Pathways Cremorne, Seniors Housing: Archaeological Report

FINAL REPORT

Prepared for Morrison Design Partnership Architects

8 December 2023

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Summary

Biosis Pty Ltd (Biosis) was commissioned by Morrison Design Partnership Architects (MDPA), on behalf of Pathways Residences, to undertake an Aboriginal Cultural Heritage Assessment (ACHA) of a proposed development located at 50–88 Parraween Street (Lot 30 DP4785; Lot A, Lot B and Lot C DP366345; Lot A and Lot B DP419832; Lot A and Lot B DP412718; Lot 1 and Lot 2 DP1001062; Lot X and Lot Y DP442664; Lot A and Lot B DP438187; Lot 1 and Lot 2 DP441402; and Lot A, Lot B, Lot C and Lot 4 DP19887) and 59–67 Gerard Street (Lot A and Lot B DP442573, Lot 78 DP4785, Lot 79 DP1052385 and Lot 81 DP978497), Cremorne New South Wales (NSW) (the study area).

This Archaeological Report (AR) documents the findings of the archaeological investigations conducted as part of the ACHA. As required under Section 2.3 of The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a) (the Code), the AR provides evidence about the material traces of Aboriginal land use to support the conclusions and management recommendations in the ACHA. The project is to be assessed as a State Significant Development (SSD) application under Part 4.36 of the *Environmental Planning and Assessment Act 1979*. An Environmental Impact Statement (EIS) is currently being prepared to satisfy the Secretary's Environmental Assessment Requirements (SEARs) for the project. This ACHA has been conducted to satisfy Requirement 19 of the SEARs.

Background research included a search of the Aboriginal Heritage Information Management System (AHIMS) database and a review of relevant reports. The AHIMS search identified 95 Aboriginal cultural heritage sites within a 2 kilometre search area, centred on the study area. None of these sites are located within the study area. The Aboriginal community was consulted regarding the heritage management of the project throughout its lifespan. Consultation has been undertaken as per the process outlined in the Department of Environment Climate Change and Water document (DECCW) document, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010b) (consultation requirements).

An archaeological survey was conducted on 18 May 2023 and 1 June 2023 by Ashley Bridge (Biosis, Heritage Consultant) and Raymond Weatherall (Cultural Sites Officer, Metropolitan Local Aboriginal Land Council (LALC)). The overall effectiveness of the survey for examining the ground for Aboriginal sites was deemed low. This was attributed to vegetation cover restricting ground surface visibility (GSV) combined with a low number of exposures. No previously unrecorded Aboriginal cultural heritage sites were identified during the archaeological survey and no areas of archaeological potential were identified.

Management recommendations

Strategies have been developed based on the archaeological significance of cultural heritage relevant to the study area. The strategies also take into consideration:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practice, widely considered to include:
  - The ethos of the Australia International Council on Monuments and Sites (ICOMOS) *Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia ICOMOS 2013) (the Burra Charter)
  - the Code.

The recommendations that resulted from the consultation process are provided below.

Prior to any development impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area being assessed as having low archaeological potential. This recommendation is conditional upon Recommendations 2 to 6.

Recommendation 2: Continued consultation with the registered Aboriginal parties

As per the consultation requirements, it is recommended that the proponent provides a copy of the final ACHA to the RAP. The proponent should continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project.

Recommendation 3: Discovery of unanticipated Aboriginal objects

All Aboriginal objects and Places are protected under the *National Parks and Wildlife Act 1974* (NPW Act). It is an offence to disturb an Aboriginal site without a consent permit issued by Heritage NSW, Department of Planning and Environment (Heritage NSW). Should any unanticipated Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 4: Discovery of unanticipated historical relics

Relics are historical archaeological resources of local or State significance and are protected in NSW under the *Heritage Act 1977* (Heritage Act). Relics cannot be disturbed except with a permit or exception notification. Should unanticipated relics be discovered during the project, work in the vicinity must cease and an archaeologist contacted to make a preliminary assessment of the find. The Heritage Council will require notification if the find is assessed as a relic.

Recommendation 5: Discovery of human remains

If any suspected human remains are discovered during any activity, you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

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Glossary

ACHA	Aboriginal Cultural Heritage Assessment
ADDA	Aboriginal Due Diligence Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AMBS	Australian Museum Business Services
AR	Archaeological Report
BP	Before Present
Biosis	Biosis Pty Ltd
CBD	Central Business District
Consultation requirements	*Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010b)
DA	Development Application
DECCW	Department of Environment, Climate Change and Water (now Heritage NSW)
DP	Deposited Plan
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
ESD	Ecologically Sustainable Development
GPS	Global Positioning System
GSV	Ground Surface Visibility
Heritage Act	*Heritage Act 1977*
Heritage NSW	Heritage NSW, Department of Planning and Environment
ICOMOS	International Council on Monuments and Sites
JMCHM	Jo McDonald Cultural Heritage Management
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
MDPA	Morrison Design Partnership Architects
MGA	Map Grid of Australia
NPW Act	*National Parks and Wildlife Act 1974*

NPWS	National Parks and Wildlife Service
NSW	New South Wales
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SP	Strata plan
SSD	State Significant Development
Study area	50–88 Parraween Street (Lot 30 DP4785; Lot A, Lot B and Lot C DP366345; Lot A and Lot B DP419832; Lot A and Lot B DP412718; Lot 1 and Lot 2 DP1001062; Lot X and Lot Y DP442664; Lot A and Lot B DP438187; Lot 1 and Lot 2 DP441402; and Lot A, Lot B, Lot C and Lot 4 DP19887) and 59–67 Gerard Street (Lot A and Lot B DP442573, Lot 78 DP4785, Lot 79 DP1052385 and Lot 81 DP978497), Cremorne, New South Wales
the Code	The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a)

1 Introduction

1.1 Project background

Biosis was commissioned by MDPA, on behalf of Pathways Residences, to undertake an ACHA of the proposed development located at 50–88 Parraween Street (Lot 30 DP4785; Lot A, Lot B and Lot C DP366345; Lot A and Lot B DP419832; Lot A and Lot B DP412718; Lot 1 and Lot 2 DP1001062; Lot X and Lot Y DP442664; Lot A and Lot B DP438187; Lot 1 and Lot 2 DP441402; and Lot A, Lot B, Lot C and Lot 4 DP19887) and 59–67 Gerard Street (Lot A and Lot B DP442573, Lot 78 DP4785, Lot 79 DP1052385 and Lot 81 DP978497), Cremorne NSW (the study area) (Figure 1 and Figure 2). This AR documents the findings of the archaeological investigations conducted as part of the ACHA. The AR provides evidence about the material traces of Aboriginal land use to support the conclusions and management recommendations in the ACHA.

This investigation has been carried out under Part 6 of the NPW Act. It has been undertaken in accordance with the Code. The Code has been developed to support the process of investigating and assessing Aboriginal cultural heritage by specifying the minimum standards for archaeological investigation undertaken in NSW under the NPW Act. The archaeological investigation must be undertaken in accordance with the requirements of the Code.

It is stated in section 1.2 of the Code that where the ACHA report concludes that the proposed activity will result in harm to Aboriginal objects or declared Aboriginal Places, an application for an AHIP will be required. This application must be supported by an ACHA report.

The EP&A Act includes provisions for local government authorities to consider environmental impacts in land-use planning and decision making. Each Local Government Area (LGA) is required to create and maintain a Local Environmental Plan (LEP) that includes Aboriginal and historical heritage items. Local Councils identify items that are of significance within their LGA, and these items are listed on heritage schedules in the local LEP and are protected under the EP&A Act and the Heritage Act.

1.2 Study area

The study area is located approximately 4 kilometres north-east of the Sydney CBD (Figure 1). It encompasses approximately 0.74 hectares of private land.

The study area is within the:

- North Sydney LGA.
- Parish of Willoughby.
- County of Cumberland.

The study area is bounded by Parraween Street to the south, SP18821 and Lot 5 SP18776 to the west, Gerard Street to the north and Lot 27 SP13518 (Figure 2).

1.3 Planning approvals

The proposed development will be assessed against Part 4.36 of the EP&A Act. Other relevant legislation and planning instruments that will inform this assessment include:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

- NPW Act.
- NSW *National Parks and Wildlife Amendment Act 2010.*
- *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP).
- *North Sydney Local Environmental Plan 2013* (LEP).
- *North Sydney Development Control Plan 2015* (DCP).

1.4 Objectives of the investigation

The objectives of the investigation can be summarised as follows:

- To identify and consult with any registered Aboriginal stakeholders and the Metropolitan LALC.
- To conduct additional background research to recognise any identifiable trends in site distribution and location.
- To search statutory and non-statutory registers and planning instruments to identify listed Aboriginal cultural heritage sites within the study area.
- To highlight environmental information considered relevant to past Aboriginal occupation of the locality and associated land use and the identification and integrity/preservation of Aboriginal sites.
- To summarise past Aboriginal occupation in the locality of the study area using ethnohistory and the archaeological record.
- To formulate a model to broadly predict the type and character of Aboriginal sites likely to exist throughout the study area, their location, frequency, and integrity.
- To conduct a field survey of the study area to locate unrecorded or previously recorded Aboriginal sites and to further assess the archaeological potential of the study area.
- To assess the significance of any known Aboriginal sites in consultation with the Aboriginal community.
- To identify the impacts of the proposed development on any known or potential Aboriginal sites within the study area.
- To recommend strategies for the management of Aboriginal cultural heritage within the context of the proposed development.

1.5 Investigators and contributors

The roles, previous experience, and qualifications of the Biosis project team involved in the preparation of this archaeological report are described below in Table 1.

Table 1 Investigators and contributors

Name and qualifications	Experience summary	Project role
Samantha Keats BA (Hons)	Samantha is an archaeologist with Biosis Wollongong office and has over five years of experience as an archaeologist. Samantha has had experience working as an archaeologist and project manager on several Aboriginal and European heritage projects across New South Wales, including water	• Quality assurance. • Technical advice.

Name and qualifications	Experience summary	Project role
	infrastructure and linear projects, residential development projects, renewable energy projects, and telecommunications projects. Samantha has experience in undertaking remote Aboriginal archaeological surveys and large scale archaeological testing excavation programs and has served as a key team member and project manager on several projects in the Illawarra, the South Coast, Canberra, and Far Western NSW. These projects have seen her take part in Aboriginal community consultation, background research, archaeological excavation, and survey, and has authored numerous Aboriginal heritage assessments and Statement of Heritage Impact reports. Samantha is also accomplished in obtaining approvals under the NSW *National Parks and Wildlife Act 1974*.	
Crystal Garabedian BA Archaeology (Hons) BSc Geology and Geophysics	Crystal joined the Heritage team in the Biosis Sydney office in 2021. She completed her Bachelor of Arts in Honours in 2018, having written her thesis on zooarchaeological remains from Vanuatu to construct a cultural chronology and assess variances in subsistence strategies throughout time and across Melanesia and Polynesia. Since joining Biosis, Crystal has gained experience in Aboriginal community consultation, research, report writing, field surveys, test and salvage excavations across New South Wales. She has managed Aboriginal due diligence and Aboriginal Cultural Heritage Assessments for a variety of projects within New South Wales.	• Project management. • Aboriginal community consultation. • Background research. • Report writing.
Molly Crissell BA Archaeology	Molly joined Biosis at the Newcastle Office as a Archaeologist in the Heritage team in 2021. She completed her Bachelor of Archaeology, majoring in Geography in 2019. As part of her education, Molly attended the Irish Archaeological Field School in Wexford, Ireland, as a volunteer. Prior to joining Biosis, Molly has worked in Western Australia and New South Wales gaining experience in Aboriginal and historical excavations and surveys. Working as a Heritage Consultant in WA, Molly gained experience in reporting, community consultation, artefact analysis and project managing.	• Background research. • Aboriginal community consultation.
Ashley Bridge Bachelor of Arts Archaeology, Masters of Archaeological Science (Advanced)	Ashley is a Heritage Consultant with over three years' experience. She has experience in conducting Aboriginal and historical heritage assessments, surveys, and archaeological test excavations for a variety of projects throughout NSW, particularly in the Sydney region. Ashley possesses specialist skills in the identification of human remains, while also having experience in zooarchaeological analysis. She also has experience in project management for several Aboriginal	• Archaeological survey.

Name and qualifications	Experience summary	Project role
	heritage projects, including test excavations, throughout Sydney and Western Sydney.	
Astrid Mackegard Bachelor of Marine Science	Astrid has been working with Biosis since January 2021 where she has been responsible for creating maps and conducting spatial analysis for various ecology and heritage projects. To generate high quality outputs, Astrid has used a variety of technical skills including georeferencing, area calculations, data conversion, map design, and data management. Prior to joining Biosis, Astrid spent 10 months as the GIS Specialist for a small environmental consultancy providing mapping outputs for environmental plans for various Pacific Island Nations. In that time she developed strong skills in spatial analysis, map design, and managing mapping projects, which she has utilised in her work with Biosis. As part of her degree, Astrid completed a major GIS project for a natural resource management organisation which involved developing a spatial method to aid the decision making process of how to best protect the Wet Tropics Rainforest. Through completing the project, Astrid developed strong skills in ArcGIS model builder and advanced geoprocessing tools.	• Mapping.
Charlotte Allen BA (Hons) Arch	Charlotte joined Biosis in 2017 and is currently a Senior Heritage Consultant. Charlotte arrived at Biosis with an established career in administrative, project management and data management support in the heritage, health and transport sectors. Charlotte has strong technical skills in background research, field surveys and excavation, artefact analysis, assessment of heritage values and impacts, covering both Aboriginal and non-Aboriginal heritage. Charlotte is also a strong project manager and field team leader, having worked across various environments, working collaboratively with senior staff and in a team throughout her working life. Charlotte is responsible for multiple heritage projects, including State Significant Developments, ranging from Historical Heritage Assessments to larger and more complex and Statements of Heritage Impact. Charlotte has also had numerous successful permit applications for both Aboriginal and non-Aboriginal heritage, with minimal comments from government regulators.	• Quality Assurance

Name and qualifications	Experience summary	Project role
Mathew Smith **BA, BSc (Hons)**	Mathew is a senior heritage consultant at Biosis with over 6 years' experience in the consulting industry. Mathew has extensive experience in NSW and has managed to completion a range of Aboriginal cultural heritage and historical heritage projects across NSW, including the Sydney Basin, Hunter Valley, South Coast and Central and Northern NSW regions. Mathew has experience working with large scale water infrastructure and linear projects, urban development projects, renewable and non-renewable energy projects, and mineral resource projects. As part of these projects Mathew has interacted with a diverse client base and is adept at managing proponent/regulator relations, particularly with resource extraction companies, architectural firms, engineering firms, and private developers. Mathew has also developed strong relations with Local and State Government agencies including Sydney Water, WaterNSW, Heritage NSW, the National Parks and Wildlife Service, and Department of Primary Industry and Water, and a number of local councils, including Wollongong, Wollondilly, Albury, Liverpool and Shoalhaven Councils.	• Quality Assurance

Acknowledgement: Topo ©NSW Land and Property Information (2016); Overview ©State of NSW (c.2003)

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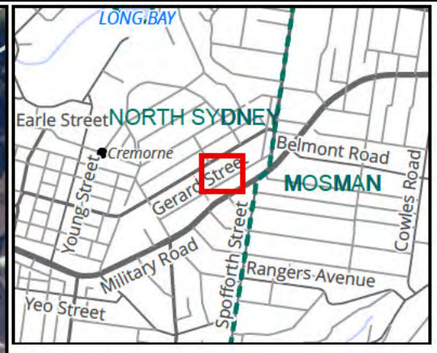
Figure 1 Location of the study area

Matter: 38545
Date: 30 January 2023,
Checked by: Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location:P:\38500s\38545\Mapping\38545_SeniorsLivingVillage

0 200 400 600 800 1,000
Metres

Scale 1:25,000@ A4, GDA 1994 MGA Zone 56

N



Legend

Study area

Figure 2 Study area detail

0 5 10 15 20

Metres

Scale: 1:500@ A3

Coordinate System:
GDA 1994 MGA Zone 56

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Matter: 38545, Date: 30 January 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_ACHA_F2_StudyArea

2 Proposed development

The proposed development involves the development the proposed Seniors Living Village at 50–88 Parraween Street (Lot 30 DP4785; Lot A, Lot B and Lot C DP366345; Lot A and Lot B DP419832; Lot A and Lot B DP412718; Lot 1 and Lot 2 DP1001062; Lot X and Lot Y DP442664; Lot A and Lot B DP438187; Lot 1 and Lot 2 DP441402; and Lot A, Lot B, Lot C and Lot 4 DP19887) and 59–67 Gerard Street (Lot A and Lot B DP442573, Lot 78 DP4785, Lot 79 DP1052385 and Lot 81 DP978497), Cremorne NSW (Figure 2).

The development will include the construction of:

- 58 independent living units.
- A residential care facility.
- Driveways and landscaped areas.
- Lounge and dining area, media room, gym, indoor pool and spa.

And will also involve:

- Installation of utility services including but not limited to water, electricity, and sewerage.
- Earthworks, with potential benching and battering.
- Heavy vehicle movement along Gerard Street and Parraween Street.

The proposed works are presented in Figure 3.

Legend

Study area

Figure 3 Proposed works

0 5 10 15 20

Metres

Scale: 1:500@ A3

Coordinate System:
GDA 1994 MGA Zone 56

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Matter: 38545, Date: 03 September 2024,
Drawn by: AM, Checked by: CG, Last edited by: hliswoyo
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38545_SeniorsLivingVillage, Layout: 38545_ACHA_F3_ProposedWorks

3 Desktop assessment

The desktop assessment involves researching and reviewing existing archaeological studies and reports relevant to the study area and surrounding region. This information is combined to develop an Aboriginal site prediction model for the study area, and to identify known Aboriginal sites and/or places recorded in the study area. This desktop assessment has been prepared in accordance with requirements 1 to 4 of the Code.

3.1 Landscape context

It is important to consider the local environment of the study area any heritage assessment. The local environmental characteristics can influence human occupation and associated land use and consequently the distribution and character of cultural material. Environmental characteristics and geomorphological processes can affect the preservation of cultural heritage materials to varying degrees or even destroy them completely. Lastly landscape features can contribute to the cultural significance that places can have for people.

3.1.1 Topography, geology and hydrology

The study area is located within the Hawkesbury Sandstone formation of the Wianamatta Group formation (

Figure 4). The Hawkesbury Sandstone formation consists of friable medium to coarse grained quartz sandstone with some shale and laminate lenses. It weathers cavernously to form overhangs, which occur in a range of topographic locations. It also occurs as flat topped outcrops (platforms of varying sizes) and boulders, mainly on ridge tops, and also along the sides of gullies and in valley bottoms (JMCHM 2008). Topographically, the study area is flat, lying on top of a ridgeline landform, with a very gentle slope towards the north-east (Figure 5).

Stream order is recognised as a factor which assists the development of predictive modelling in Sydney Basin Aboriginal archaeology, and has seen extensive use in the Sydney region, most notably by Jo McDonald Cultural Heritage Management (JMCHM) on the Cumberland Plain (JMCHM 2000, JMCHM 2005a, JMCHM 2005b, JMCHM 2006, JMCHM Pty Ltd 2008). Predictive models which have been developed for the region tend to favour higher order streams as the locations of campsites, as they would have been more likely to provide a stable source of water, and by extension other resources which would have been used by Aboriginal groups.

The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Photo 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water, and therefore the suitability for Aboriginal occupation of the area.

There are no watercourses located within the study area (Figure 5). The nearest water sources are Willoughby Creek, a first-order non-perennial watercourse, located approximately 815 metres to the north-west, and an unnamed, first-order non-perennial watercourse which feeds into Mosman Bay, located approximately 805 metres to the south-east. When considering the stream order model, this could suggest that the study area has a low potential for past Aboriginal occupation, due to its distance from the nearest source of fresh water.

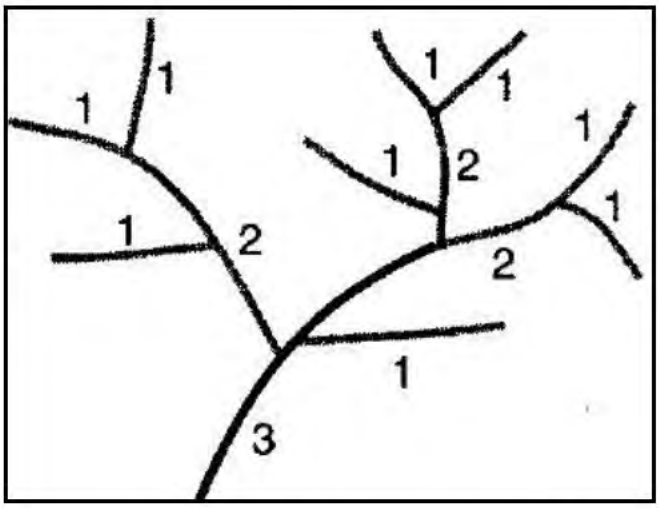


Photo 1 Diagram showing Strahler stream order (Ritter, Kochel, & Miller 1995, pp. 151)

3.1.2 Soil landscapes

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation, and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The study area is located within the Gymea/Lambert soil landscape (Figure 6). The Gymea and Lambert soil landscapes are two distinct landscapes detailed in Chapman et al. (1989) that are similar in nature, sharing several characteristics. They are grouped together in soil landscape mapping as the soils lacks enough diagnostic features to characterise one or the other landscape within the study area. Individual soil descriptions of the Lambert and Gymea soil landscapes have been provided below.

The Gymea soil landscape is an erosional landscape underlain by the Hawkesbury Sandstone formation. The soil characteristics of this landscape include shallow to moderately deep (30–100 centimetres) yellow earths and earthy sands on crests and inside of benches, shallow (less than 20 centimetres) siliceous sands on leading edges of benches, localised grey podzolic soils and yellow podzolic soils on shale lenses, shallow to moderately deep (less than 100 centimetres) siliceous sands and leached sands along drainage lines. A description of the soil types within the Gymea soil landscape are provided Table 2 and Photo 2.

Table 2 Gymea soil landscape characteristics (Chapman et al. 1989, pp. 66-67)

Soil material	Description
gy1—Loose, coarse sandy loam	This is a loamy sand to sandy loam with loose, apedal single-grained structure and porous sandy fabric. It generally occurs as topsoil (A1-horizon). The colour often becomes lighter with depth and ranges from brownish black (10YR 2/2), when organic matter is present, to bleached dull yellow-orange (10YR 7/2). It is often water repellent under native vegetation. The pH ranges from strongly acid (pH 4.0) to slightly acid (pH 6.0). Small sandstone and platy ironstone fragments, charcoal fragments and roots are common.
gy2—Earthy, yellowish-brown clayey sand	This is commonly a yellowish brown clayey sand with apedal massive structure and porous earthy fabric. It commonly occurs as subsoil over sandstone bedrock (B-horizon). Where it is exposed at the surface it forms a hard setting topsoil. Texture may increase gradually to a light sandy clay loam with depth. Colour is commonly yellowish-brown (10YR 6/8) and orange mottles are occasionally present with depth. The pH ranges from strongly acid (pH

Soil material	Description
	4.0) to slightly acid (pH 6.5). Sandstone and ironstone fragments are common and are often concentrated in stone lines in the upper parts of this material. Charcoal fragments are common whilst roots are rare.
gy3—Earthy to weakly pedal, yellowish-brown sandy clay loam	This is commonly a yellowish-brown sandy clay loam to sandy clay with an apedal massive structure and an earthy porous fabric. It usually occurs as subsoil (B or C horizon) on coarse sandstone. Texture is commonly sandy clay loam but may increase gradually with depth to sandy clay. Occasionally a weakly pedal structure, with sub-angular blocky shaped peds, is present. Peds are commonly rough-faced and porous and range in size from 5–20 mm. Colour is commonly yellowish brown (10YR 5/8, 6/6, 6/8; 2.5Y 5/6, 5/4). Orange mottles may occur with depth. The pH ranges from strongly acid (pH 4.5) to slightly acid (pH 6.0). Strongly weathered sandstone fragments are common. Roots and charcoal fragments are rare.
gy4—Moderately to strongly pedal, yellowish-brown clay	This consists of a yellowish-brown sandy clay or light clay with a moderately to strongly pedal structure and either a smooth or rough-faced ped fabric. This material occurs as subsoil on shale bedrock (Band C horizons). Peds ranging in size from 5–50 mm, are either smooth or rough-faced and are polyhedral to sub-angular blocky. Colour is commonly yellow brown (10YR 6/6) but can vary from dark reddish brown (2.5YR3/6) to light grey (7.5YR 8/1). Red, orange, and grey mottles are occasionally present at depth. The pH ranges from strongly acid (pH 4.0) to slightly acid (pH 6.0). Shale and ironstone fragments are often present but charcoal fragments are absent and roots are rare.

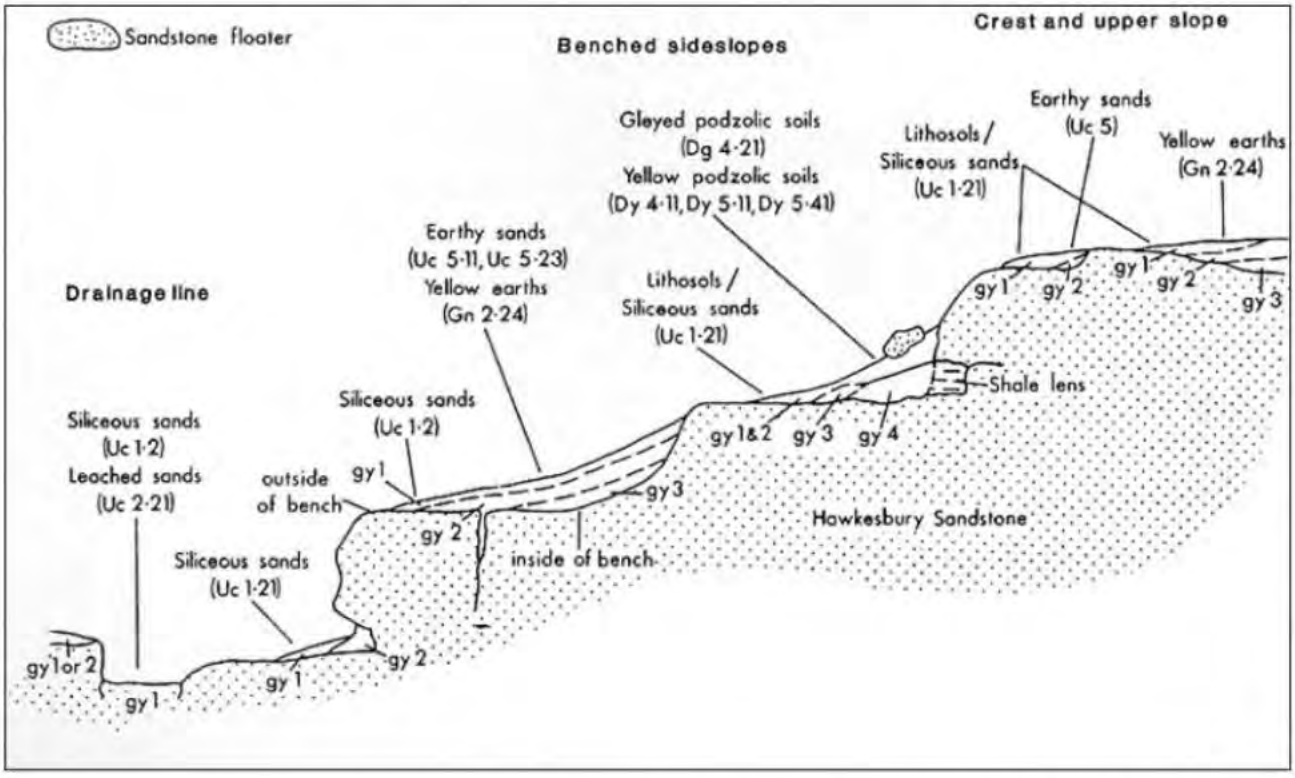


Photo 2 Schematic cross section of the Gymea soil landscape (Chapman et al. 1989, pp. 66)

The Lambert soil landscape is an erosional soil landscape that is characterised by undulating to rolling rises and low hills on Hawkesbury Sandstone. It is associated with landforms varying from broad ridges, gentle to moderately inclined slopes, wide rock benches with low, broken scarps, small hanging valleys and areas of

poor drainage. The local relief varies between 20–120 metres, with slopes comprising 20%, and rocky outcrops 50% (Bannerman & Hazelton 1990b, pp. 76). A description of the soil types within the Lambert soil landscape are provided in Table 3 and Photo 3.

Table 3 Lambert soil landscape characteristics (Chapman et al. 1989, pp. 60)

Soil material	Description
la1—Loose, stony, yellowish-brown sandy loam	This is a stony brown loamy sand to sandy loam with apedal single-grained structure and porous sandy fabric. It generally occurs as topsoil (A1-horizon). Colour, which can vary from olive brown (2.5Y 4/4) to dark brown (10YR 3/4) is commonly a yellowish-brown (10YR 5/4, 10YR 5/6, 10YR 5/8). The pH ranges from strongly acid (pH 4.0) to moderately acid (pH 5.5). Subrounded sandstone fragments and quartz pebbles are common and are occasionally concentrated as a stone line at depth. Charcoal fragments and roots are common.
la2—Earthy, yellow-brown, light sandy clay loam	This is commonly a yellow-brown, light sandy clay loam with apedal massive to weakly pedal structure and porous earthy fabric. This material occurs as subsoil (B-horizon) or occasionally as an A2-horizon. Texture can range from clayey sand to sandy clay loam. Texture often increases gradually with depth. Peds when present, are usually rough-faced and sub-angular blocky. They range in size from 10–50 mm. Porosity often decreases with depth. Colour ranges from yellowish-brown (10YR 5/6, 6/6) to brownish yellow (10YR 6/8). The pH ranges from strongly acid (pH 4.0) to moderately acid (pH 5.5). Sandstone and ironstone fragments are common, but charcoal fragments and roots are rare.
la3—Angular, blocky puggy clay	This is a fine sandy clay loam to medium clay with strongly developed angular blocky to occasionally prismatic structure when dry and apedal massive structure when wet. This material occurs as deep subsoil (B horizon) on shale lenses. Peds are predominantly rough faced (10–50 mm) and porous with isolated clusters of smooth faces and dense peds. Secondary sub-angular and polyhedral peds are common. When moist, this material is moderately sticky, and is apedal massive and plastic. It is equivalent to Buchanan's (1980) puggy clay. Colour in well-drained positions is commonly a yellowish-brown (10YR 6/6–6/8). In areas subject to prolonged saturation or seepage, colour varies from light yellow orange (10YR 8/4) to pale grey (10YR 8/2). Red, orange, and grey mottles are common. The pH ranges from extremely acid (pH 3.5) to moderately acid (pH 5.5). Platy, iron coated ironstone fragments are common. Roots and charcoal fragments are usually absent.
la4- Blackish-brown, loose sandy loam	This is a dark loamy sand to sandy loam with apedal single-grained structure and porous sandy fabric. It usually occurs as topsoil (A1-horizon). This material is often water repellent. Colour usually ranges from greyish yellow brown (10YR 4/2) to brownish black (10YR 3/2). The pH ranges between strongly acid (pH 4.0) and slightly acid (pH 6.0). Sandstone and ironstone fragments, charcoal fragments, roots, and decaying plant remains are common.
la5- Earthy, mottled, pale clayey sands	This is a pale coloured clayey sand with apedal massive structure and porous earthy fabric. It generally occurs as subsoil in wet areas (B- or C- horizon). Texture can vary from loamy sand to sandy clay loam, with clayey sands and sandy loams being the most common. Surface condition is loose, and fabric is sandy. This material is characterised by pallid/grey soil colours such as light yellow (2.5Y 7/4) and bright yellowish-brown (2.5Y 7/6). In wet situations there are often rusty piped mottles

Soil material	Description
	around root traces. The pH ranges from extremely acid (pH 3.5) to moderately acid (pH 5.5). Sandstone fragments, charcoal fragments and roots are usually absent.
Ia6 – Friable sandstone	This is a soft, friable, deeply weathered, sandstone with a coarse sugary appearance. It commonly occurs as deeply weathered parent material (C-horizon) in joint lines and beneath perched water tables. Texture is commonly clayey sand which often becomes sandier with depth. Structure is usually apedal and massive and the fabric is sandy or occasionally earthy. Colour can vary from light grey (10YR 8/1) to dull yellow orange (10YR 7/2–7/4). Pale yellow and orange mottles may be present. Rusty mottles occasionally occur which follow root traces. This material can be crushed by hand and the disrupted material has a feel and appearance like sugar crystals. The pH ranges from extremely acid (pH 3.5) to moderately acid (pH 5.0). Occasional bands of dark red (2.5YR 3/6) mottles associated with platy, angular, ironstone fragments occur. These ironstone fragments often occur in undisturbed and stratified bands. Strongly weathered fragments of sandstone are found at depth. Roots are rare and charcoal fragments are absent.

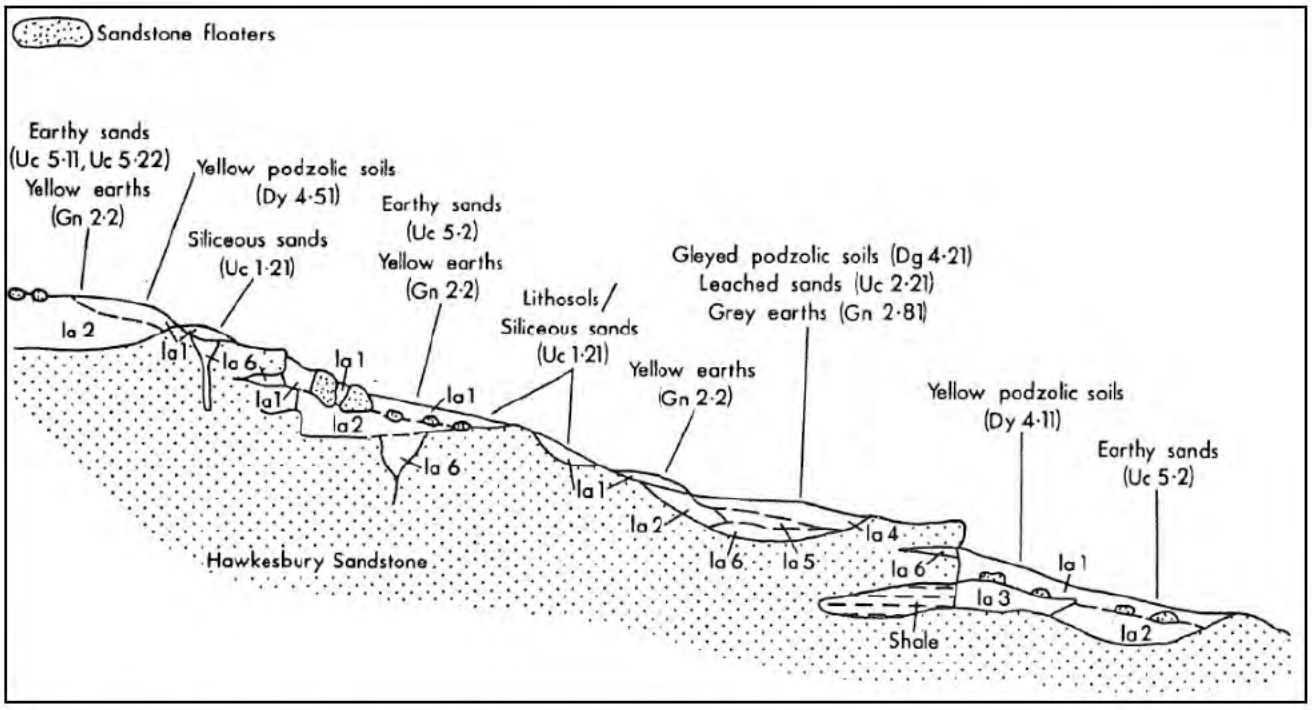
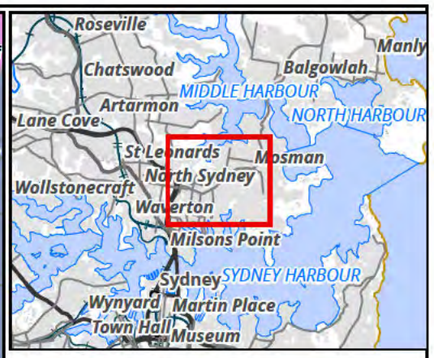


Photo 3 Schematic cross section of the Lambert soil landscape (Chapman et al. 1989, pp. 61)

Erosional soils such as the Gymea/Lambert soil landscape are typically subject to movement of shallow soils, which results in poor preservation of archaeological records. Dispersed sandy soils of Hawkesbury Sandstone bedrock and loose quartz sandy loam, and earthy clayey sands which occur as A1 and B horizons have a low erosion potential. However, when cleared of vegetation, the soils can be subject to high levels of erosion. As this soil landscape is characterised as highly erosional, the soil can be shallow and highly permeable, as well as producing low soil fertility. This would indicate that the presence of Aboriginal sites and objects is unlikely (Chapman et al. 1989, pp. 64–67, McInnes 1997, p.45, cited by Umwelt (Australia) Pty Limited 2016, pp. 13).



Legend

Study area

Geological units

- QH_bf,Coastal deposits - backbarrier flat facies
- QH_ebw,Estuarine basin and bay (subaqueous)
- QH_eci,Estuarine in-channel bar and beach deposits
- QH_edw,Estuarine fluvial delta front (subaqueous)
- QH_hfr,Anthropogenic deposits - fill on Quaternary deposits
- QH_hr,Anthropogenic deposits - reclaimed estuarine areas
- Q_h,Anthropogenic deposits
- Tuth,Hawkesbury Sandstone
- Twia,Ashfield Shale

Figure 4 Geological units in the vicinity of the study area

0 100 200 300 400 N

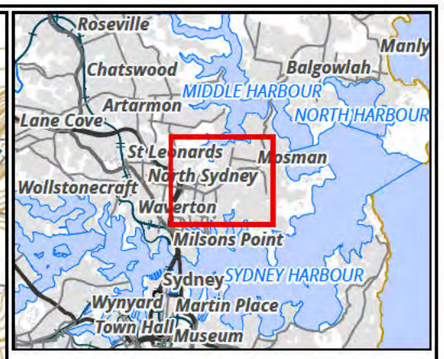
Metres

Scale: 1:10,000@ A3

Coordinate System: GDA 1994 MGA Zone 56

biosis

Matter: 38545, Date: 30 January 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_AR_F4_Geology



Legend

- Study area
- Contour (2m)

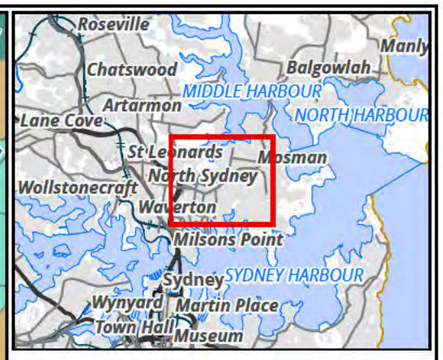
Figure 5 Hydrology and topography in the vicinity of the study area

0 100 200 300 400 Metres

N

biosis

Matter: 38545, Date: 30 January 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout:38545_AR_F5_Hydrology



Legend

- Study area

Soil landscape units

- bt - BLACKTOWN
- gy - GYMEA
- gy/la - GYMEA/LAMBERT
- ha - HAWKESBURY
- la - LAMBERT
- WATER - WATER
- ww - WOY WOY
- xx - DISTURBED TERRAIN

Figure 6 Soil landscapes in the vicinity of the study area

0 100 200 300 400 N

Metres
Scale: 1:10,000@ A3
Coordinate System:
GDA 1994 MGA Zone 56

biosis

Matter: 38545, Date: 30 January 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_AR_F6_Soils

Acknowledgements: Basemap © Land and Property Information 2016; Soils: Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, Soil Landscapes of the Sydney 1:100,000 Sheet map, Department of Environment, Climate Change and Water, Sydney;

3.1.3 Landscape resources

Within the Sydney Basin Bioregion there is a variety of vegetation types present, with Grey Box *Eucalyptus moluccanna*, Forest Red Gum *E. tereticornis*, Narrow-leaved Ironbark *E. crebra* woodland, and Spotted Gum *Corymbia maculate* present on shale hills. Hard-leaved Scribbly Gum *E. sclerophylla*, Rough-barked Apple *Angophora floribunda*, and Old Man Banksia *Banksia serrata*, are identified on alluvial sands and gravels. Broad-leaved Apple *A. subvelutina*, Cabbage Gum *E. amplifolia*, Forest Red Gum, and Swamp Oak *Casuarina glauca*, are present on river flats. Tall Spike-rush *Eleocharis sphacelata*, Juncus, and Parramatta Red Gum *E. parramattensis* are located around lagoons and swamps (NPWS 2003). The distribution of these plants is determined by soil combinations as well as the movement of seeds and plants between ecotones by Aboriginal people. In other areas of Australia, the repeated seasonal burning of vegetation allowed expedient plant growth.

The Gymea soil landscape typically supports dry sclerophyll forest, predominantly species of eucalypt, including: Red Bloodwood *E. gummifera*; Yellow Bloodwood *E. eximia*; Scribbly Gum *E. haemastoma*; Brown Stringy Bark *E. capitellata*; and Old Man Banksia (Chapman et al. 1989, p.65). Black Ash *E. sieberi*, Sydney Peppermint *E. piperita* and Smooth-barked Apple *A. costat* are also commonly present. The Lambert soil landscape typically supports opened- and closed-heathlands with patches of eucalypt woodland which include species such as: Shrub She-oak *Allocasuarina disyla*; Heath Banksia *B. ericifolia*; Spiky Hakea *Hakea teretifolia*; Red Bloodwood; Yellow Bloodwood; and Scribbly Gum. European agricultural and industrial impacts have disrupted plant availability post contact and modern vegetation communities may not reflect past vegetation resources (Attenbrow 2010).

Animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', which would have functioned as awls or piercers, are often an abundant part of the archaeological record. Brush-tailed Possums were highly prized for their fur and could be fashioned into a cloak (Attenbrow 2002, p.117). Native fauna likely to have been present in the area include but are not limited to: the Common Brushtail Possum *Trichosurus vulpecula*; Gould's Wattled Bat *Chalinolobus gouldii*; Australian Magpie *Gymnorhina tibicen*; Superb Fairy-wren *Malurus cyaneus*; Eastern Brown Snake *Pseudonaja textilis*; and Eastern Blue-tongue *Tiliqua scincoides* (Atlas of Living Australia 2021).

3.1.4 European land use history

Historical aerial imagery allows for modern developments and land use to be identified within the study area. Aerial imagery from 1943 shows that the study area has been extensively developed. It has been completely cleared of large vegetation and residential buildings have been constructed within each of the lots (Photo 4).

Photo 4 Aerial photograph dated to 1943, with the study area indicated by the red boundary (Source: NSW Spatial Services)

Aerial imagery from 1971 shows that minimal changes have occurred within the study area (Photo 5). Some of the residential buildings have grown and two of the lots in the central portion have been combined to create a single lot with a larger dwelling.

Photo 5 Aerial photograph dated to 1971, with the study area indicated by the red boundary (Source: NSW Spatial Services)

Aerial imagery from 1986 shows that minimal changes have occurred within the study area (Photo 6). Some of the residential buildings have grown and two of the lots in the central portion have been combined to create a single lot with a larger dwelling.

Photo 6 Aerial photograph dated to 1986, with the study area indicated by the red boundary (Source: NSW Spatial Services)

Aerial imagery from 2005 shows that that minimal changes have occurred within the study area (Photo 7). Current aerial imagery of the study area shows that limited changes have occurred through to the present day (Figure 2).

Photo 7 Aerial photograph dated to 2005, with the study area indicated by the red boundary (Source: NSW Spatial Services)

3.2 Previous archaeological work

Many cultural heritage surface (surveys) and sub-surface (excavations) investigations have been conducted throughout the region of NSW in the past 30 years. There has been an increasing focus on cultural heritage assessments in NSW due to ever increasing development, along with the legislative requirements for this work and greater cultural awareness of Aboriginal cultural heritage.

3.2.1 Regional overview

Several Aboriginal cultural heritage investigations have been conducted for the Sydney region. Models for predicting the location and type of Aboriginal sites with a general applicability to the Sydney region and thus relevant to the study area have also been formulated, some as a part of these investigations and others from cultural heritage investigations for relatively large developments.

Attenbrow (1990) undertook an investigation titled "The Port Jackson Archaeological Project" for the Australian Museum (Photo 8). The aim of the investigation was to improve upon the existing literature regarding Aboriginal life, as previous work had focused on historical accounts and did not utilise the archaeological record. The report was broken into two stages: stage 1 involved documentary research, survey and site recording, and stage 2 involved the excavation of selected sites. Fieldwork focused largely on previously

recorded Aboriginal sites, and supplementary surveys in areas which had the potential to hold additional Aboriginal sites. Two research areas which were investigated included the roles played by marine and terrestrial animals in the diet of Aboriginal people within the Port Jackson area, as well as their use of stone, bone and shell in tools, adornments, and weapons. The study found that many middens and deposits were still able to be located within the Port Jackson region, despite the development and expansion of Sydney and its surrounding suburbs. The survey relocated and recorded 112 sites with middens and deposits. The report concluded that there were more unregistered sites that had not been reported. Attenbrow (1990) identified that there was a correlation between the distance from the harbour mouth and the dominance of particular shellfish species. It was also noted that the location of middens is dependent upon fresh water, fish, and shellfish resources. It also appeared that Aboriginal people were occupying areas of the foreshore and exploiting shellfish for at least 4500 years, and that over time there was a change in the marine subsistence strategies of local Aboriginal groups.

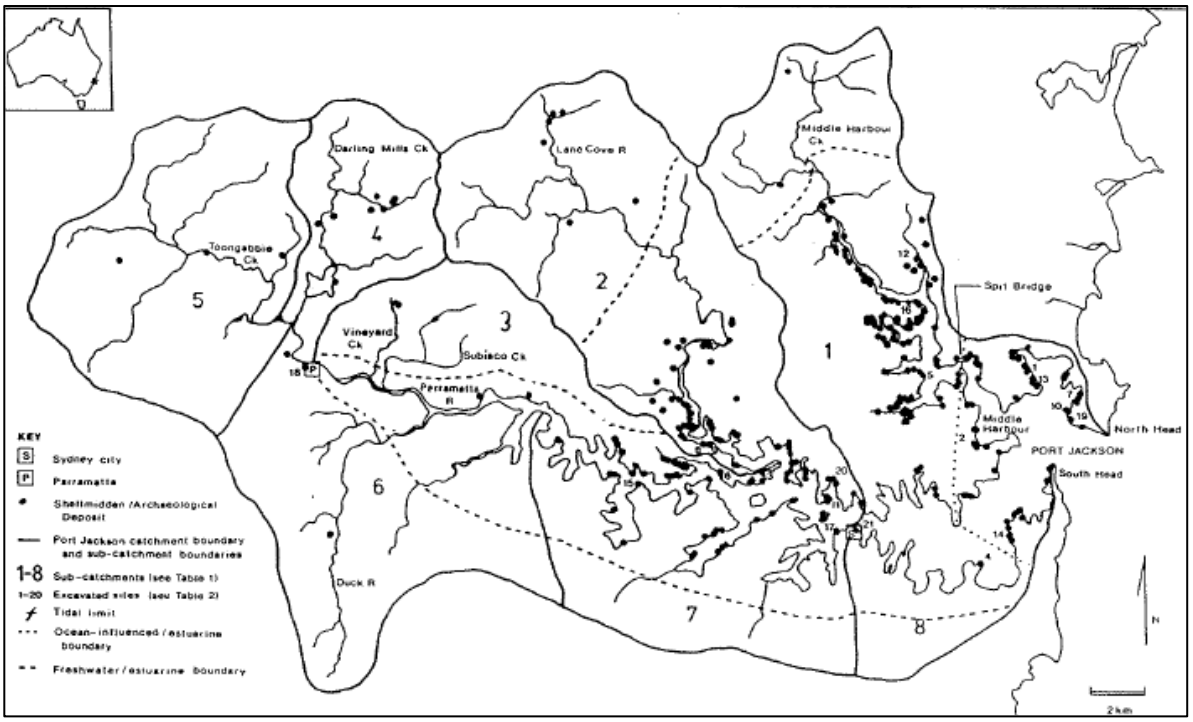


Photo 8 Port Jackson catchment area, sub-catchment and aquatic zones, with registered shell midden and archaeological deposit sites as at 28 February 1990 and known excavated sites (Source: Attenbrow 1990)

Attenbrow (1990) reported on excavations at two rock shelters with shell middens (AHIMS 45-6-0560/Mt. Trefle Nelson Park Point 1 and AHIMS 45-6-1045/Hydrofoil Cave) located in Neilson Park, Vaucluse, located approximately 4.5 kilometres south-east of study area, as part of Stage II of the Port Jackson Archaeological Project. The middens were excavated in spits measuring 5–7 centimetres where stratigraphic units exceeded these thicknesses, and the excavated materials sieved through nested 7 millimetre and 2.5 millimetre sieves. Shell, bone, stone artefacts, charcoal, and other cultural materials were extracted and bagged separately on site and analysed in an off-site laboratory. At AHIMS 45-6-0560/Mt. Trefle Nelson Park Point 1, an area measuring 2 by 1 metres was established within and outside of the rock shelter and divided into 50 by 50 centimetre units. Two instances of human bone were identified in two units within the shelter, and following consultation with the then La Perouse LALC, the bones were left *in-situ* and no further work undertaken in these locations. Excavations continued in the units established outside of the shelter; the deposit was excavated to a maximum depth of 70 centimetres, but this varied due to the presence of sloping bedrock and rock slab. Soils in this location consisted of dark humic-rich soils and were less stratified than the deposit

within the shelter; a hearth was recovered and excavated at a depth of 2–5 centimetres. In addition to Aboriginal objects and cultural material, European artefacts were also recovered, with the shelter having been used during the Great Depression in the 1930s. At AHIMS 45-6-1045/Hydrofoil Cave, an area measuring 1 by 1 metres was marked out for excavation in units measuring 50 by 50 centimetres; however, only one unit was excavated to test the integrity of the deposit. This pit reached a depth of 80 centimetres, where it reached rock. A hearth was identified and excavated at a depth of 5–15 centimetres, and the soils consisted of a black to very dark brown sandy sediment. The presence of rusted metal pieces throughout the soil profile suggests that the deposit was significantly disturbed; no further excavations took place at AHIMS 45-6-1045/Hydrofoil Cave.

HLA-Envirosciences (2003) undertook archaeological subsurface testing at Eden Gardens, Macquarie Park, NSW, approximately 10.3 kilometres north-west of the study area. The testing program consisted of nine test pits excavated along two transects, each pit measuring 50 by 50 centimeters. The purpose of the excavations was to establish the nature of soil profiles across the subject site, and to clear sandstone outcropping in a controlled manner to identify potential engravings. Test excavations encountered disturbance across all test pits. In one pit, a quartz artefact was identified along with one potential artefact. There was European material present at a greater depth in this pit however, suggesting that the artefact was in a disturbed context. No other artefacts were identified, and no engravings were identified on the sandstone outcrop.

Irish (2004) undertook an assessment of Aboriginal scarred trees at Sydney Olympic Park as part of the Aboriginal History and Connections Program (AHCP), established by the Parklands Unit at Sydney Olympic Park, approximately 14.3 kilometres west of the study area. The purpose of the AHCP was to explore Aboriginal connections to the Homebush Bay area of Sydney from the earliest occupation until the present day. The ACHP found that the Sydney Olympic Park landscape had been heavily disturbed by historical land use practices such as land reclamation and industrial activities. The ACHP found that the only area within Sydney Olympic Park that had any potential to contain evidence of Aboriginal occupation and cultural activity was the relict Cumberland Woodland known as the Wanngal (Newington) Woodland, within the Newington Nature Reserve (Irish, P. 2004, pp. 59) A survey of the Woodland was conducted as part of this assessment in order to relocate a number of scarred trees recorded in the area. This assessment determined that none of the previously recorded scarred trees were Aboriginal in origin, as the characteristics associated with cultural scarring were not present and the trees were much too young to have been scarred by Aboriginal people. A number of previously unrecorded artefact scatters were however identified during the survey.

Aboriginal Heritage Office (2011) completed a broad planning study for Aboriginal heritage in the City of Ryde LGA, located approximately 11.5 kilometers north-west of the study area. The purpose of the study was to identify, access, and re-record all Aboriginal sites located in the City of Ryde, to provide a planning document for conserving cultural values, and to provide a schedule for conservation works. It was concluded that 56 sites were recorded in the City of Ryde, most of which were rock shelters and middens. The LGA was divided into three Sections: Area 1–Lane Cove River; Area 2–Central Plateau; and Area 3–Parramatta River. Area 1 was dominated by rock shelters, engravings, and grinding grooves. Area 2 contained a single artefact scatter. The report recommended a program for staff education take place to enable workers to identify and avoid Aboriginal sites, and regular monitoring of sites in the LGA was to be undertaken to ensure that Aboriginal sites were appropriately managed.

Dominic Steele Consulting Archaeology (2015) undertook test excavations as part of mitigation measures for impacts to Aboriginal heritage for the construction of a new section of boardwalk in Glades Bay Park, Gladesville, approximately 11 kilometres west of the study area. These test excavations were carried out under an AHIP. Three test pits measuring 50 by 50 centimetres were excavated; no Aboriginal objects or archaeological deposits were identified. The soil profile presented redeveloped alluvial and colluvial soil that were waterlogged and affected by tide movements, overlying sandstone bedrock. Shell material was present on a partly grassed flat sandstone platform approximately 0.5 metres east of the boardwalk, and it was

suggested that it was also likely that archaeological deposits may be present in this area due to its location above the high water mark and higher likelihood of survival. This assessment indicated that AHIMS 45-6-1925/Bill Mitchell Park 5; RYDE 220 was restricted to the surface of the rock platform with a low likelihood that archaeological shell midden material would occur in sub-surface deposits in the immediate vicinity.

3.2.2 Local overview

Several Aboriginal cultural heritage investigations have been conducted within the local area (within approximately 10 kilometres of the study area). Most of these investigations were undertaken as part of development applications and included surface and sub-surface investigations. These investigations are summarised below.

Negerevich (1978) reported on work undertaken to record Aboriginal rock engravings at South Head, Sydney Harbour National Park, approximately 4.72 kilometres east of the study area, for the Department of Housing and Construction on behalf of the Department of Defence. Twelve separate groups of rock engravings have been previously identified at South Head by John Lough. Three sites originally recorded by W.D. Campbell in 1899 have been destroyed by development, with a further site also likely destroyed. Several previously recorded sites could also not be relocated. However, seven sites were relocated and recorded, with most of the motifs consisting of fish or marine species and human figures, and one instance of an animal (most likely a wallaby or kangaroo). One new site was also identified as part of the fieldwork. Most of the visible engravings are located on exposed rock platforms near cliff edges and are badly eroded due to being situated on soft sandstone and/or in exposed areas.

Attenbrow (1988) undertook a study into the Aboriginal heritage of Hunters Hill, approximately 7.76 kilometres south-west of the study are. The study examined environmental, archaeological, and documentary evidence to build a picture of Aboriginal occupation within the municipality. In addition to the desktop research, existing AHIMS sites were inspected where they could be relocated, noting information not included in the site card records, and recording any new sites encountered during the survey. Archaeological work dating from 1925 is reviewed, with particular attention paid to a study on Port Jackson site location patterns by Hawthorne (1982, cited in Attenbrow 1988), in which a model is proposed whereby there is a horizontal order of site types in relation to their distance from the littoral zone, with engravings the furthest distance, followed by shelters, then middens. In relation to distance to drinking water, engravings were the furthest away, followed by middens, then shelters. The littoral zone is an area of a river lake or the sea that is close to the shoreline and extends from the high water mark to parts of the shoreline which are always submerged. Attenbrow (1988) also summarises Hawthorne's findings regarding the locations of 77 engravings and grinding groove sites. Of these, 43% were located on ridgetops, and 48% were high up on hillsides with wide views of the ocean and surrounding area. Regarding distance from the littoral zone, 92% were within 2.5 kilometres of this area, while 96% occurred at a height below 120 metres. Hawthorne (1982, p. 104), cited in Attenbrow 1988) concluded that engravings in particular are located in areas not used for occupation or resource extraction (i.e. ridges and hillsides), while middens are as close as possible to food resources, while shelters are close to food resource areas as well as drinkable water.

Conyers (1990) completed an assessment which consisted of background research and a survey carried out to record the 'Aboriginal carvings and areas' in the Lane Cove River State Recreation Area, approximately 6.8 kilometres north-west of the study area. The predictive modelling identified the coastal margins of the area as the likely location of shell midden deposits, occurring in both open contexts and rock shelters. Areas where the underlying geology consists of shales were considered the locations where campsites, Potential Archaeological Deposit (PAD), quarries and scarred trees would occur, with it being noted that due to extensive vegetation clearance scarred trees are unlikely to be identified. Areas overlying the Hawkesbury Sandstone were the likely locations of rock shelters, art sites, rock engravings, and grinding grooves (Conyers 1990, pp. 30–34). The survey relocated three previously recorded sites, identified seven new sites, and noted

five potential habitation sites. The three relocated sites were all rock engravings. Two newly recorded sites were rock engravings, and five were middens. The five potential habitation sites were all rock shelters with PADs. It was recommended that all sites be managed appropriately, and in some cases be subject to further investigation.

Ross and Attenbrow (1990) completed an Aboriginal site survey of Bradley's Head in Mosman, approximately 3.1 kilometres south-east of the study area, in advance of proposed works to redevelop the memorial to HMAS Sydney in this location. The southern part of the peninsula of Bradley's Point has been extensively disturbed since 1839; these disturbances include construction of several fortifications over time, quarrying, construction of wharf facilities, landscaping, roadworks, and infrastructure associated with the reserve. While no new sites were identified within the area of proposed works, one of several registered AHIMS sites, a shell midden, was relocated at Bradley's Beach (AHIMS 45-6-2062/Bradley's Beach). One part of the area of proposed works, a flat above the car park, was noted for potential to contain sub-surface evidence of Aboriginal occupation, and it was recommended that sub-surface testing must take place in consultation with the Aboriginal community should disturbances be proposed for this area.

JMCHM (2000b) undertook salvage excavations of an Aboriginal rock shelter on Berry Island (AHIMS 45-6-1512/Berry Island 3) located approximately 3.95 kilometres south-west of the study area. The excavation methodology was derived from police investigation methods rather than solely archaeological practices. The site was excavated with a total of six 1 by 1 metre squares excavated. The results did not identify any recent human remains interred within the rock shelter. Disturbance of the deposit via infill was to bedrock depth; however human skeletal material was uncovered inside the drip line (a water line produced in this case by the form of the rock shelter overhang). Meanwhile, a mostly disturbed shell midden was located in the western portion of the site (JMCHM 2000b, pp. 1). Excavations revealed five definite and one possible stone artefact the majority of which were located in square 4A and some were found in the midden, square 6B South. These artefacts were quartz (n=3), silcrete (n=2) and volcanic (n=1) origin. Of the midden material, 23 shellfish species were identified of which both estuarine and rock platform species were present. The most common in all excavated squares was Natal Rock Oyster *Saccostrea cucullata* (n=111) (JMCHM 2000b, pp. 27). A significant portion of Hercules Club Mud Whelk *Pyrazus ebeninus*, Mud Creeper *Velacumantus* sp. and Mud Oyster *Ostrea angasi* suggests the estuary to the north of the site was utilised. The presence of other species suggests some shell species were gathered from the close vicinity to the rock shelter rather than elsewhere (JMCHM 2000b, pp. 28).

Steele (2002) undertook Aboriginal archaeological test excavation and monitoring at a block situated at Broadway, Chippendale and Mountain Street, Ultimo approximately 6.63 kilometres to the south-west of the study area. Testing in one by one metre squares was undertaken along the bank and upslope of Blackwattle Creek, which traverses the site. One small remnant patch of original topsoil, measuring approximately 5 metres by 15 metres, was tested and produced approximately 20 Aboriginal flaked stone artefacts. All items were less than 10 millimetres in maximum dimension, and the assemblage generally consisted of non-diagnostic pieces. Consent to destroy the site was subsequently granted, with the provision of monitoring of the works, but no further Aboriginal artefacts were recovered.

Biosis (2012) was engaged to undertake an ACHA for 445–473 Wattle Street Ultimo, approximately 6.65 kilometres south-west of the study area, following the initial RPS assessments. Background research for the site indicated that the Cadigal and possibly Wangal clans were associated with the Ultimo area at the time of European settlement. The presence of Blackwattle Creek nearby would have provided multiple resources for local Aboriginal people, and shell middens and stone artefact sites are located across the City of Sydney area and in the vicinity of the subject area. The predictive statements developed for the site noted that areas of PAD were likely to be present within the subject site, with potential cultural material including stone artefacts, midden deposits, burials and post-contact sites. A full coverage survey was not possible due to the presence of built items and the ground surface being obscured by concrete and asphalt surfaces. As such a discussion

of the proposed development and general landform attributes took place with the developer and RAP representatives. The site was assessed as holding archaeological potential in the natural alluvial soils beneath historical fill layers and was registered as AHIMS 45-6-3064/445–473 Wattle St PAD.

Biosis (2012) undertook an Aboriginal archaeological assessment, with full consultation with the Aboriginal community under the consultation requirements, for The Quay Project at the corner of Quay Street and Ultimo Road, Haymarket, located approximately 6.5 kilometres south-west of the study area. A Due Diligence Assessment had been previously undertaken by Biosis in 2011 of the site, which assessed that, while the site location would have been of considerable value to Aboriginal people due to nearby resources and topographical suitability for camping, impacts to the natural soils through European development since the 18th century would have removed evidence of Aboriginal occupation from the soil. However, remnant natural topsoils were encountered during historical archaeological excavations, which prompted further investigation of any potential cultural deposits through a program of test excavations, focusing on areas of potentially intact topsoils. The test excavations confirmed the findings of the Due Diligence Assessment and found that the remnant soil deposits were very shallow and contained only European artefacts, with no Aboriginal objects identified. It should be noted though that a stone artefact (AHIMS 45-6-2987/Poultry Market 1) was recovered from the fill deposit of a post hole near Test Pit 5. As this artefact was recovered from a disturbed context, the significance of the artefact was considered to be low and did not alter the assessment of the significance of the site as low.

Artefact Heritage (2016) completed an archaeological assessment of Aboriginal heritage for the Sydney Metro project from Chatswood to Sydenham. The site featured similar landforms, and the same soil and geological context as the study area, namely that it is situated on the Gymea soil landscape underlying geological formations. Background research conducted for the assessment noted that due to the shallow to moderately deep and high soil erodibility of the Gymea soil landscape, it was considered likely that the development within the area has removed or significantly disturbed the natural soils within the site location (Artefact Heritage 2016, pp. 52). Geotechnical information from two boreholes on Miller Street was summarised, citing that up to 1.2 metres of fill overlying up to 4 metres of residual sandy clay to clayey sand associated with weathering Hawkesbury Sandstone. This information was interpreted to suggest that soils were absent at the two borehole locations (Artefact Heritage 2016, pp. 52). Investigation of registered Aboriginal sites within the vicinity of the project location indicated that the majority of sites were associated with the Sydney Harbour foreshore. This was considered to be the result of greater preservation of sites on the foreshore due to the establishment of parks and low levels of development, the predominance of marine and estuarine resources within the foreshore zone and the likelihood that any rock platforms, outcrops or overhangs in the project area had been destroyed by past works (Artefact Heritage 2016, pp. 54). The site inspection identified significant disturbance through the presence of underground car parks. It is suggested that even minor surface disturbance is likely to have had a considerable impact or removal of A horizon soils due to the relatively shallow soils. As a result, the site was assessed as having low archaeological potential and no Aboriginal sites were identified (Artefact Heritage 2016, pp. 54–56).

3.2.3 AHIMS site analysis

A search of the AHIMS database (Client Service ID: 748788) identified 95 Aboriginal archaeological sites within a 2 kilometre search area, centred on the study area. None of these registered sites are located within the study area (Figure 7). AHIMS search results are provided in Appendix 1. Table 4 provides the frequencies of Aboriginal site types in the vicinity of the study area. The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied on where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence

AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 153 results presented here, compared to the 95 sites identified in AHIMS.

Table 4 AHIMS search results

Site type	Number of occurrences	Frequency (%)
Shell	58	37.91
Artefact	54	35.29
Art (Pigment or Engraved)	37	24.18
Habitation Structure	2	1.31
Grinding Groove	1	0.65
Fish Trap	1	0.65
Total	**153**	**100.00**

A simple analysis of the Aboriginal cultural heritage sites registered within 2 kilometre of the study area indicates that the dominant site type is shell, representing 37.91% (n=58), followed by artefact with 35.29% (n=54) and art (pigment or engraved) with 24.18% (n=37). Habitation structure was represented by 1.31% (n=2), followed by grinding groove and fish trap site types, each represented by 0.65% (n=1).

3.3 Discussion

The study area is underlain by the Hawkesbury Sandstone geological formation and sits on an elevated crest that runs south-west to north-east and slopes towards the north-west, overlooking Willoughby Bay. Hawkesbury Sandstone typically presents a strong likelihood of outcropping, forming escarpments and ridges around Sydney Harbour (Geological Survey of New South Wales n.d.), and weathering cavernously to form overhangs along platforms, ridge tops, along the sides of gullies, and in valley troughs (JMCHM 2008). Aboriginal rock art and engravings often occur in such shelters, caves, and overhangs, or along flat sandstone outcrops and vertical rock faces. Furthermore, quarry sites can be found in areas of rock outcrops, and significant landscape features (such as caves, rock formations, mountains, and waterholes) can be considered natural sacred sites that hold Aboriginal cultural significance.

This is consistent with site types found near the study area. The AHIMS site 45-6-0640/Mosman-Sydney approximately 470 metres to the north-west of the study area is a rock engraving site on a sideslope. Three more AHIMS sites are clustered together on a sideslope between approximately 430 and 540 metres to the north of the study area (AHIMS 45-6-1350/Kings Cave Cremorne, AHIMS 46-6-0925/Brightmore St Reserve Cremorne, and AHIMS 45-6-2141/Little Wonga Road, Cremorne), representing a rock shelter associated with art and a midden, a rock shelter associated solely with art, and a rock shelter associated solely with a midden respectively. The study area's position on a relatively flat platform above these sites indicates that vertical sandstone exposure is not expected, suggesting that further possible rock shelter sites are unlikely. However, there is potential for sandstone bedrock outcropping suitable for engravings and grinding grooves. Furthermore, the area's proximity to other sites of Aboriginal heritage and its position on an elevated outlook over the bay may indicate a landscape feature considered of cultural significance.

Above this geology, the study area rests on the Gymea/Lambert soil landscape, a relatively shallow and erosional soil prone to severe movement. Erosion can disturb or displace any present archaeological deposits, especially since this process is exacerbated by the clearance of natural vegetation as occurs with urban development as is seen around the study area (Chapman et al. 1989). This may mean that archaeological deposits (if present) have been disturbed by these natural processes, compromising their stratigraphic integrity and leaving them unlikely to remain intact.

3.3.1 Predictive statements

A series of predictive statements have been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to have existed throughout the study area and where they are more likely to be located.

This model is based on:

- Site distribution in relation to landscape descriptions within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Table 5 indicates the site types most likely to be encountered across the present study area. The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 5 Aboriginal site prediction statements

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	Low: : Stone artefact sites have been previously recorded in the region across a wide range of undisturbed areas. Due to the high disturbance of the study area there is low potential for this site type.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Low: Shell midden sites have not been recorded within the study area. There is some potential for shell middens to be located in vicinity of permanent water sources, which are not present within the study area.
Quarries	Raw stone material procurement sites.	Low: There is no record of any quarries being within or surrounding the study area. This is also supported by the nature of the local geology and absence of natural resources typically found in quarries.
PADs	Potential sub surface deposits of cultural material.	Low: Due to the development of the study area and landform present there is low potential for PADs to be present due to the disturbance of shallow soils.
Axe grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: Suitable horizontal sandstone rock outcrops could occur along drainage lines, and the underlying geology throughout the study area suggests that there may be suitable sandstone to facilitate this site type. However, the study area has been extensively developed suggesting that grinding groove sites are less likely to occur.
Burials	Aboriginal burial sites.	Low: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not commonly associated with burials as well as no indications of rock shelters or remnant vegetation.
Aboriginal ceremony and Dreaming Sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area.

Site type	Site description	Potential
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
Aboriginal places	Aboriginal places may not contain any 'archaeological' indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	Low: There are currently no recorded Aboriginal historical associations for the study area.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Nil: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present in the study area.
Modified trees	Trees with cultural modifications	Nil: No mature native trees have survived within the study area, due to extensive vegetation clearing from the 1800's onwards.

4 Archaeological survey

An archaeological survey of the study area was undertaken on 18 May 2023 and 1 June 2023. The field survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey objectives

The objectives of the survey were to:

- Provide RAPs an opportunity to view the study area and to discuss previously identified Aboriginal object(s) and/or place(s) in or within proximity to the study area.
- Undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of Aboriginal archaeological and cultural sensitivity.

4.2 Archaeological survey methodology

The survey methods were intended to assess and understand the landforms and to determine whether any archaeological material from Aboriginal occupation or land use exists within the study area.

4.2.1 Sampling strategy

The survey effort targeted all landforms that will potentially be impacted by the development. It focused on areas with disturbances to assess the extent and impact of these on the ground surface, as well as on areas with increased GSV and exposure, as this enables Aboriginal objects to be identified on the ground surface.

4.2.2 Survey methods

The archaeological survey on 18 May 2023 and 1 June 2023 was conducted on foot by Ashley Bridge (Biosis, Heritage Consultant) and Raymond Weatherall (Cultural Sites Officer, Metropolitan LALC). Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have been potentially exploited by Aboriginal people.
- Landform.
- Photographs of the site indicating landform.
- Evidence of disturbance.
- Aboriginal artefacts, culturally modified trees, or any other Aboriginal sites.

Where possible, identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, GSV and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed.

The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System (GPS) and the Map Grid of Australia (MGA) (94) coordinate system.

4.3 Archaeological survey results

A total of two meandering transects were walked across the accessible extent of the study area with the two surveyors walking two metres apart (Figure 8). This follows the methodology set out in Burke and Smith (2004, pp. 65) which states that a single person can only effectively visually survey an area of two linear metres. No Aboriginal objects were identified in the study area and no areas of archaeological potential were identified. The results from the archaeological survey have been summarised in Table 6 and Table 7.

Table 6 Survey coverage

Survey unit	Landform	Survey unit area (m²)	Visibility (%)	Exposure (%)	Effective coverage area (m²)	Effective coverage (%)
1	Ridgeline	4455.16	15	5	66.83	1.5

Table 7 Landform summary

Landform	Landform area (m²)	Area effectively surveyed (m²)	Landform effectively surveyed (%)	No. of Aboriginal sites	No. of artefacts or features
Ridgeline	7356.20	66.83	0.91	0	0

4.3.1 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey was the lack of GSV and exposures due to the significant disturbances from the residential buildings that exist currently within the study area. Access was not permitted to 60, 74 and 78 Parraween Street during the surveys and these areas could not be visually inspected.

4.3.2 Visibility

In most archaeological reports and guidelines, visibility refers to GSV, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010a).

The GSV across the study area was generally low (0–20%), with the average being approximately 15% and was seen to increase in areas in gardens and landscaped areas where disturbances from residential buildings were not present (Photo 9 and Photo 10). Low levels of visibility were the result of grass coverage, leaf litter, residential properties, footpaths, paved areas, gardens, and driveways, obscuring the view of the ground surface (Photo 11 to Photo 14).

Photo 9 **Area of increased GSV in the study area, within Lot 1 DP19887, facing south-east**

Photo 10 **Area of increased GSV in the study area, within Lot 4 DP19887, facing south-west**

Photo 11 **Area with low GSV in the study area, within Lot 1 DP441402, facing north-west**

Photo 12 **Area with low GSV in the study area, within Lot A DP412718, facing north-west**

Photo 13 **Area with low GSV in the study area, within Lot 2 DP19887, facing south-east**

Photo 14 **Area with low GSV in the study area, within Lot 30 DP4785, facing south-east**

4.3.3 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke & Smith 2004, pp. 79, DECCW 2010a).

Overall, the study area displayed low levels of exposure, ranging between 0–10% and averaging 5%. Higher levels of exposure were seen in areas underneath trees, near fence lines and in some gardens where soils had been exposed due to gardening (Photo 15 and Photo 16). Low exposure was primarily the result of buildings and features associated with the residences obscuring the ground surface from view.

Photo 15 **Increased area of exposure in the study area, within Lot 4 DP19887, facing west**

Photo 16 **Increased area of exposure in the study area, within Lot 1 DP19887, facing north-west**

4.3.4 Disturbances

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action are prevalent in the study area and cover large sections of the land surface. Examples of human agents can include residential development such as landscaping and construction of residential buildings; farming practices, such as initial vegetation clearance for creation of paddocks, fencing and stock grazing; and agricultural practices.

Disturbance levels within the study area were assessed during the visual inspection. Levels of disturbance were categorised through an inspection of the ground surface, landforms, and aerial imagery. Disturbance levels within the study area have been categorised according to the following criteria:

- High disturbance—the landform has been heavily disturbed and all natural soil horizons have been displaced or removed, these areas are unlikely to contain Aboriginal cultural material.
- Moderate disturbance—the landform has undergone disturbances to a certain degree, but the extent and nature of these disturbances cannot be fully quantified. Aboriginal cultural material may be present within these locations but is unlikely to be *in situ*.
- Low disturbance—the landform has not been significantly disturbed and is highly likely to contain intact soil horizons. Aboriginal cultural material if present is likely to be *in situ*.

As evidenced by the historic aerials (Photo 4 to Photo 7) and the archaeological survey, the entire study area has been subjected to high levels of disturbance. Though not seen in the aerial imagery, the study area would have contained native vegetation communities that would have been cleared post-European settlement. The earliest historic aerial indicates that by 1943 the study area had undergone extensive development with residential buildings existing on each of the lots (Photo 4). There have been multiple phases of development associated with residential infrastructure, and this has resulted in significant disturbances throughout the entire study area. Disturbances were evident with the residential buildings, sub-surface services, footpaths, paved and concreted areas, gardens, and driveways located throughout (Photo 17 to Photo 21).

Photo 17 **Concreted carpark and residential buildings within SP95237, facing south**

Photo 18 **Landscaping within Lot A DP442573, facing south-east**

Photo 19 **Domestic shed within Lot 30 DP4785, facing north-west**

Photo 20 **Residential property within Lot 1 DP19887, facing south-east**

Photo 21 **Residential property within Lot 1 DP441402, facing north-west**

4.4 Discussion of archaeological survey results

A total of two meandering transects were walked across the accessible extent of the study area with the two surveyors walking two metres apart. During the archaeological survey, no Aboriginal sites or objects were identified. The results of the archaeological survey have been summarised below and in Figure 8 and Figure 10.

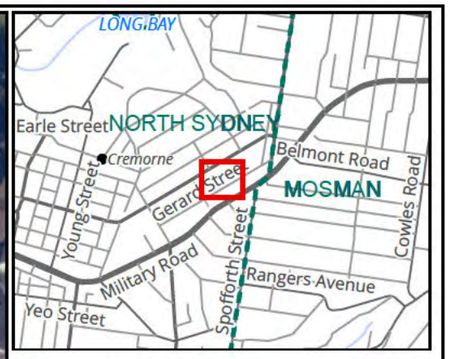
Background research identified that the study area is located within the Hawkesbury Sandstone formation, within a ridgeline landform that slopes very gently towards the north-east. The study area is also underlain by the Gymea and Lambert soil landscapes, which are classed as erosional. They comprise soils that typically experience higher levels of sediment movement within shallower deposits. Additionally, when the land is cleared of vegetation, the soils are more likely to experience higher levels of erosion. Movement of shallow soils and increased erosion typically results in poor preservation of the archaeological record.

There are no watercourses located within the study area. The nearest water sources are Willoughby Creek, a first-order non-perennial watercourse, located approximately 815 metres to the north-west, and an unnamed, first-order non-perennial watercourse which feeds into Mosman Bay, located approximately 805 metres to the south-east. When considering the stream order model, the absence of higher order watercourses near the study area suggests that it contains low potential for past Aboriginal occupation.

Previous archaeological studies conducted in the local area by Conyers and JMCHM (2000b) identified several Aboriginal sites during their investigations. JMCHM (2000b) undertook salvage excavations within a rockshelter that recovered several lithic artefacts and midden material. Conyers (1990) identified that areas overlying the Hawkesbury Sandstone formation were the likely locations of rock shelters, art sites, rock engravings, and grinding grooves. These sites however were located along coastal margins and represent a vastly different environmental context to the current Biosis study area.

A review of historical aerial photographs paired with the archaeological survey identified that the study area has been extensively disturbed. The study area has undergone extensive land clearance and has been heavily modified through multiple phases of residential development. Construction of the residences and associated infrastructure would have involved bulk excavations, installation of sub-surface services and landscaping. These activities would have resulted in the displacement of soils and the removal off any intact sub-surface deposits or surface artefacts should they have been present prior to construction. This is further supported

when considering the soil landscape within the study area, which are shallow and highly susceptible to movement. Therefore, the background research coupled with the archaeological survey have led to the conclusion that the study area has been determined to contain low archaeological potential (Figure 9).



Legend

- Study area
- Survey track
- Survey coverage (2m buffer)

Figure 8 Survey coverage

0 5 10 15 20

Metres

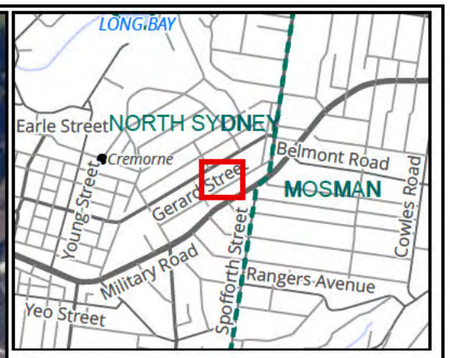
Scale: 1:500@ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 38545, Date: 06 June 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_AR_F8_SurveyCoverage



Legend

Study area

Archaeological potential

Low

Figure 9 Survey results

0 5 10 15 20

Metres

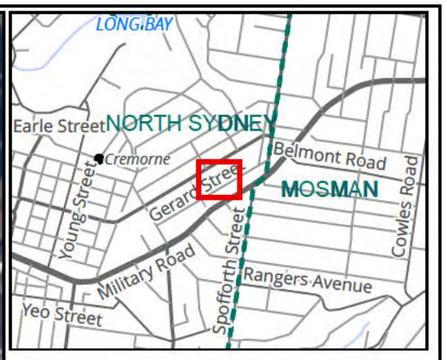
Scale: 1:500@ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 38545, Date: 06 June 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_ACHA_F9_SurveyResults



Legend

Study area

Landform

Ridgeline

Figure 10 Landforms

0 5 10 15 20

Metres

Scale: 1:500@ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 38545, Date: 06 June 2023,
Drawn by: AM, Checked by: CG, Last edited by: amackegard
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_ACHA_F9_Landforms

5 Scientific values and significance assessment

The two main values addressed when assessing the significance of Aboriginal sites are cultural values to the Aboriginal community and archaeological (scientific) values. This report will assess scientific values while the ACHA report will detail the cultural values of Aboriginal sites in the study area.

5.1 Introduction to the assessment process

Heritage assessment criteria in NSW fall broadly within the significance values outlined in the Australia ICOMOS Burra Charter (Australia ICOMOS 2013). This approach to heritage has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. These values are provided as background and include:

- **Historical significance** (evolution and association) refers to historic values and encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.
- **Aesthetic significance** (Scenic/architectural qualities, creative accomplishment) refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.
- **Social significance** (contemporary community esteem) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with local communities.
- **Scientific significance** (Archaeological, industrial, educational, research potential and scientific significance values) refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

The cultural and archaeological significance of Aboriginal and historic sites and places is assessed on the basis of the significance values outlined above. As well as the ICOMOS Burra Charter significance values guidelines, various government agencies have developed formal criteria and guidelines that have application when assessing the significance of heritage places within NSW. Of primary interest are guidelines prepared by the Commonwealth Department of the Environment and Energy, Heritage NSW, NSW Department of Planning, Industry and Environment. The relevant sections of these guidelines are presented below.

These guidelines state that an area may contain evidence and associations which demonstrate one or any combination of the ICOMOS Burra Charter significance values outlined above in reference to Aboriginal

heritage. Reference to each of the values should be made when evaluating archaeological and cultural significance for Aboriginal sites and places.

In addition to the previously outlined heritage values, the Heritage NSW Guidelines (OEH 2011) also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

Although other values may be considered – such as educational or tourism values – the two principal values that are likely to be addressed in a consideration of Aboriginal sites and places are the cultural/social significance to Aboriginal people and their archaeological or scientific significance to archaeologists. The determinations of archaeological and cultural significance for sites and places should then be expressed as statements of significance that preface a concise discussion of the contributing factors to Aboriginal cultural heritage significance.

5.2 Archaeological (scientific significance) values

Archaeological significance (also called scientific significance, as per the ICOMOS Burra Charter) refers to the value of archaeological objects or sites as they relate to research questions that are of importance to the archaeological community, including indigenous communities, heritage managers and academic archaeologists. Generally the value of this type of significance is determined on the basis of the potential for sites and objects to provide information regarding the past life-ways of people (Burke & Smith 2004, pp. 249, NPWS 1997), For this reason, the NPWS summarises the situation as 'while various criteria for archaeological significance assessment have been advanced over the years, most of them fall under the heading of archaeological research potential' (NPWS 1997, pp. 26). The NPWS criteria for archaeological significance assessment are based largely on the ICOMOS Burra Charter.

Research potential

Research potential is assessed by examining site content and site condition. Site content refers to all cultural materials and organic remains associated with human activity at a site. Site content also refers to the site structure – the size of the site, the patterning of cultural materials within the site, the presence of any stratified deposits and the rarity of particular artefact types. As the site contents criterion is not applicable to scarred trees, the assessment of scarred trees is outlined separately below. Site condition refers to the degree of disturbance to the contents of a site at the time it was recorded.

Table 8 and Table 9 outline the site content and site condition rating used for archaeological sites.

Table 8 Site contents ratings used for archaeological sites

Rating	Description
0	No cultural material remaining.
1	Site contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident stratification.
2	Site contains a larger number, but limited range of cultural materials; and/or some intact stratified deposit

Rating	Description
	remains; and/or are or unusual example(s) of a particular artefact type.
3	Site contains a large number and diverse range of cultural materials; and/or largely intact stratified deposit; and/or surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were deposited.

Table 9 Site condition ratings used for archaeological sites

Rating	Description
0	Site destroyed.
1	Site in a deteriorated condition with a high degree of disturbance; lack of stratified deposits; some cultural materials remaining.
2	Site in a fair to good condition, but with some disturbance.
3	Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.

Pearson and Sullivan (1995, pp. 149) note that Aboriginal archaeological sites are generally of high research potential because 'they are the major source of information about Aboriginal prehistory'. Indeed, the often great time depth of Aboriginal archaeological sites gives them research value from a global perspective, as they are an important record of humanity's history. Research potential can also refer to specific local circumstances in space and time – a site may have particular characteristics (well preserved samples for absolute dating, or a series of refitting artefacts, for example) that mean it can provide information about certain aspects of Aboriginal life in the past that other less or alternatively valuable sites may not (Burke & Smith 2004, pp. 247–8). When determining research potential value particular emphasis has been placed on the potential for absolute dating of sites.

The following sections provide statements of significance for the Aboriginal archaeological sites recorded during the sub-surface testing for the assessment. The significance of each site follows the assessment process outlined above. This includes a statement of significance based on the categories defined in the ICOMOS Burra Charter. These categories include social, historic, scientific, aesthetic and cultural (in this case archaeological) landscape values. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category is also proposed. Where suitable the determination of cultural (archaeological) landscape value is applied to both individual sites and places (to explore their associations) and also, to the Study Area as a whole. The nomination levels for the archaeological significance of each site are summarised below.

Representativeness

Representativeness refers to the regional distribution of a particular site type. Representativeness is assessed by whether the site is common, occasional, or rare in a given region. Assessments of representativeness are subjectively biased by current knowledge of the distribution and number of archaeological sites in a region. This varies from place to place depending on the extent of archaeological research. Consequently, a site that is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of knowledge of the regional archaeology. Any such site should be subject to re-assessment as more archaeological research is undertaken.

Assessment of representativeness also takes into account the contents and condition of a site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, although they may occur commonly within the region.

Table 10 outlines the site representativeness ratings used for archaeological sites.

Table 10 Site representativeness ratings used for archaeological sites

Rating	Description
1	Common occurrence.
2	Occasional occurrence.
3	Rare occurrence.

Overall scientific significance ratings for sites, based on a cumulative score for site contents, site integrity and representativeness are provided in Table 11

Table 11 Scientific significance ratings used for archaeological sites

Rating	Description
1–3	Low scientific significance.
4–6	Moderate scientific significance.
7–9	High scientific significance.

Each site is given a score based on these criteria—the overall scientific significance is determined by the cumulative score. This scoring procedure has been applied to the Aboriginal archaeological sites identified during the sub-surface testing.

5.2.1 Statements of archaeological significance

No Aboriginal sites, objects or areas of archaeological potential were identified as part of this assessment. The study area has been heavily disturbed by residential development that would have removed or displaced any archaeological deposits. The background research coupled with the archaeological survey has resulted in the entire study area being assessed as having low archaeological potential. This assessment was also confirmed by the cultural sites officer, Raymond Weatherall, who attended the archaeological survey and noted "that the study area has been disturbed heavily throughout, which would have removed vast amounts of soil that existed prior to development". The study area therefore does not have any research potential, scientific significance or representativeness associated with it. This assessment has therefore determined that study area does not contain any archaeological significance.

6 Impact assessment

The proposed future development will consist of a Seniors Living Village. The potential impacts of these works on Aboriginal heritage are presented below.

6.1 Predicted physical impacts

The project will involve the establishment of a Seniors Living Village. The development will include:

- 58 independent living units.
- A residential care facility.
- Driveways and landscaped areas.
- Lounge and dining area, media room, gym, indoor pool and spa.

And will also involve:

- Installation of utility services including but not limited to water, electricity, and sewerage.
- Earthworks, with potential benching and battering.
- Heavy vehicle movement along Gerard Street and Parraween Street.

6.2 Ecologically Sustainable Development

One of the primary aims of the NPW Act is the 'conservation of objects places and features … of cultural value within the landscape, including … places, objects and features of significance to Aboriginal people …' ((s.2A(1)(b)(i)). The *Operational Policy: Protecting Aboriginal Cultural Heritage (Version 2)* (State of NSW and Office of Environment and Heritage NSW 2011) provides guidance to proponents in term of Ecologically Sustainable Development (ESD).

ESD has been defined in Part 3, 6. (2) Objective of the Authority of the *Protection of the Environment Administration* Act 1991 (NSW). This outlines that the ESD requires the integration of economic and environmental considerations (including cultural heritage) in the decision-making process. Regarding Aboriginal cultural heritage, ESD can be achieved by applying the principle of intergenerational equity and the precautionary principle.

> ***Intergenerational equity***
>
> *The principle of intergenerational equity states that the present generation should make every effort to ensure the health, diversity and productivity of the environment – which includes cultural heritage – for the benefit of future generations.*
>
> *In terms of Aboriginal cultural heritage, intergenerational equity can be considered in terms of the 'cumulative impacts' of any proposal to Aboriginal objects and places. For example, if few Aboriginal objects and places remain in a region (because of harm authorised under previous AHIPs), fewer opportunities remain for future generations of Aboriginal people to enjoy the cultural benefits of those Aboriginal objects and places.*

Information about the significance of Aboriginal cultural heritage values associated with the Aboriginal objects and places proposed to be harmed will be relevant to the consideration of intergenerational equity and an understanding of the cumulative impacts of a proposal.

Where there is uncertainty, the precautionary principle should also be followed (see below).

The precautionary principle

The precautionary principle states that the lack of full scientific certainty about the threat of harm should not be used as a reason for not taking measures to prevent harm from occurring.

In applying the precautionary principle, decisions should be guided by:

- *a careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment (which includes cultural heritage)*
- *an assessment of the risk-weighted consequences of various options.*

The precautionary principle is relevant to Heritage NSW consideration of potential harm to Aboriginal cultural heritage where:

- *the proposal involves a risk of serious or irreversible harm to Aboriginal objects or places or to the value of those objects or places, and*
- *there is a lot of uncertainty about the significance of Aboriginal cultural heritage values of the Aboriginal objects or places proposed to be harmed.*

Where this is the case, a precautionary approach should be taken and all cost-effective measures implemented to prevent or reduce harm to the Aboriginal objects/place (State of NSW and Office of Environment and Heritage NSW 2011, pp. 26).

The results of this assessment did not identify any Aboriginal cultural heritage values within the study area. However, as identified in the background research and through Aboriginal community consultation, the region surrounding the study area, particularly to the east, contains several sites, landforms and landscapes that are significant to local Aboriginal groups. Therefore, this assessment has been able to further our knowledge of Aboriginal archaeology in the area, by highlighting the environmental and cultural significance of the surrounding landscape and how this may have been intertwined with the current study area.

6.3 Assessment of impacts to the study area

The study area does not contain any recorded Aboriginal sites and has been assessed as having low archaeological potential due to existing disturbances within the study area. The proposed works will therefore not impact on any Aboriginal heritage values (

Figure 11).

A summary of the impacts of the proposed works to the study area is presented in Table 12 and Table 13 below.

Table 12 Summary of sub-surface impacts of proposed works

Proposed works	Impacts to potential archaeological deposits (Yes/No)
Establishment of a Seniors Living Village	None—there will be no impacts to potential archaeological deposits by the works as these are unlikely to exist within

Proposed works	Impacts to potential archaeological deposits (Yes/No)
	the study area. Should the proposed development be approved, the works will result in physical disturbances across the study area. However, as no Aboriginal archaeological deposits are present or likely to exist across the site, the works will not impact on Aboriginal archaeological values.

Table 13 Summary of potential impacts to the study area

Study area potential	Significance	Type of harm	Degree of harm	Consequence of harm
Low	Nil	None	None	No consequence. The study area is unlikely to contain any Aboriginal sites, objects, or areas of archaeological potential. An unexpected finds protocol should be put in place if unanticipated Aboriginal objects or remains are uncovered during the proposed works.

6.4 Management and mitigation measures

Ideally, heritage management involves conservation of sites through the preservation and conservation of fabric and context within a framework of 'doing as much as necessary, as little as possible' (Marquis-Kyle & Walker 1994, pp. 13). In cases where conservation is not practical, several options for management are available. For sites, management often involves the salvage of features or artefacts, retrieval of information through excavation or collection (especially where impact cannot be avoided) and interpretation.

Consideration has been given to the principles of ESD to minimise impacts. Avoidance of impact to archaeological and cultural heritage sites through design of the development is the primary mitigation and management strategy and should be implemented where practicable. As part of the management and mitigation measures for the proposed works, an ACHA including archaeological survey and consultation with the Aboriginal community was undertaken. This was done to determine the presence and nature of any potential Aboriginal sites so that appropriate management could be undertaken. The assessment did not identify any Aboriginal sites or objects and the study area has been assessed as having low archaeological potential. However, this assessment has contributed to our knowledge of Aboriginal land use in the area and will be available for future generations to build on in line with inter-generational equity principles.

6.4.1 No further archaeological work required

No further archaeological work is recommended for the study area. The study area has been assessed as having low archaeological potential and no further investigations are recommended in this area. This recommendation is conditional upon Recommendations 2-6 outlined in this report.

Legend

Study area

Archaeological potential

Low

Figure 10 Impact assessment

0 5 10 15 20

Metres

Scale: 1:500@ A3

Coordinate System:
GDA 1994 MGA Zone 56

N

biosis

Matter: 38545, Date: 03 September 2024,
Drawn by: AM, Checked by: CG, Last edited by: hliswoyo
Location: P:\38500s\38545\Mapping\
38545_SeniorsLivingVillage, Layout: 38545_ACHA_F5_ImpactAssessment

Acknowledgements: Basemap © Land and Property Information 2016; Lower ground floor plan © Morrison Design Partnership Pty Ltd, July 2024; Imagery © Department of Customer Service 2020

7 Recommendations

Strategies have been developed based on the archaeological (significance) of cultural heritage relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter.
  - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area being assessed as having low archaeological potential. This recommendation is conditional upon Recommendation 2 to 5.

Recommendation 2: Continued consultation with the registered Aboriginal parties

As per the consultation requirements, it is recommended that the proponent provides a copy of this report to the RAPs and considers all comments received. The proponent should continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project.

Recommendation 4: Discovery of unanticipated Aboriginal objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to disturb an Aboriginal site without a consent permit issued by Heritage NSW. Should any unanticipated Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 5: Discovery of unanticipated historical relics

Relics are historical archaeological resources of local or State significance and are protected in NSW under the Heritage Act. Relics cannot be disturbed except with a permit or exception notification. Should unanticipated relics be discovered during the project, work in the vicinity must cease and an archaeologist contacted to make a preliminary assessment of the find. The Heritage Council will require notification if the find is assessed as a relic.

Recommendation 6: Discovery of human remains

If any suspected human remains are discovered during any activity, you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

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Appendices