56. These grid references are also provided on Figure 1218.

Table 12: Grid references for study area boundary

Point	Easting	Northing	Point	Easting	Northing
■	■	■	■	■	■
■	■	■	■	■	■

10.2 PERMIT TYPE

It is recommended that the AHIP permit unmitigated impact prior to the commencement of works, as a site based AHIP. The AHIP boundary comprises a 5m buffer around the initial test pit containing the glass items.

10.3 AHIMS NUMBERS

A total of one AHIMS site is located within the study area. Table 13 provides a summary of the impact assessment for sites within the study area. The impact is considered to result in a total loss of value as the proposed development will impact the site extents of NPS-AD-01 (AHIMS #52-5-1199) in its entirety.

Table 13: Summary of Impact Assessment

Site Number	Type of harm	Degree of harm	Consequence of harm
52-5-1199	Direct	Total	Total loss of value

10.4 PREVIOUS AHIPS

No AHIPs have been issued or refused previously for the study area to the best of our knowledge. This assessment is based on review of the public AHIP register and the AHIP spatial mapping layer available from Sharing and Enabling Environmental Data (SEED) NSW.

10.5 RESTRICTED INFORMATION AND CONFIDENTIALITY

Aboriginal stakeholders for the project have not identified any restricted, confidential or culturally sensitive information related to the project and this AHIP application.



It is noted that all AHIMS data and Aboriginal site specific information, along with associated mapped information, must be treated as confidential and not shared with the general public.

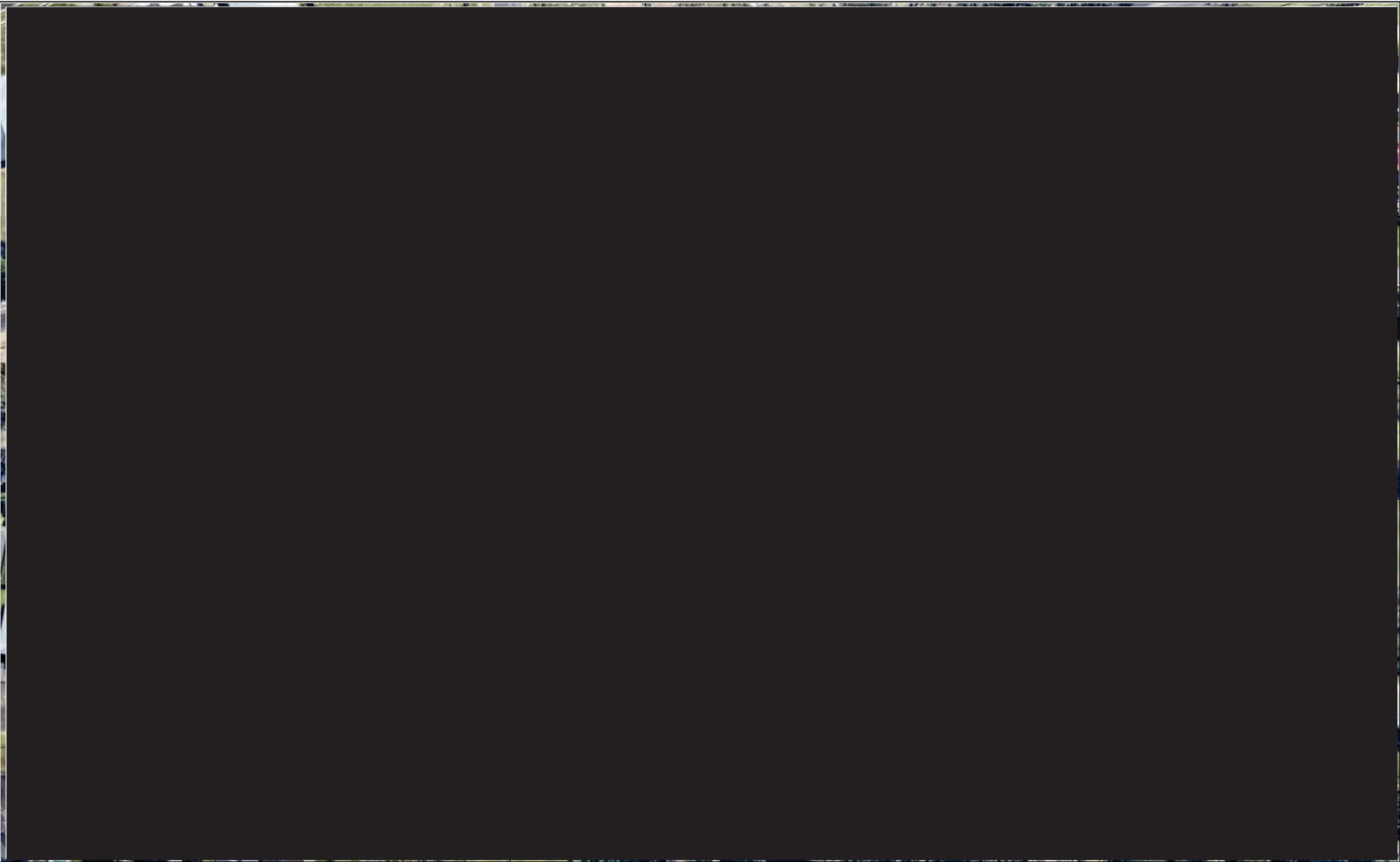
10.6 COPYRIGHT

Apex Archaeology asserts its Moral Rights in this work, unless otherwise indicated, in accordance with the Commonwealth *Copyright (Moral Rights) Amendment Act 2000*. Apex Archaeology vests copyright in all material produced in this report by Apex Archaeology (excluding pre-existing material) in SI, and retains the right to use all the material produced by Apex Archaeology for our ongoing business and professional activities (including but not limited to professional presentations, academic papers and/or publications).

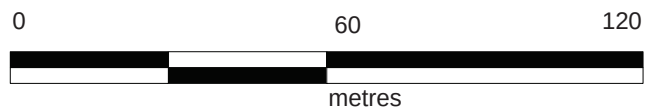
10.7 ARTEFACT MANAGEMENT

It is recommended that the flaked glass items are retained on site. This should be a reburial location within an area that will not be impacted in future as part of the development and on-going maintenance of the school. Consultation with both the RAPs and School Infrastructure is required to determine the appropriate location for the future location of the flaked glass pieces.

An ASIRF should be submitted on completion of site works noting that the area in which the flaked glass was identified has been impacted in accordance with an approved AHIP, and recording the deposited location of the flaked glass pieces.



PO Box 236
NOWRA
NEW SOUTH WALES 2541



Projection:
MGA Zone 56 (GDA 94)
Base Map:
Near Maps 2025
Image Date: 05/04/2025
Final - Version 1

Figure 12: AHIP area



11.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- The statutory requirements of the NP&W Act 1974;
- The requirements of Heritage NSW and School Infrastructure;
- The results of the cultural and archaeological assessment;
- An assessment of the likely impacts of the proposed development; and
- The interests of the registered Aboriginal stakeholders and the cultural heritage record.

It was found that:

- No previously identified Aboriginal sites were located within the study area.
- The study area was initially assessed as having potential for subsurface deposits to be present.
- Test excavations did not identify any stone artefacts within the site.
- Three flaked glass pieces were identified from a single test pit within the study area.
- The proposed construction works associated with the new school cannot avoid the location from where the flaked glass pieces were recovered.
- Mitigation measures have been proposed to minimise the potential impact of the works on the archaeological resource.

In summary, the test pit containing the flaked glass is not able to be avoided by the proposed works for the new School, and as such requires an application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to the area to occur. However, the flaked glass pieces can be retained on site, reducing the overall impact to the cultural values associated with the glass items.

The Preschool site is not considered to have archaeological potential and works in this area can proceed with caution.

Based on the results of the cultural heritage and archaeological assessments, the following recommendation has been made for the Preschool site:

RECOMMENDATION 1: NO FURTHER ARCHAEOLOGICAL ASSESSMENT REQUIRED

This report details the archaeological potential of the Preschool site, which has been assessed as negligible. No further archaeological assessment is required for the Preschool site prior to the commencement of proposed development activities. No application for an Aboriginal Heritage Impact Permit (AHIP) is necessary for this portion of the overall study area.

RECOMMENDATION 2: TEMPORARY PROTECTION OF AHIP AREA

Although located outside the works area for the Preschool site, the AHIP area must be protected and avoided during construction works to prevent inadvertent impact occurring. Temporary fencing will be



provided around the outside of the proposed AHIP area indicated in Figure 12 of this report, with no vehicle access and ground disturbance to occur within that area until an AHIP is provided for impacting the site for the Worrigee Public School project. This temporary protection area will be provided in all environmental and construction plans for the project.

The following recommendations apply to the Primary school site:

RECOMMENDATION 3: APPLICATION FOR AHIP REQUIRED

This report details the Aboriginal archaeological potential of the new School site. A total of one newly recorded site is located within the School study area. This site cannot be avoided by the proposed works associated with the School development. Application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to this site is required, and should include permission for unmitigated impact.

RECOMMENDATION 4: LONG TERM MANAGEMENT OF FLAKED GLASS

It is recommended that the three flaked glass pieces comprising NPS-AD-01 (AHIMS #52-5-1199) should be retained on site, via reburial in a location that will not be impacted in future.

An Aboriginal Site Impact Recording Form (ASIRF) will be required to be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) registrar to record the permanent location of the flaked glass pieces once reburied within the site.

RECOMMENDATION 5: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

Consultation undertaken for this project must be maintained at least every six months in order to maintain validity prior to application for an AHIP. It is the Proponent's responsibility to ensure consultation remains valid. In the event a gap of more than six months occurs between consultation events, it may be necessary to restart the consultation process to support any AHIP applications that are necessary.

The following recommendations relate to both the Preschool and Primary school sites:



RECOMMENDATION 6: DEVELOPMENT BOUNDARIES

The proposed development works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas should be completed to assist in managing Aboriginal objects and places which may be present in an appropriate manner.

RECOMMENDATION 7: STOP WORK PROVISION

Should unanticipated Aboriginal archaeological material be encountered during site works, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan (CEMP) and workers' induction process developed for the site.

RECOMMENDATION 8: REPORTING

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the Primary school project, along with required supporting documentation.

One digital copy of this report should be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.



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CONSULTATION APPENDICES NOT INCLUDED IN PUBLIC REPORT



APPENDIX H: TEST PIT RECORDS



Key for test pit illustrations



Clay



Mixed Gravels



Ironstone cobble



Charcoal



Asphalt



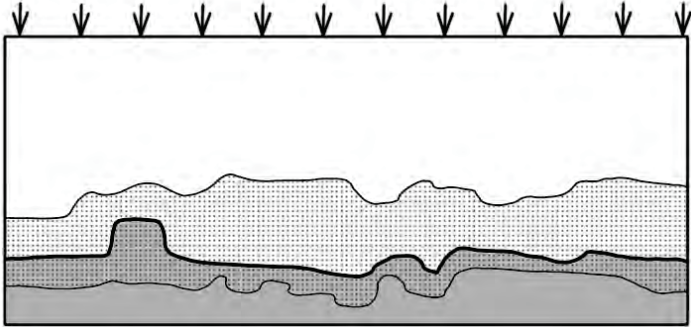
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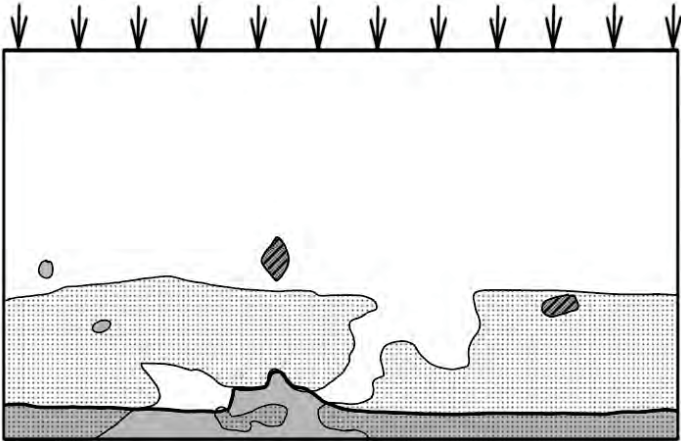


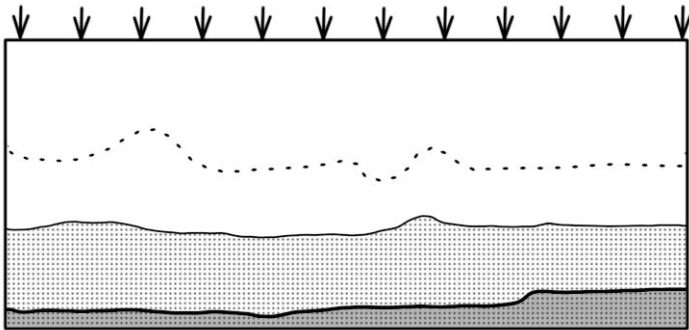
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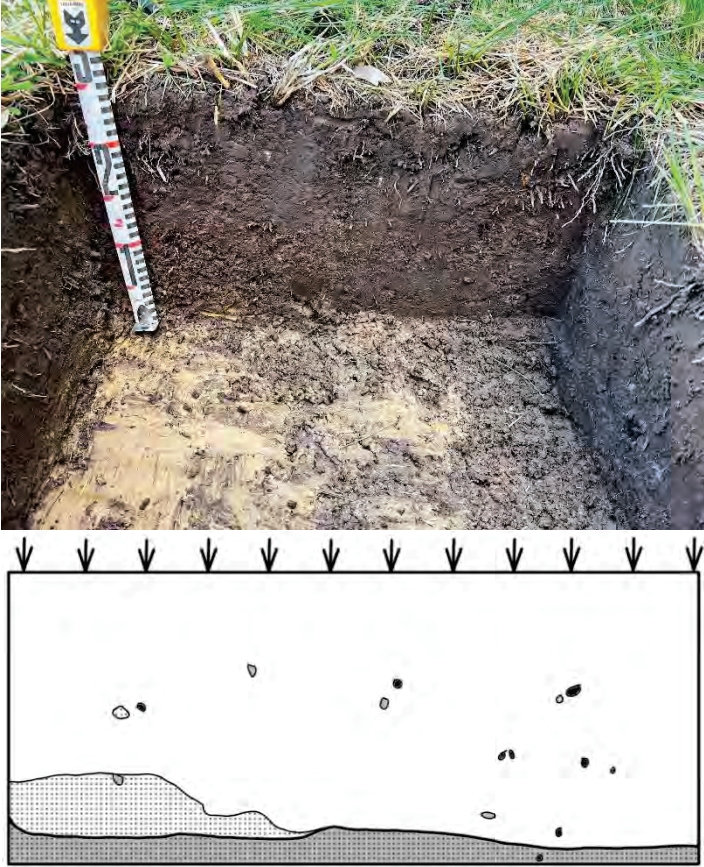
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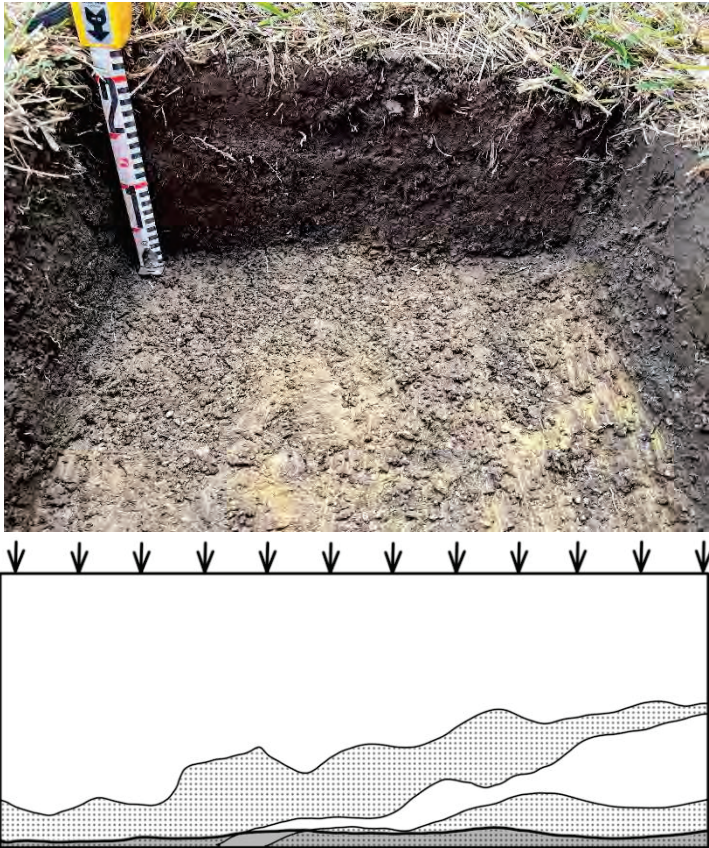
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 1	26cm	 	0-10cm: Mid brown sandy silt. Moderate compaction. Surface grasses and roots. No inclusions. 10-15cm: Mid brown clay silt. Grass rootlets continue. Damp. Compact. Fine coarse mixed gravel inclusions (0-1cm). 15-20cm: Stark horizon from mid brown to clean orange clay. 2 large roots (>5cm diameter) nearby gum trees. 20-25cm: Clean wet sticky base clay. Orange.	0-5: 10YR 2/2 5-10: 10YR 3/2 10-15: 10YR 3/2 15-20: 10YR 4/4 20-25: 10YR 4/3 0-5: 6 5-10: 6 10-15: 6.5 15-20: 6.5 20-25: 6

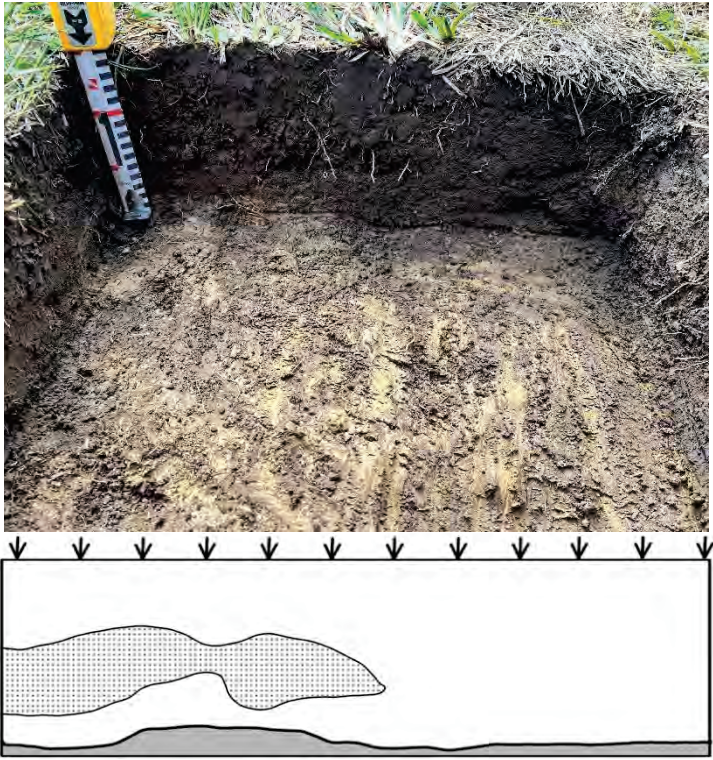
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 2	38cm	 	0-5cm: Dark brown loose but plastic clayey silt. Very high grass root content (<30%). Charcoal Flecks and clay flecks throughout. 5-15cm: As above, however less roots (<10%) and clay content increasing at <20%. Gravely charcoal throughout at <15%. 15-25cm: As above, clay increasing at 50-60% 25-38cm: As above – clay content high 60-90%. 34-38cm: Base. Plastic orangey clay.	

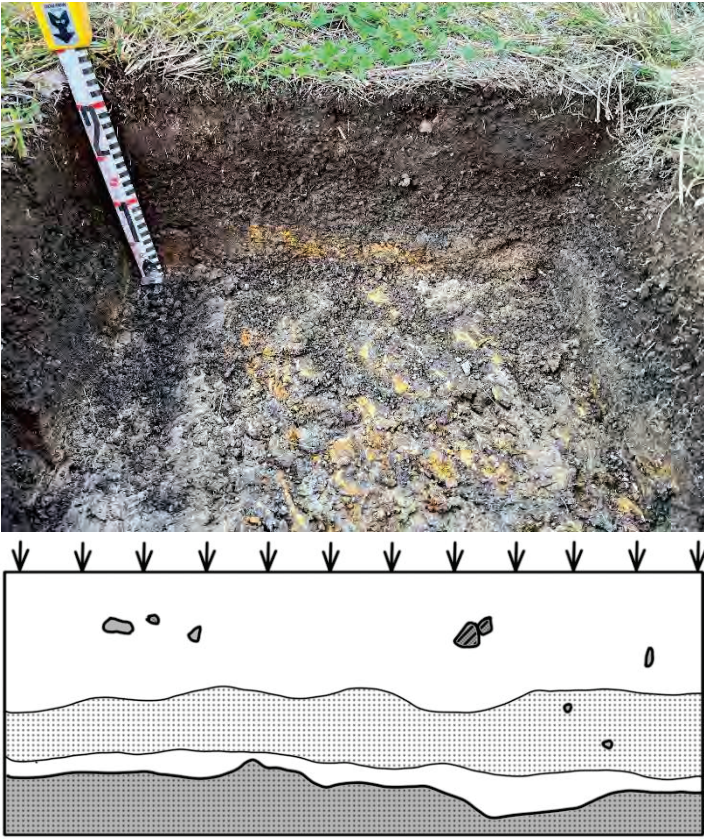
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 3	30cm	 	0-10cm: Mid brown sandy silt. Moderate compaction. Surface grasses and roots. No inclusions. 10-25cm: Mid brown clay silt. Grass rootlets continue. Damp. Compact. Fine coarse mixed gravel inclusions (0-1cm). 25-30cm: Stark horizon from mid brown to clean orange base clay. Large ironstone inclusions (>10%, >10cm). Large roots transecting pit from east-west. Large gum tree immediately north of pit.	

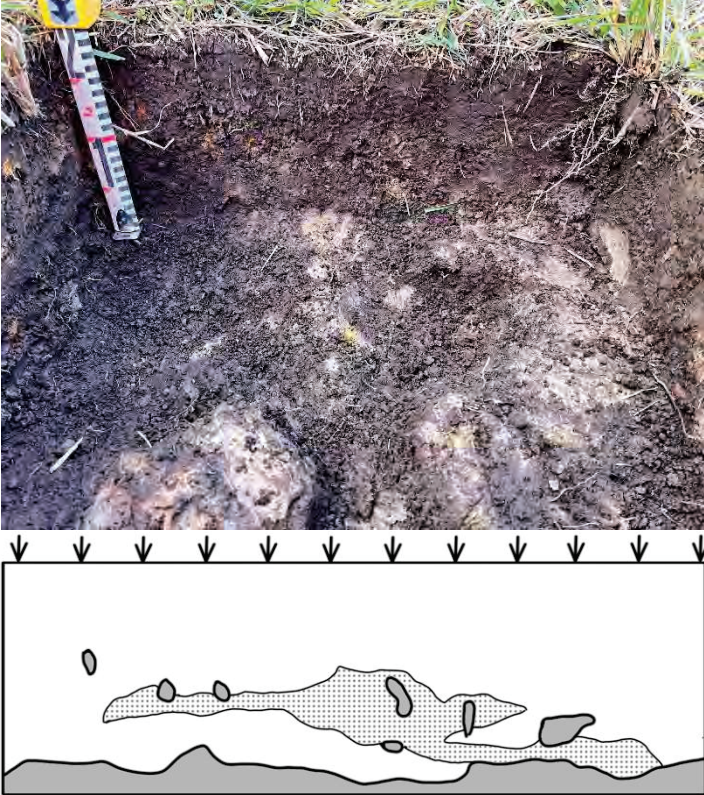
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 4	20cm		0-10cm: Dark brown loose but plastic clayey silt. Very high grass root content (<30%). Charcoal Flecks and clay flecks throughout. 10-20cm: high clay content. Evidence of disturbance (microplastics, clay clusters from ploughing). Undulating clay base from 13-19cm. Plastic orangey clay.	

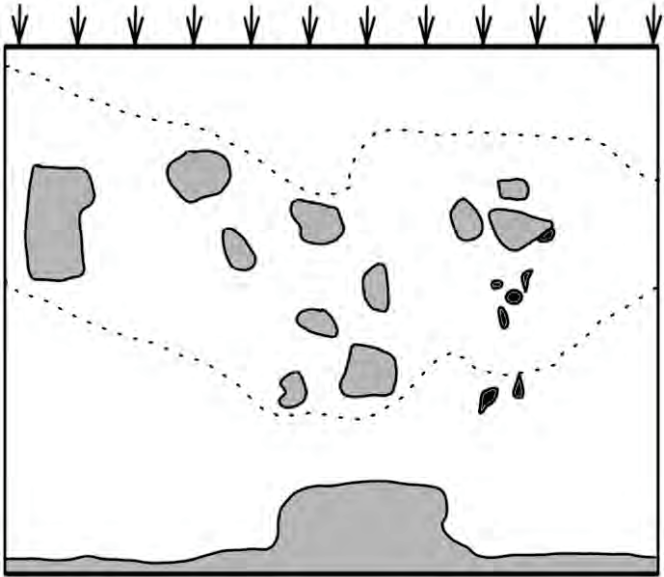
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 5	30cm		0-10cm: Dark brown clay silt. Compact. Wet. Surface grasses and dense roots. 10-20cm: Dark brown silty clay. Very compact. Mixed gravels (>1cm, 60%). 20-30cm: Dark brown very compact silty clay. Mixed gravel lense (<1.5cm, >40%) at point of transition between silty clay and yellow clay base.	

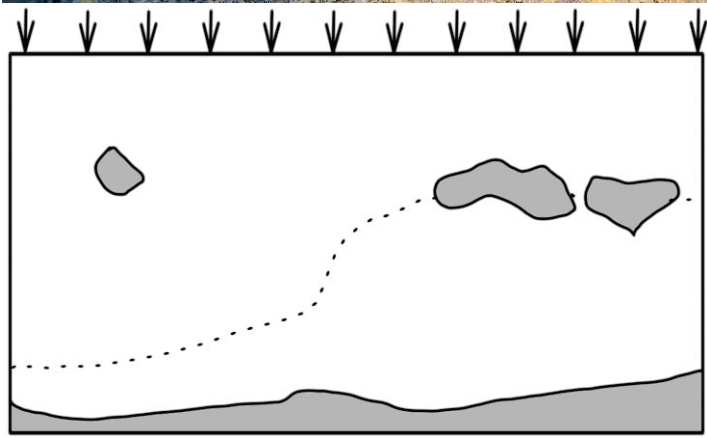
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 6	24cm		0-20cm: Brown sticky clay loam. 20-24cm: Interface – gravels >20% into clay base. Base of orange sticky clay. Grass roots present from surface to base.	

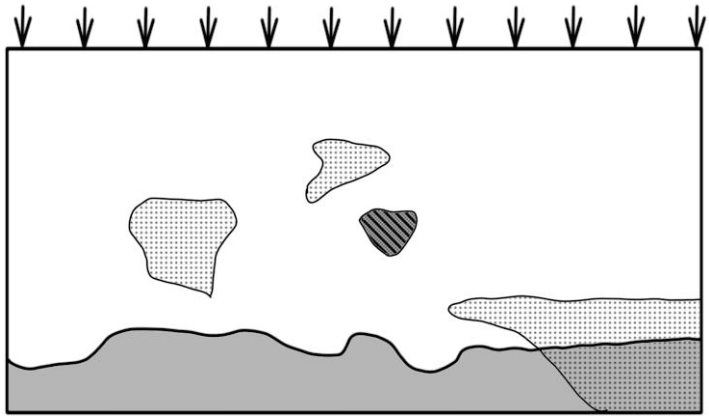
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 7	23cm		0-20cm: Brown sticky clay loam. 20-24cm: Interface – gravels >20% into clay base. Base of orange sticky clay. Grass roots present from surface to base.	

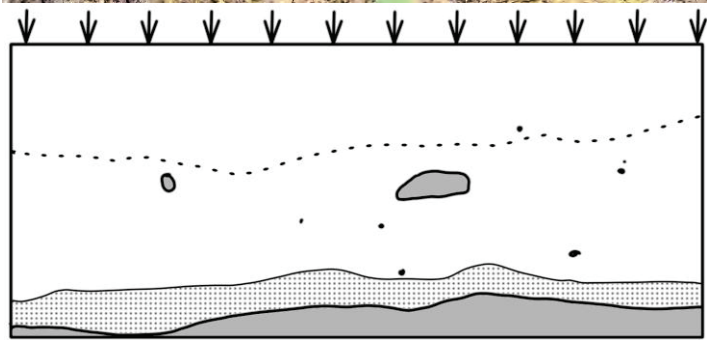
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 8	25cm		0-10cm: Mid brown clay silt. Moderate compaction. Surface grasses and roots. Some mixed gravels (>10%, >1cm). 10-20cm: Mid brown silty clay. Moderate compaction. Mixed gravels increasing (>50%, >1cm). 20-25cm: Mottled yellow/grey clay, with ironstone inclusions (>10%, >5cm) and mixed gravels (>20%, >1cm). Mottled clay at base.	

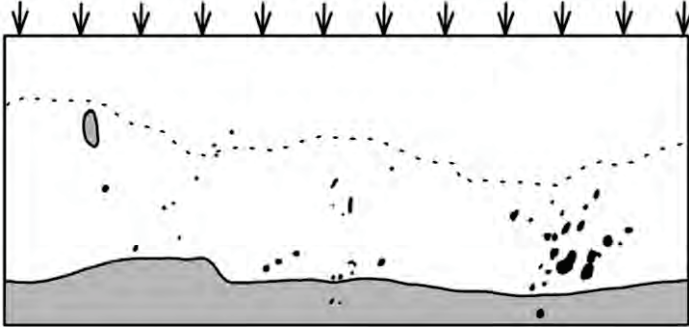
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 9	18cm		0-18cm: Brown sticky clay loam. 18-20cm: Base of mottled and churned clay. Very uneven. Glass in base. Disturbed.	

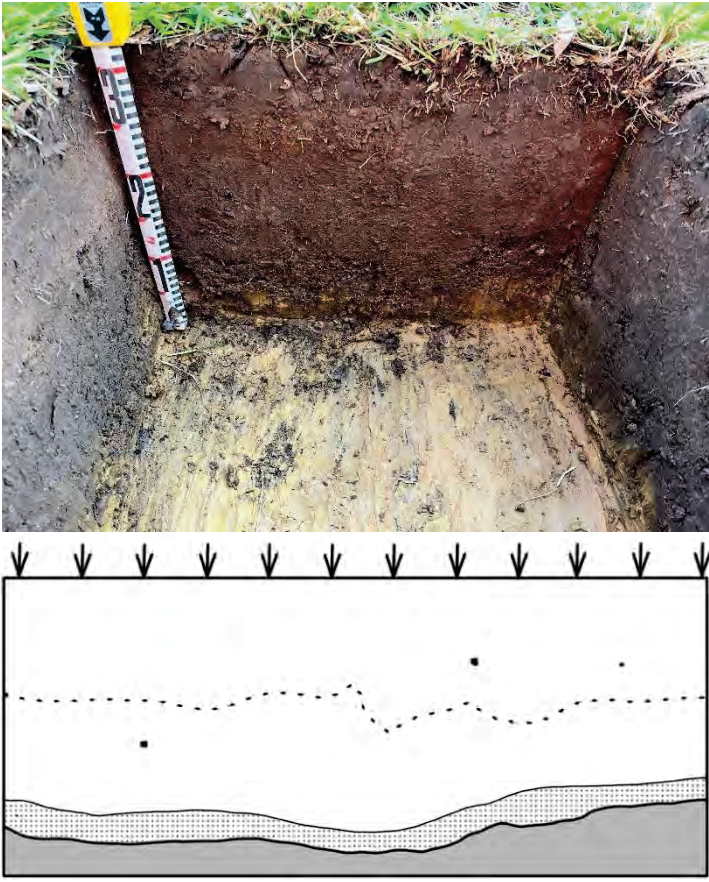
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 10	50cm	 	0-15cm: Mid brown sandy silt. Friable. Surface grasses and roots. 15-25cm: Mid brown clay silt. Compact. 10-15cm diameter clay nodules (grey/red/yellow) ball clay. No other inclusions. 25-40cm: Mottled red and grey clay, with pockets of black-brown clay silt, continued until silt removed. 40- 50cm: Silt removed. Undulating red/grey damp clay at base. Heavily mottled. Heavy clay. Disturbance ie. Ploughing.	

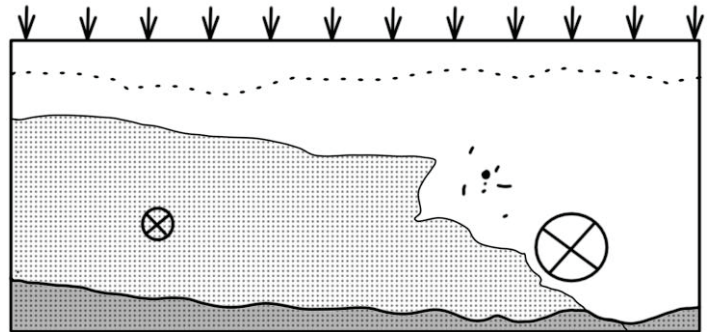
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 11	30cm	 	0-10cm: Humic layer, disturbance (mottled clay) brown sticky loam. 10-30cm: Light brown/grey sticky clay loam. Charcoal flecks <5% throughout. Base of orange solid sticky clay. Grass roots to base.	

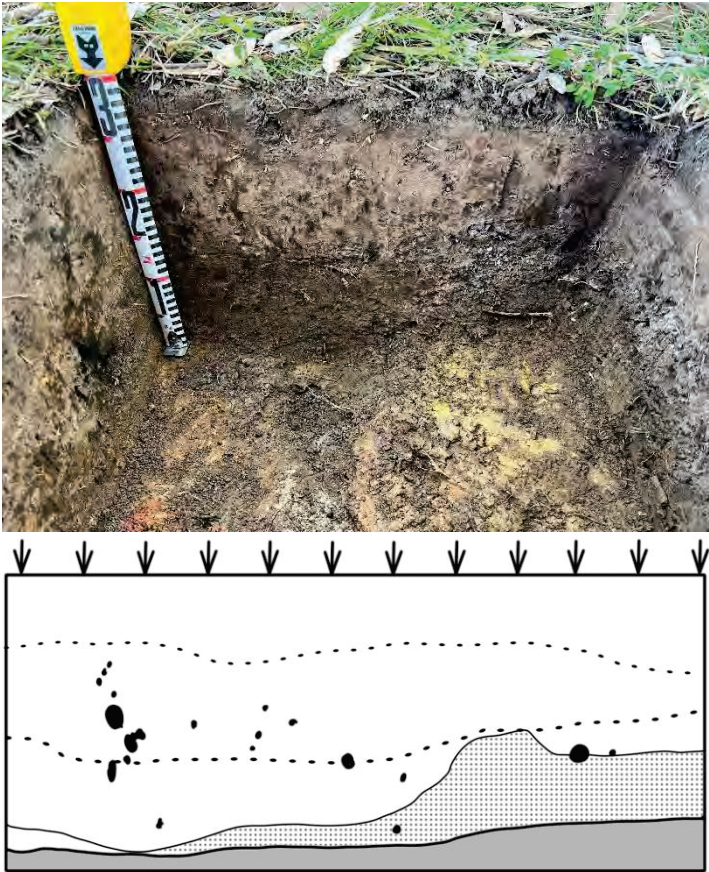
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 12	35cm	 	0-25cm: Mid brown clay silt, loose compaction, few ironstone gravel inclusions (>5%, >1cm). Surface grasses and rootlets. 25-30cm: Mid grey, brown clay silt. Compact. Dense ironstone and mixed gravels (>70%, >1cm). 30-35cm: Yellow solid clay base.	

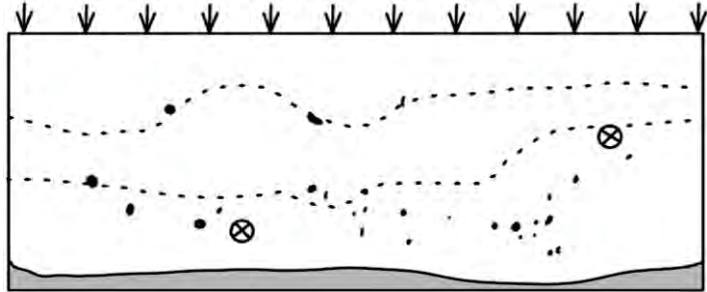
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 13	30cm	 	0-10cm: Humic layer, disturbance (mottled clay) brown sticky loam. 10-30cm: Light brown/grey sticky clay loam. Charcoal flecks <5% throughout. Base of orange solid sticky clay. Grass roots to base.	

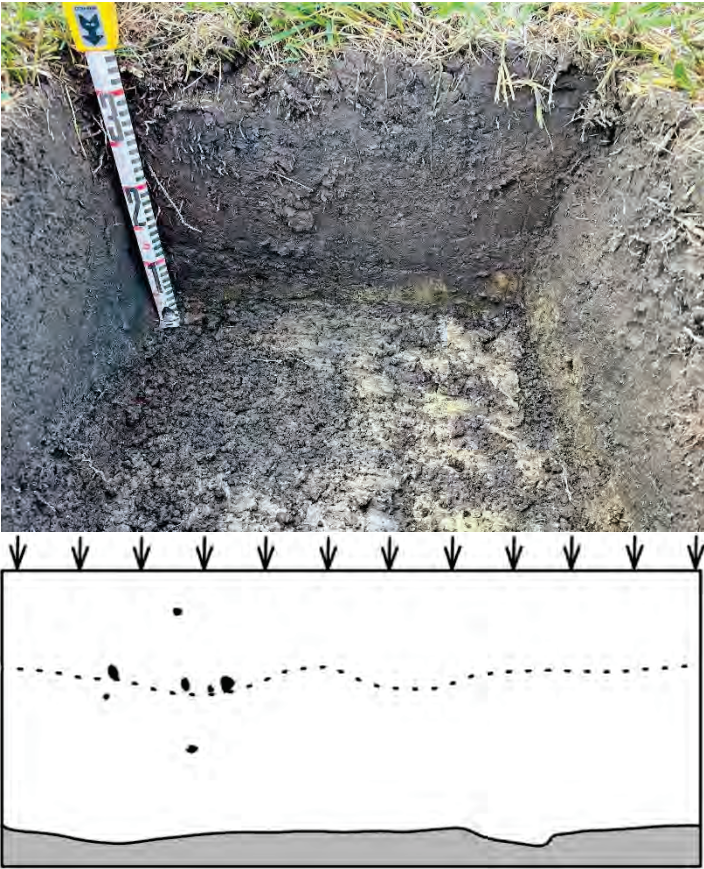
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 14	30cm	 	0-10cm: Humic layer, disturbance (mottled clay) brown sticky loam. 10-30cm: Light brown/grey sticky clay loam. Charcoal flecks <5% throughout. Base of orange solid sticky clay. Grass roots to base.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 15	35cm		0-10cm: Dark brown clay silt. Loose compaction. Surface grasses and rootlets. Damp. Soft. 10-25cm: Mid brown silty clay. Loose compaction. Damp. Soft. Fine mixed gravels throughout (>15%, >1cm). 25-30cm: Lense of mixed gravels contained in grey, brown clay silt matric capping yellow wet clay. Mixed gravels are compact and dense (8%, >1cm). Wet clay is very compact. Overall dampness may be due to rain the previous night.	

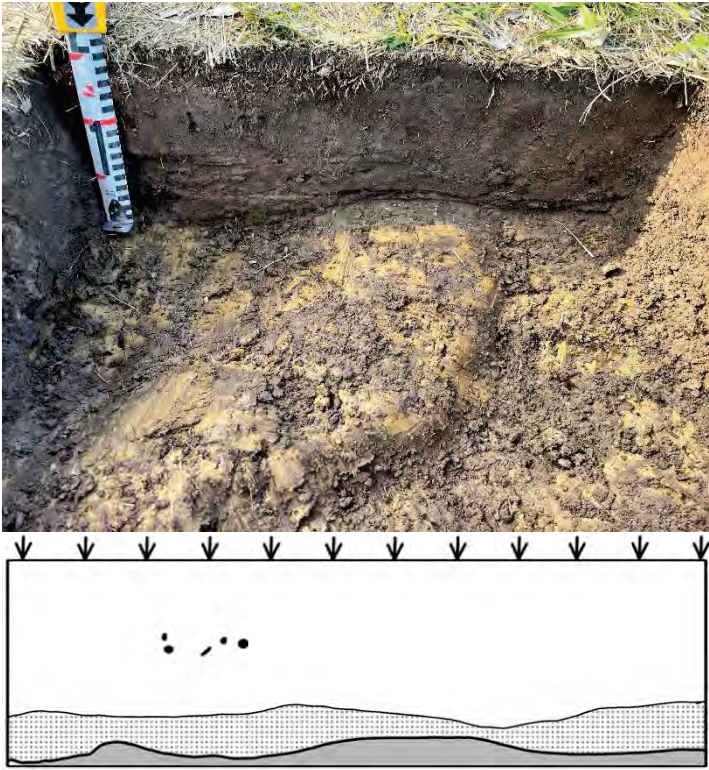
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 16	30cm	 	0-7cm: Brown clay loam. 7-30cm: Gravels throughout, almost concreted. Brown clay loam with proximity to large old gum – roots may affect soil. Clay base, orange, sticky, gravels to clay base. Grass roots from surface to clay base.	

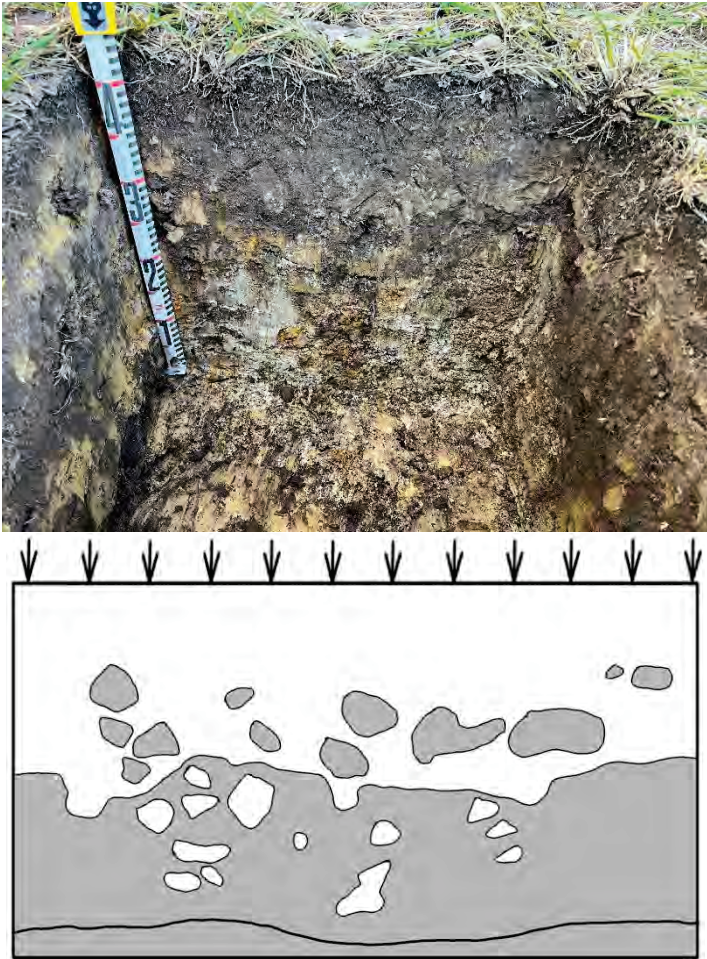
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 17	30cm		0-5cm: Sandy silt. Grey, brown. Frable. Surface grasses and leaf litter. Powdery consistency. 5-20cm: Mottled grey brown clay silt. Dry. Powdery. Compact. Lense of compact mixed gravels in eastern half. Mixed gravels contained in grey silty clay (>1cm, >40%). 20-30cm: Mottled clay (red, yellow, grey) dry, compact. Mixed gravels continue (>1cm, >40%). Rounded ironstone nodules present to depth of 30cm (>10cm, >10cm. Mottled undulating clay base.	

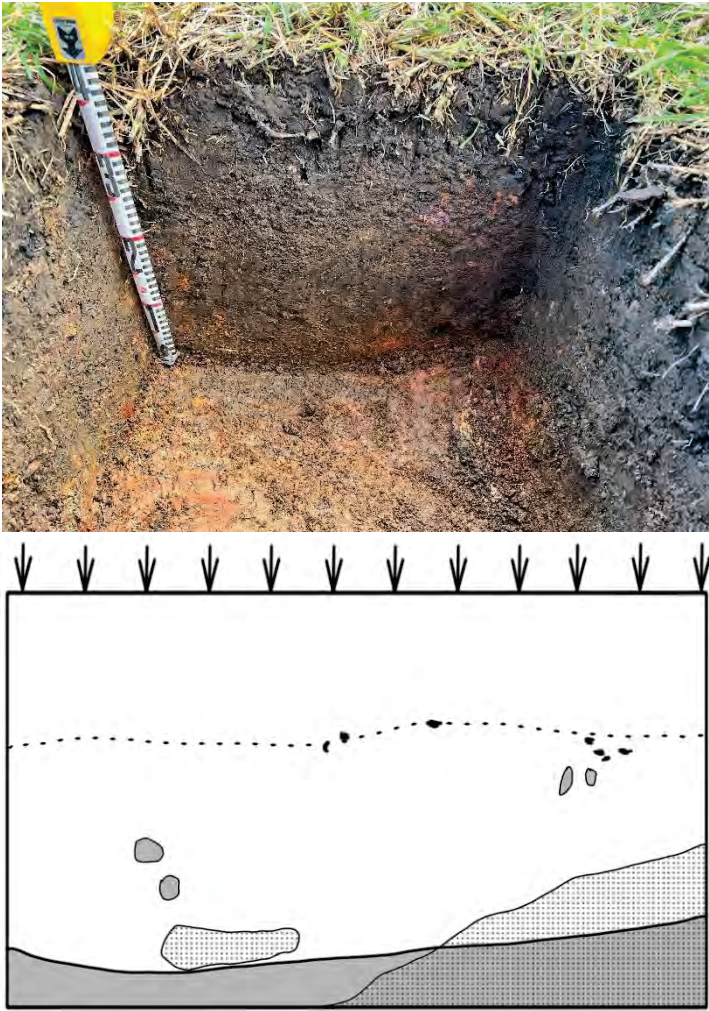
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 18	25cm	 	0-25cm: Brown silty clay loam. Orange yellow sticky clay base. Grass roots from surface to clay base.	

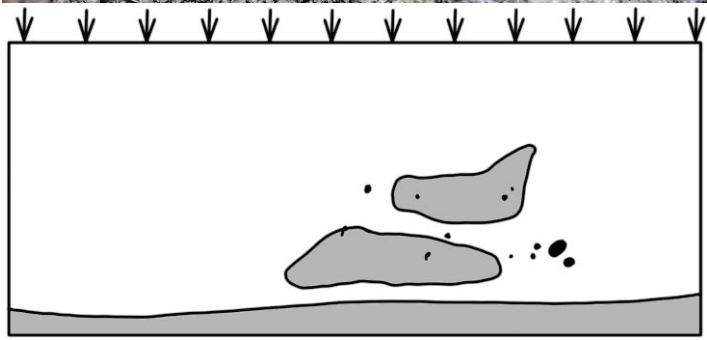
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 19	35cm		0-10cm: Mid brown clay silt. Damp. Compact. Surface grasses and rootlets. Small patches of charcoal flecking at horizon between spits 2 and 3 (10cm-15cm) 10-20cm: Mid brown. Very compact. Gravel inclusions (>50%, 1cm) silty clay. 20-30cm: Mid brown. Silty clay. Very compact. Dense gravel inclusions (70%, >1cm). 30-35- Mottled yellow clay base, gravel continuing from spit above, contained in a grey clay matrix, damp.	

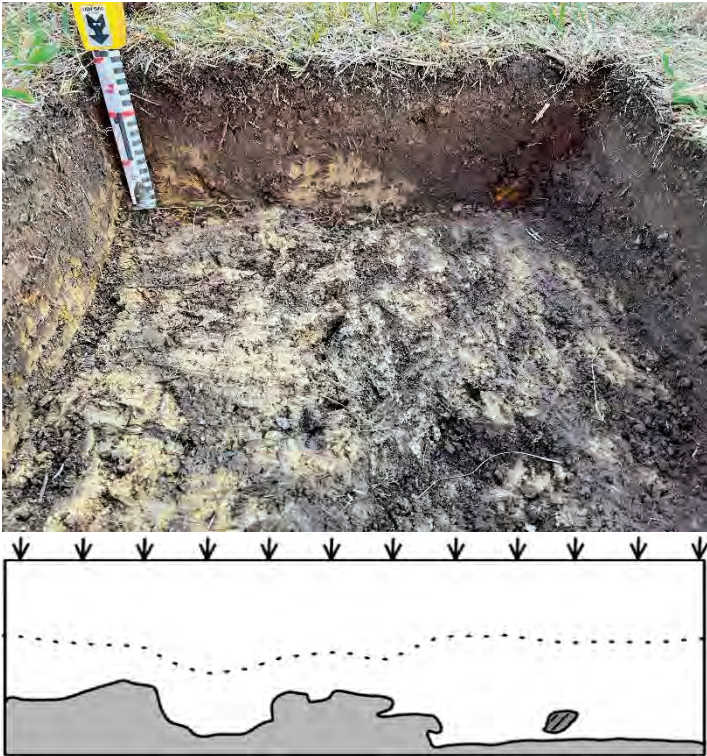
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 20	21cm		0-20cm: Brown silty clay loam. Charcoal flecking. Orange yellow sticky clay base. Grass roots from surface to clay base.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 21	17cm		0-25cm: Brown silty clay loam. Orange yellow sticky clay base. Grass roots from surface to clay base.	

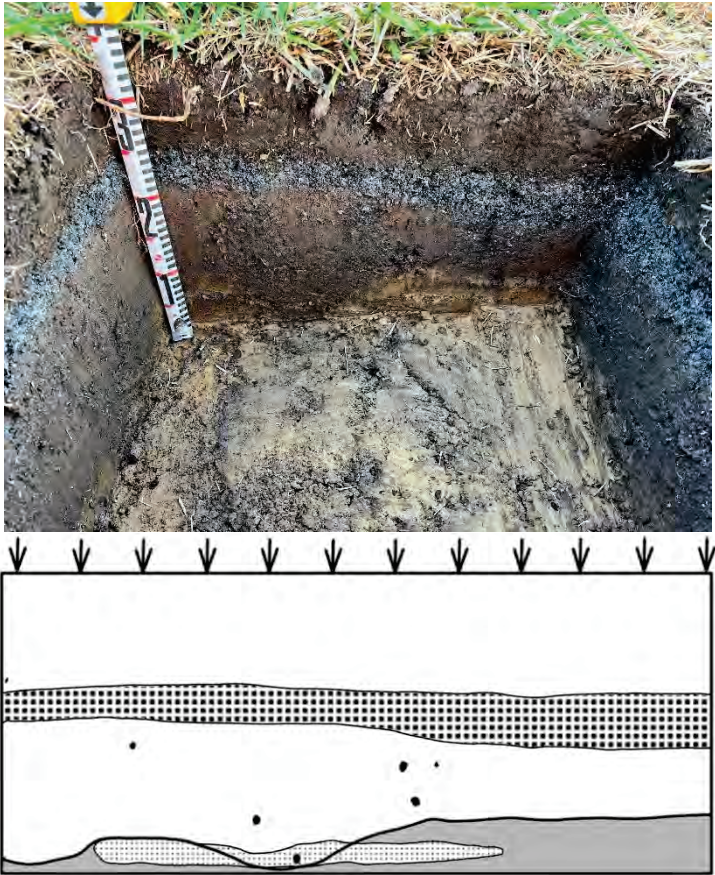
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 22	40cm		Highly disturbed. 0-5cm: Mid brown topsoil. Clay silt. Surface grasses and roots. 5-40cm: Mid brown clay silt with redeposited balls of clay throughout (grey, yellow, red) highly plastic, with lenses and pockets of silt distributed throughout.	

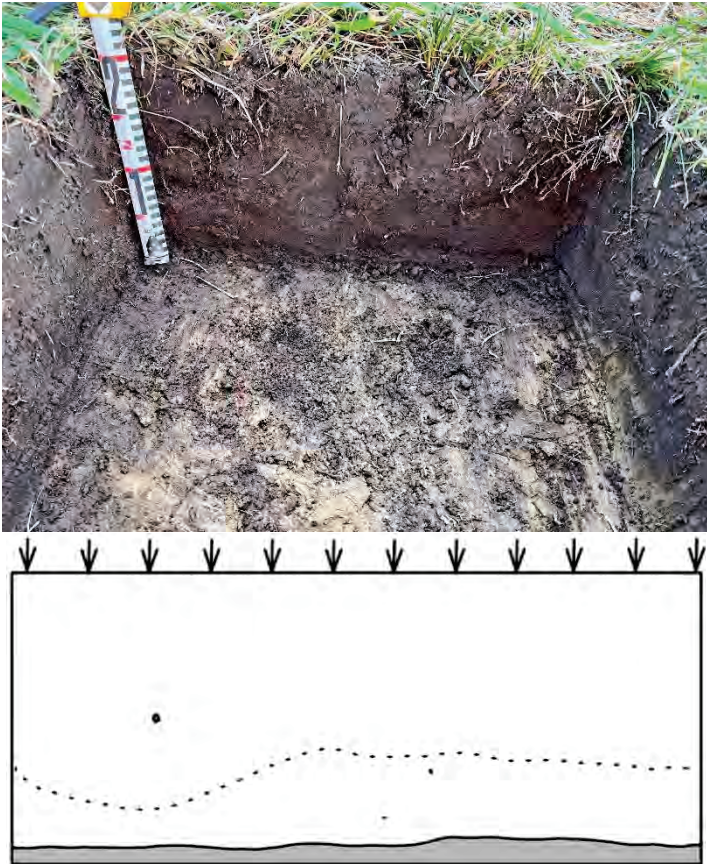
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 23	35cm		0-10cm: Mid brown silty clay. Compact. Dense grasses and roots. Small patches of charcoal at horizon between 10-15cm (spits 2-3). \10-20cm: Mid brown silty clay. Damp. Compact. Mixed gravel inclusions (>30%, >1cm). 20-30cm: Mid brown silty clay. Damp. Compact. Mixed gravels increasing frequency (60%, 1cm). concentration of ironstone rounded pebbles in northeast corner (>5cm, >10%). 30-35cm: Mixed gravels come down onto mottled clay base (red and yellow).	

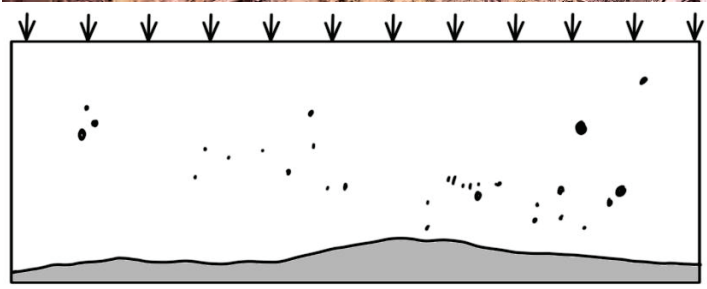
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 24	28cm	 	0-25cm: Brown silty clay loam. Small pocket of gravel in southwest corner of pit down to 28cm. Orange yellow sticky clay base. Grass roots from surface to clay base.	

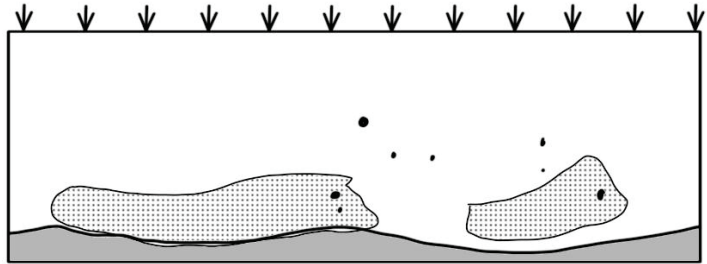
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 25	15cm		0-10cm orange brown silty clay. Very compact. Few ironstone inclusions (>10cm, >4cm). 10-15cm: Orange brown silty clay. Increasing compaction. Orange/yellow clay at base.	

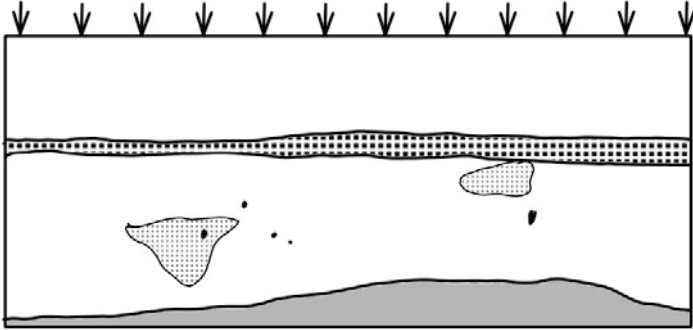
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 26	18cm		0-10cm orange brown silty clay. Very compact. Few ironstone inclusions (>10cm, >4cm). 10-15cm: Orange brown silty clay. Increasing compaction. Orange/yellow clay at base.	

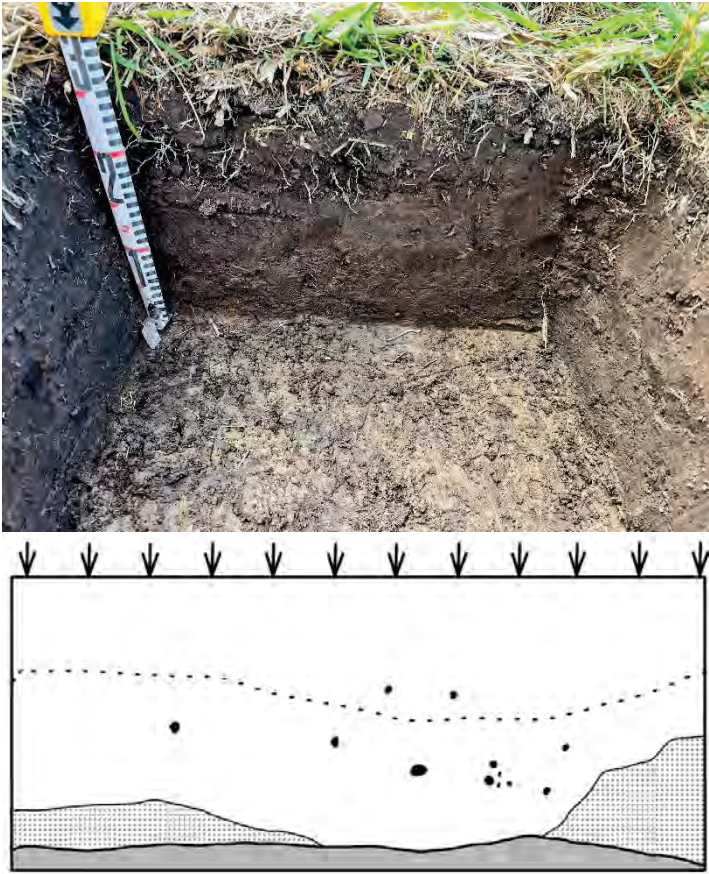
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 27	35cm		0-10cm: Mid brown top soil, surface grasses and roots. Clay silt. Moderate compaction. 10-15cm: 5cm thick band of loose asphalt. No soil. Grey/black with some shell fragments. 15-30cm: Mid brown clay silt. Uniform. No inclusions. Likely imported base. 30-35cm: Yellow natural clay base.	

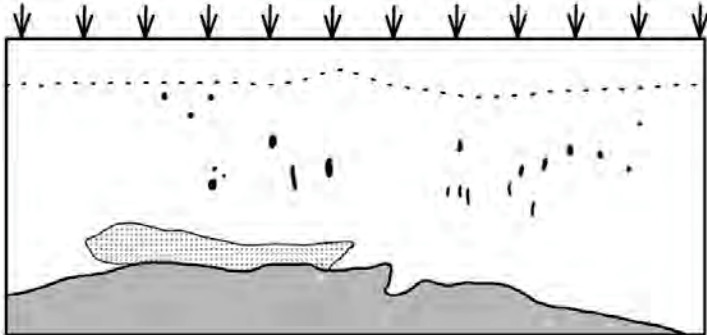
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 28	22cm		0-10cm orange brown silty clay. Very compact. Few ironstone inclusions (>10cm, >4cm). 10-15cm: Orange brown silty clay. Increasing compaction. Orange/yellow clay at base.	

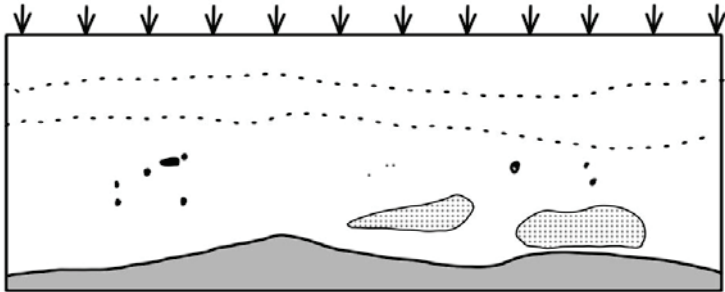
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 29	20cm	 	0-5cm: Grey silty topsoil. Leaf litter, surface grasses and roots. 5-15cm: Mid brown clay silt. Charcoal flecking. Worms. 15-20cm: Yellow clay. 4 small roots, likely associated with nearby gums.	

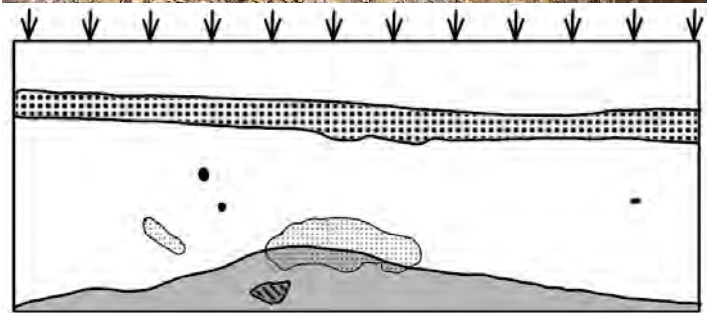
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 30	17cm	 	0-10cm orange brown silty clay. Very compact. Few ironstone inclusions (>10cm, >4cm). 10-15cm: Orange brown silty clay. Increasing compaction. Orange/yellow clay at base.	

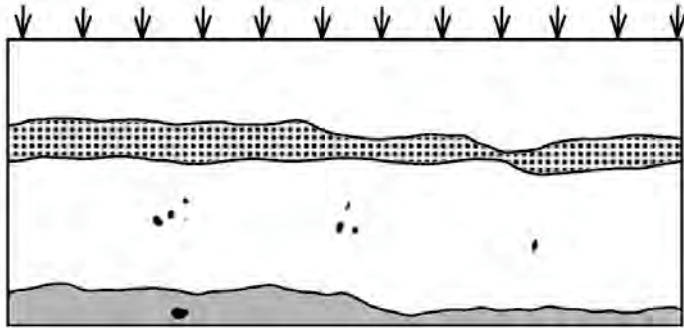
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 31	30cm	 	0-10cm: Mid brown silty clay topsoil. Surface grasses and roots. 10-15cm: Layer of asphalt. Tapering to southwest. Thinner and overall, less uniform than TP27. 15-25cm: Mid brown clay silt. Uniform. No inclusions likely imported base. 25-30cm: Yellow base clay.	

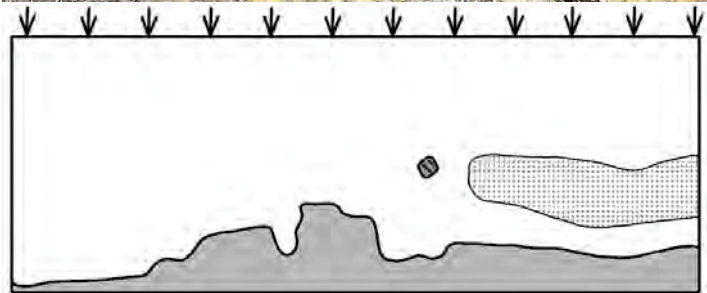
Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 32	30cm		0-30cm: Brown sticky clay loam. Base of sticky yellow clay. Small lens in south east corner of bitumen at 8 cm to 11cm (3cm thickness) does not extend throughout pit, only visible in southeast corner.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 33	25cm	 	0-5cm: Mid brown silty clay topsoil. Grasses and roots. Transition from 5cm-10cm (spit 1-2) contains 2cm of asphalt concentrated in southwestern corner and visible in the southern, eastern and western sections. 10-20cm: Mid brown clay silt. Uniform. No inclusions. Likely imported. 20-25cm: Yellow clay base.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 34	20cm	 	0-2cm: Pale grey silty topsoil. Surface grasses and roots. Compact. 2-10cm: light brown clay silt. Very compact. Ironstone inclusions (>3cm, >2%). Diffused horizon with below 10-15cm: Mid brown. Clay silt. Very compact. Charcoal flecking in western wall. 15-20cm: Yellow base clay. Damp. Very compact.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 35	25cm	 	0-2.5cm: Mid brown clay silt topsoil. Surface grasses and roots. Friable. 2.5-5cm: Asphalt as TP27. Visible in all sections. 5-20cm: Uniform mid brown silty clay. Some charcoal flecking (>1cm, >2%) moderate compaction. 20-25cm: Yellow compact base clay. Damp. Frequent fine roots. Likely from nearby gum.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 36	30cm	 	0-10cm: Mid brown clay silty topsoil. Friable. Surface grasses and roots. 10-12cm: Asphalt as TP27. Thin band visible in all sections. 12-25cm: Mid brown silty clay. Charcoal flecking (>2cm, >2%). 25-30cm: Yellow clay, approximately 5 small roots, likely gum. Clay is damp at base.	

Pit Name	End Depth	Pictures	Soil Description	Munsell and PH
TP 37	20cm	 	0-10cm: Grey brown friable clay silt. Surface grasses and roots. 10-20cm: Yellow brown silty clay. Ironstone gravel lens at 15cm. Yellow clay at base.	0-5: 10YR 5/3 5-10: 10YR 3/3 10-15: 10YR 3/3 15-20: 10YR 5/4 0-5: 6 5-10: 6 10-15: 6 15-20: 6



APPENDIX I: CULTURAL HERITAGE AWARENESS TRAINING

All personnel involved in the construction works within the study area should be made aware of the heritage significance of the site and the legal requirements relating to Aboriginal cultural heritage. Works should be conducted in accordance with the recommendations of this report and the requirements of the AHIP. This could take the form of a heritage induction included as part of the site induction or tool box talk for site workers. Suggested information that could be presented as part of these talks is provided below.

Aboriginal people have lived in Australia for over 65,000 years and the Illawarra area specifically for at least 20,000 years. Evidence of their lives is found in artefact sites and scarred trees in this area. All evidence of Aboriginal occupation of NSW is protected under the *National Parks and Wildlife Act 1974* and penalties apply if anything is damaged or destroyed without an appropriate permit.

The current works have an Aboriginal Heritage Impact Permit (AHIP) in place to permit the works to proceed. Before works started, test excavations were undertaken which identified Aboriginal cultural material within the lot. The artefacts have been placed in a safe location which won't be impacted by the current works. The presence of artefacts confirms that this area was lived in by Aboriginal people before European settlers arrived. The people living in this area are known as the Yuin people, more specifically the Wandandian people.

This information is to make sure all people working on this land are aware of the cultural significance of the land, and that it represents an unbroken connection to the past for Aboriginal people. It has a link to their ancestors and respect must be shown by all working on site.

As mentioned before, a permit has been issued for the works to be completed on site. This allows any remaining cultural evidence within the site to be impacted. However, anyone working on the site should be aware of the potential for Aboriginal objects to be present. If you see anything that looks unusual, you should stop work and let your supervisor know. They may need to contact an archaeologist and/or the Aboriginal community so the items can be collected and stored with other archaeological material.

So far, no evidence of Aboriginal burials has been identified within these areas. However, this does not mean that these do not exist in the area. In the unlikely event that you identify something that looks like human bone, you must stop works and let your supervisor know. They will need to contact the archaeological consultant for the site who will engage a specialist physical anthropologist to confirm whether the bones are human. If they are, the NSW Police should be contacted. They will determine the course of action depending on the likely age of the bones, and Heritage NSW may need to issue another permit before works can proceed at that location.