APPENDIX S

Pre-colonial Aboriginal land and resource use in Centennial, Moore and Queens Parks – assessment of historical and archaeological evidence for Centennial Parklands Conservation Management Plan

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TABLES AND FIGURES

1. INTRODUCTION

The agreed brief for this project was to prepare

1. a sensitivity map which would give a broad indication of the areas likely to have potential for sub-surface cultural deposits (potential archaeological deposits – PADs) relating to pre-colonial Aboriginal occupation of the area. Given the limited funding, this would be based on
   (a) readily available information about present and prior European activities in the Parklands;
   (b) a review of the currently known archaeological evidence for Aboriginal occupation on the eastern end of the 'Sydney peninsula' (referred to throughout as the eastern Sydney peninsula); and
   (c) one day's field inspection.

2. a report that would include:
   (a) a predictive model outlining activities likely to have been carried out in the Parklands prior to 1788 based on early colonial historical descriptions and environmental information about the probable food and raw materials resources available in the Parklands;
   (b) a summary review of currently known archaeological evidence on the eastern end of the Sydney peninsula;
   (c) report of the field inspection;
   (d) details about preparation of the sensitivity map;
   (e) an assessment as to the likelihood (eg. high, medium, low) that potential archaeological deposits will be present, undisturbed and/or have an abundance of archaeological evidence such as stone artefacts;
   (f) recommendations about areas that will require further detailed investigation of prior land-use activities in order to assess the presence of PADs; and,
   (g) general recommendations about the nature of future archaeological work and management or conservation that may be required if PADs are identified.

All of this information is included in this report, but not under these headings. The following sections thus concern only the evidence for pre-colonial Aboriginal use of Centennial, Moore and Queens Park (referred to hereafter as 'the Parklands'). To assess the significance of archaeological sites that are known to exist/have existed in these Parklands and the potential for other archaeological evidence to exist, a summary of the historical and archaeological evidence for Aboriginal land and resource use patterns in the surrounding areas is presented and discussed, as well as information about the present and past environments.

The term eastern Sydney peninsula refers to the land between Port Jackson and Botany Bay (a north-south distance of ca 19 km) and stretching east-west from the coast to a line running between the Sydney Harbour Bridge and the mouth of the Cooks River [ca 8 km].

2. THE PEOPLE – A BRIEF OVERVIEW OF THEIR LIFE AND CULTURE

When Captain Arthur Phillip and the First Fleet landed, first in Botany Bay and then in Port Jackson (Sydney Harbour), in January 1788, he was met by people who had lived in this land for many thousands of years. At least 1500 people lived in the area between Botany Bay and Broken Bay and the intermediate coast (Phillip 15 May 1788[1892:133]; see also 9 July 1788a[1892]:153 and 10 July 1788b[1892:177]).

There were two main languages spoken in the Sydney region – Darug and Tharawal. The Darug language had two main dialects – one spoken along the coast and the other in the hinterland (west of present-day Parramatta). Tharawal was spoken to the south of Botany Bay and as far west as the Georges River and possibly Camden.

People belonged to small groups (territorial clans) through which they were spiritually related to specific tracts of land – these clans included the Gadigal, Wanngal, Gamaragal, Wallumedegal and Boromedegal. The suffix 'gal' denotes 'people of' (Collins 1798[1975:453]), thus, for example, the Gadigal were the people of Gadi (also spelled Cadigal and Cadi respectively).

The 'district of Gadi' was reported to have stretched from South Head west to 'the cove adjoining this settlement' (Darling Harbour) (Phillip 13 February 1790[1892:309]) – an area that would have included Centennial, Moore and Queens Parks. Watkin Tench (1793:201–2 [1979:292]) referred to the Gadigal as 'those who reside in the bay of Cadi'. The 'bay of Cadi' is probably Kutti, the Aboriginal place name recorded for present-day Watsons Bay (Larmer 1832[1898:228]), and the present name of a small beach in the bay.

Each clan distinguished itself from other clans in having different designs and decorations on their tools and weapons. They also distinguished themselves by having different body decorations – for example painted designs worn during certain rites and ceremonies, and the cicatrices (scarification) formed during initiation rites. Some groups also had distinctive hair styles (Collins 1798[1975]:457, 467, 487–8).

Very little was recorded by the First Fleet writers about the spiritual beliefs of the Sydney people; a well-known exception is the detailed description by David Collins of an initiation ceremony that took place near Farm Cove, in what is now the Royal Botanic Gardens (Collins

1798[1975]:466-485). However, by extrapolating from information recorded in the late 1800s about adjacent regions to the north-west of the Hawkesbury River (Mathews 1896, 1897), around Lake Macquarie to the north (Threlkeld 1825–26 in Gunson 1974 Vol. 1:42, 50–53, 65, Vol. 2:194, 206), and the NSW south coast (Howitt:1904[1996]:516–62, 527–43; Mathews 1904:346), it can be assumed that encompassing all aspects of life was a rich spiritual life which included a series of rites and initiation ceremonies as well as a belief in ancestral beings *Baiame* and *Daramulan* and other beings that inhabited the land.

People living around Port Jackson and Botany Bay lived by catching fish and a variety of other marine animals; hunting land animals, birds, and reptiles; and gathering plants, shellfish, birds' eggs and other small animals. The part that each of these activities (hunting, fishing and gathering) played in the lives of the people varied according to where they lived and the resources available. For example, around Port Jackson fishing provided a greater part of the diet of the people living near the harbour mouth than in the upper reaches of the estuaries. In the hinterland (west of Parramatta, Liverpool) hunting was more important than fishing, and land animals such as wallabies and possums, formed a greater part of the diet.

Many different tools and weapons were used in their daily life – in obtaining food and raw materials; for carrying small items; for making tools, weapons and equipment; in preparing food, and for defensive and offensive purposes. Fishing gear used by the coastal people included three- or four-pronged spears, which were used by the men in shallow waters, from bark canoes, and from rock platforms around the shores. In contrast to the men, women used hooks and lines whilst in canoes. This division of labour between men and women and the different modes of fishing extended along the New South Wales coast from only Port Stephens to the NSW/Victorian border. Canoes were essential, not only for fishing, but as transport around the bays and estuaries and along the rivers.

Men also used a variety of equipment in hunting large and small game – eg. barbed and unbarbed wooden spears, spear-throwers, clubs and ground-edged hatchets. A variety of traps and snares were also used to catch birds and other small animals, particularly away from the coast.

Small items such as shellfish and plant foods (berries, yams, nectar-bearing blossoms, leaf vegetables), once collected, were carried in net bags or bark baskets. The principal piece of equipment required for gathering plant foods was a wooden digging stick which was used by the women to dig out root vegetables such as fern roots (rhizomes), bulbs from numerous orchid species, and tubers from a variety of vines. One end of the *wiggoon* spear-thrower (ie. the end opposite that which had the hook) was also used to dig out fern-roots and yams (Collins 1798[1975:487]). Some fern roots and yams were prepared for eating 'by moistening & beating between two stones [for] a considerable time' (Bradley 1786-1792[1969]:135, see also p.117 and Hunter 1793[1968]:80), before and/or after being roasted (Bradley 1786–

92[1969]:75, 76, 95, 103, 117, 131, 135; Hunter 1793[1968]:64, 80; Phillip 15 May 1788[1892:129], 28 September 1788[1892:192], in Stockdale 1789[1950]:135; Tench 1789:82, 1793:196[1979:48, 287–8]).

Tools, weapons and other objects were made from a range of natural products – wood, bark, reed and other plant materials, as well as bone, shell, animal skins, sinew and stone. At the time of British colonisation coastal groups used stone as implements less often than hinterland groups (eg. those on the Cumberland Plain), and bone or shell was used in its place for items such as spear barbs, adzes and scrapers (Hunter 1793[1968]:519; Collins 1798[1975]:488). Unmodified shells and stones were used opportunistically on some occasions as cutting or adzing tools and missiles.

Objects such as boomerangs, clubs, spear-throwers and some shields (those known as *aragoon*) were made of wood. The shafts of the spears were made from either hardwood or often the flowering stems of the grass tree *Xanthorrhoea*; the prongs, which were from hardwood, were often barbed with bone points. The single piece fish-hooks, which were made and used by the women, were made from large turban shells.

Some shields (those known as *ileemon*), canoes and baskets were made of bark. Huts (bark shelters) were made of bark as well as boughs covered with the leaves of Cabbage trees (*Livistona australis*) (Bradley 1786–92[1969]:140. Net bags were made from two-ply vegetable twine often from bark fibres. The bark used for canoes along the coast was probably Grey (or saltwater Swamp) She Oak (*Casuarina glauca*) (the tree from which the bark came was described by George Worgan as coming from a tree which 'bears Leaves like a Fir' and 'somewhat resembles the Fir in its Growth'(Worgan 1788[1978:11, 17]). In addition, the bark of Bangalay (*Eucalyptus botryoides*) or some stringybarks (*E. agglomerata* and *E. acmenioides*) may have been used for making canoes, as they were in other parts of the east coast (Lampert & Sanders 1973:Table 1 [NSW south coast]; Kamminga 1982:98 [SE Qld]).

Although there is much information about the life and culture of the coastal Sydney people, the early colonial writings have no detailed information or clear descriptions of direct observations of people utilizing the land and resources of the sandhills and wetlands on the eastern Sydney peninsula.

3. THE LAND AND ITS RESOURCES

Knowledge about the geology and soils of a region, as well as the vegetation communities, is important in investigating past Aboriginal land and resource use in an area. The formation,

survival and current distribution of Aboriginal sites is very much associated with the distribution of particular geological and geomorphological formations. Information about sources of stone materials, as well as plant and animal foods can indicate activities that may have been carried out in the area.

The underlying bedrock geology of the eastern Sydney peninsula is Hawkesbury sandstone. Lands within the Parklands are part of a large complex of sand dunes and wetlands which extend north-south from Botany Bay between the coast and Sheas Creek on the west. Lachlan Swamps within Centennial Park are one of the main wetlands in this system (Benson & Howell 1990:90-92). From the 1820s the wetlands provided Sydney's water supply and, although they were modified by a series of dams and embankments between 1860 and 1875, 'remarkably little change has taken place in the configuration of these water bodies since that time' (Benson & Howell 1990:92). Originally they formed smaller, less permanent expanses of open water than today, with patches of tall emergent sedges, fringed with zones of shorter sedges and occasional shrubs.

Land within the boundaries of Centennial, Moore and Queens Parks belong principally to the Tuggerah soil landscape unit. These landscapes are described as gently undulating to rolling coastal dunefields, with north-south oriented dunes; local relief to 20 m, slope gradients generally 1-10%, but occasionally up to 35%. Run off from rain, when it occurs, collects in a series of depressions, lagoons and swamps. The extensive dune system and wetlands of the Botany Lowlands is the largest example of this landscape. Soils on the sandstone ridge along the northern boundary belong to the Gymea soil landscape unit, whereas the high ground with wind-blown sands which cover the ridge to the east along York Road and in Queens Park are classified as Newport soil landscape (Chapman & Murphy 1989:64-67, 94-101). Small expanses of sandstone crop out in the northern areas of the Tuggerah landscape unit in Centennial Park and in the Newport landscape unit in the eastern end of Queens Park where a small cliffline with rockshelters occurs. These areas of sandstone have been severely altered by landscaping activities, including blasting.

The nature of the soils influences the vegetation communities which grow on them and thus the plant and animal resources that were available to Aboriginal people. Benson & Howell's (1990:90) map of the distribution of plant communities at the time of British colonisation shows Eastern Banksia scrub grew on the sandy soils, which cover most of the Parklands, whereas the northern and eastern boundaries were covered with heath and woodland, except for a small area in the north-western corner with Turpentine-Ironbark forest on Wianamatta shale. The Eastern Banksia Scrub consists of varied heath, scrub and low forest with a rich variety of shrubs.

The northern boundary of the Parklands (Oxford Street) is the watershed ridge between Port Jackson and Botany Bay and is only about 1.5 km from Port Jackson. The eastern boundary of the Parklands (Queens Park) is about 1.5 km from the present coastline.

3.1 Resources within the Parklands

3.1.1 *Edible and useful plant species*

The vegetation communities that grew on the sand-hills and sandstone ridges, and in and around the freshwater sedge swamps, included many plants that had edible and/or useful parts which may have been collected and used in pre-colonial times. These plants provided fruits, berries, seeds, tubers, nectar as well as leafy vegetables. They also provided wood, bark and fibres used to make tools, weapons and other pieces of equipment. Plants referred to below are believed to (a) occur or probably occurred in the Parklands and the immediately surrounding area, and (b) have been the source of food or raw materials, based on:

- observations by the first British colonists in the Sydney region;
- observations of foods eaten and raw materials used in adjacent regions; and,
- Benson & Howell's (1990) reconstruction of the vegetation communities from remnant patches of vegetation, historical descriptions as well as landform and geological data.

Very few of the plants used as foods and/or raw materials in coastal Sydney were referred to by a specific name in the early historical sources. Those plants that are immediately identifiable are:

- *Banksia spp*. blossoms which were collected by the women for their nectar; the blossoms were soaked in water and the sweet liquid was drunk (Bellingshausen 1820 in Barratt 1981:35)
- *Melaleuca spp*. bark used as a wrap/blanket on which children were laid and in which babies were carried (Phillip in Hunter 1793[1968]:544-5; Collins 1798[1975]:465, 612, Fn 14). Along the Hawkesbury River the bark was used as a torch (firestick), Phillip in Hunter 1793[1968]:514).
- *Xanthorrhoea* spp. the grass tree, particularly *Xanthorrhoea resinifera*, the 'Yellow gum tree' of early colonists is one of the best documented raw material sources. Its flowering stem was used for spear shafts (Collins 1798[1975:487, Phillip in Hunter 1793[1968]:462, Tench 1789[1979:105, n 22], White 1790[1962]:151, 177, 200 and Worgan 1788[1978]:17); its resin ('yellow gum') was used as an adhesive and hafting agent in making composite tools (spears, hatchets, spear-throwers) and to patch canoes and baskets (Bradley 1786-1792[1969]:132, Collins 1798[1975:487], Hunter 1793[1968]:53, Phillip in Hunter 1793[1968]:496, Tench 1789[1979:187], and Worgan 1788[1978]:12), and to fasten various objects to people's hair (Collins 1798[1975:457], Phillip 15 May 1788[1892:132], Phillip in Stockdale 1789[1950:137-8]). Its fronds were used in head-dresses for young initiates in ceremonies (Collins 1798[1975:481, Plate 8]).

Several species of *Banksia and Melaleuca* and *Xanthorrhoea resinifera* were part of the Eastern Banksia Scrub community as well as the sandstone heaths and woodlands. In addition some species of *Banksia* and *Melaleuca* were part of the freshwater communities.

Other plants that are believed to be the source of foods and raw materials in coastal Sydney are based on interpretations of some of the early colonists' plant descriptions:

- *Acmena smithii* lilly pilly fruits were probably what Banks referred to as 'fruit of the Jambosa kind … resembling cherries' (Banks 1770 in Beaglehole 1963:59);
- *Angophora costata* was probably the tree from which the bark around gnarls was used to make containers (Smith & Wheeler 1988: Plate 50 inscription; White 1790[1962]:157);
- *Blechnum cartilagineum*, *B. indicum* and *Pteridium esculentum* may be some of the ferns referred to by Bradley 1789-1792[1968]:107, 134-5, Hunter 1793[1968]:65, Collins 1798[1975:462-3, 588, and Worgan 1788:11);
- *Blechnum cartilagineum*, *B. indicum*, *Eleocharis sphacelata, Phragmites australis, Triglochin microtuberosum*, *T. rheophilum*, and *Typha orientalis* may have been amongst the 'roots they dig up in the swamps' that Tench (1789:80-81[1979:48]) included in his list of foods;
- *Exocarpus cupressiformis*, Native cherry, may be the fruit described by Phillip (in Hunter 1793[1968]:478–9) as 'another fruit, which, when ripe, is of a transparent red colour, about the size of a currant, and shaped like a heart: it has an agreeable flavour, leaving an astringency on the palate';
- *Ficus rubiginosa,* Port Jackson fig, may be the small fruit 'about the size of a cherry, it is yellow when half grown, and almost black when ripe ... good deal the taste of a fig ..' (Hunter 1793[1968]:65);
- *Leptomeria acida*, Native currant, is probably the plant Phillip (in Hunter 1793[1968]:478–9) referred to as 'the acid berry, which is about the size of a currant and grows on a tree, the leaves of which resemble the broom:'.

Many other plants that occur in and around the Parklands and are known to have been food plants in adjacent regions include: *Acacia longifolia* var. *sophorae* Coast wattle (seeds), *Astroloma humisifusum* and *A. pinifolium* Native Cranberry (fruit), *Billardiera scandens* Apple berry (fruit), *Cissus hypoglauca* Water vine (fruit and water), *Kennedia rubicunda* Running Postman (nectar), *Lambertia formosa* Mountain devil (nectar), *Leucopogon parviflorus* Native currant (fruit), *Lissanthe strigosa* Prickly heath (fruit), various orchids (tubers), *Persoonia* spp. Geebungs (fruit), *Styphelia* spp. Five corners (fruit). Plant used as raw materials in adjacent regions include: *Acacia falcata* Hickory wattle and *Acacia longifolia* (bark of first and leaves of second used to stun fish); *Acacia* spp. wood used to make objects; *Eucalyptus botryoides* bark used to make canoes; *Ficus rubiginosa* Port Jackson fig, bark used to make shields (information from database created by Val Attenbrow).

Aboriginal people continue to collect some of these native plant foods today – see associated report by Sue Kenney.

3.1.2 *Animals*

Animal species that are likely to have inhabited the heath, woodland and forest communities and that would have been hunted by Aboriginal people, include kangaroos, wallabies, possums, gliders, echidnas, bandicoots, fruit bats (grey-headed flying foxes), as well as birds, snakes, goannas and other lizards.

In the freshwater wetlands there would have been fish including eels, tortoises, as well as waterbirds and their eggs, frogs and probably freshwater mussels. Fish likely to inhabit the wetlands include; *Myxus petardi* mullet, *Tandanus* sp. catfish, *Macquaria novemaculeata* Australian bass, *M. colonorum* Estuary perch, and long- and short-finned eels (*Anguilla reinhardtii*, *A. australis*) (Mark McGrouther, Ichthyology, Australian Museum pers.comm.; www.cp.nsw.gov.au/research/fauna.htm).
Freshwater shellfish that inhabit the Hawkesbury-Nepean, Parramatta, Georges and Hacking River catchments and which are likely to inhabit the wetlands include members of the Hyriidae family: *Hyridella australis*, *H. depressa*, *H. drapeta*, and *Velesunio ambiguus* (Alison Miller, Malacology, Australian Museum pers. comm.).

The enormous list of birds that have been recorded in the Parklands (Gould League of NSW pamphlet, www.cp.nsw.gov.au/research/fauna.htm) includes a large number of waterbirds which would have inhabited the wetlands. In addition to the birds themselves, their eggs would have been a good resource. Although emus are not on the current list of birds that inhabit the Parklands, they would have been there in the past.

3.2 Resources of the eastern Sydney peninsula

The Parklands formed only part of the country over which local Aboriginal communities would have obtained their resources. The vegetation and animal communities present in the Parklands extended well beyond its boundaries, and other communities of woodland, forest and heath as well as estuarine swamps provided other plants and animals which provided additional types of food and raw materials. In particular, Port Jackson, Botany Bay and the intermediate coastline with their sandstone cliffs and rock platforms, and sandy beaches and mudflats provided a diverse array of ocean and estuarine resources – fish (including eels), seals, turtles, beached whales, crustacea (crabs and crayfish) and shellfish. Estuarine plants which may have been sources of food include *Phragmites australis,* and of raw materials include *Casuarina glauca*, Swamp She-oak, which is probably the tree from which bark was taken to make canoes.

There were thus both food and raw material plant resources, as well as many animal species, that would have attracted people to the sandhills and wetlands of the eastern Sydney peninsula. Movements throughout the country would have been organised to take advantage of seasonally available resources as well as to meet ceremonial and other social obligations.

3.3 Landscape changes in the distant past

The environment as described above existed for only the last few thousand years. During the period over which people have lived in Australia (definitely the last 40,000 years, probably the last 60,000 years and maybe even longer), many changes took place to the coastline as a result of changing sea levels. During the period over which people may have inhabited the Sydney region (the last 60,000 years) the sea was at its lowest around 18,000 years ago (the height of the Glacial Period). At this time the coastline between Port Jackson and Botany Bay was between 13 km and 6 km further east than it is today. These sea-level changes quite dramatically affected the landscape around Botany Bay and Port Jackson as well as the position of the coastline.

During periods of low sea level sand from what is presently the bed of Botany Bay and continental shelf, was blown onto the land and formed the present-day sand-dunes. These aeolian sediments, presently up to 80 m thick in places (though presumably shallower in the north), mantle the underlying Hawkesbury sandstone which today forms the adjacent coastal clifflines.

Geological investigations in the 1970s identified four sedimentary units in Botany Bay and the Banksmeadow area, south of the Parklands. Two of these units (3 and 4), which overlie fluvial and marine sediments, are aeolian sands which appear to extend virtually across the whole of the Botany Basin (i.e. as far as Central Railway Station, Edgecliff and eastward to Maroubra, Coogee and Bondi). A radiocarbon age of >35,000 BP for the lower Unit 3 suggests the sand was transported from a source presumably to the south-east (Smart 1974 and Albani *et al*. 1978 in Roy 1983:81–3). Between 40,000 and 30,000 years ago, the sea-level fluctuated from ca 45 m below present sea level, down to ca 70 m and then back up to ca 50 m below present sea level (Table 1). At these levels, Botany Bay was dry land and the coast was between 2 and 5 km to the east of present Bondi Beach (based on Chappell 1983 present-day contour maps).

Towards the top of Unit 3 sands, there is an indurated sandrock (coffee rock, 'Waterloo rock') layer which Smart (1974 in Roy 1983:83) considered evidenced a time break before deposition of the upper sand unit (4). In the Banksmeadow area, Unit 4 rarely exceeds 10 m in thickness and is composed of sediments deposited in several different environments – transgressive dune, estuarine, tidal flat and finally terrestrial swamp. Radiocarbon ages from freshwater peats in Unit 4 indicate it has an early to mid-Holocene age (say, pre-6000 BP).

These northerly trending dunes on the surface of the older aeolian unit (3) were possibly formed by re-working of the older sand surface, though the addition of new sands at this time is also possible.

The age of the sand hills in the Randwick area was investigated during the Prince of Wales (POW) Hospital project. Optically stimulated luminescent (OSL) dates were obtained for two sediment samples: one from 40 cm below the overlying fill and 35 cm above the coffee rock; the other came from 40 cm below the coffee rock horizon and 35 cm above the sandstone bedrock. On the basis of these OSL dating results they concluded that 'the entire sand body present at the POW site was created during the terminal Pleistocene, between 30,000 and 40,000 years ago.' (Godden *et al*. 1997:23–25). This conclusion is in agreement with the age of >35,000 years gained for the lowest aeolian sand unit (3) at Banksmeadow. It suggests that the Holocene unit (4) identified at Banksmeadow either did not occur on the POW Hospital site or has been removed.

During the period the sandhills were accumulating and afterwards, the distribution of the lagoons and swamps that form the wetlands, and the surrounding vegetation communities on the sand hills and ridges may have changed over time. The nature of these changes and the nature of the country that existed before the sandhills began to form have not been investigated during this project. However, before the sandhills accumulated, the Parklands may have had the headwaters of small freshwater creeks which ran down small sandstone valleys. These creeks ran into a river which ran across what is now the northern side of the then-dry Botany Bay, through present-day Botany Heads and across a short then-dry section of the continental shelf to the ocean. Sub-surface layers indicating the presence of mangrove/estuarine conditions have been found in construction boreholes at the entrance to Grand Drive (Craig Burton, pers.comm.), but the possible age and depth of these deposits has not been ascertained for this report.

If people arrived on the eastern coast at the same time as they were at Lake Mungo in western NSW, say ca 40,000 (or possibly 60,000) years ago, they may have arrived prior to the mantling of the Botany Basin with sand, with the coast some 2 to 5 km (or 1 to 7 km) to the east.

Table 1 – Speculative landform history in Botany Basin

Period – years BP	Sea-level (m below present)	Width of land exposed on continental shelf off Bondi Beach as sea level changed	Possible landform changes in the Botany Basin
60,000 – 40,000	fluctuating from 30 to 80 to 45 to 60 to 45 m	changing from 1 to 8 to 2 to 3 to 2 km	Sandstone / forest and woodlands, freshwater creeks. Estuarine reaches extend further north than today
40,000 – 30,000	fluctuating from 45 to 70 to 50 m	changing from 2 to 5 to 2 km	Sandhills forming – sands mobile? wetlands forming? estuarine conditions retract southwards

30,000 – 18,000	dropping from 50m to 140 m	increasing from 2 to 13 km	Sandhills and vegetation stabilise and wetlands formed. Totally freshwater.
18,000 – 6,000	rising from 140 m to present level	decreasing from 12 km to present coastline	Sandhills and vegetation stabilise and wetlands formed. Totally freshwater until sometime around 8,000 BP when sea-level reaches mouth of Sheas Creek
6,000 to present	+/-2 m present level	present coastline	Northern coastline of Botany Bay extends southwards; length of estuarine conditions decrease in streams running into Bay. Present configuration for last 4000 years.

Around 18,000 years ago, when the sea was at its lowest level and the coast was some 13 km to the west, temperatures were 6-8 degrees colder than today. The changes set out in Table 1 are speculative and require further work including discussions with a coastal geologist. However, such changes to sea-level, country and climate would have meant that the availability of and access to food resources and raw materials for tools and weapons would have changed over time. Documenting environmental changes that may have occurred in the Parklands and surrounding areas, further than is describe above, is beyond the time and scope of this present report.

4. THE PRE-COLONIAL PAST – ARCHAEOLOGICAL EVIDENCE IN CENTENNIAL, MOORE AND QUEENS PARKS

Archaeological evidence for Aboriginal use of the Parklands, which consists of engraved and pigment images and stone artefacts, is described below:

4.1 Engraved images - Darvall Street, Centennial Park. NPWS Site No 45-6-647

The engraved images at this site were destroyed many years ago – they were within the area that is now Darvall Street. However, two people recorded them in the mid-late 1800s before they were destroyed, although even then a cart-track passed over them and they were badly damaged.

In 1883, John Mann referred to the engravings briefly in a paper he presented at the general monthly meeting of the Geographical Society of Australasia. This paper was subsequently published and the publication included a sketch of some of the figures (Mann 1885:50, unnumbered plate 3). Mann's description stated:

> A flat rock near the Association Ground, Sydney Common, was covered with the representations of kangaroo, opossum, fish, boomerangs, &c.

The sketch includes two fish, two macropods (kangaroos or wallabies), an axe or club-like object, and an indeterminate outline (Figure 1).

In *Aboriginal Carvings of Port Jackson and Broken Bay*, WD Campbell (1899:10) recorded the following:

> Locality: In Allotment 726, on a flat rock in a saddle of the ridge between the Pastoral and Agricultural Society's Ground and the Centennial Park, on the old cart-track crossing, which is now Darvall-street, below an old quarry.
> Description: The group comprises two boomerangs, portions of a kangaroo or wallaby, a waddy or a stone tomahawk. Mr FJ Mann, Licensed Surveyor, who informed the writer of this group, saw it fully forty-five years ago, and states that there were other figures visible then; these have now disappeared in consequence of cart traffic wearing away the rock. Some of these figures are illustrated by him (Proc. Geogr. Soc. Austr. (N.S.Wales and Vict. Branches) for 1883 S4 [1885], I, 3rd plate).

Figure 2 shows Plate II, Fig. 10, that accompanied Campbell's description.

Some 90 years later, FD McCarthy's (1983:119–120) interpretations of the recordings by Mann and Campbell were published:

> DESCRIPTION
> In one line:
> Leaping kangaroo (1) headless, 4' long, broad body, arched back, no forelegs, concave belly, pair of short finlike hind legs vertical, no genital sac, straight tail in line with body.
> Indeterminate figure (2) 2'6" long, mammal-like, flat head, conical face, rounded top of head, no eyes, high arched back, concave belly, pointed finlike leg, probably a pointed finlike hind leg same length as foreleg, tail incomplete.
> Club (3) 2'3" long, triangular head, round ended handle.
> 2 incomplete figures (4, 5)
> Leaping kangaroo (6) head and part of back missing, broad body, high arched back, conical foreleg sloped slightly background, straight, conical ended hind leg vertical, male, straight tail in line with body and slightly downward.
> Pair of sword clubs or boomerangs (7, 8) at a right angle to one another, 2'2" long.
> 8 figures.
>
> TECHNIQUE AND STATE OF PRESERVATION
> The engravings have been damaged by cart traffic.
>
> FURTHER NOTES
> Campbell only described the club (3), a leaping kangaroo (1 or 6) and the pair of boomerangs (7, 8) but illustrated the 2 incomplete figures (4, 5) without describing them.
> Mann stated that more engravings possibly including figures 1 and 2 were visible prior to the engraving being worn away by cart traffic.

> The group is now destroyed.

Registration of the site in the NPWS Aboriginal Sites Register as 45-6-647 was based on information in Campbell 1899.

A memo from Joseph Waugh (Randwick & District Historical Society) to Joanne McLean at Centennial Park & Moore Park Trust in September 1995 includes the above quote and a discussion of the significance of the carvings:

> The depictions are unusual for the district in that they are a considerable distance from the coast, and consequently do not feature fish, which the ones nearer the coast often do. One contributor to our files … suggests that the 'tomahawk' figure is actually a crudely portrayed eel.

(Information from Sue Kenney)

4. 2 Rockshelter with pigment images – Queens Park. NPWS Site No 45-6-675

The earliest site card in the NPWS Aboriginal Sites Register describes the rockshelter as 'one of a series, at the N. end. No deposit. 20 white human hand stencils, rather faded'. This information came from FD McCarthy's Australian Museum site index. The site was subsequently recorded by Michael Guider who submitted information to NPWS in 1979. He described the site as follows:

> Rock shelter. Length 58 ft, Depth 8 ft, Height 12 ft. Facing NW with view over entire area of Centennial Park and city of Sydney. No occupation – shelter has a rocky floor.
>
> ART: 27 white hand stencils, 1 white fish stencil and 6 white unknown stencils. These stencils range from quite clear to very faint. Cave has been subjected to heavy vandalism since 1899 and it's quite surprising any art survives at all. Of interest is a natural rock slippery-dip which appears to have been worn down over a long period of time possibly by Aboriginal children. European children still use it frequently and its surface is shiny and smooth. Above this is a darkened hollow which contains art which is best seen at night using a torch.
>
> CONDITION: Fair. Rockshelter has been subjected to very heavy vandalism, some dating back to 1899 and 1910.

Guider also submitted a sketch (Figure 3), as well as several colour photographs which show some of the hand stencils quite clearly.

The shelter was visited briefly during daytime on Tuesday 8th and 17th January 2002. Large areas of the back wall are covered with graffiti and only a few stencils were barely visibly. A longer, closer inspection of the walls is required to determine what actually remains.

Guider's comment that the 'natural rock slippery-dip' was possibly worn down by Aboriginal children is conjecture, but investigation into the origin of this surface is warranted.

4. 3 Australian Museum archaeological collections

Amongst the collections held at the Australian Museum, only one small stone artefact has been traced that can be said to have come from within the Parklands. It is described in the register as

Registration Date	19 February 1902
Registration No	E.10437
Object	Flint chip
Locality	Sydney Cricket Ground
Depositor	Thos. Whitelegge

It is a complete flake, 24 x 14 x 5 mm in size, and probably yellowish silcrete. However, its edges are rounded and its surfaces highly polished, far more than would be expected from just sand-blasting from being in a sand-dune. In 1992 use-wear and residue specialist Dr Richard

Fullagar examined this artefact at the request of Val Attenbrow. Fullagar (pers.comm.) reported that its glossy state and wear was reminiscent of a gizzard stone – perhaps it had been swallowed by an emu and passed through? If this is the case, then it may not have been originally deposited or lost in Moore Park but somewhere else within the foraging range of the emu.

4. 4 Summary of known archaeological evidence in Parklands

The engraved images have long been destroyed by the construction of the present-day Darvall Street. The pigment images that were in the rockshelter/s in Queens Park were barely discernible during a daytime visit, much of the wall being covered by graffiti. The rockshelters in the cliffline at the eastern end of Queens Park all have sandstone floors. Any flat areas of land that may have existed in front of them, and may have contained stone artefacts, have been highly disturbed by the construction of an all-weather footpath. There is an abundance of broken glass associated with the shelters, but no stone artefacts were seen. No stone artefacts (as isolated finds or small scatters) were seen in other areas of the Parklands.

5. PRE-COLONIAL ABORIGINAL SITES OF THE EASTERN SYDNEY PENINSULA

5.1 Type and number of Aboriginal sites – an overview

The Sydney region as a whole has over 4000 sites recorded in the NPWS site register. These include shell middens and archaeological deposits in rockshelters and open locations, dry pigment, painted and engraved images in rockshelters, engraved images and grinding grooves on rock platforms, scarred and carved trees, waterholes, stone arrangements, burials, mythological sites, and post-contact campsites.

The eastern Sydney peninsula has been taken as the geographic context in which to discuss the pre-colonial importance of Aboriginal sites in the Parklands and to assess their current scientific/archaeological significance. For this area the NPWS Aboriginal Sites Register has records for 145 pre-colonial sites (Table 2). These sites are: engraved images (55) and grinding grooves (3) on rock platforms, pigment (11) and engraved (3) images in rockshelters, burials in both rockshelters (2) and open contexts (4), shell middens in both rockshelters (31) and open contexts (33), and other archaeological deposits in rock shelters (3) and open contexts (11). Some of the sites have more than one trait (type of evidence), eg. two of the burials are in middens, and two of the rockshelters have midden and pigment images. In addition, three open middens are associated with and extend into small rockshelters and are

thus classified as being both 'sheltered' and 'open'. Therefore, totals in Table 2 add to more than 145.

Table 2 Type and number of traits at Aboriginal sites on the eastern Sydney peninsula.

Site trait	Context			Totals
	Rockshelter	Open	Rock platform	
Archaeological deposit	3	11		14
Burial	2	4		6
Grinding grooves			3	3
Images – engraved	3		55	58
Images – pigment	11			11
Midden	31	33		64
Totals	50	48	58	166

In addition to the sites in the NPWS Aboriginal Sites Register, there are several 'isolated finds' – objects (usually stone artefacts) found by themselves – which are held in the Australian Museum Archaeological Collections.

The recorded sites are principally adjacent to the coastline, with only seven being recorded in locations more than 0.5 km from the shoreline. Sites that have been recorded away from the coast are mostly small in scale, having only a few engraved and pigment images (Cooper and Centennial Parks), hearths and few stone artefacts (Prince of Wales Hospital, Randwick). The exception is the rockshelter with pigment images in Queens Park. Whilst this is one of the largest on the eastern Sydney peninsula, the total number of recorded images (34) is not large in comparison with the largest assemblages in sites in other parts of the Sydney region where in excess of 100 images have been recorded.

5.2 Shell middens and archaeological deposits

Sixty-four (64) sites in the eastern Sydney Peninsula have deposits which are classified as 'middens', and 14 are classified as 'archaeological deposits'. Thirty-one (31) of the middens are in rockshelters and 33 are in open contexts; three of the archaeological deposits are in rockshelters and 11 in open contexts. Usually, both of these traits are interpreted as being places where people camped and carried out domestic tasks, though in some cases the contents may indicate a more restricted activity site.

In Australia, the term shell midden (often abbreviated to midden) is used to refer to archaeological deposits in which shells are the dominant visible cultural items. The shells are principally the remains of past meals. Some middens consist only of shells, but others contain a range of materials including stone, bone and shell artefacts, animal bones and pieces of ochre, as well as charcoal and hearths (fireplaces). Thus some middens represent the

accumulation from one or many more individual meals eaten during the day, whilst others can be interpreted as campsites at which a range of activities were undertaken. Human burials have also been found in many coastal middens. In coastal environments, middens are usually found in relatively close proximity to marine or estuarine shorelines. Away from the coast, middens composed of the shells of freshwater shellfish occur, particularly in western NSW – none has been recorded in the Sydney region. As in the case of other archaeological deposits, middens can occur in rockshelters as well as in the open. They also vary widely in size from a few shells scattered over the surface of a small area to thousands of shells extending tens of square metres in area, and several metres in depth with complex stratigraphy which has built up over thousands of years.

An archaeological deposit is soil or other sediment which contains cultural materials, such as stone artefacts, animal bones and charcoal, as well as features such as hearths and heat-treatment pits. In this report, the term is used to refer to cultural deposits which are not dominated by shell (referred to as shell middens). It is also used to refer to such deposits in open locations as well as rockshelters; the former are often referred to as stone artefact scatters, open campsites, open sites and surface campsites, even though they may in fact represent the exposed surface of a buried artefact assemblage. These sites can vary in size (both in dimensions and the amount and range of cultural material present) and stratigraphic complexity (from shallow homogenous sediment to deep stratified deposits). In many open locations, particularly where they occur on eroded land surfaces, stone artefact scatters may be deflated sequences of artefact assemblages that represented several episodes of occupation built up over many centuries or millennia. These traits/sites are often interpreted as habitation sites or campsites but some, particularly where small numbers of artefacts are present, may also represent places where animals were butchered or short-term (single night) transit camps as people travelled to ceremonies or for trading purposes. A single stone artefact found by itself is referred to as an isolated find.

Because these deposits accumulate over time, are often stratified with a range of different cultural materials, some of which can be dated by radiocarbon or thermoluminescent methods, they are ideal contexts in which to investigate issues relating to changes over time in aspects of human culture such as behaviour, diet, tools and weapons, and raw material use.

5.2.1 *Archaeological excavations and collections*

At least 19 sites in the eastern Sydney peninsula are known to have been excavated or had materials collected from them. Archaeological research in the Sydney region extends back over 100 years, with some of the earliest documented excavations occurring on the peninsula in late 1800s/early 1900s – places such as Long Bay (David & Etheridge 1889) and Sheas Creek (Etheridge *et al.* 1896). Detailed reports, either published or unpublished, often were not written for many early excavations and they are only known from collections held in

institutions such as the Australian Museum, eg. at Parsley Bay (AM Registration No E.5500 and E.017716) and Woollahra Point (Thorpe 1911a, 1911b). At this time, very large collections of stone artefacts were made from the sandhills at Bondi Beach and Maroubra, as well as very small collections from 'several windswept sandy patches on the Waterloo Swamps between Kensington and Bourke Street, Redfern' (Etheridge & Whitelegge 1907:234–6, 249).

Some of the more recent excavations have occurred at Yarra Point (Rich 1986), Frenchmans Bay (McIntyre 1985 in Rich 1986, Table 14), Mt Trefle and Hydrofoil in Vaucluse (Attenbrow & Steele 1995); Milk Beach IV (Rich 1984); and Prince of Wales Hospital, Randwick (Godden *et al*. 1997). In the city, small-scale evidence (in the form of flaked stone artefacts) for Aboriginal occupation has been found during archaeological excavations on several historical sites – Angel Place (Godden Mackay 1998), Cumberland Street in The Rocks (Attenbrow 1992b); First Government House (Proudfoot *et al*. 1991:47); Moores Wharf Bond Store at Millers Point (Lampert 1984); and Junction Lane, Woolloomooloo (NPWS site card No 45-6-2580). Most of these investigations have occurred during the course of development projects. Archaeological materials from many of these investigations are housed in the Australian Museum.

5.2.2 *Length of occupation*

Radiocarbon dates have been obtained from four sites: Mt Trefle and Hydrofoil at Vaucluse, Prince of Wales Hospital, Randwick, and Cumberland Street, The Rocks Sydney CBD (Table 3). Although the radiocarbon dated evidence of human occupation in coastal Sydney extends

Table 3 Sydney peninsula east – earliest radiometric dates at Aboriginal sites. Conventional radiocarbon dates are quoted. In addition, dates based on shell samples indicate ages when corrected for marine reservoir effect and 450 years (±35%) has been deducted.

Site Name, Location	Lowest/Earliest Radiometric Date	Method of dating and material dated	Reference
Prince of Wales Hospital, Randwick	8 400±800 [Lab. No not available from source]	Thermoluminescence Sandstone from hearthstone	Godden *et al*. 1997:25
	7 860± 50 Beta-87211	Radiocarbon AMS Charcoal adhering to sandstone hearthstone	Godden *et al*. 1997:26
Mt Trefle, Vaucluse	1 730± 50 (conv.) 1 280± 50 (corr.) Wk-2082	Radiocarbon Shell	Attenbrow 1994:42; Attenbrow & Steele 1995:51
Hydrofoil, Vaucluse	1 630± 60 (conv.) 1 180± 70 (corr.) Wk-2510	Radiocarbon Shell	Attenbrow 1994:43
Cumberland Street, The Rocks, Sydney CBD	890± 60 (conv.) 440± 60 (corr.) Beta-47633	Radiocarbon Shell	Attenbrow 1992c:19

back only 8000 years, this simply indicates the difficulty of identifying and finding older sites in a highly developed urban environment where many sites have been destroyed, and not the lack of people in this part of the country in earlier periods of the distant past. The earliest claimed evidence for human occupation in the Sydney region are flaked pebbles associated with the gravels of Cranebrook Terrace at Castlereagh near Penrith (Nanson et al. 1987; Stockton 1979:52; Stockton & Holland 1974:65), but these are much debated. In other parts of New South Wales evidence for human occupation dates back at least 40,000 years at Lake Mungo (Bowler 1976:59; Bowler & Thorne 1976:129; Flood 1999:284; Johnston & Clark 1998:107, 111–13; Webb 1989:1; and possibly around 60,000 years ago: Thorne et al. 1999:591, 610, though these latter dates are hotly contested: Allen 2000; Brown 2000). Closer to Sydney evidence for Aboriginal occupation in the NSW south coast dates back some 20,000 years based on archaeological excavations at Burrill Lake (Lampert 1971:13, 64, Table 1) and Bass Point (Bowdler 1976:254; Hughes & Djohadze 1980:Table 3), and in the nearby Blue Mountains a rockshelter site on Kings Table has a basal occupation date of around 22,000 years ago (Stockton 1993:33; Stockton & Holland 1974:45-46, 64).

5.2.3 *Diet*

The excavated materials indicate a range of fish were caught and a larger number of different shellfish were gathered, but that land animals, birds and reptiles were also part of the diet (Tables 4, 5 and 6). The tables were compiled from the analysis of faunal remains from Mt Trefle, Vaucluse (Attenbrow & Steele 1995), Cumberland Street, The Rocks Sydney (Attenbrow 1992c:6), Milk Beach IV, Vaucluse (Rich 1984:6, Tables 3 and 4); Woollahra Point (Steele in Attenbrow 1992b, Appendix 3); Yarra Point, La Perouse (Rich 1986:33-36, Tables 5 and 9). In addition to the fauna listed in the tables, crustacean exoskeleton fragments (probably crabs) were retrieved from Mt Trefle. The amount of bone recovered from each site varied widely with 16,224 fragments weighing 370 g being recovered from Mt Trefle, but only 140 fragments (weight not given) from Milk Beach IV, and 31.87 g (number not given) from Yarra Point. Only a small number of selected large bones were collected from Woollahra Point.

The cooking of freshwater fish was identified at the Prince of Wales (POW) Hospital site through lipid analysis of 'greasy' residues found on the surface of one of the hearth stones (Godden *et al*. 1997:30, Specialist Report 3). More specific species identification could not be made from the methods applied. The results of the thermoluminescence method of dating the hearthstones indicated there were two distinct heating periods – the first around 8500 and the second about 5200 years ago (Godden *et al*. 1997:25). A date of around 8000 years ago for the cooking of fish on the hearthstones would make this the earliest evidence for diet in the coastal Sydney region. Animal bones and shell rarely last longer than 3000 years in the Sydney region though shell from the basal levels of a midden in Cammeray has been dated to ca 6000 years BP (Attenbrow 1999:202).

Another rare and unusual find in Sheas Creek at St Peters on the eastern Sydney peninsula was the discovery in the late 1800s of dugong bones. They were found during canalisation of the creek and were between 1.7 m and 2.6 m below present high-water level and between 1.4 m and 2.1 m below the surface of the swamp at the time of the excavations. Cut marks and scars on the bones suggest the animal was butchered and thus killed for food. (Etheridge 1905:18; Etheridge *et al*. 1896:170–74). Two ground-edged hatchet heads found in these deposits at the same time come from ca 70 m away from the dugong bones (Etheridge *et al*. 1896:173–74, Plate 9) and whether they were deposited at the same time is not clear. The dugong bone has recently been dated to around 6000 years BP (R. Haworth, University of New England, pers.comm.).

The shellfish species and number of species present in each midden depend on its location within the estuary and along the coastline. Along the coast and immediately inside the mouths of Port Jackson and Botany Bay where ocean species occur, the predominant midden species are rock oyster (*Saccostrea glomerata*, syn. *Saccostrea cucullata* and *S. commercialis*), hairy mussel (*Trichomya hirsuta*), limpet (*Cellana tramoserica*), and black nerita (*Nerita atramentosa*), with Sydney cockle (*Anadara trapezia*), cartrut (*Dicathais orbita*) turbans (*Turbo torquata* and *T. undulata*), and tritons (*Cabestana spengleri*) relatively common. Ocean species are occasionally recorded in very small numbers in mid-estuarine middens, eg. Cumberland Street, but generally the predominant species in mid-estuarine middens are rock oyster, Sydney cockle, and hairy mussel, with mud oyster (*Ostrea angasi*) and Hercules club whelk (*Pyrazus ebeninus*) relatively common (Attenbrow 1991:49, 1992c:Table 3). No freshwater mussel shells have been identified in the coastal middens.

Unfortunately, no plant food remains have been retrieved during any of these investigations.

Fish appears to be the dominant food animal at the excavated coastal middens, with snapper the preferred species. The presence of some land animal species in these middens as well as the freshwater lipids at POW Hospital indicates that the resources of the vegetation communities and wetlands were utilised as well as those of the bays, estuaries and ocean.

Table 4 Identified fishes from excavated Aboriginal sites on the eastern Sydney peninsula (sources cited in text).
Scientific names updated according to Hutchins & Swainston 1986 and The Australian Museum Ichthyology Department.

Family name	Genus and species name	Common name	Cumberland St, The Rocks	Woollahra Point	Mt Trefle Vaucluse	Milk Beach IV, Vaucluse	Yarra Point
Carangidae	*Seriola lalandi*	Yellowtail Kingfish			◆		
Labridae	*Achoerodus viridus*	Eastern Blue Groper			◆		
Labridae	*Labrid* unidentified	Parrotfish / Wrasse			◆		
Labridae	*Pseudolabrus tetricus*	Blue-throated Wrasse			◆		
Monacanthidae	*Monacanthid* unidentified	Leatherjacket			◆		
Platycephalidae	*Platycephalus fuscus*	Dusky Flathead		◆	◆		
Sciaenidae	*Argyrosomus japonicus*	Mulloway		◆	◆		
Serranidae	*Epinephelus* spp.	Rock Cod			◆		
Sillaginidae	*Sillago ciliata*	Sand Whiting			◆		
Sillaginidae	*Sillago* sp.	Whiting			◆		
Sparidae	*Acanthopagrus australis*	Yellowfin Bream, Eastern Black Bream		◆	◆		
Sparidae	*Pagrus auratus*	Snapper	◆	◆	◆◆		
Sparidae	*Rhabdosargus sarba*	Tarwhine			◆		
Fish unidentified	Fish unidentified	Fish unidentified				◆	◆

Table 5 Identified land mammals from excavated Aboriginal sites on the eastern Sydney peninsula (sources cited in text).

Genus and species name	**Common name**	**Woollahra Point**	**Mt Trefle, Vaucluse**	**Milk Beach IV, Vaucluse**	**Yarra Point**
Canis familiaris dingo	Dingo		◆? [=dog, poss dingo]		
Wallabia bicolor	Swamp Wallaby	◆			
Petrogale spp.	Wallaby	◆			
	Macropodid unidentified e.g. kangaroo, wallaby		◆		
	Mammal - unidentified	◆		◆	◆
	Marsupial – unidentified			◆	
INTRODUCED SPECIES					
Mus musculus	house mouse		◆ upper levels		
Oryctolagus cuniculus	rabbit		◆ upper levels		
Ovis aries	sheep		◆ upper levels		

Table 6 Identified reptiles, birds and amphibians from excavated Aboriginal sites on the eastern Sydney peninsula (sources cited in text).

Family or genus/species name		**Mt Trefle, Vaucluse**	**Woollahra Point**	**Yarra Point**
LIZARDS AND SNAKES				
Reptile unidentified		◆		
BIRDS				
Alectra lathami	Brush turkey	◆		
Diomedea spp.	Albatross		◆	
Birds unidentified		◆		◆

5.2.4 *Artefacts*

Artefacts found in the archaeological sites in the eastern Sydney peninsula include items made of stone, bone and shell. They include both flaked and ground stone implements, bone points probably used as both awls and nose bones, as well as shell fish-hooks, fish-hook blanks and possible shell adzes. Lumps of red ochre (pigment) with ground surfaces have also been found.

Flaked stone implements include backed artefacts (Bondi points and Elouera), as well as flakes and flaked pieces with retouch/use wear. In addition to these tools and implements there are cores (both hand-held and bipolar), and thousands of flakes, flaked pieces and bipolar pieces which are the debris from their manufacture. Ground implements include ground-edged axe/hatchet heads.

Bone and shell implements have been found only in relatively recent contexts less than 3000 years old as they do not survive well in Sydney's acidic soils, but the durable stone artefacts occur throughout the depths of cultural deposits and in contexts dating back at least 8000 years ago. Shell fish-hooks, however, have only been found in coastal contexts less than 900 years old and it is clear that this is when they began to be used in the NSW central and south coast. Found in contexts of a similar age and location are small stone files (also referred to as fish-hook files), usually of sandstone, which are considered to have been used in the manufacture of the shell fish-hooks but also used for other purposes (Attenbrow *et al.* 1998).

One rare and unusual find consisted of several fragments of fibrous twine, possibly fishing line (total length is 150-200 mm) from Parsley Bay, Vaucluse (Australian Museum Registration No E.17716). The fragments were found in about 1902 buried under a skeleton in a rockshelter. The shelter was subsequently destroyed during erection of a jetty.

The largest stone assemblages come from sites along the ocean and estuarine shorelines. Vast numbers of stone artefacts were collected from the coastal dune sites at Bondi Beach and Maroubra in the late 1800s / early 1900s as they were exposed during storms (Australian Museum archaeological collections; Etheridge & Whitelegge 1907). These include the now well-known Bondi point, a backed artefact which was named after Bondi Beach, the location where it was first recognized as being a distinctive implement type – though at the time its collectors called it a 'chipped-back surgical knife' (Etheridge & Whitelegge 1907:238–242, Plate XLII).

Mt Trefle, with just over 2000 artefacts, has the largest radiocarbon dated flaked stone assemblage on the peninsula. Over 80% of the artefacts (by number) were made from quartz, and most were made using bipolar methods of reduction. Silcrete and chert/indurated mudstone/tuff each accounted for only 2% of the assemblage (Attenbrow 1992b:14-17).

The earliest artefact assemblages come from POW Hospital. These assemblages consisted of ten isolated flaked stone artefacts of fine grained siliceous rock, isolated sandstone manuports of varying size and form, and concentrations of sandstone cobbles, some of which were associated with charcoal and three of which were identified as deflated hearths including Feature 203 which was dated to ca 8000 years BP (Godden *et al*. 1997:26-30). One of the hearthstones appeared to have a 'greasy' residue on its surface which was subject to lipid analysis (see under diet). At the time of the study, the position of these finds relative to the original dune profile was assessed as being between about 40 cm and 50 cm below the topsoil. It was concluded that the flaked stone artefacts, which were all of the same white, banded indurated stone, were roughly contemporaneous with the dated hearth (Godden *et al*. 1997:35).

A very small number of very much smaller collections which are held in the Australian Museum Archaeological Store come from the dunes and wetlands.

- E.15615. Eight stone artefacts collected by Thomas Whitelegge 'From Waterloo Swamp, about 1/2 mile W of "Mount" Rennie'. They include: a flaked piece/pebble fragment, grey medium-grained quartzite, maximum dimension 40 mm; two white/light grey chert/indurated mudstone flaked piece, max length 29 mm and 18 mm; five white/light grey chert/indurated mudstone flakes, all complete, maximum lengths between 10 and 25 mm. Microscopic examination by Richard Fullagar (Fullagar & Szpak 1992) indicated none had obvious use wear or residues.
- E.26132. Two flakes with retouch which were recorded in the register on 4 February 1912 as being collected by WW Thorpe from an 'old land surface between sandhills, Waterloo. West of Kensington'. One is a distal segment, made of buff chert/indurated mudstone, 41 mm long; the other is a complete flake of a grey porphyry-like material, 44 mm long.
- E.26055. A single flake with retouch/use-wear from the 'Sandhills west of Kensington, Randwick Municipality, Sydney', collected by WW Thorpe on 2 May 1920. It is 26 x 28 x 11 mm.
- E.49194. A single, hammer-dressed, ground-edged axe/hatchet, 105 mm long, which was registered in 22 January 1940, came from a garden in Alexandria.

Comparison of the raw materials from the Waterloo sandhills with that from POW Hospital site would be warranted to determine whether they may have come from the same source.

Other small artefacts scatters and isolated finds have been found on the sandstone/shale country to the north-west closer to Port Jackson but not directly associated with the estuarine shoreline:

- E.5161: a ground-edged axe/hatchet head found in a cutting behind St Mary's Cathedral;
- E.22266: a 'chopping block' found adjacent to the Tank Stream near Hunter Street in Sydney's CBD during a development in 1913;

- E.059294: a ground-edged axe/hatchet head, found on the south-east corner of Riley and William Streets, Darlinghurst in 1925;
- NPWS Site No 45-6-2581 a small number of stone artefacts adjacent to the Tank Street at Angel Place in Sydney CBD (Godden *et al.* 1998).

5.3. Engraved and painted images

5.3.1 *Pigment images*

Eleven rockshelters on the eastern Sydney peninsula are recorded as having pigment images on their walls. All but one of these rockshelters are in the north-east sector, ie. in Queens Park, Bellevue Hill, Vaucluse and South Head. The remaining site is at Congwong Bay, La Perouse. Only three of these shelters are recorded as having middens, two of which contained burials.

All figures, excluding the stencils, are dry pigment drawings. The pigment images have not been recorded in as much detail as the rock engravings, and for a few sites the motifs depicted have not been recorded. In some rockshelters only unidentifiable fragments remain. The drawn motifs that have been recorded include fish, kangaroos, dingo, jellyfish, snake/serpent, shields, boomerangs, and 'grey finger marks'. The stencils are of hands, a fish and other indeterminate oval objects. Stencilled hands are the most common motif overall. The maximum number of recorded figures in any one shelter is 34 – these were recorded in the rockshelter in Queens Park.

Most hand stencils are in white ochre; red hand stencils have been recorded in only one rockshelter. The drawings are in both red ochre and charcoal.

5.3.2 *Engraved and scratched images*

At all but three of the sites, the recorded engraved figures are on open rock platforms; the exceptions are in rockshelters. The scratched outline figures occur in a rockshelter which also has several pigment images. Just over half of the 58 sites with engraved images are in the northern part of the peninsula – South Head, Watsons Bay, Vaucluse and Woollahra. There is another group of 13 around La Perouse, but the other 15 are spread all along the coastline between Port Jackson and Botany Bay. Grinding grooves occur on two of the rock platforms with the engraved figures. The site in Bondi golf course has the largest number of engraved figures, a total of 87 being recorded here in the late 1880s by the surveyor WD Campbell.

The motifs recorded at these sites have been identified as predominantly marine animals (including fish, dolphin, eels, jellyfish, porpoise, sharks, sting-rays, turtles, whales). However, some have been reported as humans as well as land animals such as

kangaroo/wallaby and bandicoot and also tools/weapons such as shields, boomerangs and clubs.

5.4 Grinding grooves

Grinding grooves have been recorded at four sites, one of which sounds doubtful from the site card description. Engraved figures occur at two of the sites. Only a few grooves (<7) occur at each site.

5.5 Discussion of archaeological evidence and a land and resource use model

The present site distribution pattern and the evidence from archaeological excavations suggests that on the eastern Sydney peninsula people concentrated their activities along the coastline; that their base camps were in coastal locations, and only short visits were made to the lands behind the coastline for a variety of activities. The maximum distance from the coast to the western edge of the wetlands is only about 8 km. Historical observations provide support for the validity of this part of this interpretation of this archaeological patterning:

> They live in small whigwhams … they are chiefly near the water, for the convenience, no doubt, of catching fish, the principal part of their subsistence. (Southwell 1788[1893:689]).

However, while it is probable that most time was spent along the coast with its abundant marine resources, it is not known how accurately the current archaeological evidence reflects the land and resource use patterns on the eastern Sydney peninsula prior to 1788.

The present site distribution pattern is as much due to natural processes operating on archaeological materials as to past human behavioural responses to environmental resource availability and cultural pressures. That is, the presently recorded pattern is due largely to the locations in which Aboriginal sites have been able to survive and to be found, and have been recorded – eg. in areas such as parks and reserves where they have not been destroyed through developments; in sandstone areas where formations such as rock platforms and rock shelters provided media for engraved and pigment images to be created and locations in/on which shell midden and other archaeological deposits can accumulate and be preserved. The sandstone areas are principally around the coastal periphery of the Sydney peninsula, and away from the coast there are far fewer clifflines in which shelters have developed. Shells do not survive well in poorly-drained areas or in highly acidic soils such as those of the Sydney area. However, once a shell midden reaches a certain mass, its alkaline properties help preserve it and any bone within it. Sites with abundant shells (shell middens) were more likely to have formed near the shoreline and are much more visible than stone artefacts which are more likely to be the evidence of subsistence activities carried out away from the

coastline. Even before European developments, it would have been difficult to find Aboriginal sites that existed in areas of dry, well-drained land that occurred within the sandhill-wetland system of the eastern Sydney peninsula.

Evidence for diet from archaeological sites, particularly faunal remains from coastal middens and sites such as the POW Hospital, in addition to knowledge about the plant and animal resources available in pre-colonial times, can help in determining land and resource use patterns away from the coastline.

If tuberous plant foods were one of the main food resource gained from the sandhill and wetland system, then the main implements used in the area would have included wooden digging sticks and the *wiggoon* spearthrower to dig them out, shells to process them and baskets to carry them in – all items made from materials that would not survive. This could explain the paucity of flaked stone associated with the hearths in the POW Hospital site (Godden *et al*. 1997:37), and the small number of flaked artefacts found in other parts of the wetlands and sandhills (eg. at Waterloo swamp). However, other stone artefacts (non-flaked) were reported to have been used in processing fern-root, yams and other tubers, but unfortunately, there are no details or descriptions of these 'beating or pounding stones'. Some of the sandstone cobbles found in the POW Hospital site may have been taken there for such purposes, though no evidence of such uses was reported.

If bark was removed from trees for canoes, shields and containers, then stone wedges and ground-edged hatchet/axe heads may have been left behind.

Hearths such as those in the POW Hospital site could be 'dinner-time camps' (Meehan 1982:26 n) that were used to roast tuberous foods as documented historically as well as to cook the fish that was documented archaeologically.

Lack of stone sources within the sandhills and wetland system also could account partially for the lack of flaked stone manufacturing debris. However, the paucity of local stone sources (except for quartz pebbles in the sandstone, and possibly igneous materials at Bondi) did not deter the early manufacturers of the thousands of stone artefacts found along the coast at places such as Bondi Beach and Maroubra. Stone types such as silcrete, silicified wood, chert, tuff, rhyolite, which have been identified in coastal artefact assemblages, are not available in the Hawkesbury sandstone. Silcrete, and possibly also silicified wood and tuff, occurs on the western half of the Sydney peninsula in ancient river channels (Tertiary Period palaeo-channels associated with the Wianamatta shales, eg. at Newtown and Homebush Bay, Byrnes 1982:9-10; Corkill 1999:Figs 7.2 and 7.3), but seemingly not in large quantities. It is likely therefore that such materials would have been brought into the eastern Sydney peninsula from further afield – from either the west or the south – the Cumberland Plain, Holsworthy area, or possibly the NSW south coast. The very small number of stone tools

showing evidence of use that have been found in the sandhills also suggests the maintenance of wooden tools was seldom necessitated or carried out in this area (cf. Godden *et al*. 1997:38-39).

The presence of Aboriginal sites with small numbers of engraved and pigmented images in places such as Centennial, Queens and Cooper Park indicate that activities other than food procurement occurred away from the coast. The motifs at these sites do not provide an obvious indication of the behaviour that was associated with their creation – whether they were associated with ritual or secular activities is not known.

Although land animals were identified in the faunal assemblages from the excavated sites on the eastern Sydney peninsula, very few species were identified compared to coastal assemblages further to the north and south (Balmoral Beach, Attenbrow 1992a; Angophora Reserve, McDonald 1992; and Curracurrang 1, Megaw 1968:326). This is possibly explained by 'sample size effect' because the areas excavated at the eastern Sydney peninsula sites, and the faunal assemblages from these sites as a whole, were much smaller than those excavated at the aforementioned sites. Alternatively, however, people on the eastern Sydney peninsula may have had a stronger focus on fish and fishing in their subsistence activities than their neighbours to the north and south, as the country that surrounds the sites north of Port Jackson and south of Botany Bay is principally forest and woodlands with fewer and smaller freshwater wetland systems.

Godden *et al*. (1997:40) propose that the POW Hospital site 'was formed under conditions of high [residential] mobility, perhaps the results of short-term forays, and represents a different settlement and subsistence pattern to that observed at contact and in the archaeological record during the last 3000 years'. However, it is also possible that a pattern of gaining the dune and wetland resources during short-term visits on a daily basis could have continued throughout the Holocene, irrespective of the level of residential mobility at base camps along the ocean and estuarine shorelines.

6. POTENTIAL FOR SUB-SURFACE ARCHAEOLOGICAL EVIDENCE IN THE CENTENNIAL PARKLANDS AND THE LIKELIHOOD OF FINDING IT

The following discussions can only be considered preliminary. There are still many sets of information that need to be gathered and collated, eg. the depth of the sand deposits, and the depth of disturbed ground and landfill area.

6.1 Potential archaeological deposits (PADs)

The above discussions indicate that any buried archaeological evidence relating to food and raw material resources that is likely to occur in the sandhills and wetlands will consist of stone artefacts. These items would have been associated with collecting and processing plant foods, fishing, shellfishing, hunting birds and land animals, and the cooking of such foods. It is probable, however, that these activities were carried out during the day on short-term forays out from base camps along the coast and estuary shorelines, or at most at overnight campsites. The types of archaeological evidence that can be expected will thus consist of small-scale artefact scatters, isolated artefacts (flaked and ground), hearths and pounding/grinding stones. Such archaeological evidence could exist within the boundaries of the Parklands.

The activities described above could have been carried out almost anywhere in the Parklands, and thus objects associated with them could occur almost anywhere in the Parklands. Digging sticks, spears and other tools may have been lost in the wetlands whilst getting tuberous foods, water-birds and their eggs, though activities such as food processing and cooking presumably only occurred on dry, well-drained ground. Wooden objects such as boomerang, spears and digging sticks, were found at Wyrie Swamp in South Australia which dated to 9,000 – 10,000 years ago (Luebbers 1975; 1978:209–10; Mulvaney 1975:212). Identifying locations and boundaries of areas that may contain buried objects may not be easy, not only for the foregoing reasons, but also because of the magnitude of the landscaping and other modifications that have taken place since British colonisation. In addition, even if such areas can be identified and defined as they existed in 1788, many changes will have taken place in the morphology of the wetlands and sandhills over the last 40,000 years.

If people inhabited the area before the sandhills began to form, they may have hunted and collected foods and raw materials, and possibly camped, around headwaters of small freshwater creeks and estuarine conditions which may have existed in the present Parklands at that time. Land and resource use patterns would have been quite different to those that existed when the sandhills were accumulating through to the time of British colonisation. Within the constraints of this project, identifying specific areas which have the potential to contain buried archaeological evidence dating to all periods of human occupation has not been attempted.

The availability of information about the following matters has not been explored:

- depths to which the sands extend to bed-rock and/or the pre-human land surface over the Parklands;
- the nature and configuration of the bedrock/land surface, vegetation communities and creeks/drainage lines before the sands accumulated;
- to what depth do buildings, structures and other disturbances, modifications and land fill interfere with the original dune deposits;

- do undisturbed sediments exist between (a) landfill and disturbed soils associated with developments and (b) bed-rock and/or the pre-human land surface;
- how long have the wetlands had their present configuration – have the areas of swamp and wetlands and dry/well-drained ground moved over time;
- are the peaty deposits that occur in the sandhill-wetland complex likely to be of a nature that organic materials, such as wood and bone would survive?

It is possible that archaeological evidence (stone artefacts and hearths) exist at depth beneath areas that are presently ponds, landfill, buildings and other structures.

Although rockshelters are present in the sandstone outcrops at the eastern end of Queens Park, all of them have rock floors which slope sufficiently towards the front such that deposits would not accumulate inside without some form of barrier. If there was ever deposit in front of the shelters it is now highly disturbed or removed.

6.2 Buried engraved images and grinding grooves

In the northern and eastern sectors of the Parklands, the presence of outcropping sandstone indicates that suitable conditions and surfaces for the creation of engraved images (in addition to those recorded) and the sharpening of ground-edged axe/hatchet heads may have been present.

Although current radiometric dates indicate that the sandhills accumulated over almost the whole area between 40,000 and 30,000 years ago, it is possible that areas of sandstone on the ridge tops and higher slopes became alternatively covered by sand and exposed over time. It is therefore possible that engravings and grinding grooves occur on surfaces that have been buried beneath the sand hills since and/or shortly before British colonisation. The potential for axe/hatchet grinding grooves to be present will depend, of course, on whether the sandstone surfaces were ever exposed during the last 4000 years – the period when such tools first began to be used in the Sydney region. The potential is similar with engraved images though when the Sydney-Hawkesbury style of engravings first began to be depicted is not known; however, it is often assumed they extend back 5000 or 6000 years ago.

However, much of the originally outcropping sandstone, particularly in Centennial Park, was blasted away and/or severely modified during early landscaping programmes. Unless areas can be identified where buried rock platforms that were not subjected to landscape modifications may exist, the potential for finding any sub-surface engravings and grinding grooves is low.

6.3 The sensitivity map/table

It is difficult without having detailed knowledge of the pre- and post-1788 environmental and land-use history of the Parklands to say which areas have absolutely no potential and which areas have high potential to contain archaeological evidence relating to pre-colonial Aboriginal occupation of the area. This is the case even where buildings and other structures, land-fill and ponds occur. In the absence of the knowledge discussed above, the potential of each soil unit has been assessed tentatively based on the soils analysis map provided by Conybeare Morrison & Partners (Table 7).

Table 7 Archaeological sensitivity within Centennial Parklands according to soil group analysis map provided by Conybeare Morrison & Partners.

Area/soil group	Description	Potential archaeological evidence	Potential to be present	
			Surface	At depth
Gymea	Shallow to moderately deep soils (30-100 cm); rock outcrops. Soils probably disturbed throughout much if not all of their depth. Sandstone outcrops have been drastically modified during landscaping.	PAD engraved images grinding grooves	nil nil nil	nil to low low - possibility of undamaged buried sandstone surfaces suitable for engravings and grinding grooves needs to be explored
Newport	Shallow (<50 cm) soils overlying moderately deep (<150 cm) buried soils. Soils probably disturbed throughout much if not all of their depth Sandstone outcrops have been drastically modified during landscaping.	PAD engraved images grinding grooves	nil nil nil	nil to low low - possibility of undamaged buried sandstone surfaces suitable for engravings and grinding grooves needs to be explored
Tuggerah ***– northern area with outcrops***	north-south oriented dunes; deep soils greater than 200 cm – with rock outcrops	PAD engraved images grinding grooves	low	low
– areas with buildings, roads and tracks, etc	north-south oriented dunes; deep soils greater than 200 cm.	PAD	nil	low to medium beneath level of disturbance if it does not extend to bedrock or pre-human land surface
– remainder	north-south oriented dunes; deep soils greater than 200 cm.	PAD	low to medium	low to medium
Aquatic ponds/boggy soils	freshwater ponds and boggy soils	PAD	nil	low to medium, depending on age and depth
Playing areas modified with fill, known areas of fill	imported fill overlying ?	PAD	nil	low to medium potential for PAD beneath if level of disturbance does not extend to bedrock or pre-human land surface

7. ASSESSMENT OF SIGNIFICANCE OF ARCHAEOLOGICAL RESOURCES WITHIN CENTENNIAL PARKLANDS

The rock engravings in Darvall Road no longer exist and thus have no present archaeological significance.

The pigment images in the rockshelter in Queens Park are highly defaced by graffiti, but some stencils are still visible. The significance of this site cannot be assessed until: (a) it has been examined by an archaeologist experienced in rock art recording to determine how many of the stencils remain, and (b) advice has been received from a rock-art conservator about whether it is possible to remove the graffiti and possible protective measures; and (c) Aboriginal land council and local community members' opinions have been gained.

PADs cannot be assessed for their archaeological significance and can only be assessed for their potential to be present and their potential to contain significant archaeological materials. There appears to be potential for archaeological evidence to be present in the Parklands, but it is likely to be small-scale. Even so, little is known about the use of wetland areas in the Sydney region, particularly in the distant past, and any archaeological materials that are found at depth would be of great significance, particularly if they were in datable contexts. The PADs in the Parklands therefore have the potential to contain sparse but highly significant archaeological evidence.

The following assessments of significance according to the NSW Heritage Office Guidelines, World Heritage Register listing, and the Register of the National Estate, are made based on the foregoing:

NSW Heritage Office Guidelines

- if found, buried archaeological deposits would be highly significant under Criteria (e) and (f);
- the rockshelter with pigment images in Queens Park could have moderate to little significance, but this will depend on the results of the work by a rock-art specialist and rock-art conservator;
- the Darvall Street engravings have no significance.

None of the recommended treatments are appropriate to this site, particularly the words 'reconstruct' and 'adapt'.

World Heritage Register

There is nothing that warrants listing.

Register of the National Estate

- if found, archaeological deposits would be highly significant under Criteria B and C;

- the rockshelter with pigment images and the engraved images have no significance.

Criteria for local heritage listing

Only the Queens Park rockshelter with pigment images may be appropriate for this listing, but needs consultation with the local Aboriginal land council and communities to obtain their opinions.

Centennial Parklands Landscape Analysis

Pre-colonial Aboriginal archaeological evidence belongs to

Era 2 – Aboriginal occupation and management.

8. RECOMMENDATIONS FOR FURTHER WORK

Further work is required to determine the full significance of the known surviving Aboriginal site and the potential Aboriginal sites in the Centennial Parklands:

- An archaeologist experienced in rock art recording is needed to identify the Aboriginal stencils amongst the recent graffiti and determine what stencils have survived. In addition a rock-art conservator (eg. Dave Lambert from NSW National Parks & Wildlife Service) is needed to provide advice about the possibility of removing the graffiti, and about measures to protect the rockshelter walls from future graffiti artists. Before and during each of these stages of work local Aboriginal land council and community members will need to be consulted about the extent of work undertaken.

- With regard to the presence and likely distribution of potential archaeological deposits, existing data held by the Centennial Park Trust and elsewhere (eg. geotechnical reports and libraries), about the evolution and nature of the sandhills and wetland complex, as well as the land surface before the sandhills formed, needs to be collated and assessed. In addition, information about the impacts that post-1788 developments have had on the sandhills and wetlands within the Parklands, and the depths to which they extend, is necessary. To fully assess the potential for the existence of buried archaeological evidence further geological/geomorphological investigations may be necessary.

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