

**Proposed 7 Lot Rural Subdivision of Portion 14 and Boundary Adjustment
of Lot B in DP 33573 at Picnic Point, Wonboyn Lake, via Eden NSW
Aboriginal Archaeological Assessment**

A Report to
The Planning Group
PO Box 1612
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1. SUMMARY

1.1 Introduction

New South Wales Archaeology was commissioned by The Planning Group in January 2007 to undertake an Aboriginal archaeological assessment of a proposed subdivision of Portion 14 and a boundary adjustment with adjoining Lot B DP33573 at Wonboyn, via Eden on the Far South Coast of New South Wales.

It is proposed to subdivide the land measuring 131.1 hectares into seven rural lots including six smaller lots and a large residual lot (also rural) containing the majority of the land. The smaller lots measure between 2.6 and 4.62 hectares in size while the seventh lot contains the residual land after subdivision. The majority of this lot would remain undisturbed with the exception of a dwelling envelope, proposed right of carriageway and fire trail.

The property comprises undeveloped eucalypt forest and is bounded in the east and west by the Wonboyn River.

The proposed development is a Major Project and Part 3A of the Environmental Planning and Assessment Act 1979 applies. The Director-General, NSW Department of Planning, has issued The Planning Group with a list of requirements relating to the environmental assessment of the proposal. In accordance with these requirements this Aboriginal archaeological assessment has been prepared for the purposes of informing the planning and assessment process.

This project has been managed by Julie Dibden, New South Archaeology Pty Ltd.

1.2 Partnership with the Aboriginal Community

The proposal area falls within the boundaries of the Eden Local Aboriginal Land Council (ELALC). This assessment has been conducted in accordance with the Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (NSW DEC 2004). ELALC registered an interest in the project via telephone.

Mr Bobby Maher and Mr BJ Cruse, ELALC conducted the field inspection of the property with a representative of New South Wales Archaeology Pty Ltd.

1.3 Proposed Impacts

It is proposed to subdivide the land into six smaller lots and one residual lot. The impacts include:

- The main access roads and service easements;
- Driveways and service easements to each house site; and
- Building envelopes.

The six smaller lots will range in size from 2.6 hectares to 4.68 hectares and equate to a total of 18.15 hectares. The proposed right of carriageway and associated fire trail equates to a total easement of approximately 3.2 hectares. As such the maximum area of impacts is 22.35 hectares, and given that each building envelope is less than half the size of the respective lot the total area of proposed impacts is estimated to be around 13 hectares, or approximately 10% of the total property area.

1.4 Methodology

The New South Wales National Parks and Wildlife Service (now the Department of Environment and Climate Change – the NSW DECC) has prepared a draft document which provides a series of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales. This report has been prepared in accordance with these draft guidelines (NSW NPWS 1997).

The investigation has included both a literature search and field survey. The study has sought to identify and record any Aboriginal archaeological objects which may be present in the areas of direct impact, to assess the archaeological potential of the landform elements present and to formulate management recommendations based on the results of background research, field survey and an analysis of results.

The archaeological assessment undertaken during this study has been focused on surveying the areas of direct impacts associated with the proposal. As such the study has not sought to assess the entire area of the property but has focused on the six smaller rural lots and the area of direct impacts in the larger rural residual lot. Areas of proposed direct disturbance include:

- The main access roads and service easements;
- Driveways and service easements to each house site; and
- Building envelopes.

The approach to recording in the current study has been a 'nonsite' methodology: the elementary unit recorded is an artefact rather than a site. It is assumed that stone artefacts will be distributed across the landscape in a continuum with significant variations in artefact density and nature in different landform elements. While cultural factors will have informed the nature of land use, and the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to analyse archaeological variability across the landscape. Accordingly in this study while the artefact is the elementary unit recorded it is the Survey Unit which is utilised as a framework of recording and analysis.

A landscape based approach and methodology has therefore been implemented during this study. The proposal area has been divided into a number of Survey Units each of which have been defined on the basis of a combination of environmental variables. These areas are termed *archaeological terrain units* which in this study have been defined according to landform element, gradient and aspect.

1.5 Landscape Context

The property comprises undeveloped eucalypt forest and is situated adjacent to the Wonboyn River. Topography within the proposal area comprises broad open ridge and spur crests, low to moderate gradient slopes and a foreshore that varies from open low gradient slopes to a narrow shore backed by steep gradient banks. There are four ephemeral first order drainage lines that feed into the Wonboyn River which itself bounds the property on the western, eastern and part of the northern side. The residential subdivision proposal is concentrated in the eastern part of the property. The proposed blocks are on the spur crests and slopes overlooking the northern reaches of Wonboyn Lake. Access to these blocks would be via a road that traverses the eastern and northern sections of the main ridge crest.

1.6 Archaeological Context

A search of the New South Wales Department of Environment and Climate Change (DECC) Aboriginal Heritage Information Management System (AHIMS) has indicated that there are no previously recorded Aboriginal objects situated within the proposal area (AHIMS # 17774). This absence of prior recordings is likely to be a factor of lack of previous investigations rather than a true reflection of the archaeological status of the proposal area.

A number of sites have been recorded within the wider Wonboyn region. These have included:

- stone artefacts;
- burials; and
- middens.

Middens, artefact scatters and burials are well documented site types found on the New South Wales Far South Coast. Midden deposits can be found on headlands, in shelters, and adjacent to estuaries and wetlands. Artefact scatters are found across the full range of environmental zones, and their size and nature can be expected to reflect different landuse patterns of exploitation. Large and complex artefact scatters are most likely to be found in areas where a number of different resource zones and a source of reliable fresh water are present. Human burials are typically found in sandy deposits.

Based on the review of selected research a predictive model of site type and location has been constructed for the proposal area. Aboriginal stone artefact density is predicted to vary across the property, ranging from low to low/moderate. Landform elements such as ridge and spur crests can be expected to contain relatively higher density artefact distributions. Additionally midden material might be expected on the low gradient slopes and crests adjacent the estuary. The potential for burials in the proposal area is assessed to be low but cannot be discounted. This evidence is predicted to be representative of Aboriginal land use such as repeated encampments and exploitation of the local environment and its resources.

1.7 Results

Three Aboriginal artefact locales were identified within the study area. Only one of these recordings (Artefact locale SU7/L1) is in an area of proposed impacts. A number of Survey Units are predicted to contain archaeological deposit in a subsurface context.

1.8 Conclusions

Of the total survey area (41.6 ha) 15.83 hectares was subject to direct visual inspection. Average ground exposure encountered is calculated to have been 0.4 hectares with 0.0158 hectares of that area assessed to be effective archaeological visibility. Effective Survey Coverage is calculated to have been 0.04% of the total survey area.

The effective survey coverage achieved during the survey is very low, although fairly typical of what is encountered in undeveloped coastal forests. This poor effective survey coverage is a result of dense undergrowth combined with extensive leaf litter affording minimal surface exposures and minimal breaching of potential artefact bearing soils within those exposures. It is assessed that visibility variables were less than adequate for providing a reliable characterization of the archaeological status of the land based on the results of the field survey alone.

Based on a consideration of the predictive model applicable to the study area it can reliably be asserted that there is a high likelihood of subsurface deposits being present in the study area. The nature and significance of any potential subsurface deposits which might be present in the study area is difficult to predict with any reliability. However a prediction of the relative archaeological potential is indicated in relation to each individual Survey Unit within the study area has been undertaken.

A total of 14 stone artefacts at three artefact locales were recorded during the field inspection. All artefacts were found on either spur crests or low gradient slopes along the foreshore of the lake. While the overall number of artefacts and occurrences of midden is relatively low, this is thought to be a reflection of the poor visibility encountered rather than the true archaeological status of the study area. The recorded artefact locales were identified in areas of locally increased visibility. As such it is reasonable to expect that artefacts and midden are likely to occur across other sections of the study area but were not detected due to the low visibility.

1.9 Recommendations

The following recommendations are based on the following:

- Consideration of the local landscape, biodiversity and predictive model of site type and location relevant to the proposal area.
- The results of the investigation as documented in this report.
- A consideration of the low effective survey coverage encountered during the survey and recognition that the limited archaeological material recorded is unlikely to be a comprehensive and accurate reflection of the archaeological status of the area.
- An analysis of the survey results.
- Consideration of the type of development and the nature of the proposed impacts.
- Consultation with the Bobby Maher and BJ Cruse, Eden Local Aboriginal Land Council. The assessment has been discussed with Bobby Maher in detail and he has strongly indicated his belief in the need for test excavation in the proposal area.

It is recommended that:

1. Aboriginal objects in the form of stone artefacts and shell midden were recorded in three locales on the property. One of these recordings is situated within a proposed building envelope (Lot 2); the remaining two locales are situated outside proposed impact areas.

2. Three Survey Units are predicted to contain Aboriginal objects (stone artefacts and shell midden) in low to moderate density in a subsurface context: Survey Units 3, 7 and 8. It is noted that there are no subdivision impacts proposed for Survey Unit 8. However various discrete impacts are proposed in Survey Units 3 and 7.

The nature of the predicted subsurface archaeological deposit in these Survey Units is not expected to exceed a significance threshold which would act to preclude proposed impacts.

However a strategy of impact mitigation is recommended to be implemented in regard to these Survey Units.

Given that Survey Units 3 and 7 are predicted to contain artefacts in low to moderate densities (between 20 and 50 stone artefacts per square metre) and isolated midden deposits it is concluded that an impact mitigation strategy of subsurface excavation is appropriate. Subsurface test excavation should be undertaken within areas of proposed impact in these two Survey Units.

The program of subsurface archaeological investigation will provide clarification in regard to the nature, extent, integrity and significance of the predicted subsurface archaeological deposit. This information will provide the proponent with a more informed basis for managing and mitigating impacts to the archaeological resource during the construction phase of the proposal.

3. There are no identified archaeological constraints in regard to Survey Units 1, 2, 4 and 6. It is recommended that inadvertent impacts be avoided in Survey Unit 8.

Acknowledgments

Gratitude is extended to the following people for their assistance in this project:
Bobby Maher and BJ Cruse, Eden Local Aboriginal Land Council
Jenny Titterton, The Planning Group
Mr Doug Hemmingway, Picnic Point Pty Ltd

2. INTRODUCTION

The proponent, Picnic Point Pty Ltd, is proposing to subdivide Portion 14 and adjust the boundary of Lot B in DP33573 at Wonboyn Lake on the Far South Coast of New South Wales. The proposal area is situated south of Eden, NSW.

It is proposed to subdivide the land measuring 131.1 hectares into seven rural lots including six smaller lots and a large residual lot (also rural) containing the majority of the land. The smaller lots measure between 2.6 and 4.62 hectares in size while the seventh lot contains the residual land after subdivision. The majority of this lot would remain undisturbed with the exception of a dwelling envelope, proposed right of carriageway and fire trail.

New South Wales Archaeology has been commissioned by The Planning Group to undertake an Aboriginal archaeological assessment in respect of the proposed subdivision.

This report aims to document:

- the subdivision proposal;
- the potential impact of the proposed development upon any Aboriginal objects present within the direct areas of impact;
- the methodology implemented during the study;
- the environmental setting of the study area in order to establish background parameters;
- a review of archaeological and relevant literature and listings on the NSW DEC Aboriginal Heritage Information Management System;
- any archaeological and heritage sites known to exist within the study area;
- a synthesis of local and regional archaeology;
- a predictive model of site location for the study area;
- the field survey strategy and results;
- the archaeological sensitivity of the study area and the impact of the development on the known and potential archaeological heritage;
- the significance of cultural heritage located within the study area;
- mitigation and management options relating to proposed impacts and Aboriginal heritage; and
- a series of recommendations based on the results of the investigation.

This project has been managed by Julie Dibden. Field work was undertaken by Rebecca Parkes, NSW Archaeology Pty Ltd and Bobby Maher and BJ Cruse (Eden Local Aboriginal Land Council). This report has been written by Julie Dibden and Rebecca Parkes.

3. ABORIGINAL CONSULTATION

This project has been undertaken in accordance with the NSW DEC Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (IGACC) (NSW DEC 2004). The NSW DEC requires proponents to undertake consultation with the Aboriginal community "...as an integral part of the impact assessment" process (NSW DEC 2004).

The NSW DEC manages Aboriginal cultural heritage in NSW in accordance with the National Parks and Wildlife Act 1974. Part 6 of the Act provides protection for Aboriginal objects and Aboriginal Places. When an activity is likely to impact Aboriginal objects or declared Aboriginal Places approval of the Director-General of the NSW DEC under s90 or s87 of the NPW Act is required. The decision as to whether or not to issue s90 or s87 is based on the supply to the NSW DEC by a proponent of adequate information to enable the Director-General to make an informed decision (NSW DEC 2004).

When administering its approval functions under the NPW Act the NSW DEC requires applicants to have consulted with the Aboriginal community about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and places present in the area subject to development (NSW DEC 2004).

The NSW DEC requires consultation with the Aboriginal community because it recognises the following:

- That Aboriginal heritage has a cultural and archaeological significance and that both should be the subject of assessment to inform its decision process;
- That Aboriginal people are the primary determinants of the significance of their heritage;
- That Aboriginal community involvement *should occur early* in the assessment process to ensure that their values and concerns can be taken into account and so that their own decision making structures can function;
- That the information arising from consultation allows consideration of Aboriginal community views about significance and impact and allows for management and mitigation measures to be considered in an informed way (NSW DEC 2004).

The community consultation process as outlined in the IGACC document aims to improve the assessment by providing the Aboriginal community with an opportunity to:

- Influence the design of the assessment of cultural and scientific significance;
- Provide relevant information about cultural significance values of objects/places;
- Contribute to the development of cultural heritage management recommendations; and
- Provide comment on draft assessment reports (NSW DEC 2004).

The role of the Aboriginal Community is outlined by the NSW DEC (2004) as follows:

- The Aboriginal community is the primary determinant of the significance of their heritage;
- The Aboriginal community may participate in the process via comment on the assessment methodology, contribution of cultural knowledge; and
- The Aboriginal Community may comment on cultural significance of potential impacts and/or mitigation measures.

In order to fulfil the consultation requirements as outlined in the IGACC document NSW Archaeology Pty Ltd, on behalf of the proponent, has adopted the following procedure:

1. Notification and Registration of Interests

The proponent has actively sought to identify stakeholder groups or people wishing to be consulted about the project and has invited them to register their interest.

Written notification about the project has been supplied to the following bodies:

- The Eden Local Aboriginal Land Council
- Bega Local Aboriginal Land Council
- Merrimans Local Aboriginal Land Council
- Bega Traditional Aboriginal Elders Council Inc
- Gadu Elders Group

- Mr Lionel P Mongta
- Native Title Services
- Bega Valley Shire Council
- Department of Environment and Conservation

In addition an advertisement has been placed in the Magnet newspaper (18th January 2007) providing notification of the cultural heritage study.

The final closing date of registration of interest was 21st February 2007.

The Eden LALC registered an interest in this project via telephone.

2. Preparation for the Assessment (design)

A proposed methodology has been sent to ELALC for review however no comments have been received.

3. Drafting, Review and Finalisation of the Cultural Heritage Assessment Report

The draft report will be provided to the Eden Local Aboriginal Land Council for review and comment.

The study area falls within the boundaries of the Eden Local Aboriginal Land Council (ELALC) as defined under the *Aboriginal Land Rights Act 1983* (NSW). Mr Bobby Maher was informed of the proposal by telephone. Bobby Maher and BJ Cruse assisted in the field survey.

All assessments in regard to archaeological sensitivity of the study area and management recommendations have been formulated jointly by Julie Dibden and Bobby Maher. The ELALC will provide documentation to the proponent in which its views in regard to management of Aboriginal objects and the development will be made.

4. PROPOSED IMPACTS

The information contained in this section of the report is provided in accordance with the NSW NPWS (1997) guidelines for archaeological survey reporting. A description of previous impacts, the proposal impacts and potential impact of the development on Aboriginal objects is described below.

4.1 Previous Impacts

The proposal area and the property as a whole have been subject to relatively limited prior impacts. Previous landuse impacts are characterized by a degree of vegetation clearance, camping activities and construction of graded roads and a power line easement in the west (outside impact zones). The extent of prior impacts over the eastern part of the property where subdivision is proposed is considered to be minor. While previous impacts may have caused some disturbance to Aboriginal objects this is likely to be very localized and limited.

4.2 Proposed Impacts

The proponent plans to subdivide the proposal area into six rural lots and one residual rural lot (Figure 1). This study is concerned with assessing the archaeological status of the proposed areas of direct impacts associated with subdivision.

The components of the proposal subject to this study are:

- Right of carriageway and associated fire trail access.
- Service easements.
- Driveways and service easements within individual lots.
- House site locations.

4.3 The Potential Impact of the Development on Aboriginal Heritage

The six smaller lots range in size from 2.6 hectares to 4.68 hectares and equate to a total of 18.15 hectares. The proposed building envelope, right of carriageway and associated fire trail in the larger residual rural lot equates to a total impact area of approximately 4.2 hectares. As such the maximum area of impacts is 22.35 hectares, and given that each building envelope is less than half the size of the respective lot the total area of proposed impacts is estimated to be around 13 hectares, or approximately 10% of the total property area.

Probable impacts relating to the proposal would include removal of vegetation and grading and sealing of the right of carriageway and individual driveways; removal of vegetation and grading along the proposed fire trail; installation of power and telephone lines; preparation of building sites including limited vegetation clearance, excavation of footings and/or foundations and installation of septic systems.

These activities have the potential to impact upon any Aboriginal archaeological objects which may be present.

4.4 Summary of the Potential Impact of the Development on Aboriginal Heritage

The entire property measure ca. 131.1 hectares in area, of which an estimated 13 hectares would be subject to direct impacts associated with the proposed subdivision. Each of the individual components of the proposal subject to this assessment, including main access road and service easement, individual access roads and service easements and the building envelopes comprise a total area of ca. 13 hectares. Accordingly, the area of direct impacts associated with the proposal is calculated to comprise an absolute maximum of 10.2% of the overall property area. Therefore approximately 90% of the property will not be impacted upon by the proposal and accordingly any Aboriginal objects situated within the wider area will not sustain impacts resulting from the proposal.

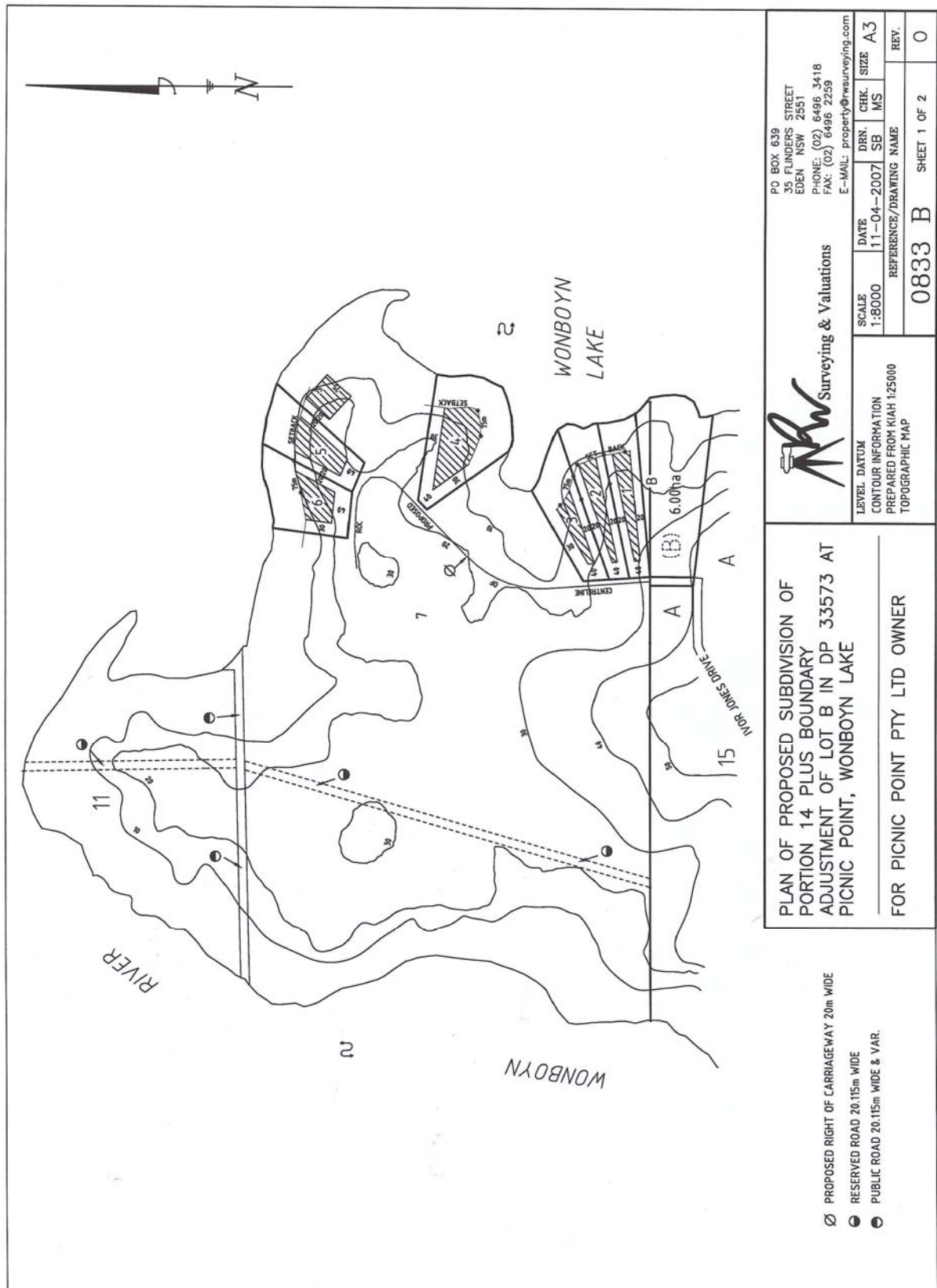


Figure 1. The proposed layout of the draft subdivision (map supplied by client).

5. STUDY METHODOLOGY

This Aboriginal archaeological assessment has included the following components:

- A review of site registers and heritage listings.
- A review of existing documentary information.
- The formulation of a survey strategy.
- A comprehensive field survey of the area of proposed direct impact.
- Documentation of survey results.
- An analysis of survey results.
- The formulation of recommendations ensuing from the above.

5.1 Literature Review

A range of documentation has been used in order to assess the current archaeological knowledge for the area in which the development is situated and the surrounding region. Documentary sources consulted have included the New South Wales Department of Environment and Conservation (NSW DEC) Aboriginal Heritage Information Management System and its associated catalogue of archaeological reports.

Background research has been used to determine if known Aboriginal heritage sites are located in the vicinity of the development and to facilitate site prediction on the basis of known regional and local site patterns in order to place the study area within an archaeological and research management context.

5.2 Field Survey

The field survey was carried out in April 2007. The field survey was undertaken on foot by three people and was designed to encompass all areas of direct impacts subject to the proposed subdivision as well as areas peripheral to those that would be directly impacted, particularly the areas along the foreshore that afforded marginally increased levels of ground visibility. The survey was focused on inspecting ground surfaces for evidence of stone artefacts and middens. Ground exposures inspected during the survey included wheel tracks, animal tracks and bare earth exposures. Survey coverage is described in Section 8 of this report.

While the field survey was aimed at locating Aboriginal objects (as defined under the NSW NPWS Act 1974 as amended) an assessment was also made of prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the potential archaeological sensitivity of the land.

The approach to recording in the current study has been a 'nonsite' methodology: the elementary unit recorded is an artefact rather than a site (*cf* Dunnell 1993; Shott 1995). The rationale behind this approach is that artefacts may be directly observed however 'sites' are a construction within an interpretative process. Given that it can be expected that full archaeological visibility will not be encountered during the survey the process of identifying site boundaries (if they exist at all) will not be possible.

However, it can be expected that artefacts will be distributed across the proposal area in a virtual continuum. This phenomenon is not anomalous; subsurface work conducted elsewhere in the south east confirms this pattern (see Dibden 2005a; 2005b; 2005c and 2006). Therefore in respect of stone artefact distribution the notion of site is itself a meaningless concept and cannot encompass or reflect the actual distribution of artefacts across the landscape. Given that artefacts are continuous in distribution and not discrete 'site' occurrences artefact distribution is better conceptualised in broad landscape based terms.

The density and nature of the artefact distribution will vary across the landscape in accordance with a number of behavioural factors which resulted in artefact discard. While cultural factors will have informed the nature of land use, and the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to analyse the variability in artefact density and nature across the landscape. Accordingly in this study while the artefact is the elementary unit recorded it is the Survey Unit which is utilised as a framework of recording and analysis (Wandsnider and Camilli 1992).

The study area has been divided into a number of Survey Units each of which have been defined on the basis of a combination of environmental variables which are assumed to relate to Aboriginal usage of the area. These areas are termed *archaeological terrain units* and in this study have been defined on the basis of a combination of landform element, gradient and aspect (*cf* Kuskie 2000: 67). The survey area is defined as an individual unit that is bounded on all sides by different archaeological terrain units; survey units are differentiated on the basis of variations in regard to landform element type, gradient and aspect (see Section 8: Table 1).

The rationale for employing this definition relates to its utility in regard to predicting the archaeological potential of landforms; archaeological terrain units are "...discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location may be extrapolated to other similar locations" (Kuskie 2000: 67). The archaeological evidence which is observed within individual survey units is assumed to be generally representative of the archaeological resource located within the entire survey unit.

Field survey was designed to encompass the entire area of direct impacts as well as many adjacent areas that afforded good ground exposure and suitable archaeological visibility. Field survey entailed a foot survey and was comprehensive within all areas of direct impacts. The survey methodology entailed walking parallel transects across individual archaeological terrain units. This methodology enabled direct visual inspection of as much of the ground surface of each survey unit as practicable.

All trees assessed to be of sufficient age as to bear evidence of Aboriginal scarring were examined.

6. ENVIRONMENTAL CONTEXT

A consideration of the landscape is necessary in archaeological studies in order to characterise and predict the nature of Aboriginal occupation across the land (NPWS 1997). In Aboriginal society landscape could be both the embodiment of Ancestral Beings and the basis of a social geography and economic and technological endeavour. The various features and elements of the landscape are/were physical places that are known and understood within the context of social and cultural practice.

Given that the natural resources that Aboriginal people harvested and utilised were not evenly distributed across landscapes, Aboriginal occupation and the archaeological manifestations of that occupation will not be uniform across space. Therefore, the examination of the environmental context of a study area is valuable for predicting the type and nature of archaeological sites which might be expected to occur. Factors which typically inform the archaeological potential of a place include the presence or absence of water, animal and plant foods, stone and other resources and as well, the nature of the terrain.

Additionally, geomorphological and humanly activated processes need to be defined as these will influence the degree to which archaeological sites may be visible and/or conserved. For example land which is heavily grassed will prevent the detection of archaeological material while land which has suffered disturbance may no longer retain artefacts or stratified deposits. A consideration of such factors is necessary in formulating site significance and mitigation and management recommendations.

The following section provides information in regard to the landscape context of the study area.

6.1 Local Environment

The property proposed for subdivision measures ca. 131.1 hectares in total, of which around 22.35 hectares would be subject to impacts under the current proposal. The property comprises undeveloped eucalypt forest; it is located at Wonboyn Lake, south of Eden on the NSW Far South Coast and is bounded in the east and the west by the Wonboyn River (Figure 2).

Topography within the proposal area comprises broad open ridge and spur crests, low to moderate gradient slopes and a foreshore that varies from open low gradient slopes to a narrow shore backed by steep gradient banks. There are four ephemeral first order drainage lines that feed into the Wonboyn River which itself bounds the property on the western, eastern and part of the northern side. The current subdivision proposal is concentrated in the eastern part of the property. The proposed blocks are on the spur crests and slopes along the northern and eastern boundaries of the property overlooking the northern reaches of Wonboyn Lake. Access to these blocks would be via a road that traverses the eastern and northern sections of the main ridge crest. Local elevation within the property ranges from ca. 5 m AHD along the shoreline to 30 m AHD on the highest sections of the ridge crest; the proposed development is largely within the range of 10-20 m AHD.

While the drainage lines within the proposal area probably would not have provided reliable fresh water in an Aboriginal land use context, the Wonboyn River-Lake complex would have been a resource rich zone targeted for hunting and gathering of a variety of resources including fish, shellfish and crustaceans. Fresh water might also have been accessible from the river along the western boundary as it appears that the nature of the water course has changed during the past century with an overall increase in the extent of the estuary (Pers. Comm. D. Hemmingway).

Geology within the proposal area consists primarily of late Devonian Merimbula Group sediments including sandstones, conglomerate, siltstones and shales. The Merimbula Group rests on the Ordovician (400 million years old) Mallacoota Beds or on Middle Devonian Gabo Island granite. Soils are generally poor, sandy to gravelly, acidic and easily eroded (DEC 2006).

Vegetation within the proposal area is dominated by open eucalypt forest (Plate 1). Some of the dominant species present include silvertop ash (*Eucalyptus sieberi*), woollybutt (*E. longifolia*) and red bloodwood (*E. gummifera*). The understorey and ground cover include sunshine wattle (*Acacia terminalis*), saw banksia (*Banksia serrata*), black oak (*Allocasuarina littoralis*) and common bracken (*Pteridium esculentum*). While the eucalypts are generally characterised by a relatively open distribution with limited sections of dense regrowth trees, the understorey is quite dense, particularly along the margins of the drainage lines where bracken fern is prevalent. There are few signs of logging within the study area; the most significant impacts to vegetation appear to have been bush fires, which have resulted in sections of dense regrowth eucalypts. Similarly, the area

does not appear to have been subject to any other extensive impacts associated with European settlement. The most noticeable impacts are 20th century litter associated with rough stone hearths in the southeast portion.

Summary

The local environment is considered to be archaeologically sensitive on environmental grounds. This assessment is based on a consideration of a number of factors including:

- Topography and gradient

Much of the proposal area is comprised of landforms such as low gradient spur crests and simple slopes with a north to northeasterly aspect. These landforms provide some protection from the prevailing cold weather systems from the southwest and have a gradient that is suitable for occupation. Accordingly, it can be expected that the spur crests and slopes along the eastern margins of the property, particularly those with a north to northeasterly aspect, might have been targeted by Aboriginal people for camping.

- Biodiversity and hydrology

The property as a whole is reasonably well endowed with resource zones that may have been targeted for use by the Aboriginal population on a repeated basis. The river and lake would have been the source of a variety of food possibilities, while the upper stretches of the river might also have supplied fresh water. The forests across the ridge would also have provided a range of food sources and resources for constructing shelters, canoes and wooden implements. There is however an absence of stone resources suitable for tool making.

- Previous landuse impacts

The proposal area and the property as a whole have been subject to relatively limited prior impacts. Previous landuse impacts are characterized by a degree of vegetation clearance, camping activities and construction of graded roads and a power line easement in the west (outside impact zones). The extent of prior impacts is considered to be minor.



Plate 1. Eucalypt forest typical of the study area. View to the northeast across Survey Unit 1.

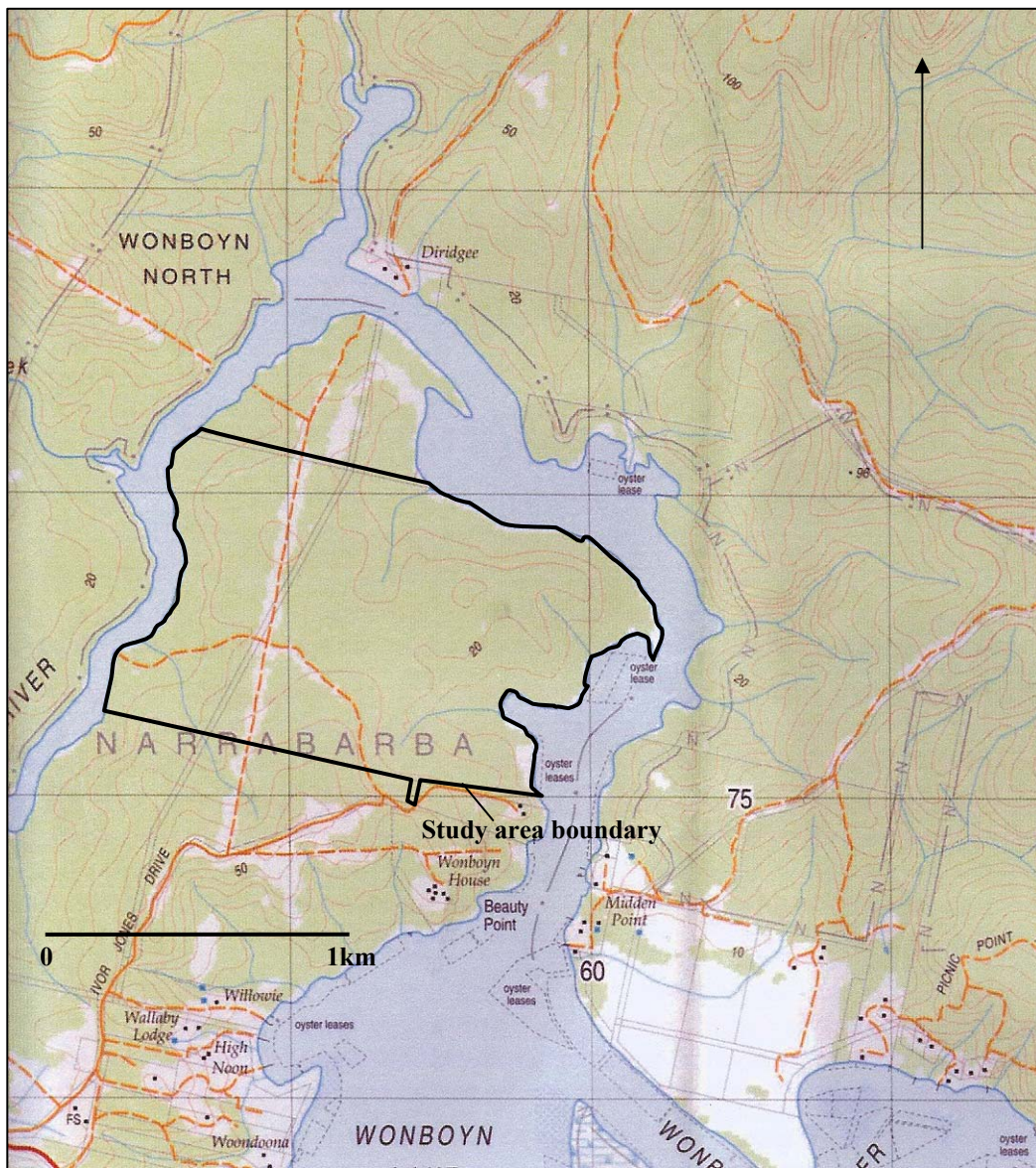


Figure 2. The location of the proposal area within its local topographic context (Kiah 8823-1-S 2nd ed. CMA: AGD).

7. ARCHAEOLOGICAL CONTEXT

7.1 Archaeology – Regional Overview

On the basis of archaeological research it is known that Aboriginal people have occupied Australia for at least 40,000 years and possibly as long as 60,000 years (Mulvaney and Kamminga 1999: 2). By 35,000 years, all major environmental zones in Australia, including periglacial environments of Tasmania, were occupied (Mulvaney and Kamminga 1999: 114).

Late Pleistocene occupation of south east Australia has been established by radio carbon dating of cultural material from a number of sites (Boot 1994; Bowdler 1970; Lampert 1971, Ossa *et. al* 1995). It is therefore reasonable to assume that the study area was similarly occupied during this time.

At the time of early occupation Australia experienced moderate temperatures. However, between 25,000 and 12,000 years BP (a period called the Last Glacial Maximum) dry and either intensely hot or cold temperatures prevailed over most of the continent (Mulvaney and Kamminga 1999: 114). At this time the mean monthly temperatures on land were 6-10°C lower; in southern Australia coldness, drought and winds acted to change the vegetation structure from forests to grass and shrublands (Mulvaney and Kamminga 1999: 115-116).

With the cessation of glacial conditions, temperatures rose with a concomitant rise in sea levels. During the Late Pleistocene the sea was as much as 130m below the present level, and accordingly, the continent was correspondingly larger. By ca. 6000 BP sea levels had more or less stabilised to their current position. With the changes in climate during the Holocene Aboriginal occupants had to deal with reduced landmass and changing vegetation and hydrological systems; forests again inhabited the grass and shrublands which had been present at the time of the Late Glacial Maximum. As Mulvaney and Kamminga (1999: 120) have remarked:

When humans arrived on Sahul's shores and dispersed across the continent, they faced a continual series of environmental challenges that persisted throughout the Pleistocene. The adaptability and endurance in colonising Sahul is one of humankind's' inspiring epics.

The majority of recorded sites located in the south east date from the mid to late Holocene, at the time the sea more or less stabilized at its current level. Common Aboriginal objects include stone artefacts, middens, rock shelters containing surface artefacts and/or occupation deposit and/or rock art, and grinding groove sites. The distribution of each site type is related to variance in topography and ground surface geology. Rare site types include scarred trees, quarry and procurement sites, burials, stone arrangements, carved trees and traditional story or other ceremonial places.

The study area lies within the area defined by Tindale (1974) as that belonging to the Thaua people. The Thaua people are described as occupying land south from Wallagoot Lake to Green Cape (south of Eden) and inland to the escarpment of the Great Divide. Tindale (1974) notes that there were two groups of Thaua, the Katungal, or 'sea coast people' and the Baianbal or Paienbara, the inland 'tomahawk people'. Both 'tribes' belonged to the Yuin 'cultural area' whose groups shared cultural characteristics such as a common initiation ceremony and closely related languages. Eades (1976) describes the Dyirringan language as being spoken in the area between Wallaga Lake and Twofold Bay with the Thawa language spoken south of Twofold Bay.

Observations from the Bega/Eden region indicate that Aboriginal people relied heavily on coastal resources such as fish and shellfish and that camps were located on coastal dunes or in forests within close proximity to the coast (Sullivan 1982). Ethnohistorical records note that fishing methods utilised on Black Ada Lagoon near Tathra, involved a combined effort of people driving fish to one end of the lagoon where they could be easily speared (Smith 1970:5).

A number of historical sources refer to Aboriginal people exploiting beached sea mammals. Frazer (1892) noted that at Twofold Bay and along the South East Coast:

"...a stranded whale is a god-send to the tribe. When the news spreads, they come down in multitudes to enjoy the feast and for many days they may be seenhurrying in and out of the body of the monster."

Robinson noted that a dead porpoise near Twofold Bay was similarly eaten (cited in Sullivan 1982).

The proposal area is situated between two major resource zones, the estuary and its forested hinterland. Accordingly both marine and terrestrial species of mammals, birds, fish and reptiles were available for economic exploitation.

7.2 Previously Recorded Sites

A search of the NSW DEC Aboriginal Heritage Management Information System was conducted on the 16th January 2007 (AHIMS search #17774). The search was undertaken for an area encompassed by Eastings: 757000-761000 and Northings: 5874000-5878000.

Three Aboriginal sites are recorded on AHIMS as being present within the site search area. None of the sites listed in the AHIMS search are present in the study area.

The grid reference for one of the sites and its associated site card are not available. However a review of the associated report (Moore 2005) indicates that this site is not located within the proposed impact area.

The AHIMS register only includes sites which have been reported to NSW NPWS/DEC. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal sites situated within the local area. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. It should be expected that unrecorded Aboriginal objects are likely to be present in the proposal area.

The following discussion in Section 7.3 will present a review of previous archaeological work in the region for the purposes of producing a predictive model of site type and location for the study area.

7.3 Archaeology – The Study Area

Numerous studies have been undertaken, both in an academic and consultancy context, on the Far South Coast region. Consideration of a predictive model of site type and site location within a geographical context relevant to the study area can be made through recourse to these previous studies. From this a contextual and relevant assessment of the archaeological potential of the study area can be formed.

The consideration by a number of researchers with regard to the nature of Aboriginal occupation on the South Coast prior to European settlement has resulted in conflicting arguments. Perceived higher site densities on the coast compared to forested hinterland contexts have led researchers, until recently, to argue that the coast was the focus of Aboriginal occupation and landuse.

Poiner (1976) proposed semi-nomadic occupation of the coast during summer and nomadic occupation of both the coast and hinterland during winter. However, this model was based on scanty evidence (Hiscock 1982) and an assumption that hinterland sites were few in number, small and widespread (Boot 2002). The strong seasonal focus of Poiner's (1976) model is inappropriate however, given that the mesothermal climate which prevails on the south coast presents only limited seasonal variation (Boot 2002).

Attenbrow (1976) argued that the major determinant of Aboriginal land use would have been the carrying capacity of the land. While Attenbrow (1976) proposed that groups would have utilized the coast and inland at all times of the year she argued that in spring, summer and autumn more people in larger numbers would have occupied the coastal zone practicing a largely marine economy and in winter smaller groups would be spread more evenly across country subsisting on a higher proportion of land animals. She predicted that areas such as coastal margins and inland valleys would have supported larger populations than the mountain slopes or foothills.

The forest-woodland environment contains large numbers of land mammals and plants (Attenbrow 1976). Poiner (1976) and Attenbrow (1976) have argued that both inland and marine resources declined in both range and abundance during winter. Poiner (1976) argued that the sea was the source of the bulk of food resources.

Vallance (1983) argued that a range of subsistence strategies would have been pursued and that these would have varied both within and between seasons and from year to year. This shift away from a seasonal model has been further expanded by Boot (1994) who has predicted that based on the Vallance (1983) model larger archaeological sites could be expected to be situated in areas where large quantities of food are available, either on a single occasion or on a regular basis, with smaller sites located elsewhere reflecting short term occupation or movement between focused occupation sites. Based on work undertaken during his doctoral research Boot (1994) has argued that the hinterland occupation was "widespread and very dense..." during the past 4000 years.

Prior to these debates within the academy, Geological Surveyor William Anderson recorded and excavated several Aboriginal midden sites in the region (Anderson 1890). Anderson (1890) mapped the location of major 'shell-heaps' at Wagonga Inlet and Pambula Lake. Anderson noted that the coastal zone in the area "...seems from all accounts to have been permanently inhabited by certain tribes of Aborigines, who occupied specialized areas in the district". Anderson (1890) described the results of the excavation of two middens at Wagonga Inlet in some detail. Both contained deep deposits; one 5' deep and the other 3'. The skeleton of a dingo was retrieved from one midden. Anderson excavated one mounded at Pambula River (Site 10) and the results led him to conclude that the Pambula mounds differed to Wagonga mounds in that they had more mud oysters and two species of mussel. Anderson also retrieved fish and 'vertebrate' bones (1890).

Anderson mapped a large number (concentrations in 17 locations) of middens on the Pambula River shoreline.

Sullivan (1982) subsequently examined the middens of the south coast as the topic of her doctoral research. Sullivan (1982) calculated that when Anderson inspected the Pambula middens approximately 57,000 cubic metres of shell midden was present on the estuarine shoreline. At the time of her inspections this was reduced to ca. 55,000 cubic metres.

Sullivan (1982) argued that the inlet of Pambula Lake seems to have been a focus of Aboriginal activity. The middens at Pambula River include primarily estuarine species such cockle, mud oyster, rock oyster, whelk and mussel with occasional rock platform species including abalone, warrener (*Cabestana splengleri*), nerite and *Austrochlelea*.

Test excavation was carried out by Sullivan (1982) at one mounded midden on the shore of Pambula Lake. The age of the base of the midden was determined by radiometric analysis to be about 3,000 years BP. The shell was broadly divided into an upper, middle and lower midden. The upper midden was found to be composed mainly of edible mussel with a low proportion of hairy mussel which has had accumulated between 1,200 years BP and the time of European contact. The middle midden contained mainly hairy mussel and mud oyster and had accumulated between 3,000 and 2,300 years BP. The lower midden was made up primarily of mud oyster and its accumulation was found to have commenced at 3,000 years BP (Sullivan 1982).

The excavated midden was found to contain fragmented bones of fish, bird, and land and sea mammals. The bones of small marsupials including wallaby, possum and other medium sized animals were interpreted as indicating consistent exploitation throughout time while larger animals including sea mammals and kangaroos occurred sporadically indicating irregular exploitation. The bones from 12 different species of fish were found. Their differential distribution through the deposit allowed Sullivan to infer a diversification of fishing methods through time (Sullivan 1982).

Both bone and stone artefacts were recovered. Flaked stone artefacts were made from silcrete, quartz and acid volcanic. Silcrete and backed artefacts are present in the earliest (lower) part of the deposit only and quartz (with low incidences of bipolar features) dominated the stone assemblage from 1,900 years BP. This pattern, argued Sullivan (1982), corresponds to the previously defined Bondaian and Post Bondaian periods.

A limited number of archaeological studies have been undertaken in the Eden area. Accordingly the following review will consider work conducted within the wider area.

Lourandos (1974) conducted surveys of a number of locations situated between Wallagoot Lake and Nadgee Nature Reserve. Three sites were recorded near the entrance of the Merrica River south of Wonboyn, including a midden on a headland and two small rock shelters containing deposit.

Bowdler (1982) conducted an emergency salvage excavation of an Aboriginal human burial at Wonboyn Beach at the request of the NSW National Parks and Wildlife Service. The burial was situated in a 1.1m high sand cliff of an exposed hind dune at ca. 75 m north of Snake Creek at the south end of Wonboyn Beach. The skeleton was found to be almost complete and it appeared to be resting on a wood or bark support. The skeleton was determined to probably be a mature male dating to between 500 and 1000 years old.

Byrne and Smith (1987) conducted a survey for Aboriginal sites in selected locations within the state forests of the Eden area. Twenty two sites were recorded nineteen of which were artefact scatters. The remainder included a midden, stone arrangement and quarry. Fifty percent of the open sites were situated in saddles, 25% on ridge summits and 25% on creek banks/flats. Artefact numbers and densities were found to be low however, poor visibility variables encountered at sites was suggested to explain this feature.

Fuller (1988) conducted a survey at Quarantine Bay situated at Eden. An area measuring 4.5 ha comprising a steep hilltop landform was surveyed. Despite apparently good visibility no sites were recorded. This result was explained to be a factor of the low sensitivity of the landform given the steep gradient, rocky substrate and absence of fresh water.

Byrne (1990) conducted a survey of various roads proposed by the NSW Forestry Commission of NSW in the Eden and Bombala areas. Seven artefact scatters and three isolated finds were recorded. All scatters were situated on flat locations on ridgelines and contained low artefact numbers. The artefacts were predominantly quartz.

Williams (1995) conducted subsurface probing at Old Road Creek, 15 km south of Boydtown in response to a proposal by Optus to install a Fibre Optic Cable in an area previously identified to be an area of high archaeological potential. The landforms investigated comprised a flat floodplain with a low spur situated north of the creek and an elevated flat spur south of the creek. The creek itself is a permanent fresh water source. Artefacts were recovered from the low spur situated on the north side of the creek. The results indicated the presence of a shallow, moderate to high density subsurface artefact occurrence situated on the crest of the spur. The majority of the artefacts recovered were made of silcrete with quartz also found to be common.

The Greenglade rock shelter at Wonboyn Beach was excavated by Colley (1997). Occupation of the site was established by radio carbon dating to have extended from 600 years BP (before present) until the 19th century. The site was found to contain shell midden and glass artefacts. Colley (1997) also excavated an open midden at Baycliff. A date of 330±110 BP was obtained from charcoal retrieved from 55 cm below the surface.

English (1997a) conducted a survey and subsurface augering program at Baycliff and Greenglade, near Wonboyn. The work was undertaken in response to a proposal by NSW NPWS to install new infrastructure facilities in the Nadgee Nature Reserve. The Baycliff survey area is situated at the north end of Wonboyn Beach and adjacent to the south side of Wonboyn Lake. The area is comprised of a hind dune system of low relief and an area adjacent to Wonboyn Lake comprised of a narrow beach backed by a steep sandy slope. The Greenglade survey area is situated at the south end of Wonboyn Beach and is comprised of level ground bordered to the south and southwest by steep sandstone slopes and cliffs and in the east by the beach. No previously unrecorded archaeological material was located during the investigations.

English (1997b) conducted a subsequent investigation in the Greenglade and Wonboyn areas. The survey was focused on a proposed walking track extending from Greenglade to Merrica River. The track traversed moderate to steep gradient spurlines west of the coastline. No sites were recorded. A vehicle track network from Wonboyn to Greenglade and Baycliff and an access track to the centre of the beach was also surveyed (some auguring was also conducted) in areas both west and within the Wonboyn Beach hind dune system. No sites were recorded.

Navin Officer Heritage Consultants (1999) identified fourteen sites during a survey conducted at East Boyd for inclusion within an Environmental Impact Study relating to the proposed wharf, commercial facility and Naval Munitions Storage Facility. Sites recorded included two middens, ten artefact scatters, two isolated finds and five areas assessed to have the potential to contain subsurface archaeological material.

The Aboriginal site East Boyd 3 and PAD2 were subsequently subject to a program of subsurface excavation (Navin Officer Heritage Consultants 2000). A total of 485 stone artefacts were retrieved from twenty seven hand excavated pits. Raw materials present included quartz, chert, silcrete, quartzite, tuff, fossil wood, rhyolitic tuff and ochre. Chert, quartz and silcrete were the most common materials. The excavation results indicated that midden and stone artefacts were concentrated on the coastal margin of the headland crest at Munganno Point. Given the nature of the evidence the site was considered to be representative of occasional activity over a long period of time rather than sustained occupation.

Heffernan and Boot (2000) document the results of the SEFRAC Archaeology Project conducted within the Eden Management Area (EMA). Over 1100 Aboriginal sites are recorded in the EMA. Based on the known population and density of sites a predictive study has indicated that over 11 million sites may remain undiscovered within the EMA. Based on survey data the most likely locations of Aboriginal sites are identified to be: ridges and flats with slopes of 10° or less; all elevations below 1300 m above sea level; areas of granite and sedimentary geology; areas which once contained lowland and mid altitude forests and in areas presently vegetated with dry forest and woodland.

Boot (2000) surveyed a proposed walking track at Green Cape, Ben Boyd National Park. The study area traversed an area situated close to the cliff top of the Green Cape headland. Poor visibility was encountered. No sites were recorded however the area was assessed to potentially contain middens.

Boot (2001) surveyed a proposed beach access track at Jewfish Beach on the south western shore of Wonboyn Lake. The areas surveyed included forest and wetland contexts. One site containing eighteen stone artefacts and two pieces of midden shell was recorded on level dry ground adjacent to the wetland.

Barber (2001) conducted a survey of the Bittangabee Campground, Ben Boyd National Park. The survey was undertaken in response to a NSW NPWS proposal to upgrade the camping area. The area is situated on the end of a long wide spur which extends north east from Skeleton Hill, situated ca. 3 km to the south west. The area forms a headland situated immediately to the south of Bittangabee Bay inlet.

Two occurrences of midden material and 91 stone artefacts were recorded by Barber (2001). Stone artefacts were found to be distributed across the entire study area. Artefactual materials recorded included fine grained siliceous stone, chert, quartz, quartzite, rhyolite, silcrete and volcanics with quartz and rhyolite dominating the raw material count. The recording of four hammerstones was interpreted to indicate the manufacture of implements at the site.

Barber (2002) subsequently conducted subsurface test excavation at the Bittangabee Bay site. Twenty six test probes were undertaken in three areas of the site. The site was found to contain relatively intact subsurface archaeological deposit. The excavated material was assessed to be representative of flaking and quartz was found to be the most common raw material.

Navin Officer Heritage Consultants (2003) conducted a survey of an alternative commercial facility location at East Boyd Bay. The area is situated at ca. 375m inland from Fisheries Beach and south east of Munganno Point and comprises upper and mid west facing slopes of the Jews Head ridgeline and the crest and upper slopes of two minor spurs. Three artefact scatters and two isolated finds were recorded.

Dibden (2004) conducted an assessment of the Boydtown site and recorded a large number of stone artefacts distributed across a number of different landform elements.

Dibden (2006) surveyed the Davidson Whaling Station site for the NSW NPWS. Visibility variables were low however several locales containing stone artefacts were recorded on simple slopes situated above the estuary.

A number of archaeological studies have been conducted in the Pambula/Merimbula area in similar environmental contexts to that of the current study area (Barber 1998; Hughes 1982; Hughes 1993; Kuskie and Gutierrez 2000; Kuskie and Webster 2001).

Hughes (1982) investigated an area on the northern shores of Merimbula Lake. The property consisted of low sandy flats, cliffs and slopes above the lake. Six midden sites situated on the cliffline at the junction of the hill slopes and rock platforms and estuarine sand flats were recorded. The relatively intact, large middens consisted almost entirely of estuarine species: rock oyster, mud oyster, cockle, mud whelk and mussel, the later being present in the upper parts of the middens only. Stone artefacts, charcoal, fish bones and scales were also noted in some middens (Hughes 1982).

Hughes (1983) conducted a further study of the Merimbula Lake foreshore and slopes above the lake. An additional nine sites, eight discrete middens/midden complexes and a stone artefact scatter were located. Hughes (1983) indicated that midden material is virtually continuous along parts of the cliff line and estuarine sand flats fronting the lake. As a result of the analysis of this work Hughes (1983) argued that the archaeology in the Merimbula Lake area was found to differ to that in the Bega River estuary located to the north. While sites in the north are of a high density they tend to be predominantly surface scatters of stone artefacts with very few shell middens. Hughes (1983) argued that the relative lack of shell midden at the Bega River appears to reflect the low shell fish productivity of the estuary river mouth as compared to both the Merimbula and Pambula Lakes.

Kuskie and Gutierrez (2000) conducted a survey of the ten hectare Merimbula Cove property located on the northern shores of Merimbula Lake. Six Aboriginal sites were located including middens, one artefact scatter and one isolated stone artefact. The middens contained estuarine shellfish species of predominantly cockle with some mud oyster and whelk. Stone artefacts were made on locally available rhyolite and quartz and were interpreted to be representative of non-specific flaking activities and microblade production. Kuskie and

Gutierrez (2000) found that sites were tethered to level to moderate sloping simple slopes and spur crests within 100 m or so of the lake margin.

Kuskie and Webster (2001) conducted test excavation at a midden site situated on a ridge crest overlooking Merimbula Creek. The investigation revealed the presence of three low density scatters of shell across site. No stone artefacts were recorded.

In summary, middens and stone artefacts are commonly found on the New South Wales Far South Coast. Midden deposits can be found on headlands, in shelters, and adjacent to estuaries and wetlands. Stone artefacts are found across the full range of environmental zones and their density can be expected to reflect different landuse patterns of exploitation. High density distributions are most likely to be found in areas where a number of different resource zones and a source of reliable fresh water are present.

7.4 Archaeological Potential of the Study Area

The literature review presented above indicates that in coastal environments on the far south coast middens and stone artefact scatters are commonly recorded sites. Human burials and scarred trees are also recorded, albeit in low numbers.

Given the location of the study area near the confluence of a number of different resource zones it is possible that the area may have been utilised on a reasonably regular basis for harvesting of estuarine resources and camping. Accordingly, the nature of the archaeological evidence at the site is likely to reflect this type of Aboriginal occupation.

Based on a consideration of the review of prior research conducted in the Eden area the following predictions are made:

Stone Artefacts

Stone artefacts are located either on the surface and/or in subsurface contexts. The raw materials used for artefact manufacture in the Eden area include acid volcanics, quartz and silcrete (*cf* Sullivan 1982).

Silcrete is locally available in the Pambula Lake catchment (Sullivan 1982).

Quartz (opaque milky white to pink) is locally available as veins throughout the Devonian sandstone and minor volcanic outcrops. Quartz (translucent white, glassy or crystalline) pebbles are also available from Tertiary gravels within the Pambula Lake catchment, and occurs as subrounded to subangular beach pebbles on the lake foreshore (Sullivan 1982).

Acid volcanic rock varying from equigranular uniformly reddish material, to flow-banded, variously coloured rhyolite and grey to green porphyritic is derived from the Eden Rhyolite which is present in the Pambula Lake catchment and in pebble beaches on the lake shores (Sullivan 1982).

The detection of artefact scatters depends on ground surface factors and whether or not the potential archaeological bearing soil profile is visible. Prior ground disturbance, vegetation cover and sediment/gravel deposition can act to obscure artefact scatter presence.

Based on the results of previous surveys in the local area and the environmental context of the proposal site it is assessed that archaeological evidence in the form of stone artefacts may be present in the proposal area.

Grinding Grooves

Grinding grooves are found in rock surfaces and result from the manufacture and maintenance of ground edge tools. Given the absence of sandstone exposures in the study area grinding groove sites are unlikely to be present.

Burials sites

Several Aboriginal burial sites are known to have been present within the wider region. Burials are generally only visible in areas where the deposit has been disturbed either by natural erosion or human activity. This site type is not usually found during field survey.

Two burials have previously been recorded in the Wonboyn/Greenglade area both of which have been found in hind dune contexts. Both burials were situated within 30 m of each other (English 1996).

The potential for burials to be present within the study area is assessed to be low (*but cannot be ruled out*) due to the absence of a suitable dune complex.

Rock Shelter Sites

Rock shelter sites will not be present in the study area given the absence of vertical stone outcrops.

Scarred and Carved Trees

Scarred and Carved trees result from the removal of bark for either domestic or ceremonial purposes. Carved trees associated with burial grounds and other ceremonial places have been recorded in the wider region. In an Aboriginal land use context this site type would most likely have been situated on flat or low gradient landform units in areas suitable for either habitation and/or ceremonial purposes.

Bark removal by European people through the entire historic period and by natural processes such as fire blistering and branch fall make the identification of scarring from a causal point of view very difficult. Accordingly, given the propensity for trees to bear scarring from natural causes their positive identification is impossible unless culturally specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria in regard to tree species/age/size and its specific characteristics in regard to regrowth is adopted.

Nevertheless, the likelihood of trees bearing cultural scarring remaining extant and *in situ* is low given events such as land clearance and bushfires. Generally scarred trees will only survive if they have been carefully protected (such as the trees associated with Yuranigh's grave at Molong where successive generations of European landholders have actively cared for them).

The study area has been extensively cleared. While not impossible this site type is unlikely to have survived and therefore be extant in the study area.

Middens

Middens consist of deposits of shell and sometimes contain stone artefacts, bone and human burials. Middens are a commonly recorded site type in the south coast.

Middens situated in the area will vary in their species composition which is generally a factor of environmental location. Rock platform species are typically dominant in sites situated on headland contexts, while estuarine species are dominant in sites found around lakes.

There is some potential for midden deposits to be present in the proposal area.

Stone Quarry and Procurement Sites

A lithic quarry is the location of an exploited stone source (Hiscock & Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occurs. These sites will commonly have evidence of exploitation including extraction and preliminary flaking preparation. The presence of these site types is dependent on the surface exposure of suitable stone. Quarries are a rare site type in this region. Given the absence of suitable stone in local outcrops in the proposal area this site type is unlikely to be recorded during the study.

8. SURVEY RESULTS

8.1 Effective Survey Coverage

Survey Coverage Variables are a measure of ground surveyed during the study and the archaeological visibility present within that surveyed area. Survey coverage variables provide a measure with which to assess the effectiveness of the survey so as to provide an informed basis for the formulation of management strategies.

Specifically, an analysis of survey coverage is necessary in order to determine whether or not the opportunity to observe stone artefacts in or on the ground was achieved during the survey. In the event that it is determined that ground exposures provided a minimal opportunity to record artefacts it may be necessary to undertake archaeological excavation for determining whether or not artefacts are present. Conversely, if ground exposures encountered provided an ideal opportunity to record the presence of artefacts, the survey results may be considered to be adequate and accordingly no further archaeological work may be required.

Two variables have been recorded during this study to measure Effective Survey Coverage: The area of ground exposure encountered and the quality and type of ground visibility (archaeological visibility) within those exposures. The two variables recorded during the survey are defined as follows:

Ground Exposure – an estimate of the total area of ground inspected which contained exposures of bare ground; and

Archaeology Visibility – an estimate of the average levels of potential archaeological surface visibility within those exposures of bare ground.

The survey units are described further below in Table 1 (and see Figure 3) and a summary of Effective Survey Coverage is provided in Table 2.

Ground exposures encountered during this survey included vehicle tracks, bare earth patches and erosional features. Generally ground exposure was very low given the presence of ground cover and leaf litter in the forested environment. Generally archaeological visibility within ground exposures was similarly low given the lack of complete breaching of the potential artefact bearing soils by erosion or other disturbance.

Based on the two visibility variables as defined above, a net estimate (Net Effective Exposure) of the archaeological potential of exposure area within a survey unit or set of units has been calculated. The Effective Survey Coverage (ESC) calculation is defined and required by the NPWS. The ESC provides an estimate of the proportion of the total study area which provided a net 100% level of ground surface visibility (with archaeological potential). The ESC achieved in the present study is very low. ESC is assessed to have been inadequate for determining the archaeological status of the proposal area

Survey Unit	Landform element	Aspect	Gradient	Vegetation	Geology/soils	Landuse impacts	Proposed impacts
SU1 (Plate 1)	Simple slope	0-40°	6-10°	Eucalypt forest; scattered to dense bracken fern; scattered banksias and casuarina	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; animal burrows; wheel tracks; camping	Right of carriageway; building envelope Lot 3
SU2	Simple slope	90-125°	4-8°	Eucalypt forest; dense bracken fern; scattered casuarinas and banksia	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; animal burrows	Right of carriageway
SU3 (Plate 3)	Crest	Open	0-4°	Eucalypt forest; scattered to dense bracken fern; scattered banksias and casuarina	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; animal burrows	Right of carriageway; fire trail; Driveways and part building envelopes (Lot 4, 5, 6 & 7)
SU4	Simple slope	330-0°	6-15°	Eucalypt forest; scattered to dense bracken fern; scattered banksias and casuarina	Sandstone and quartzite; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; animal burrows	Part building envelopes Lots 5, 6 & 7

Survey Unit	Landform element	Aspect	Gradient	Vegetation	Geology/soils	Landuse impacts	Proposed impacts
SU5	Simple slope	140-170°	8-15°	Eucalypt forest; dense bracken fern; scattered banksias and casuarina	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; animal burrows	None
SU6	Simple slope	135-180°	4-10°	Eucalypt forest; scattered to dense bracken fern; scattered banksias and casuarina	Sandstone; occasional cobbles; sandy gravelly loam	Limited vegetation clearance; animal burrows	Part building envelope Lot 4; driveway
SU7 (Plate 2)	Spur crest	Open-90°	0-6°	Eucalypt forest; scattered to dense bracken fern; scattered banksias and casuarina	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; wheel tracks; animal burrows	Right of carriageway; Building envelopes Lots 1, 2 & 3 and respective driveways
SU8	Simple slope (foreshore)	45-90°	5-20°	Eucalypt forest; scattered bracken fern; banksias and casuarina	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; wheel tracks; camping/hut; animal burrows	None
SU9	Spur crest	open	0-3°	Eucalypt forest; scattered to dense banksias and bracken fern	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; graded track, power lines, animal burrows	Fire Trail
SU10	Simple slope	350-10°	8-12°	Eucalypt forest; scattered to dense casuarinas; bracken fern and banksia	Sandstone; occasional cobbles; quartz gravels; sandy gravelly loam	Limited vegetation clearance; animal burrows	Fire trail

Table 1. Survey unit descriptions.

Survey Unit	Exposure types	Survey Unit Area	Area surveyed	Ave. ground exposure	Ave. arch visibility %	Net Effective Exposure	ESC %	Artefacts recorded	Predicted potential density of undetected artefacts
SU1	Bare earth; animal burrows	2.5 ha	40% 1.0 ha	1% 0.01 ha	5%	0.0005 ha	0.020	0	Low
SU2	Bare earth	6.8 ha	15% 1.02 ha	1% 0.012 ha	5%	0.0006 ha	0.009	0	Low
SU3	Bare earth	8.0 ha	40% 3.2 ha	1% 0.032 ha	5%	0.0016 ha	0.02	0	Low/Moderate
SU4	Bare earth	4.2 ha	50% 2.1 ha	1% 0.021 ha	5%	0.0011 ha	0.026	0	Low
SU5	Bare earth	4.0 ha	15% 0.6 ha	1% 0.006 ha	5%	0.0003 ha	0.008	0	Very low
SU6	Bare earth	4.2 ha	50% 2.1 ha	1% 0.021 ha	5%	0.0011 ha	0.026	0	Low
SU7	Bare earth; wheel tracks; animal burrows	5.6 ha	70% 3.92 ha	2% 0.0784 ha	5%	0.0039 ha	0.070	1 & Midden	Low/Moderate
SU8	Wheel tracks; bare earth; animal burrows	2.1 ha	70% 1.47 ha	5% 0.0735 ha	5%	0.0037 ha	0.176	13	Low/Moderate
SU9	Graded track; bare earth;	3.0 ha	10% 0.3 ha	5% 0.15 ha	20%	0.003 ha	0.100	0	Low
SU10	Bare earth; pedestrian track	1.2 ha	10% 0.12 ha	0% 0.0 ha	0%	0.0 ha	0.000	0	Very low
Total		41.6 ha	15.83 ha	0.4039 ha		0.0158 ha	0.04 %	14	

Table 2. Survey coverage data.



Plate 2. Building Envelope 2 through 1, facing south – Survey Unit 7.



Plate 4. Building envelope 5 facing west – Survey Unit 3.

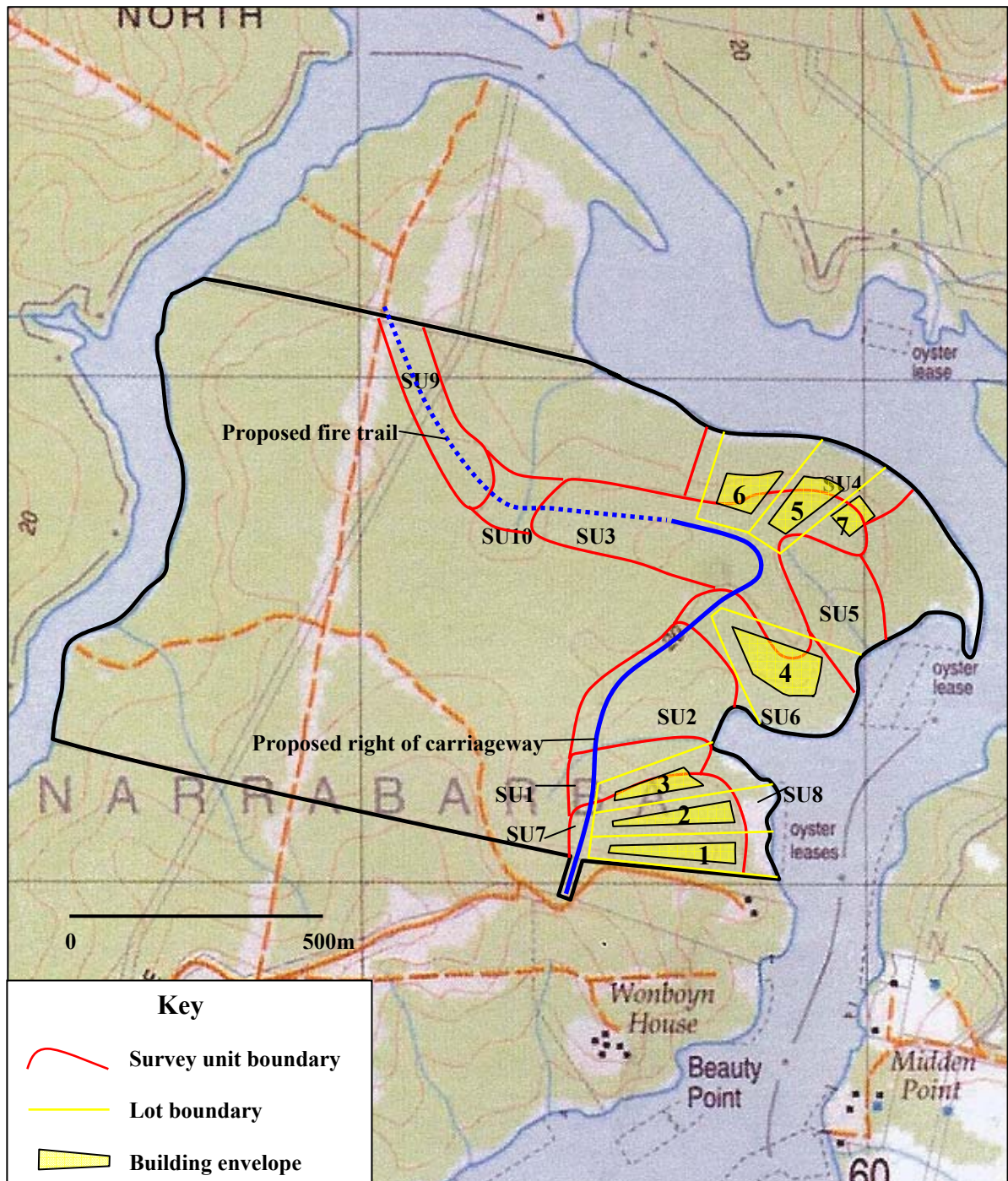


Figure 3. Location of survey units and proposed lot boundaries and building envelopes (and Lot numbers).

8.2 Artefact Recordings Present in the Proposal Area

A total of three Aboriginal artefact locales were recorded within the survey area (Figure 4) during this study. These recordings are described below:

SU7/L1 grid reference: Hand GPS: 759699. 5875167 – 759688. 5875173 (WGS 84)

This artefact locale comprises a moderate density scatter of shell and a single stone artefact located on the spur crest in proposed lot 2. This location has a generally level to low gradient and an open to northerly aspect.

The visible shell scatter is located in open eucalypt forest and extends over an area of approximately 50 m² in an area that has been disturbed by a fallen tree (Plates 4 & 5). There are three shell types clearly present: cockle, mud whelk and rock oyster; cockle is the dominant species represented. Both the cockle and the mud whelk comprise shells of comparable size (ca. >60 mm), indicative of human selection rather than natural deposition.



Plate 4. General view of SU7/L1 facing northwest.



Plate 5. Example of shell present at SU7/L1.

The recorded artefact is a grey silcrete flake measuring 32 x 22 x 10 mm. The flake is located approximately 15 m west of the midden material in a burnt out tree stump.

Surface visibility across the wider area is limited. Vegetation and leaf litter have reduced ground exposure to approximately 5%, of which about 5% is assessed to be archaeological visibility. The areas of greatest visibility are highly localised and restricted to ground disturbed by fallen timber or burnt out stumps such as the locations of the midden and stone artefact. Accordingly, it is predicted that pockets of midden and low to perhaps moderate density stone artefact scatters will occur across the landform but are presently obscured by vegetation, leaf litter and soil deposits. Given the relatively limited nature of European impacts in the area there is a moderate to high potential for sections of the predicted shell and artefact distribution to occur *in situ*.

The recorded artefact and midden are situated within the proposed building envelope of lot 2.

SU8/L1

grid reference: Hand GPS: 759699. 5875253 – 759756. 5875190 (WGS 84)

This artefact locale is a sparse scatter of 13 stone artefacts found along the foreshore of proposed lot 3. The site location has a north-easterly aspect and the gradient is low to generally level; the northern extremity of the artefact locale is approximately 25 m south of an ephemeral first order drainage line that flows into the lake.

The artefacts were visible eroding out of intermittent patches of exposed sandy topsoil in open eucalypt forest where the majority of the ground surface is obscured by vegetation and leaf litter (Plates 6 & 7). Limited amounts of quartz and sandstone gravels are also present. The highest density of artefacts was located at the northern end where four artefacts were found in an area of approximately 1.5 m² (80% ground exposure and 5% archaeological visibility), the remainder were scattered across a 70 m stretch of the foreshore.

Artefacts recorded at this locale comprise:

- Brown silcrete flake measuring 25 x 19 x 5mm.
- Crystal quartz flake measuring 19 x 15 x 8mm.
- Grey silcrete flake measuring 12 x 7 x 2mm.
- Brown silcrete flake measuring 14 x 11 x 5mm.
- White quartz flake measuring 18 x 6 x 5mm.
- Brown silcrete flake measuring 25 x 24 x 5mm.
- White quartz core measuring 19 x 16 x 14mm. The artefact has 2 platforms and 6 scars.
- Brown silcrete flake portion (proximal) measuring 11 x 25 x 8mm.
- Crystal quartz flake measuring 14 x 9 x 2mm.
- Grey silcrete flake portion (proximal) measuring 10 x 14 x 3mm.
- Grey silcrete core measuring 17 x 28 x 19mm. The artefact has 2 platforms and 5 scars.
- White quartz flake measuring 18 x 17 x 3mm.

Surface visibility within the individual ground exposures averaged about 80% with ca. 5% of that exposure assessed to be archaeological visibility. Across the wider site area ground exposure is estimated to be 5% with ca. 5% of that exposure assessed to be archaeological visibility. Within this area there is also evidence of European settlement in the form of bottle glass fragments and the remains of stone and brick hearths.

Given the very low effective survey coverage of the wider site area it is predicted that there is a high potential for additional artefacts to be present in a subsurface context. It is further predicted that the recorded artefact scatter will continue as a low to perhaps moderate density artefact scatter across the entire survey unit. Taking into consideration the presence of European settlement remains it is expected that the artefact locale has been subject to moderate levels of disturbance. As such the potential for *in situ* finds would be limited to artefacts that might be present at a depth of ca.15 cm or greater.

Artefact locale SU8/L1 is situated approximately 60 m east of the proposed building envelope in lot 3.



Plate 6. Location of northern concentration of artefacts at SU8/L1, facing southeast.



Plate 7. Southern extremity of recorded artefact locale SU8/L1 facing northwest.

SU8/L2

grid reference: Hand GPS: 759785. 5875166 (WGS 84)

Artefact locale SU8/L2 is a single stone artefact found on a low gradient slope approximately 30 m west of the lake in proposed Lot 2. The artefact location has an open to easterly aspect. The artefact is situated about 15 m from the moderate to steep gradient banks of the foreshore and approximately 40 m southwest of SU8/L1.

The artefact is situated at the base of a tree in open eucalypt forest (Plate 8); ground surfaces across the area are largely obscured by leaf litter.

The artefact is a grey silcrete flake measuring 22 x 30 x 6 mm.

Ground exposure at the base of the tree is approximately 0.25 m² of which ca. 5% of is assessed to be archaeological visibility. Ground visibility across the wider area is generally less than 1% with similarly minimal archaeological visibility.

Given the poor effective survey coverage it is predicted that additional artefacts occur across the low gradient slopes along the foreshore. Furthermore it is predicted that this artefact locale is an extension of the artefact scatter recorded at SU8/L1, which is located on the lower north-easterly aspect slopes of the foreshore. Accordingly the entire survey unit is assessed to have a high potential for low to perhaps moderate density subsurface artefact distribution. Given the relatively limited nature of European disturbance it is expected that the potential for *in situ* artefacts would increase with depth.

This artefact locale is situated approximately 30 m east of the proposed building envelope in lot 2.



Plate 8. Artefact locale SU8/L2 facing southwest. Arrow marks location of artefact.

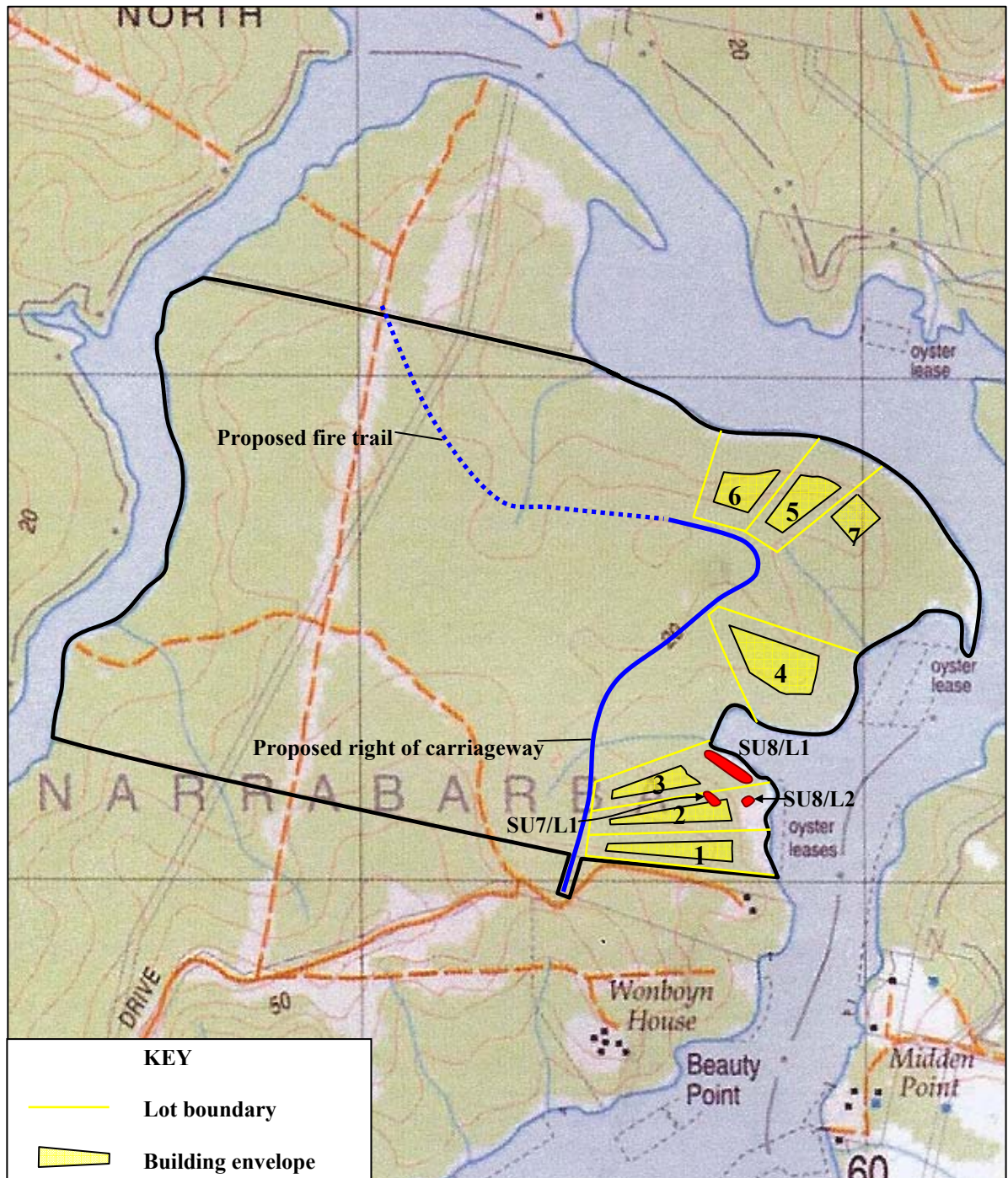


Figure 4. Location of recorded artefact locales relative to the proposed subdivision

8.3 Discussion

A total of 41.6 hectares was surveyed during the field inspection. This survey area encompassed all areas of direct impacts subject to the subdivision and in addition areas that are peripheral to those which will be directly impacted.

Of the total survey area (41.6) 15.83 hectares was subject to direct visual inspection. Average ground exposure encountered is calculated to have been 0.4039 hectares with 0.0158 hectares of that area assessed to be effective archaeological visibility. Effective Survey Coverage is calculated to have been 0.04% of the total survey area.

The effective survey coverage achieved during the survey is very low, although it is fairly typical of what is encountered in undeveloped coastal forests. This poor effective survey coverage is a result of dense undergrowth combined with extensive leaf litter affording minimal surface exposures and minimal breaching of potential artefact bearing soils within those exposures. It is assessed that visibility variables were less than adequate for providing a reliable characterization of the archaeological status of the land based on the results of the field survey alone.

The nature and significance of any potential subsurface deposits which might be present in the study area is difficult to predict with any reliability. However, based on a consideration of the predictive model applicable to the study area it can reliably be asserted that there is a high likelihood of subsurface deposits being present in the study area. In Table 2 a prediction of the relative archaeological potential is indicated in relation to each individual archaeological terrain unit within the study area.

Survey Units 3, 7 and 8 are each predicted to contain stone artefact at low/moderate density; that is – as containing an average density of between 20 and 50 artefacts per square metre. The remainder of Survey Units are predicted to contain artefacts distributed at low or very low densities (<20 artefacts per square metre). This prediction of artefact density in individual Survey Units is based on a consideration of the nature of their environmental context (landform, gradient, aspect and relative situation). Survey Units 3, 7 and 8 are discrete landform elements with low gradients, and are situated in close proximity to the lake; such landforms are favourable encampment sites. The remainder of the Survey Units are assessed to contain low artefact densities generally given their relatively high gradients.

A total of 14 stone artefacts at three artefact locales (Figure 4) were recorded during the field inspection. All artefacts were found on either spur crests, or low gradient slopes along the foreshore of the lake. While the overall number of artefacts and occurrences of midden is relatively low, this is assessed to be a reflection of the poor visibility encountered rather than the true archaeological status of the study area. The recorded artefact locales were identified in areas of locally increased visibility. As such it is reasonable to expect that artefacts and midden occur across other sections of the study area but were not detected due to the low visibility. Given a consideration of the predictive model for the local area it is predicted that the study area was utilised for hunting and gathering activities and camping which is likely to have resulted in low to moderate density distributions of artefacts and pockets of midden across the spur crests and low gradient slopes in situations located within ca.200-300 m of the lake.

9. STATUTORY INFORMATION

Two pieces of legislation provide the primary basis for Aboriginal heritage management in NSW, the National Parks and Wildlife Act 1974 (NPW Act) and the Environmental Planning and Assessment Act 1979 (EP&A Act) (NPWS 1997).

The Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act), its regulations, schedules and guidelines provides the context for the requirement for environmental impact assessments to be undertaken during land use planning (NPWS 1997).

Part 3A of the Environmental Planning and Assessment Act 1979

On 9 June 2005 the NSW Parliament passed the Environmental Planning and Assessment Amendment (Infrastructure and Other Planning Reform) Bill. The Act was assented to on 16 June 2005 and commenced on 1 August 2005. This amendment contains key elements of the NSW Government's planning system reforms and makes major changes to both plan-making and major development assessment.

A key component of the amendments is the insertion of a new Part 3A (Major Projects) into the EP&A Act. The new Part 3A consolidates the assessment and approval regime for all major developments which previously were addressed under Part 4 (Development Assessment) or Part 5 (Environmental Assessment).

Part 3A applies to all major State government infrastructure projects, developments previously classified as State significant and other projects, plans or programs of works declared by the Minister. The amendments aim to provide a streamlined assessment and approvals regime and also to improve the mechanisms available under the EP&A Act to enforce compliance with approval conditions of the Act.

Under Part 3A Major infrastructure and other projects, the following relevant definitions apply:

approved project means a project to the extent that it is approved by the Minister under this Part, but does not include a project for which only approval for a concept plan has been given.

critical infrastructure project means a project that is a critical infrastructure project.

development includes an activity within the meaning of Part 5.

major infrastructure development includes development, whether or not carried out by a public authority, for the purposes of roads, railways, pipelines, electricity generation, electricity or gas transmission or distribution, sewerage treatment facilities, dams or water reticulation works, desalination plants, trading ports or other public utility undertakings.

project means development that is declared under section 75B to be a project to which this Part applies.

proponent of a project, means the person proposing to carry out development comprising all or any part of the project, and includes any person certified by the Minister to be the proponent.

The current report has been compiled for inclusion within an Environmental Assessment Report

Under the terms of Part 3A of the Environmental Planning and Assessment Act 1979 the following authorizations are not required for an approved project (and accordingly the provisions of an Act that prohibit an activity without such an authority do not apply):

- a permit under section 87 or a consent under section 90 of the National Parks and Wildlife Act 1974

The NSW National Parks and Wildlife Act 1974 (as amended)

The NPW Act provides statutory protection for all Aboriginal objects and Aboriginal Places.

An 'Aboriginal object' is defined as

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

An Aboriginal place is an area declared by the Minister to be an Aboriginal place for the purposes of the Act (s84) being a place that in the opinion of the Minister *is or was of special significance with respect to Aboriginal culture*.

Under s90 of the NPW Act a person must not knowingly destroy, damage or deface or knowingly cause or permit the destruction, damage or defacement of an Aboriginal object or Aboriginal Place without first obtaining the consent of the Director-General of the NSW DECC. Consents which enable a person to impact an Aboriginal object are issued by the NSW DECC upon review of a s90 Consent application.

Under s87 of the NPW Act a person must not excavate or disturb land for the purposes of discovering an Aboriginal object without first obtaining the consent of the Director-General of the NSW DECC. Permits which enable a person to excavate land for the purposes of determining whether or not an Aboriginal object is present are issued by the NSW DECC upon review of a s87 Permit application.

Statutory constraints would ordinarily arise from this assessment in the proposal area. Given that the survey assessment has been determined to have been inadequate for the purposes of clarifying the actual archaeological status of the area due to low Effective Survey Coverage, and that a number of survey units have been assessed to potentially contain subsurface archaeological deposit, a s87 permit is usually required to be sought in order to determine the nature, extent and significance of the archaeological resource in the proposal area.

10. SIGNIFICANCE ASSESSMENT

The information provided in this report and the assessment of significance of Aboriginal objects provides the basis for the proponent to make informed decisions regarding the management and degree of protection which should be undertaken in regard to the objects located within the study area.

10.1 Significance Assessment Criteria

The NPWS (1997) defines significance as relating to the meaning of sites: “meaning is to do with the values people put on things, places, sites, land”.

The following significance assessment criteria is derived from the relevant aspects of ICOMOS Burra Charter and NSW Department of Urban Affairs and Planning’s ‘State Heritage Inventory Evaluation Criteria and Management Guidelines’.

Aboriginal archaeological sites are assessed under the following categories of significance:

- cultural value to contemporary Aboriginal people,
- archaeological value,
- aesthetic value,
- representativeness, and
- educational value.

Aboriginal cultural significance

The Aboriginal community will value a place upon a place in accordance with a variety of factors including contemporary associations and beliefs and historical relationships. Most heritage evidence is valued by Aboriginal people given its symbolic embodiment and physical relationship with their ancestral past.

Consultation with the local Aboriginal community is necessary to identify the cultural significance attached to heritage sites and the broader landscape.

Archaeological value

The assessment of archaeological value involves determining the potential of a place to provide information which is of value in scientific analysis and the resolution of potential archaeological research questions. Relevant research topics may be defined and addressed within the academy, the context of cultural heritage management or Aboriginal communities. Increasingly, research issues are being constructed with reference to the broader landscape rather than focusing specifically on individual site locales. In order to assess scientific value landforms are evaluated in terms of nature of the evidence, whether or not they contain undisturbed artefactual material, occur within a context which enables the testing of certain propositions, are very old or contain significant time depth, contain large artefactual assemblages or material diversity, have unusual characteristics, are of good preservation, or are a part of a larger site complex. Increasingly, a range of site types, including low density artefact distributions, are regarded to be just as important as high density sites for providing research opportunities.

Representativeness

Representative value is the degree to which a “class of sites are conserved and whether the particular site being assessed should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole” (NPWS 1997). Factors defined by NPWS (1997) for assessing sites in terms of representativeness include defining variability, knowing what is already conserved and considering the connectivity of sites.

Educational value

The educational value of cultural heritage is dependent on the potential for interpretation to a general visitor audience, compatible Aboriginal values, a resistant site fabric, and feasible site access and management resources.

Aesthetic value

Aesthetic value relates to aspects of sensory perception. This value is culturally contingent.

10.2 Archaeological Significance Values

Distributions of stone artefact are common in the local area and wider region. Stone artefacts can be expected to be distributed in a virtual continuum across most landscape element contexts. The density of this background artefact scatter is related to factors such as terrain (landform element, gradient and slope), the permanence of the local water source and the proximity of other resource features.

Open artefact scatters will contain differences in terms of their artefact density and composition. These differences will potentially reflect differences in site function ie different activities undertaken in different places. Therefore, these site types, while common, will each have the potential to provide unique archaeological data and hence interpretive value within a research context.

The archaeological significance of each of the recorded artefact locales is listed in Table 3. It is noted however that significance ratings are based on the surface evidence; it is possible that significance rating may be revised pending the results of further archaeological investigations.

Most Aboriginal heritage sites have cultural value to the local Aboriginal community given that they provide direct physical and symbolic linkages to their ancestral past and to the landscape.

Site	Significance	Criteria
SU7/L1	Low local scientific significance. However predicted associated subsurface deposits predicted to be of a higher significance.	Common site type Low educational value Low aesthetic value Low research potential Predicted to be larger than recorded with potential to contain relatively undisturbed subsurface deposits.
SU8/L1	Low local scientific significance. However predicted associated subsurface deposits predicted to be of a higher significance.	Common site type Low educational value Low aesthetic value Low research potential Predicted to be larger than recorded with potential to contain relatively undisturbed subsurface deposits.
SU8/L2	Low local scientific significance. However predicted associated subsurface deposits predicted to be of a higher significance.	Common site type Low educational value Low aesthetic value Low research potential Predicted to be larger than recorded with potential to contain relatively undisturbed subsurface deposits.

Table 3. Archaeological significance rating of recorded artefact locales.

11. MITIGATION AND MANAGEMENT STRATEGIES

The aim of this study has been to identify and assess the nature of the Aboriginal objects in the study area, to assess their significance and thereafter to make recommendations relating to the management and mitigation of proposed impacts. The table below provides a summary list of the Aboriginal objects known to be present in the study area and an indication of whether or not they are situated within the areas of proposed direct impacts associated with the subdivision.

Artefact Locale	Direct impacts:	
	YES	NO
SU7/L1	Yes	
SU8/L1		No
SU8/L2		No
Total	1	2

Table 4. Summary of sites in study area and their spatial relationship to areas of proposed direct impact.

Only one of the recorded artefact locales is situated within areas of proposed direct impacts (SU7/L1 - Figure 4). Accordingly, the proponent will need to implement mitigation and management strategies in relation to this locale in order to proceed with the proposed development while acting in accordance with the provisions of the relevant legislation (see Section 9). The remaining two artefact locales are situated away from proposed development impacts and therefore will be conserved within the context of the proposal.

In the following sections a variety of strategies that can be considered for the mitigation and management of impacts to the identified Aboriginal sites present within the proposal area are listed and discussed.

11.1 Management and Mitigation Strategies

Further Investigation

The current field survey has been focused on recording artefactual material present on visible ground surfaces. Further archaeological investigation entails subsurface excavation which is generally undertaken as test pits for the purposes of identifying the presence of artefact bearing soil deposits and their nature, extent, integrity and significance.

Further archaeological investigation in the form of sub-surface test excavation can be appropriate in certain situations. Such situations generally arise when the proposed development is expected to involve ground disturbance in areas which are assessed to have subsurface archaeological deposits and/or when the nature and significance of subsurface deposit cannot be reliably predicted based on the field survey results.

Test excavation can be undertaken in a variety of ways including hand excavation, shovel pits, auger holes, mechanically excavated trenches or surface grader scrapes.

In the case at hand further investigation in the form of subsurface excavation is considered to be warranted in respect of a number of survey units. Effective survey coverage achieved during the current survey was generally very low across the study area. Accordingly, the survey results are not necessarily an accurate reflection of the archaeological status and significance of some landform elements within the study area. The survey units for which it is recommended that further investigation occur (subsurface excavation) are listed in Table 5.

Conservation

Conservation is a suitable management option in any situation however, it is not always feasible. Such a strategy is generally adopted in relation to sites which are assessed to be of high cultural and scientific significance, but can be adopted in relation to any site type. Conservation of sites can be achieved by relocating components of the proposed development (ie roads, house footprints) or not pursuing the development at all (ie the 'do nothing' approach).

Artefact locales SU8/L1 and SU8/L2, which are situated outside areas of proposed impacts, will effectively be conserved. It should also be noted that any other artefact occurrences that might be present across the foreshore will not be directly impacted by the current development proposal. The same is also true of the majority of residual lot 7.

No sites or Survey Units have been identified, on the basis of a visual inspection alone (and a consideration of the relevant predictive model), to surpass any significance thresholds whereby conservation is essential. However, pending the results of further subsurface investigations this assessment may be revised.

Mitigated Impacts

Mitigated impacts usually takes the form of partial site impact and/or salvage prior to impact. Such a management strategy is appropriate when sites are assessed to be of moderate or high significance to the scientific and/or Aboriginal community and when avoidance of the site is not feasible. Salvage can include the surface collection or sub-surface excavation of artefacts as a condition of a Section 90 Consent issued by the Director-General, NSW DEC.

The issue of whether or not mitigated impacts are necessary in regard any of the artefact locales, or any of the Survey Units identified to be potentially archaeologically sensitive, will need to be resolved pending the result of further archaeological investigations.

Unmitigated Impacts

Unmitigated impacts to a site can be given consideration when a site is assessed to be of low or low/moderate archaeological and cultural significance and otherwise in situations where conservation is simply not feasible. The issue of whether or not mitigated impacts are necessary in regard any of the artefact locales, or any of the Survey Units identified to be potentially archaeologically sensitive, will need to be resolved pending the result of further archaeological investigations.

11.2 Management options - Summary

A summary of recommended management and mitigation strategies relating to Survey Units and Aboriginal objects are listed in Table 5 below.

Survey Unit	Artefact recordings	Potential artefact density in the landform	Recommended management strategy	Justification/Rationale
1	-	Low	No constraints No further archaeological investigation	Given the predicted low density of the artefact distribution and limited nature of impacts subsurface test excavation is not warranted.
2	-	Low	No constraints No further archaeological investigation	Given the predicted low density of the artefact distribution and limited nature of impacts subsurface test excavation is not warranted.
3	-	Low/Moderate	Further archaeological investigation engage archaeologist to conduct test excavation in proposed impacts areas within Survey Unit	The Survey Unit is predicted to contain subsurface artefacts in a low to moderate density across the landform; subsurface test excavation is warranted for the purposes of clarifying artefact density, nature and significance so that management recommendations can be reliably formulated.
4	-	Low	No constraints No further archaeological investigation	Given the predicted low density of the artefact distribution and limited nature of impacts test excavation is not warranted
5	-	Very low	No constraints No further archaeological investigation	Given the predicted very low density of the artefact distribution and absence of direct impacts subsurface test excavation is not warranted.
6	-	Low	No constraints No further archaeological investigation	Given the predicted low density of the artefact distribution and limited nature of impacts subsurface test excavation is not warranted
7	SU7/L1	Low/Moderate	Further archaeological investigation engage archaeologist to conduct test excavation in proposed impacts areas within Survey Unit	The Survey Unit is predicted to contain subsurface artefacts in a low to moderate density across the landform; subsurface test excavation is warranted for the purposes of clarifying artefact density, nature and significance so that management recommendations can be reliably formulated.
8	SU8/L1 SU8/L2	Low/Moderate	No constraints ; however inadvertent impacts to recorded artefact locales during the 'life' of the development should be avoided No further archaeological investigation	Given that the survey unit is outside areas of proposed impacts test excavation is not warranted
9	-	Low	No constraints No further archaeological investigation	Given the predicted low density of the artefact distribution and limited nature of impacts subsurface test excavation is not warranted
10	-	Very low	No constraints No further archaeological investigation	Given the predicted very low density of the artefact distribution and the limited nature of impacts subsurface test excavation is not warranted.

Table 5. Summary of recommended management and mitigation strategies.

12. RECOMMENDATIONS

The following recommendations are made on the basis of:

- Consideration of the local landscape, its biodiversity and the predictive model of site type and location relevant to the proposal area.
- An analysis of the survey results, consideration of the low effective survey coverage encountered during the survey and recognition that the limited archaeological material recorded is unlikely to be a comprehensive and accurate reflection of the archaeological status of the area.
- Consideration of the type of development and the nature of the proposed impacts. The proposed impacts in the subdivision property will occupy approximately 10% of the land; the remainder of the property will be excluded from subdivision impacts. Accordingly Aboriginal objects situated within the majority of the property will not sustain impacts.
- Consultation with the Bobby Maher and BJ Cruse, Eden Local Aboriginal Land Council.

It is concluded and recommended that:

1. Aboriginal objects in the form of stone artefacts and shell midden were recorded in three locales on the property. One of these recordings is situated within a proposed building envelope (Lot 2); the remaining two locales are situated outside proposed impact areas.
2. Three Survey Units are predicted to contain Aboriginal objects (stone artefacts and shell midden) in low to moderate density in a subsurface context: Survey Units 3, 7 and 8. It is noted that there are no subdivision impacts proposed for Survey Unit 8. However various discrete impacts are proposed in Survey Units 3 and 7.

The nature of the predicted subsurface archaeological deposit in these Survey Units is not expected to exceed a significance threshold which would act to preclude proposed impacts.

However a strategy of impact mitigation is recommended to be implemented in regard to these Survey Units.

Given that Survey Units 3 and 7 are predicted to contain artefacts in low to moderate densities (between 20 and 50 stone artefacts per square metre) and isolated midden deposits it is concluded that an impact mitigation strategy of subsurface excavation is appropriate. Subsurface test excavation should be undertaken within areas of proposed impact in these two Survey Units.

The program of subsurface archaeological investigation will provide clarification in regard to the nature, extent, integrity and significance of the predicted subsurface archaeological deposit. This information will provide the proponent with a more informed basis for managing and mitigating impacts to the archaeological resource during the construction phase of the proposal.

3. There are no identified archaeological constraints in regard to Survey Units 1, 2, 4 and 6. It is recommended that inadvertent impacts be avoided in Survey Unit 8.
4. Copies of this report should be forwarded to:

Bobby Maher
Eden Local Aboriginal Land Council
PO Box 199
EDEN NSW 2551

Dr Phil Boot
Environment Protection and Regulation Division
NSW Department of Environment and Climate Change

PO Box 2115
QUEANBEYAN NSW 2620

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