Hometown Australia

4029 and 4045 Nelson Bay Road, Bobs Farm

LGA: Port Stephens

Archaeological Due Diligence Assessment

31 October 2022

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EXECUTIVE SUMMARY

McCardle Cultural Heritage Pty Ltd (MCH) has been engaged by Hometown Australia to undertake an Archaeological Due Diligence Assessment for the proposed rezoning to extend the existing Sunrise Lifestyle Village located at 4029 and 4045 Nelson Bat Road, Bobs Farm.

Located on Holocene dunes approximately 220 metres south of the interbarrier depression, the project area is situated on Quandary gravel, sand, silt, clay, Waterloo Rock, marine and freshwater deposits. Consisting of a disturbed landscape, the project area is located approximately 775 metres south of Bobs Farm Creek, approximately 220 metres south of the interbarrier depression and 1.8 kilometres from the ocean. In terms of past Aboriginal land uses and survival (water is necessary for survival), the project area may be considered somewhat-resourced in terms of water and resource availability being located 220 metres from the interbarrier depression. It has been established that locations on dunes overlooking the interbarrier depression, specifically within 50 metres, were favoured for camping whilst locations over 50 metres have shown a significant decrease in site numbers and densities.

The western side of the project area has been subject to clearing and construction works associated with the house, sheds and pool in the centre, a large shed at the north eastern side, as well as driveways and utilities. The eastern side of the project area, also previously cleared, has undergone construction works along the western border for a house and sheds, driveways and utilities. Discussions with the land owner whose family had previously owned both properties for over 80 years, indicate that the northern half of both properties were mined and in filled using the remainder of the upper dune portion of the properties

A search of the AHIMS register (Appendix A) has identified 55 known Aboriginal sites currently recorded within two kilometres of the project area. Considering the AHIMS results, local and regional archaeological investigations as well as the environmental context, the project area is located within 220 metres of the interbarrier depression. The dunes that overlook the interbarrier depression are known to have been favoured for past Aboriginal land uses and camping due to the rich resource of the swamp area and evidence of past Aboriginal land uses and resource exploitation is located throughout this dunal system and typically within 50 metres of the swamp with sites reducing in density away from the swamp but increasing again in close proximity to other fresh water sources. As the project area is located approximately 220 metres from this resource, it is likely the project area would have been utilised for hunting and gathering opportunities rather than camping and evidence of such past Aboriginal land uses manifests in the archaeological record as low-density shell middens, low-density artefact scatters and, or, isolated artefacts.

The project area, consisting of two separate properties were surveyed as two units. 4029 had been previously cleared, all trees and vegetation had been planted by the owners. The property was flat, indicating that the property had indeed been scrapped with none of the original upper dune remaining. Additionally, construction had occurred for the house, pool, sheds, garages, driveways as well as utilities. 4045 had also been previously cleared with the upper dune also removed with the project area being flat. Additionally, construction works had occurred in the western side for a house, garages and driveways. Vegetation was primarily grass with trees around the border.

No sites or areas of potential archaeological sensitivity were identified in the project areas during the survey and this is due to the significantly high impacts from previous land uses across the project area (clearing, mining, upper dune removal). Additionally, being located at a distance from reliable fresh water and resources, indicates the project area may have been utilised for more transitory activities rather than camping. Evidence of such past Aboriginal land uses manifests in the

archaeological record as a background scatter of discarded artefacts, which would have been disturbed/destroyed through past land uses.

As no sites or PADs were identified in the project area, there are no impacts to the archaeological record and the following recommendations are provided:

1) The persons responsible for the management of onsite works will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Regulation 2019, under the National Parks and Wildlife Act 1974;

2) Should any Aboriginal objects be uncovered during works, all work will cease in that location immediately and the Environmental Line contacted.

GLOSSARY

Aboriginal Place: are locations that have been recognised by the Minister (and gazetted under the *National Parks and Wildlife Act 1974*) as having special cultural significance to the Aboriginal community. An Aboriginal Place may or may not include archaeological materials.

Aboriginal Site: an Aboriginal site is the location of one or more Aboriginal archaeological objects, including flaked stone artefacts, midden shell, grinding grooves, archaeological deposits, scarred trees etc.

Artefact: any object that is physically modified by humans.

Artefact scatter: a collection of artefacts scattered across the surface of the ground (also referred to as open camp sites).

Assemblage: a collection of artefacts associated by a particular place or time, assumed generated by a single group of people, and can comprise different artefact types.

Backed artefact: a stone tool where the margin of a flake is retouched at a steep angle and that margin is opposite a sharp edge.

Background scatter: a term used to describe low density scatter of isolated finds that are distributed across the landscape without any obvious focal point.

Core: a chunk of stone from which flakes are removed and will have one or more negative flake scars but no positive flake scars. The core itself can be shaped into a tool or used as a source of flakes to be formed into tools.

Debitage: small pieces of stone debris that break off during the manufacturing of stone tools. These are usually considered waste and are the by-product of production (also referred to as flake piece).

Flake: any piece of stone struck off a core and has a number of characteristics including ring cracks showing where the hammer hit the core and a bulb of percussion. May be used as a tool with no further working, may be retouched or serve as a platform for further reduction.

Flaked piece/waste flake: an unmodified and unused flake, usually the by-product of tool manufacture or core preparation (also referred to as debitage).

Harm: is defined as an act that may destroy, deface or damage an Aboriginal object or place. In relation to an object, this means the movement or removal of an object from the land in which it has been situated

In situ: archaeological items are said to be "in situ" when they are found in the location where they were last deposited.

Retouched flake: a flake that has been flaked again in a manner that modified the edge for the purpose of resharpening that edge.

Typology: the systematic organization of artefacts into types on the basis of shared attributes.

ACRONYMS

ACHA	Aboriginal Cultural Heritage Assessment
ACHMP	Aboriginal Cultural Heritage Management Plan
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit

AHIMS SITE ACRONYMS

ACD	Aboriginal ceremonial and dreaming
AFT	Artefact (stone, bone, shell, glass, ceramic and metal)
ARG	Aboriginal resource and gathering
ART	Art (pigment or engraving)
BOM	Non-human bone and organic material
BUR	Burial
CFT	Conflict site
CMR	Ceremonial ring (stone or earth)
ETM	Earth mound
FSH	Fish trap
GDG	Grinding groove
HAB	Habitation structure
HTH	Hearth
OCQ	Ochre quarry
PAD	Potential archaeological deposit.
SHL	Shell
STA	Stone arrangement
STQ	Stone quarry
TRE	Modified tree (carved or scarred)
WTR	Water hole

1 INTRODUCTION

1.1 INTRODUCTION

McCardle Cultural Heritage Pty Ltd (MCH) has been engaged by Hometown Australia to undertake an Archaeological Due Diligence Assessment for the proposed rezoning to extend the existing Sunrise Lifestyle Village located at 4029 and 4045 Nelson Bat Road, Bobs Farm.

The assessment has been undertaken to meet the Heritage NSW, Department of Premier & Cabinet Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW and the brief. The purpose of a due diligence assessment is to assist proponents to exercise due diligence when carrying out activities that may harm Aboriginal objects or Aboriginal places and to determine whether they should apply for a consent to harm Aboriginal objects or Places through an Aboriginal Heritage Impact Assessment (AHIP). The purpose of this due diligence report is to demonstrate that all reasonable and practicable measures have been undertaken to prevent harm to any Aboriginal objects and/or place within the project area. This report has met the Heritage NSW Due Diligence requirements and considered the relevant environmental and archaeological information, the project land condition, the nature of the proposed development activity and impacts, as well as preparing appropriate recommendations.

1.2 THE PROJECT AREA

The project area is located at 4029 and 4045 Nelson Bat Road, Bobs Farm. Including Lot 3622 DP622485 and Lot 2 DP 622229, the location of the project area is shown in Figures 1.1 and 1.2.

Figure 1.1 Location of the project area

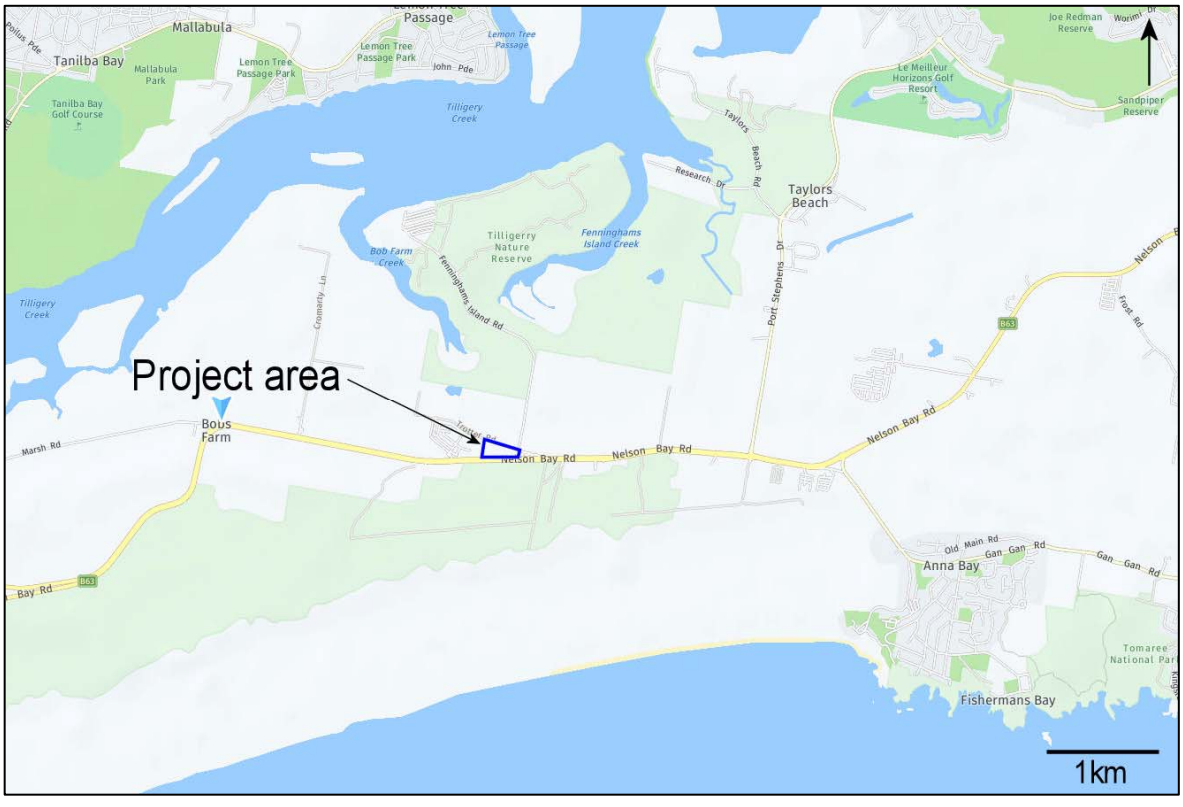


Figure 1.2 Aerial photograph of the project area (Nearmap 2022)

1.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposal is for a rezoning to extend the existing Sunrise Lifestyle Village. Works typically associated with such a development include clearing and demolition of existing structures, site remediation, bulk earthworks including construction of dwellings and roads, services reticulation: WW, PW, NBN, electrical and gas and landscaping.

1.4 OBJECTIVES OF THE DUE DILIIGENCE ASSESSMENT

The objectives and primary tasks of this due diligence assessment were to:

- undertake a search of the Aboriginal Heritage Management System (AHIMS) and other relative registers;
- undertake research into the environmental and archaeological contexts of the project area;
- develop a predictive model of site location for the project area;
- undertake a field survey of the project area;
- assess the potential impacts of the proposed development on any identified Aboriginal sites or potential archaeological deposits (PADs) identified within the project area;
- assess the significance of any identified Aboriginal objects or sites identified within the project area;
- complete and submit site cards to AHIMS for any Aboriginal sites identified; and
- provide appropriate recommendations.

1.5 LEGISLATIVE CONTEXT

The following overview of the legislative framework, is provided solely for information purposes for the client, and should not be interpreted as legal advice. MCH will not be liable for any actions taken by any person, body or group as a result of this general overview and MCH recommends that specific legal advice be obtained from a qualified legal practitioner prior to any action being taken as a result of the general summary below.

Land managers are required to consider the effects of their activities or proposed development on the environment under several pieces of legislation. Although there are a number of Acts and regulations protecting Aboriginal heritage, including places, sites and objects, within NSW, the three main ones include:

- National Parks and Wildlife Act (1974, as amended)
- National Parks and Wildlife Regulation (2019)
- Environmental Planning and Assessment Act (1979)

1.5.1 NATIONAL PARKS AND WILDLIFE ACT (1974, AS AMENDED)

The National Parks and Wildlife Act (1974), Amended 2010, is the primary legislation for the protection of Aboriginal cultural heritage in New South Wales. The NPW Act protects Aboriginal heritage (places, sites and objects) within NSW and the protection of Aboriginal heritage is outlined in s86 of the Act, as follows:

- "A person must not harm or desecrate an object that the person knows is an Aboriginal object" s86(1)
- "A person must not harm an Aboriginal object" s86(2)
- "A person must not harm or desecrate an Aboriginal place" s86(4)

Penalties apply for harming an Aboriginal object, site or place. The penalty for knowingly harming an Aboriginal object (s86[1]) and/or an Aboriginal place (s86[4]) is up to $550,000 for an individual and/or imprisonment for 2 years; and in the case of a corporation the penalty is up to $1.1 million. The penalty for a strict liability offence (s86[2]) is up to $110,000 for an individual and $220,000 for a corporation.

Harm under the National Parks and Wildlife Act (1974, as amended) is defined as any act that destroys defaces or damages the object, moves the object from the land on which it has been situated, causes or permits the object to be harmed. However, it is a defence from prosecution if the proponent can demonstrate that;

1) harm was authorised under an Aboriginal Heritage Impact Permit (AHIP) (and the permit was properly followed), or
2) the proponent exercised due diligence in respect to Aboriginal heritage.

The 'due diligence' defence (s87[2]), states that if a person or company has applied due diligence to determine that no Aboriginal object, site or place was likely to be harmed as a result of the activities proposed for the Project Area, then liability from prosecution under the NPW Act 1974 will be removed or mitigated if it later transpires that an Aboriginal object, site or place was harmed. If any Aboriginal objects are identified during the activity, then works should cease in that area and Heritage NSW, Department of Premier & Cabinet notified (DECCW 2010:13). The due diligence defence does not allow for continuing harm or as defence to s.86(1) or (4).

The archaeological due diligence assessment and report has been carried out in compliance with the Heritage NSW (DECCW 2010) Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.

1.5.2 NATIONAL PARKS AND WILDLIFE REGULATION (2019)

The National Parks and Wildlife Regulation 2019 provides a framework for undertaking activities and exercising due diligence in respect to Aboriginal heritage. The Regulation (201909) recognises various due diligence codes of practice, including the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW, but it also outlines procedures for Aboriginal Heritage Impact Permit (AHIP) applications and Aboriginal Cultural Heritage Consultation Requirements (ACHCRs); amongst other regulatory processes.

1.5.3 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979 (EP&A ACT)

EP&A Act establishes the statutory framework for planning and environmental assessment in NSW and the implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils. The EP&A Act contains three parts which impose requirements for planning approval:

- Part 3 of the EP&A Act relates to the preparation and making of Environmental Planning Instruments (EPIs), State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs).
- Part 4 of the EP&A Act establishes the framework for assessing development under an EPI. The consent authority for Part 4 development is generally the local council, however the consent authority may by the Minister, the Planning Assessment Commission or a joint regional planning panel depending upon the nature of the development.
- Part 4, Division 4.1 of the EP&A Act establishes the assessment pathway for State Significant Development (SSD) declared by the State Environmental Planning Policy (State and Regional Development) 2011 (NSW). Once a development is declared as SSD, the Secretary's Environmental Assessment Requirements (SEARs) will be issued outlining what issues must be considered in the EIS.
- Part 5 of the EP&A Act provides for the control of 'activities' that do not require development consent and are undertaken or approved by a determining authority. Development under Part 5 that are likely to significantly affect the environment is required to have an EIS prepared for the proposed activity.
- Part 5.1 of the EP&A Act establishes the assessment pathways for State Significant Infrastructure (SSI). Development applications made for SSI can only be approved by the Minister. Once a development is declared as SSI, the SEARs will be issued outlining what issues must be addressed in the EIS.

The applicable approval process is determined by reference to the relevant environmental planning instruments and other controls, LEPs and State Environmental Planning Policies (SEPPs). This project falls under Part 4.

1.6 ABORIGINAL COMMUNITY CONSULTATION

A due diligence assessment relates to the physical identification of Aboriginal objects, sites and places. Community consultation is only required once Aboriginal objects, sites or places have been identified and an Aboriginal Heritage Impact Permit (AHIP) is deemed necessary. Section 5.2 of the

Heritage NSW (DECCW 2010) Due Diligence Code of Practice for the protection of Aboriginal Objects in NSW specifically states that;

> *'consultation with the Aboriginal community is not a formal requirement of the due diligence process' (2010:8).*

1.7 QUALIFICATIONS OF THE INVESTIGATOR

Dr. Penny McCardle: Principal Archaeologist & Forensic Anthropologist has 22 years experience in Indigenous archaeological assessments, excavation, research, reporting, analysis and consultation and 19 years in skeletal identification, biological profiling and skeletal trauma identification for NPWS, NSW Police and the NSW Department of Forensic Medicine.

- BA (Archaeology and Palaeoanthropology): Indigenous archaeology, University of New England 1999
- Hons (Archaeology and Palaeoanthropology): Physical Anthropology, University of New England 2001
- Forensic Anthropology Course, University of New England 2003
- Armed Forces Institute of Pathology Forensic Anthropology Course, Ashburn, VA 2008
- Analysis of Bone trauma and Pseudo-Trauma in Suspected Violent Death Course, Erie College, Pennsylvania, 2009
- Documenting Scenes of War and Human Rights Violations. Institute for International Criminal Investigations, 2018
- PhD, University of Newcastle, 2019

1.8 REPORT STRUCTURE

The report includes Section 1 which outlines the project, Section 2 presents the environmental and archaeological context, Section 3 provides the results and discussion and Section 4 presents the Impact Assessment, Section 5 discusses the mitigation measures and Section 6 provides the management recommendations.

2 ENVIRONMENTAL AND ARCHAEOLOGICAL CONTEXT

The archaeological due diligence process and assessment requires that the available knowledge and information in relation to the environmental and archaeological contexts are considered. The purpose of this is to assist in identifying whether Aboriginal objects, sites or places are likely to be present within the project area based on archaeological predictive modelling and in what condition they may be found in given the environmental impacts, both natural and anthropogenic.

2.1 LOCAL ENVIRONMENT

Past site location and land use are closely linked to the environment including the landform, geology, geomorphology, soils, waterways and associated resources. The environmental context is important to identify potential factors relating to past Aboriginal land use patterns.

The project area is located in east of the Newcastle Bight sand barrier system, which is bounded in the east and south by the Hunter River and to the north by the bedrock hill slopes at Raymond Terrace (Thom *et al*., 1992, Matthei 1995). The system incorporates both inner (Pleistocene: c. 1.8 million to 10 000 years ago) and outer (Holocene: 10 000 years ago, to today) coastal barriers as well as the inter barrier system. Sediments include marine, estuarine aeolian and paludal deposits. Between the inner and the outer barrier is a large inter-barrier depression that is followed by Tilligerry Creek and was originally an extensive lagoon that is now filled with either estuarine or fresh water swamp deposits, mud and clay and natural shell beds (Robson *et al.,* 1993). Periods of active dune movement may either re-work and effectively destroy archaeological sites or bury older land surfaces and potentially preserve sites. Located on Holocene dunes approximately 220 metres south of the interbarrier depression, the project area is situated on Quandary gravel, sand, silt, clay, Waterloo Rock, marine and freshwater deposits (Newcastle 1:250,000 Geological Sheet Series, 1966). Materials most dominant in stone tool manufacture in the area are indurated mudstone/tuff from local sources (such as Nobbys Head) and silcrete (traded from further up the Hunter Valley).

Consisting of a disturbed landscape, the project area includes the Shoal Bay soil landscape that includes the A_1 Horizon of brownish grey loose sand that ranges from brownish black to brownish grey in colour with a speckled appearance, includes few grave sized charcoal fragments, is 10-40 centimetres in depth and pH ranges from 4.0 to 6.0. The A_2 Horizon includes bleached light grey loose sand that is 60-260 centimetres in depth and pH that ranges from 5.5 to 7.5. The B Horizon includes coherent organic and iron-stained sand that is a combination of black to brownish black to a dull yellow orange colour and soil pH ranges from 5.5 to 7.5 (Murphy 1995: 119-122).

Examination of the Morna Point 1:25,000 topographic map and Nearmap indicates that the project area is located approximately 775 metres south of Bobs Farm Creek, approximately 220 metres south of the interbarrier depression and 1.8 kilometres from the ocean. In terms of past Aboriginal land uses and survival (water is necessary for survival), the project area may be considered somewhat-resourced in terms of water and resource availability being located 220 metres from the interbarrier depression. It has been established that locations on dunes overlooking the interbarrier depression, specifically within 50 metres, were favoured for camping whilst locations over 50 metres have shown a significant decrease in site numbers and densities.

The regional environment provided resources, including raw materials, fauna, flora and water, that would have allowed for sustainable occupation of the area both along the interbarrier depression and the beaches. Within the project area, the landforms of the dunes overlooking the interbarrier

depression have proven to be favoured for past Aboriginal land use with an abundance of sites and a variety of site types throughout these landforms, both on the surface and subsurface. However, being located approximately 220 metres from the interbarrier depression indicates the project area may have been utilised for more transitory activities such as hunting and gathering.

In relation to land uses and associated impacts, Heritage NSW (DECCW 2010) defines disturbed lands as land that has been the subject of human activity that has changed the lands' surface and, or subsurface, these changes being changes that remain clear and observable. This definition is based on the types of disturbances classified in The Australian Soil and Land Survey Field Handbook (CSIRO 2010) and Table 2.1 provides a scale formulated by the CSIRO of the levels of disturbances and their classification, which will assist in determining the level of disturbance across the project area and its impact on potential cultural material that may be present.

Table 2.1 Land use scale (CSIRO 2010)

Minor disturbance		Moderate disturbance		Major disturbance	
Cleared and/or grazed at some time, but apparently never ploughed		Cleared and/or grazed at some time, with ploughing also attested		Severe disturbance to natural soil profiles; complete-to-near complete topsoil loss/disturbance	
0	No effective disturbance; natural	3	Extensive clearing (e.g., poisoning and ringbarking	6	Cultivation: grain fed
1	No effective disturbance other than grazed by hoofed animals	4	Complete clearing: pasture native or improved, but never cultivated	7	Cultivation: irrigated, past and present
2	Limited clearing (e.g., selected logging)	5	Complete clearing: pasture native or improved, cultivated at some stage	8	Highly disturbed: e.g., quarry, road works, mining, landfill, urban

Regionally, following European settlement of the area in the 1820s, the regional landscape has been subjected to a range of different modifactory activities including extensive logging and clearing, agricultural cultivation (ploughing), pastoral grazing, residential developments and other construction works. The associated high degree of landscape disturbance has resulted in the alteration of large tracts of land and the cultural materials contained within these areas.

Based on aerial photography (Nearmap 2018 – 2022), the western side of the project area has been subject to clearing and construction works associated with the house, sheds and pool in the centre, a large shed at the north eastern side, as well as driveways and utilities. The eastern side of the project area, also previously cleared, has undergone construction works along the western border for a house and sheds, driveways and utilities. Discussions with the land owner whose family had previously owned both properties for over 80 years, indicate that the northern half of both properties were mined and in filled using the remainder of the upper dune portion of the properties. These landuses and how they impact on the landscape and deposits are discussed below.

Early vegetation clearing included the uprooting of trees by chaining which disturbed or destroyed that may be present near, or underneath trees and vegetation (Wood 1982). Farming and agricultural activities also disturbed the landscape. Pastoralism activities result in disturbances due to vegetation clearance and the trampling and compaction of grazed areas which accelerate the natural processes

of sheet and gully erosion, which in turn can cause the horizontal and lateral displacement of artefacts. Furthermore, grazing by hoofed animals can affect the archaeological record due to the displacement and breakage of artefacts resulting from trampling (Yorston et al 1990). Pastoral land uses are also closely linked to alterations in the landscape due to the construction of dams, fence lines and associated structures.

Excavation works required for developments, including but not limited to business, residential, industrial, works depots and associated infrastructure and utilities, require excavation, cut and fill methods. These direct impacts to the land and associated cultural materials that may be present are easy to see and understand. Any form of construction or resource exploitation that involves the removal of, relocation of or compaction or soils sediments or minerals, requires the modification of the topography, thus displacing and/or destroying any cultural materials that may have been present (Wood 1982). Theses significant disturbances have results in none of the original topsoils remining in situ.

Additional disturbances would have derived from natural processes. The patterns of deposition and erosion within a locality can influence the formation and/or destruction of archaeological sites. Within an environment where the rate of erosion is generally high, artefacts deposited in such an environment will be eroded downslope after being abandoned (Waters 2000; Waters and Kuehn 1996). If erosion occurs after cultural material is deposited, it will disturb or destroy sections, or all of, archaeological sites even if they were initially in a good state of preservation. The more frequent and severe the episodes of erosional events the more likely it is that the archaeological record in that area will be disturbed or destroyed. Additionally, bioturbation processes such as the redistribution and mixing of cultural deposits occurs as a result of burrowing and mounding by earthworms, ants and other species of burrowing animals. Artefacts can move downwards through root holes as well as through sorting and settling due to gravity, and translocation can also occur as a result of tree falls (Balek 2002; Peacock and Fant 2002; Canti 2003; Stein 2003:).

The project area is located within an environment that provided resources along the interbarrier depression. Without a fresh water supply to enable camping, or closer proximity to the interbarrier depression and associated resources, the project area may have been utilised for more transitory activities such as travel and hunting and gathering on the way to such resources. Such past Aboriginal land uses are manifest in the archaeological record as a background scatter of discarded artefacts (such as isolated artefacts and/or very low-density artefact scatters) and low-density shell middens. In relation to modern alterations to the landscape, the previous large-scale clearing, and construction works associated with the structures, infrastructure and utilities can be expected to have had moderate to high impacts upon the archaeological record at those locations.

2.2 ARCHAEOLOGICAL CONTEXT

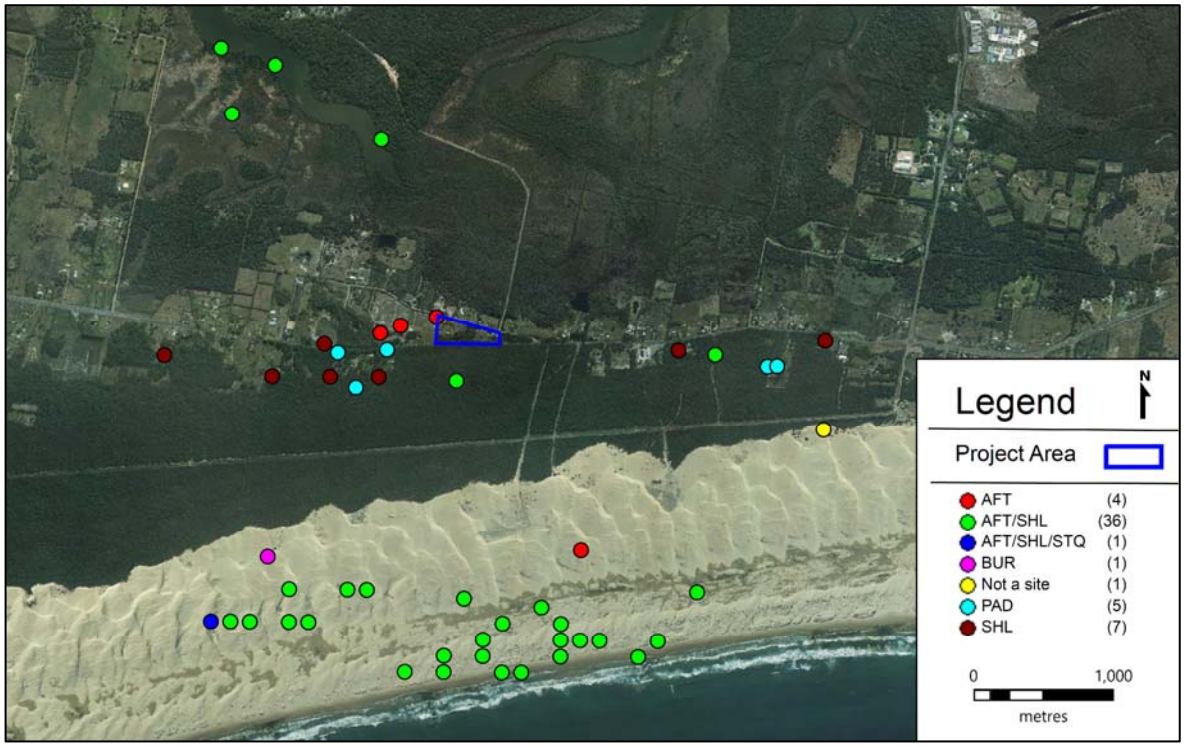
A review of the archaeological literature of the region, and more specifically the local area and the results of an AHIMS search provide essential contextual information for the current assessment.

2.2.1 ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM (AHIMS)

It must be noted that there are many limitations with an AHIMS search including incorrect site coordinates due to errors and changing of computer systems at AHIMS over the years that failed to correctly translate old coordinate systems to new systems. Secondly, AHIMS will only provide up to 110 sites per search, thus limiting the search area surrounding the project area and limiting a more comprehensive analysis and finally, few sites have been updated on the AHIMS register to notify if they have been subject to a s87 or s90 and as such what sites remain in the local area and what sites have been destroyed, to assist in determining the cumulative impacts, is unknown.

A search of the AHIMS register (Appendix A) has identified 55 known Aboriginal sites currently recorded within two kilometres of the project area and include 36 shell and artefact sites, 4 artefact sites, 7 shell m middens, 5 PADs, 1 burial and 1 artefact/Shell and stone quarry site (Figure 2.1). One site (AHIMS 38-5-0326) appears to be located in the project area and examination of the site card shows this low-density artefact scatter (2 artefacts over 70m) is located along a disturbed track west in the adjoining property of the western boundary of the current project area. Whilst there are no registered sites or Aboriginal Places within the project area, site 38-5-0326 may extent into the project area.

Figure 2.1 Approximate location of AHIMS sites



2.2.2 HERITAGE REGISTER LISTINGS

The National Heritage List, the Commonwealth Heritage List, the Australian Heritage Database, Australia's National Heritage List, The National Trust Heritage Register State Heritage Inventory the and the relevant Local Environmental Plan have no Aboriginal objects, sites or places listed.

2.2.3 SUMMARY OF THE REGIONAL ARCHAEOLOGICAL CONTEXT

The most relevant large-scale investigation across the area was undertaken by Dean-Jones (1980) and further supplemented by numerous assessments throughout the region (e.g., Robson *et al.*, 1993; ERM 2003; MCH 2018, 2019, 2020, 2022 in prep; Mitchel et al in prep) that indicate differing results and observations based on surface visibility and exposure, alterations to the landscape (including mining, industrial and residential development), proximity to water sources and geomorphology. The following summary, is derived from a review of these investiagtions and provides a regional archaeological context in terms of site location and distribution. The Newcastle Bight regional archaeology of the area can be summarised as follows:

- The majority of sites within the region consist of shell middens (containing beach and/or estuarine species) and stone artefact scatters, with sites varying from single artefacts to dense concentrations of material in both a surface and sub-surface context.
- Other site types occur including a significant number of burials (usually exposed through erosion), scar trees and ceremonial sites.
- Within the stabilised dune fields, there are greater concentrations of archaeological material (in terms of site numbers and artefact densities) are located on low ridgelines, spurs and low dunes associated with wetland resources overlooking the interbarrier depression.
- Areas at the interface of the swamps (inter-barrier depression) and dunes overlooking the swamp have high archaeological potential due to the fact that the swamp (inter-barrier depression) was a very important food and fibre resource.
- Archaeological material within the active transgressive dune field and current deflation basin primarily consists of exposed and/or deflated deposits that were once associated with former stabilised surfaces and periods of stabilisation. Although some archaeological material may have been deposited during periods of instability (i.e., not in association with a stabile soil surface), this material is likely to have been limited in both extent and distribution.
- Access area between the ocean and swamp area were not suitable for more than transitory activities such as hunting and gathering and travel between resource rich environments with possible overnight camping due to the distance from the aquatic and estuarine resources.
- Due to vegetation coverage and the nature of sand deposits, the detection of sites is directly related to levels of exposure and visibility. Sub-surface deposits may be at a considerable depth below the current dune surface and therefore are unlikely to be detectable unless significant disturbance has occurred.

2.3 SUMMARY OF THE LOCAL ARCHAEOLOGICAL CONTEXT

All archaeological surveys throughout the local area have been undertaken in relation to environmental assessments for developments and mining activities. The most relevant investigations indicate differing results and observations based on surface visibility and exposure, alterations to the landscape, proximity to water sources and geomorphology.

MCH has reviewed key local assessments to obtain a local archaeological context. Previous assessments of the wider area (Ahoy 1994, Comber 1990, Cubis 1981, Dean-Jones 1990, MCH 2015, 2021, Umwelt 2010, 2011) and has identified that the majority of sites are located on both the Holocene and Pleistocene dunes overlooking the inter barrier depression and at the interface of the dunes and the interbarrier depression, although very rarely within the inter barrier depression.

Locations along the beach were also favoured due to the significantly high resources available and the majority of sites within the region consist of shell middens (containing beach and/or estuarine species) and stone artefact scatters, with sites varying from single artefacts to dense concentrations of material in both a surface and sub-surface context. Artefacts typically date to the Holocene although Pleistocene deposits have been identified at Williamtown (Baker 1993).

Raw materials are predominantly tuff (also called indurated mudstone by some) obtained locally and silcrete, chert or quartz that have been traded/transported from other areas and artefacts are typically flakes, flake pieces, broken flakes, cores and tools. Burials are often identified in eroding sand and are often associated with shell middens (being buried underneath).

The majority of surface sites were noted to have been disturbed through past landuses including clearing and erosion with subsurface deposits impacted and disturbed through mining, agricultural and pastoral activities, residential developments, utilities and infrastructure.

2.4 SYNTHESIS OF ENVIRONMENTAL AND ARCHAEOLOGICAL CONTEXTS

When assessing sites in terms of distance to fresh water, in the region there is a clear pattern of past Aboriginal land uses whereby the majority of high-density sites are situated within 50 metres of reliable fresh water (high order), the interbarrier depression and beaches, and reduce in both numbers and densities with an increase in distance from these resources. Other unsuitable locations for camping, such as the area between the beach and previous lagoon (interbarrier depression) would not have been suitable but used for travel as well as hunting and gathering. Based on information gained from previous studies, both regionally and locally, within a two-kilometre radius of the project area, it can be expected that:

- the likelihood of locating sites increases with proximity to the interbarrier depression and the beach;
- the likelihood of finding large sites increases markedly with proximity to the interbarrier depression and the beach;
- sites are located on both the Holocene and Pleistocene dunes overlooking the interbarrier depression;
- sites may be present at the interface of the interbarrier depression and the dunes;
- sites are not usually found in the interbarrier depression;
- there is a decrease in site numbers and site densities between the Inner Holocene dunes and the beach front;
- site types are typically shell middens with various shell species, stone tools and may also contain charcoal, fish and animal bone;
- artefact scatters, isolated finds, scarred trees, burials and ceremonial sites may also be found along the dunes;
- artefacts typically date to the Holocene but Pleistocene sites may be present in the Pleistocene dues;
- raw materials are tuff obtained locally and/or silcrete, chert or quartz that have been traded/transported from other areas; and
- stone artefacts are typically flakes, flake pieces, broken flakes, cores and tools with fish hooks manufactured form local shell.

2.5 MODELS OF PAST ABORIGINAL LAND USE

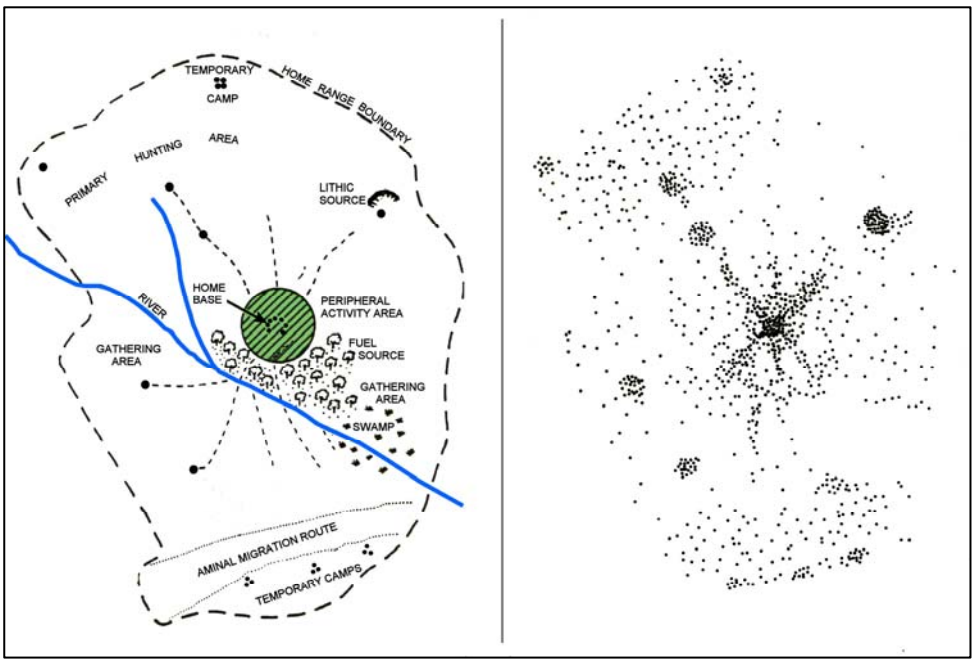
The main aim of this project is to attempt to define both the nature and extent of occupation across the area. As a result, the nature of the analysis will focus on both the landform units and sites. The purpose of this strategy is to highlight any variations between sites and associated assemblages, landforms and resources across the area treating assemblages as a continuous scatter of cultural material across the landscape. In doing this, it is possible to identify variation across the landscape, landforms and assemblages that correspond with variation in the general patterns of landscape use and occupation. Thus, the nature of activities and occupation can be identified through the analysis of stone artefact distributions across a landscape. A general model of forager settlement patterning

in the archaeological record has been established by Foley (1981). This model distinguishes the residential 'home base' site with peripheral "activity locations".

Basically, the home base is the focus of attention and many activities and the activity locations are situated away from the home base and are the focus of specific activities (such as tool manufacturing). This pattern is illustrated in Figure 2.2. Home base sites generally occur in areas with good access to a wide range of resources (reliable water, raw materials etc). The degree of environmental reliability, such as reliable water and subsistence resources, may influence the rate of return to sites and hence the complexity of evidence. Home base sites generally show a greater diversity of artefacts and raw material types (which represent a greater array of activities performed at the site and immediate area). Activity locations occur within the foraging radius of a home base camp (approximately 10 km); (Renfrew and Bahn 1991).

Based on the premise that these sites served as a focus of a specific activity, they will show a low diversity in artefacts and are not likely to contain features reflecting a base camp (such as hearths). However, it is also possible that the location of certain activities cannot be predicted or identified, adding to the increased dispersal of cultural material across the landscape. If people were opting to carry stone tools during hunting and gathering journeys throughout the area rather than manufacturing tools at task locations, an increased number of used tools should be recovered from low density and dispersed assemblages.

Figure 2.2 Foley's model (L) and its manifestation in the archaeological record (R), (Foley 1981).



2.6 MODEL OF OCCUPATION FOR THE REGION

Work throughout NSW has aimed to understand the nature of Aboriginal occupation and to identify the nature of past Aboriginal land uses. This theme often aims to identify and explain archaeological patterning in site type, content and distribution. General theories have been developed outlining the relationship between land use patterns and the resulting archaeological evidence. A number of models developed for the region have been reviewed (McBryde 1976; Koettig 1994; Dean-Jones and Mitchell 1993; Rich 1995; Kuskie and Kamminga 2000). All models state that the primary requirements for repeated, concentrated or permanent occupation is access to reliable fresh water.

Brief and possible repeated occupation may be represented in areas that have unreliable access to ephemeral water sources, however, these areas will not contain high archaeological evidence or potential (Goodwin 1999).

Kuskie and Kamminga (2000) established a general model of occupation strategies based primarily upon ethnographic research. Used as a starting point, it makes a general set of factors that are consistent with other studies (e.g., McDonald and White 2010, Nelson 1991). The model distinguishes between short-term or extended long-term occupation and makes some predictions about the likely location of different foraging and settlement activities. Combining this information with a review of assemblage contents from a sample of excavated sites within the region, a baseline of settlement activities may be determined (Barton 2001).

The model provides a number of archaeological expectations that may be tested. For example, the presence of features requiring a considerable labour investment (e.g., stone-lined ovens or heat-treatment pits) are likely to occur at places where occupation occurred for extended periods of time. The presence of grindstones is also a reliable indicator of low mobility and extended occupation as seed grinding requires a large investment of time and effort (Cane 1989). In most ethnographic examples, seed grinding is an activity that takes place over an entire day to provide adequate energetic returns (Cane 1989; Edwards and O'Connell 1995).

Where group mobility was high and campsites frequently shifted throughout the landscape, artefact assemblages are not expected to contain elements such as grindstones, heat-treatment pits, ovens and the diversity of implements frequently discarded at places of extended residential occupation. It may also have been the case that the location of particular activities could not be predicted by tool users, adding to the increased low-density scattering of artefacts over the landscape. Also, if individuals were opting to carry a number of stone tools during hunting and gathering activities and maintaining these tools rather than manufacturing new tools at each task location, the ratio of used tools to unworn flakes in these assemblages should be high. Table 2.2 has been adapted from Kuskie and Kamminga (2000).

Table 2.2 Site descriptions (Kuskie & Kamminga 2000).

Occupation Pattern	Activity Location	Proximity to water	Proximity to food	Archaeological expectations
Transitory movement	all landscape zones	not important	not important	• assemblages of low density & diversity • evidence of tool maintenance & repair • evidence for stone knapping
Hunting &/or gathering without camping	all landscape zones	not important	near food resources	• assemblages of low density & diversity • evidence of tool maintenance & repair • evidence for stone knapping • high frequency of used tools
Camping by small groups	associated with permanent & temporary water	near (within 100m)	near food resources	• assemblages of moderate density & diversity • evidence of tool maintenance & repair • evidence for stone knapping & hearths
Nuclear family base camp	level or gently undulating ground	near reliable source (within 50m)	near food resources	• assemblages of high density &diversity • evidence of tool maintenance, repair, casual knapping • evidence for stone knapping • heat treatment pits, stone lined ovens • grindstones

Community base camp	level or gently undulating ground	near reliable source (within 50m)	near food resources	• assemblages of high density & diversity • evidence of tool maintenance, repair, casual knapping • evidence for stone knapping • heat treatment pits, stone lined ovens • grindstones & ochre • large area >100sqm with isolated camp sites

2.7 PREDICTIVE MODEL FOR THE LOCAL AREA

Previous archaeological studies undertaken throughout the area provide a good indication of site types and site patterning in the area. The research has shown that middens with stone implements, and middens with only shell are the most predominate site types. The most common site locations are the seaward margin of active transgressive dunes/active blowouts, Holocene and Pleistocene dunes overlooking the interbarrier depression and at their interface, and areas near water sources. Predictions about site patterning for the three landforms are discussed.

Outer Pleistocene dunes:

There is a high potential for sites on this landform. Sites are predominantly middens (composed of either or both estuarine and marine shell species) and open camps, with a sparse scattering of cultural material along the ridgelines of the dunes and high-density sites situated on low flat ridgelines immediately adjacent to wetlands. It is predicted that ridges on the margins with the interbarrier depression have high archaeological potential.

Interbarrier depression:

The interbarrier depression was an important area for foraging as indicated by the prevalence of sites on the margins of both the Pleistocene and Holocene dune systems overlooking the depression and at their interface. Although these sites are close to the depression, they are not located within it. Evidence of occupation within the depression is very limited and consists of a scattering of the remnants of midden between Boyces Track and Uralla (Dean-Jones 1990). The interbarrier depression, once the coastal margin and estuarine swamp, is now covered with Holocene estuarine sand, mud and clay ranging in depth from one to ten metres as well a natural shell bed (Robson et al 1992: 13-19). This area has also been extensively disturbed through ploughing, grazing, road construction and development. It is therefore predicted that there is a very low potential for archaeological sites in this landform.

Inner Holocene dunes:

There is a high potential for both middens (including estuarine shell species, especially rock oysters and mud whelk) and open camp sites on the inner landward margin of the Holocene dunes. These dunes are stable and have the potential to contain stratified deposits dating back to 4,500 PB (Dean-Jones 1992). Such occupational sequences are often high density and up to one metre in depth. There is a space scattering of cultural material along the ridges of this landform and high-density sites are present along the low flat ridgelines overlooking the wetland (interbarrier depression) area.

2.8 PREDICTIVE MODEL FOR THE PROJECT AREA

An archaeological predictive model is established to identify areas of archaeological sensitivity so it can be used as a basis for the planning and management of Aboriginal heritage. It involves reviewing existing literature to identify basic site distribution patters. These patterns are then modified according to the specific environment of the project area to form a predictive model for site location

within the current project area. A sampling strategy is then used to test the model and the results of the survey used to confirm, refute or modify the model.

Land-systems and environmental factors are commonly used factors in predictive modelling based on the assumption that they provide distinctive sets of constraints and opportunities that influenced past Aboriginal land use patterns. As land use patterns may differ between zones (due to different environmental conditions), this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence. The predictive model presented here is based on landform units, previous archaeological assessments conducted within the region, distribution of known sites and site densities and traditional Aboriginal land use patterns. Also taken into consideration are land use impacts (both natural and anthropomorphic) that may have resulted in a disturbed landscape and associated archaeological record.

Considering the AHIMS results, local and regional archaeological investigations as well as the environmental context, the project area is located within 220 metres of the interbarrier depression. Dunes that overlook the interbarrier depression are known to have been favoured for past Aboriginal land uses and camping due to the rich resource of the swamp area and evidence of past Aboriginal land uses and resource exploitation is located throughout this dunal system and typically within 50 metres of the swamp with sites reducing in density away from the swamp but increasing again in close proximity to other fresh water sources. As the project area is located approximately 220 metres from this resource, it is likely the project area would have been utilised for hunting and gathering opportunities rather than camping and evidence of such past Aboriginal land uses manifests in the archaeological record as low-density shell middens, low-density artefact scatters and, or, isolated artefacts.

The site types that may be present within the project area, include low-density shell middens, low-density artefact scatters and, or isolated artefacts, both of which are described below.

- **Artefact scatters**

Also described as open campsites, artefact scatters and open sites, these deposits have been defined at two or more stone artefacts within 50 metres of each other and will include archaeological remains such as stone artefacts and may be found in association with camping where other evidence may be present such as shell, hearths, stone lined fire places and/or heat treatment pits. These sites are usually identified as surface scatters of artefacts in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing, grazing) and access ways can also expose surface campsites. Artefact scatters may represent evidence of;

- Large camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of such tools, management of raw materials, preparation and consumption of food and storage of tools has occurred;
- Medium/small camp sites, where activities such as minimal tool manufacturing occurred;
- Hunting and/or gathering events;
- Other events spatially separated from a camp site, or
- Transitory movement through the landscape.

Artefact scatters are a common site type in the locality and the broader region. There is potential for low-density artefact scatters to occur within the project area and be representative of hunting and gathering activities. There is also the potential for such sites to be impacted on through past land uses.

- **Isolated finds**

Isolated artefacts are usually identified in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface artefacts. Isolated finds may represent evidence of;

- Hunting and/or gathering events; or
- Transitory movement through the landscape.

Isolated finds are a common site type in the locality and the broarder region. There is potential for isolated artefacts to occur across the project area and across all landforms. There is also the potential for such sites to be impacted on through past land uses.

- **Shell middens**

Shell middens are places where debris from eating shell fish has accumulated. Middens preserve a range of past dietary remains which have the potential to inform about past dietary consumption and availability of food resources. Most shell middens analysed to date pertain to coastal environments with few pertaining to inland middens. In NSW, middens are located on headlands, beaches and dunes, around estuaries, swamps, the tidal stretches of creeks and rivers and along the banks of inland rivers, creeks and lakes. Shell middens may be found in the open or in rock shelters and often those in the open are disturbed through erosion and land use impacts and those in shelters are usually well preserved. The location of middens is influenced by a variety of factors including, but not limited to, the availability of shell fish, aspect, accessibility and the nature of the immediate area and are typically located within a reasonable distance from water on level, sheltered surfaces.

Ranging in size from small scatters to deep layered deposits that have built up over time, the size of the midden may relate to its location (e.g., riverbank middens tend to be smaller than estuarine and coastal middens). Small middens may represent short term occupation or the debris from a single meal. Major estuarine species include bivalves such as cockle, whelk, mud and rock oyster and both edible and hairy mussels. Rock platform species of gastropods include limpets, turban shell, periwinkles, nerits, tritans and cartrut shell fish and the most prevalent beach species is the pipi.

Shell middens may also include fish, sea birds, sea mammals and land mammals. Stone artefact are also typically found within middens and indicate trade and/or transportation of raw materials. Bone and shell artefacts, such as fish hooks and barbs, as well as evidence of cooking may be present in the form of charcoal, ash, fire stones, hearths, burnt clay and/or burnt earth. The midden usually occurs within a soil or sand layer that is darker than the surrounding sediment. Middens may also contain burials and if present are usually located under the midden.

Preservation varies with food stuffs such as berries and fruits leaving no archaeological traces, sea foods such as cartilaginous fish, stingrays, octopus and fish eggs are likely to be equally invisible in the archaeological record. However, tissue such as shell and crustations and bone may be preserved and preservation is dependent on land use impacts and associated soil pH.

An important contribution to the study of coastal shell middens was made by Meehan (1975, 1977a, b) through ethnographic studies of coastal hunter and gatherers in northern Arnhem Land. Through a yearlong quantitative record of the total diet, Meehan provides unique insights into all aspects of shell fish gathering and the creation of shell middens with pertinent data to the interpretation of midden data. Shell middens may be distinguished from natural shell beds as follows (Attenbrow 1992; Bailey 1975, 1994; Gill 1951; Coutts 1966; Hughes and Sullivan 1974);

1) Middens contain charcoal, burnt wood, clay and/or earth, blackened shells, some artefacts, hearth stones. These are absent from natural shell beds.
2) Middens are either unstratified or roughly stratified whereas natural shell deposits are well stratified and exhibit sedimentary features of water laid deposits.

3) Middens contain edible species and sizes whereas shell beds contain shells of varied species and sizes as well as both edible and non-edible species.
4) Middens do not contain worn shell resulting from transportation from the off shore or beach zone, whereas shell beds do.
5) Middens contain mammal bones used in food consumption, shell beds do not.
6) Middens do not contain certain forms of marine life not used by Aboriginal people (e.g., corals, tube worms) but shell beds do.

Interpretation of shell middens usually falls into three main categories;

1) Taphonomy: differential survival value of different species may be considered.
2) Environmental/ecological: changes in habitat may bring about changes in the availability of species (Coutts 1970).
3) Economic/behavioural: changes in gathering habits brought about by some purely cultural factor may be considered (Bowdler 1970, 1976).

The interpretation of shell middens is only as good as one's analysis, which is only as good as one's sample, all of which are typically limited during surface survey only. Shell middens may represent evidence of;

- Large camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of such tools, management of raw materials, preparation and consumption of food and shell fish and storage of tools has occurred;
- Medium/small camp sites, where activities such as a small meal was cooked and/or consumed;
- Hunting and/or gathering events;
- Other events spatially separated from a camp site, or
- Transitory movement through the landscape.

Shell middens are a common site type in the locality and the broader region. There is potential for low-density shell middens to occur in the project area. There is also the potential for such sites to be impacted on through past land uses.

3 RESULTS AND DISCUSSION

To comply with the due diligence requirement that a visual inspection of the project area be undertaken, an archaeological survey across the project area was undertaken by MCH archaeologist Dr. Penny McCardle on 28th October 2022. The survey focused on areas of high ground surface visibility and exposures (erosional features, tracks, cleared areas).

3.1 SURVEY UNITS

The project area, consisting of two separate properties were surveyed as two units. Discussions with the land owner, whose family had owned both properties for over 80 years stated that the northern half of the project areas had been previously mined and the remainder of the properties were scrapped forward to fill in the old mined area, resulting in none of the original upper dune (landform) remaining.

4029 had been previously cleared, all trees and vegetation had been planted by the owners. The property was flat, indicating that the property had indeed been scrapped with none of the original upper dune remaining. Additionally, construction had occurred for the house, pool, sheds, garages, driveways as well as utilities. Examples of this SU are provided in Figures 3.1 to 3.3.

Figure 3.1 4029 – Southern end facing north west

Figure 3.2 North eastern end facing west

Figure 3.3 Back of the property facing west

4045 had also been previously cleared with the upper dune also removed with the project area being flat. Additionally, construction works had occurred in the western side for a house, garages and driveways. Vegetation was primarily grass with trees around the border. Examples of this SU are provided in Figures 3.4 and 3.5.

Figure 3.4 South western corner facing north east

Figure 3.5 North eastern corner facing south west

As shown if Table 3.1 the total effective coverage for the project area was 23,340m², or 55.97% reflecting the good visibility.

Table 3.1 Effective coverage for the investigation area

SU	Landform	Area (m2)	Vis. %	Exp. %	Exposure type	Previous disturbances	Present disturbances	Limiting visibility factors	Effective coverage (m2)
1	4029	25,100	50%	100%	erosion, tracks, original landform removed	clearing, mining, scraping of top soils, residential construction	residence, erosion	grass, leaf litter	12,550
2	4045	16,600	65%	100%	erosion, tracks, original landform removed	clearing, mining, scraping of top soils, residential construction	erosion	grass, leaf litter	10,790
Totals		**41,700**							**23,340**
								Effective coverage %	**55.97%**

The level and nature of the effective survey coverage is considered satisfactory to provide an effective assessment of the project area. The coverage was comprehensive for obtrusive site types (e.g., grinding grooves and scarred trees) as well as for the less obtrusive surface stone artefact sites by surface visibility constraints that included vegetation cover and minimal exposures.

In relation to land uses and the associated impacts on the landscape and any cultural materials that may have been present, the project area has been subject to large scale clearing, partially mined with the remainder of the dune scrapped to fill the mined area resulting in none of the original landscape remaining and as indicated in Table 3.2, these disturbances range are high.

Table 3.2 Land use scale (CSIRO 2010) and land uses in the project area

Minor disturbance		Project area	Moderate disturbance		Project area	Major disturbance		Project area
0	No effective disturbance; natural		3	Extensive clearing (e.g., poisoning and ringbarking		6	Cultivation: grain fed	
1	No effective disturbance other than grazed by hoofed animals		4	Complete clearing: pasture native or improved, but never cultivated		7	Cultivation: irrigated, past and present	
2	Limited clearing (e.g., selected logging)		5	Complete clearing: pasture native or improved, cultivated at some stage		8	Highly disturbed: e.g., quarry, road works, mining, landfill, urban	yes

3.2 ARCHAEOLOGICAL SITES AND ARCHAEOLOGICAL SENSITIVITY

No sites or areas of potential archaeological sensitivity were identified in the project areas during the survey and this is due to the significantly high impacts from previous land uses across the project area (clearing, mining, upper dune removal). Additionally, being located at a distance from reliable fresh water and resources, indicates the project area may have been utilised for more transitory activities rather than camping. Evidence of such past Aboriginal land uses manifests in the archaeological record as a background scatter of discarded artefacts, which would have been disturbed/destroyed through past land uses.

In view of the predictive modelling and the results obtained from the effective coverage and disturbance rating, it is concluded that the survey provides a valid basis for determining the probable impacts of the proposal and formulating recommendations for the project. The survey results demonstrate the absence of Aboriginal objects within the project area. The results are consistent with those obtained from other studies in the local area. The results indicate a number of possible past Aboriginal land use within the project area;

- No Aboriginal occupation
- Ground disturbances having disturbed or removed evidence

Considering general models of occupation for the locality, the results of this and local investigations, the locality may have been utilised by Aboriginal people. As the project area itself is located over 220 metres from the interbarrier depression and associated resources, the project area is unlikely to have been utilised more than a low intensity usage such as transitory movement or hunting/gathering activities.

3.3 CONCLUSION

It is well established that proximity to water was an important factor in past occupation of the area, with sites reducing in number significantly away from water with most sites located within 50 metres of the tributaries. The project area is located approximately 220 metres from the interbarrier depression, 775 metres form Bobs Farm Creek and 1.8 kilometres from the ocean and associated resources. The project area was unsuitable for camping but may have been utilised for transitory movement or hunting/gathering activities.

In relation to modern alterations to the landscape, previous large-scale clearing, partial mining and upper dune removal to fill the mined area, along with additional construction works for the structures, infrastructure and utilities, can be expected to have had high impacts upon the archaeological record. Natural factors such as erosion would also have impacted on the archaeological record, all of which would have displaced cultural materials and the likelihood of in situ cultural materials is very low to nil.

4 ASSESSMENT OF IMPACTS

The archaeological record is a non-renewable resource that is affected by many processes and activities. As outlined in Section 2 and Section 3, the various natural processes and human activities have impacted on archaeological deposits through both site formation and taphonomic processes.

4.1 IMPACTS

The Heritage NSW Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (2010:21) describes impacts to be rated as follows:

1) Type of harm: is either direct, indirect or none
2) Degree of harm is defined as either total, partial or none
3) Consequence of harm is defined as either total loss, partial loss, or no loss of value

As no sites or PADs were identified, there are no impacts on the archaeological record.

5 MITIGATION AND MANAGEMENT STRATEGIES

Specific strategies, as outlined through the Heritage NSW Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010b), the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011), and the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW 2010c), are considered below for the management of the identified site(s) within the project area.

5.1 CONSERVATION/PROTECTION

Conservation is the first avenue and is suitable for all sites, especially those considered high archaeological significance and/or cultural significance. Conservation includes the processes of looking after an indigenous site or place so as to retain its significance and managed in a way that is consistent with the nature of peoples' attachment to them.

As no sites or PADs were identified conservation/protection is not required.

5.2 FURTHER INVESTIGATION

An Aboriginal Heritage Impact Permit (AHIP) is no longer required to undertake test excavations (providing the excavations are in accordance with the Code of Practice for Archaeological Investigations in NSW). Subsurface testing is appropriate when a PAD has been identified, and it can be demonstrated that sub-surface Aboriginal objects with potential conservation value have a high probability of being present, and that the area cannot be substantially avoided by the proposed activity.

As no sites or PADs were identified further investigations are not justified.

5.3 AHIP

If harm will occur to an Aboriginal object or Place, then an AHIP should be sought from Heritage NSW, Department of Premier & Cabinet as a defence to that harm. If a systematic excavation of the known site could provide benefits and information for the Aboriginal community and/or archaeological study of past Aboriginal occupation, a salvage program, and, or community collection, may be an appropriate strategy to enable the salvage of cultural objects.

As no sites or PADs were identified an AHIP is not required.

6 RECOMMENDATIONS

6.1 GENERAL

1) The persons responsible for the management of onsite works will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Regulation 2019, under the National Parks and Wildlife Act 1974;

2) Should any Aboriginal objects be uncovered during works, all work will cease in that location immediately and the Environmental Line contacted.

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APPENDIX A

AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Bobs Farm

Client Service ID : 726323

Penny Mccardle

Po Box 166

Adamstown New South Wales 2289

Attention: Penny Mccardle

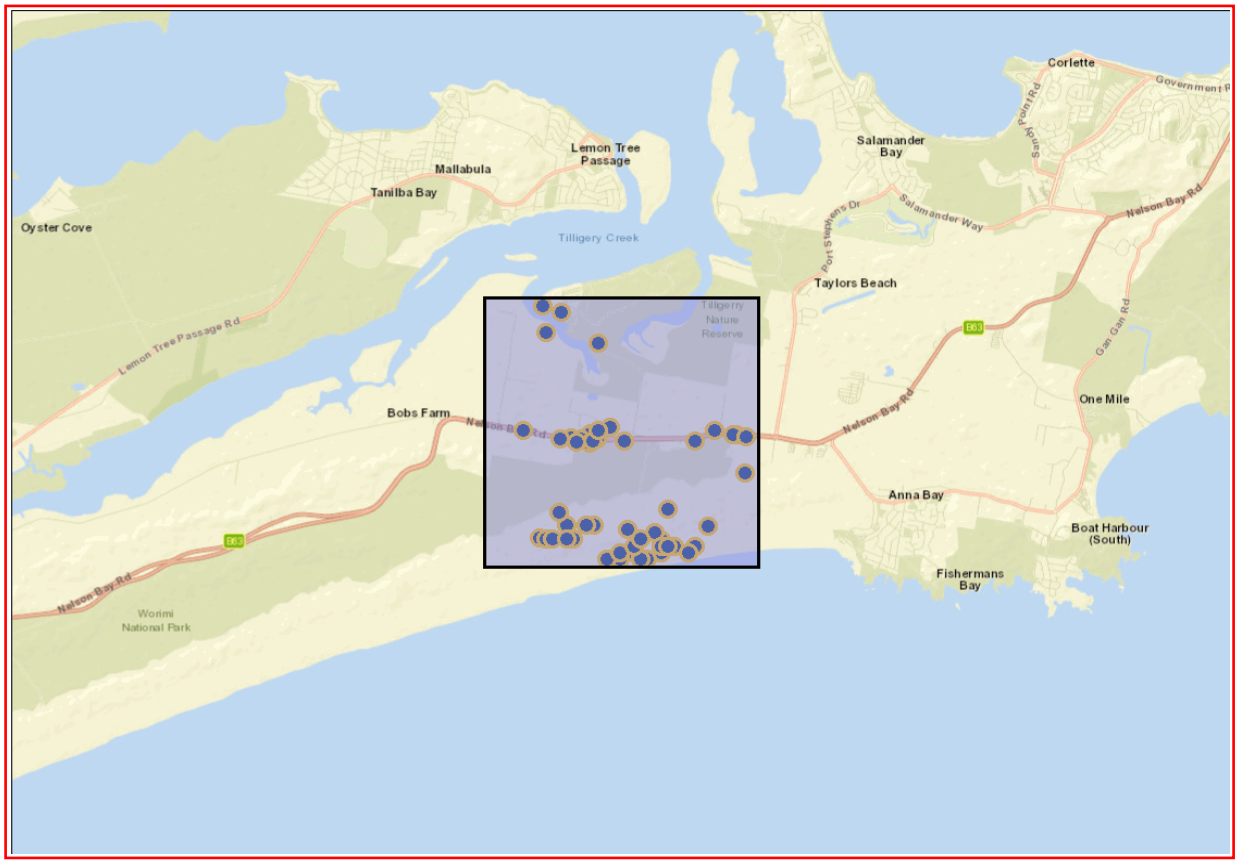
Email: penny@mcheritage.com.au

Date: 25 October 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 408200.0 - 412200.0, Northings : 6372000.0 - 6376000.0 with a Buffer of 0 meters, conducted by Penny Mccardle on 25 October 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

55	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Bobs Farm

Client Service ID : 726323

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
38-5-0074	Lemon Tree Passage;	AGD	56	409750	6375150	Open site	Valid	Shell : -, Artefact : -	Midden	233,102218
	Contact	**Recorders**	Sue Effenberger					**Permits**		
38-5-0090	B F 2;	AGD	56	410400	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0091	B F 3;	AGD	56	410400	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0092	B F 4;	AGD	56	410300	6372100	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0093	B F 5;	AGD	56	410100	6372000	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0094	B F 7;	AGD	56	409900	6371900	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0095	B F 6;	AGD	56	410100	6371900	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0099	B F 11;	AGD	56	409300	6372400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0100	B F 12;	AGD	56	409300	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0101	B F 13;	AGD	56	409400	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0102	B F 14;	AGD	56	409600	6372400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0103	B F 15;	AGD	56	409600	6372400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0104	B F 16;	AGD	56	409700	6372400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0105	B F 17;	AGD	56	409700	6372400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0106	B F 18;	AGD	56	409100	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0107	B F 19;	AGD	56	409000	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0122	Anna Bay 2;	AGD	56	411200	6372100	Open site	Valid	Shell : -, Artefact : -	Midden	1845,102128
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0123	Anna Bay 3;	AGD	56	411100	6372000	Open site	Valid	Shell : -, Artefact : -	Midden	1845,102128
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		

Report generated by AHIMS Web Service on 25/10/2022 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 408200.0 - 412200.0, Northings : 6372000.0 - 6376000.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 55

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Bobs Farm

Client Service ID : 726323

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
38-5-0124	Anna Bay 4;	AGD	56	410900	6372100	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0125	Anna Bay 5;	AGD	56	410800	6372100	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0126	Anna Bay 6;	AGD	56	410700	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0127	Anna Bay 7;	AGD	56	410700	6372000	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0128	Anna Bay 8;	AGD	56	410700	6372100	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0129	Anna Bay 9;	AGD	56	410500	6371900	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0130	Anna Bay 10;	AGD	56	410400	6371900	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-5-0131	Anna Bay 11;	AGD	56	410300	6372000	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-5-0108	B F 20;	AGD	56	408900	6372200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0109	B F 21;	AGD	56	408900	6372200	Open site	Valid	Shell : -, Artefact : -, Stone Quarry : -	Midden,Quarry	1845
	Contact	**Recorders**	Mr.Luke Godwin					**Permits**		
38-5-0114	NB1	AGD	56	410800	6372650	Open site	Valid	Artefact : -	Open Camp Site	2078,4645
	Contact	**Recorders**	Doctor.Jillian Comber					**Permits**		
38-5-0115	NB2;	AGD	56	410200	6372350	Open site	Valid	Shell : -, Artefact : -	Midden	2078,2978
	Contact	**Recorders**	Doctor.Jillian Comber					**Permits**		
38-5-0117	Fenninghams Island 2;	AGD	56	409200	6375600	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-5-0118	Fenninghams Island 3;	AGD	56	408920	6375700	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-5-0119	Fenninghams Island 4;	AGD	56	408920	6375700	Open site	Valid	Shell : -, Artefact : -	Midden	1845,102218
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-5-0120	Fenninghams Island 5;	AGD	56	408980	6375300	Open site	Valid	Shell : -, Artefact : -	Midden	1845,102218
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-5-0121	Anna Bay 1;	AGD	56	411400	6372400	Open site	Valid	Shell : -, Artefact : -	Midden	1845,102128
	Contact	**Recorders**	Pam Dean-Jones,Mr.Luke Godwin					**Permits**		
38-5-0219	Tomaree 3	AGD	56	409200	6373700	Open site	Valid	Shell : 1		102218
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		

Report generated by AHIMS Web Service on 25/10/2022 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 408200.0 - 412200.0, Northings : 6372000.0 - 6376000.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 55

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Bobs Farm

Client Service ID : 726323

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
38-5-0220	Tomaree 4	AGD	56	409500	6373700	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
38-5-0221	Tomaree 5	AGD	56	409750	6373700	Open site	Valid	Shell : 1		102218
	Contact	**Recorders**	Mrs.Angela Besant,Doctor.Tim Owen					**Permits**		
38-5-0222	Tomaree 6	AGD	56	410150	6373680	Open site	Valid	Artefact : 2, Shell : 2		
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
38-5-0245	Upton Midden	AGD	56	408644	6373823	Open site	Valid	Shell : 16		
	Contact	**Recorders**	Doctor.Tim Owen,Mr.Andy Collis					**Permits**		
38-5-0250	Anna Bay 1, NBR	AGD	56	411480	6373850	Open site	Valid	Artefact : 2, Shell : 1		102128
	Contact	**Recorders**	Mr.Peter Kuskie					**Permits**		
38-5-0261	Worimi Ancesral Remains Repatriation Site. Worimi Conservation Lands	AGD	56	409188	6372597	Open site	Valid	Burial : -		
	Contact Worimi Local Aboriginal Land	**Recorders**	Mr.Steve Brereton					**Permits**		
38-5-0089	B F 1;	AGD	56	410600	6372300	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	Contact	**Recorders**	Pam Dean-Jones,Bonhomme Craib & Associates					**Permits**		
38-5-0303	NBR PAD 02	GDA	56	409790	6373866	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Doctor.Tim Owen					**Permits**		
38-5-0304	NBR PAD 01	GDA	56	409538	6373846	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Doctor.Tim Owen					**Permits**		
38-5-0320	NBRd 4	GDA	56	412046	6373942	Open site	Valid	Shell : 1		103447
	Contact	**Recorders**	Ms.Penny Mccardle					**Permits**		
38-5-0321	NBRd 5	GDA	56	411292	6373875	Open site	Valid	Shell : 1		103447
	Contact	**Recorders**	MCH - McCardle Cultural Heritage Pty Ltd,Ms.Penny Mccardle,Ms.Penny Mccardle					**Permits**	4843	
38-5-0322	NBRd 6	GDA	56	409468	6373900	Open site	Valid	Shell : 1		103447
	Contact	**Recorders**	Ms.Penny Mccardle					**Permits**		
38-5-0326	RPS NBR AS1	GDA	56	410044	6374068	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Jeremy Hill					**Permits**	4226	
38-5-0323	NBR3/PAD2	AGD	56	409632	6373635	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Ms.Penny Mccardle					**Permits**		
38-5-0324	NRB3/PAD3	AGD	56	411750	6373780	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Ms.Penny Mccardle					**Permits**		

Report generated by AHIMS Web Service on 25/10/2022 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 408200.0 - 412200.0, Northings : 6372000.0 - 6376000.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 55

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Bobs Farm

Client Service ID : 726323

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
38-5-0325	NBR3/PAD4	AGD	56	411800	6373784	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Ms.Penny Mccardle						**Permits**	
38-5-0347	Anna Bay PAD 1	GDA	56	412042	6373398	Open site	Not a Site	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Niche Environment and Heritage,Niche Environment and Heritage,Doctor.Morgan						**Permits**	4466
38-5-0338	4011 Nelson bay Road A1	GDA	56	409756	6373969	Open site	Destroyed	Artefact : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd - Hamilton,RPS Australia East Pty Ltd - Hamilton,Mr.Ben						**Permits**	
38-5-0339	4011 Nelson Bay Road A2	GDA	56	409859	6374015	Open site	Destroyed	Artefact : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd - Hamilton,Mrs.Tessa Boer-Mah						**Permits**	

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 25/10/2022 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 408200.0 - 412200.0, Northings : 6372000.0 - 6376000.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 55