An Archaeological Assessment

at

Pacific Pines Estate
North Creek Road
Lennox Head
North Coast, N.S.W.

August 2003

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C O N T E N T S

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1. INTRODUCTION

1.1 Location (Figure. 1, 2 : 5, 6)

The following report presents the results and outcomes of an archaeological assessment over 56 ha of land at Lennox Head N.S.W. The land is located west of North Creek Road bounded by the existing Pacific Pines Estate to the south, Hendersons Lane to the north and wetlands bordering North Creek to the west.

1.2 Property description (Figure. 3 : 7)

The study area includes:

- Pt Lot 217 DP 1017615
- Lot 216 DP 101615

Lot 216 is the lot designated in the proposed Master Plan as playing fields. Pt Lot 217 incorporates the remainder of the proposed sub-division.
The land is zoned 2(b) Residential under Ballina Shire Council LEP 1987.

1.3 Development proposal

This report is to provide supporting material to a Master Plan to be prepared under the requirements the 1997 Coastal Policy more specifically State Environmental Planning Policy No. 71 - Coastal Protection (SEPP 71). As the proposed sub-division contains a total number of lots which exceed the Ministers authority to waive the need for a Master Plan under clause 18 (1) of SEPP 71, a Master Plan for the land must be adopted by the Minister prior to consent (either the local council or the Minister) for sub-division within the coastal zone.

The Proponents of the Master Plan are Robert & Judith Pidcock.

Figure. 1.

Region

Figure. 2.

Study Area

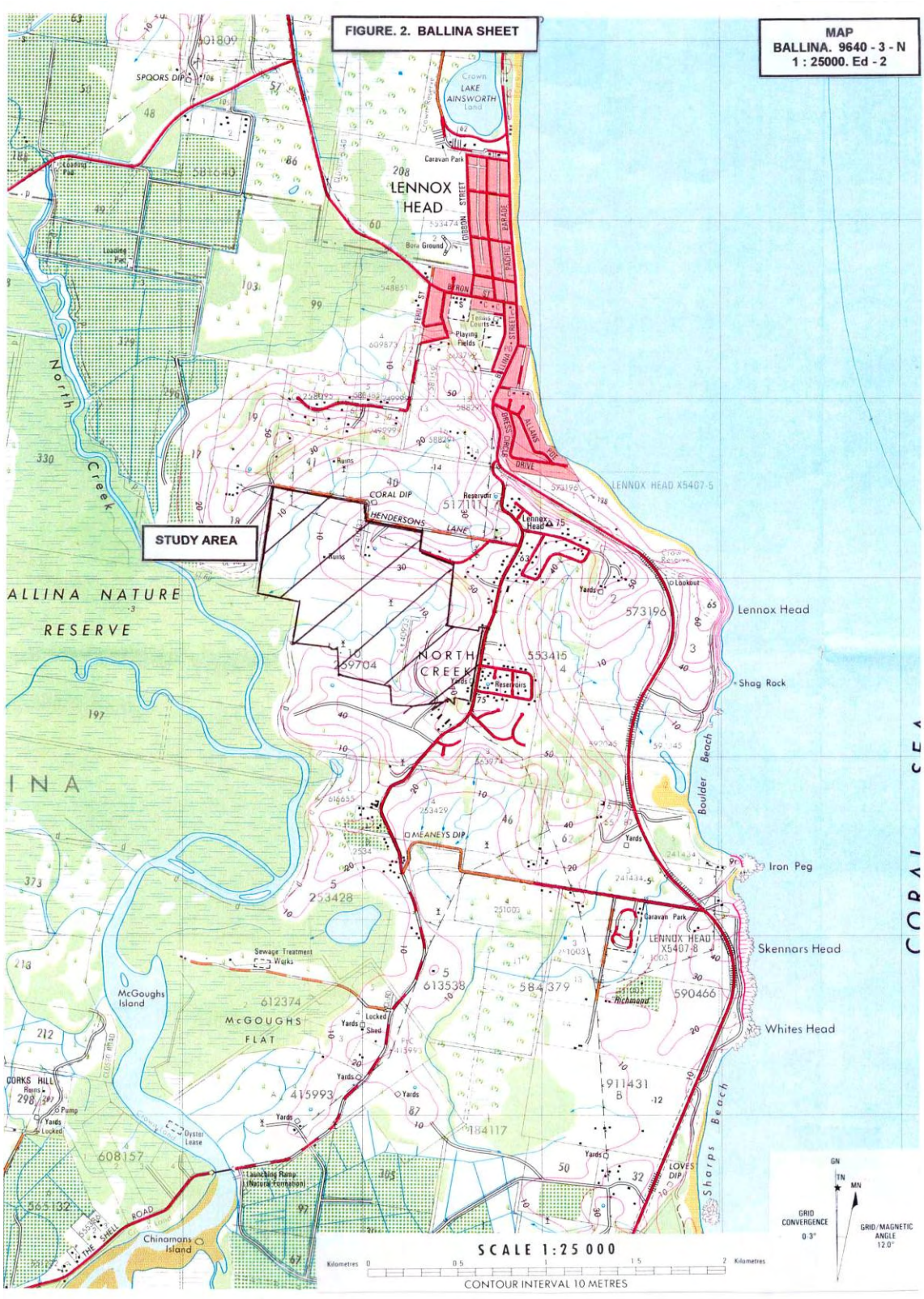
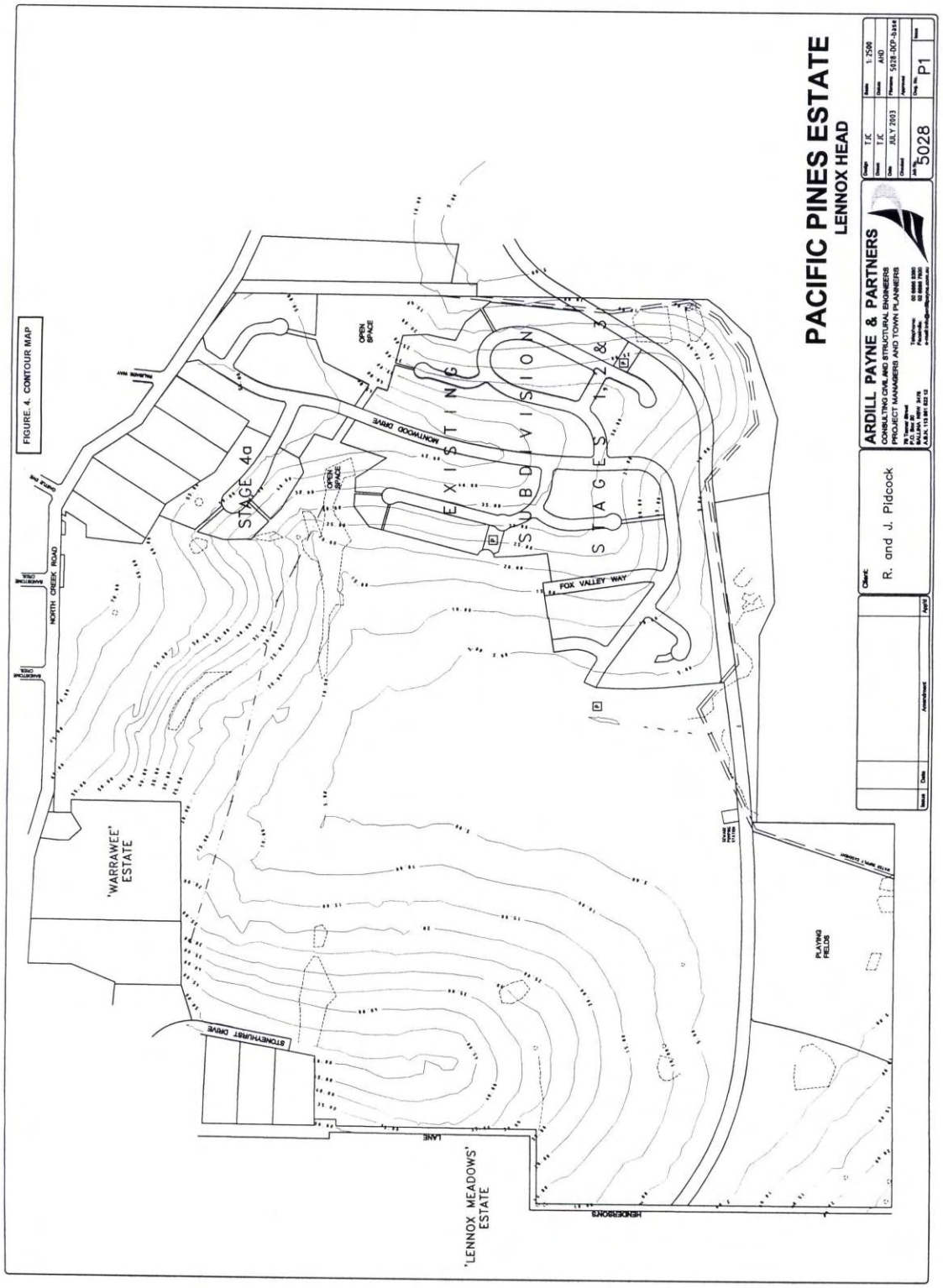


Figure. 3.

Proposed Master Plan

Figure. 4.

Contour Map



2. ENVIROMENTAL CONTEXT

A recognition of the broad environmental contexts within the study area and past and present land uses can assist in making predictive statements as to the potential for Aboriginal sites, their type, possible locations and detectability.

2.1 Topography, soils, vegetation (Figure. 4 : 8)

The main landform pattern is rolling hills c 50 metres (AHD) that form a barrier that extends from Lennox Head to Ballina between the coastline and the Newrybar wetlands to the west. The study area is mainly a moderate (10% - 20%) to gentle (6% - 10%) western slope terminating on wetlands that extend to North Creek. Level ridge crests are only a small proportion of total area on the north boundary at Shearwater and Hendersons Lane and on North Creek Road. Several non-perennial streams drain the study area. They are widely spaced (400 - 625 m) and both tributary and erosional in character. (Speight 1990 : 36, 41). All streamlines fall to a central lower drainage basin where fresh water may collect and mix with saline overflows from North Creek.

Soil types in the study area are derived from basalts of the Lamington Volcanics overlying older Neranleigh - Fernvale strata. The upper soils are red/brown krasnozem types on the slopes and ridge crests. These soils tend to be friable and porous and readily erodable if exposed. The lower drainage basin would appear to contain aggraded sediments from the upper slopes mixed with humic material over lacustrine sands.

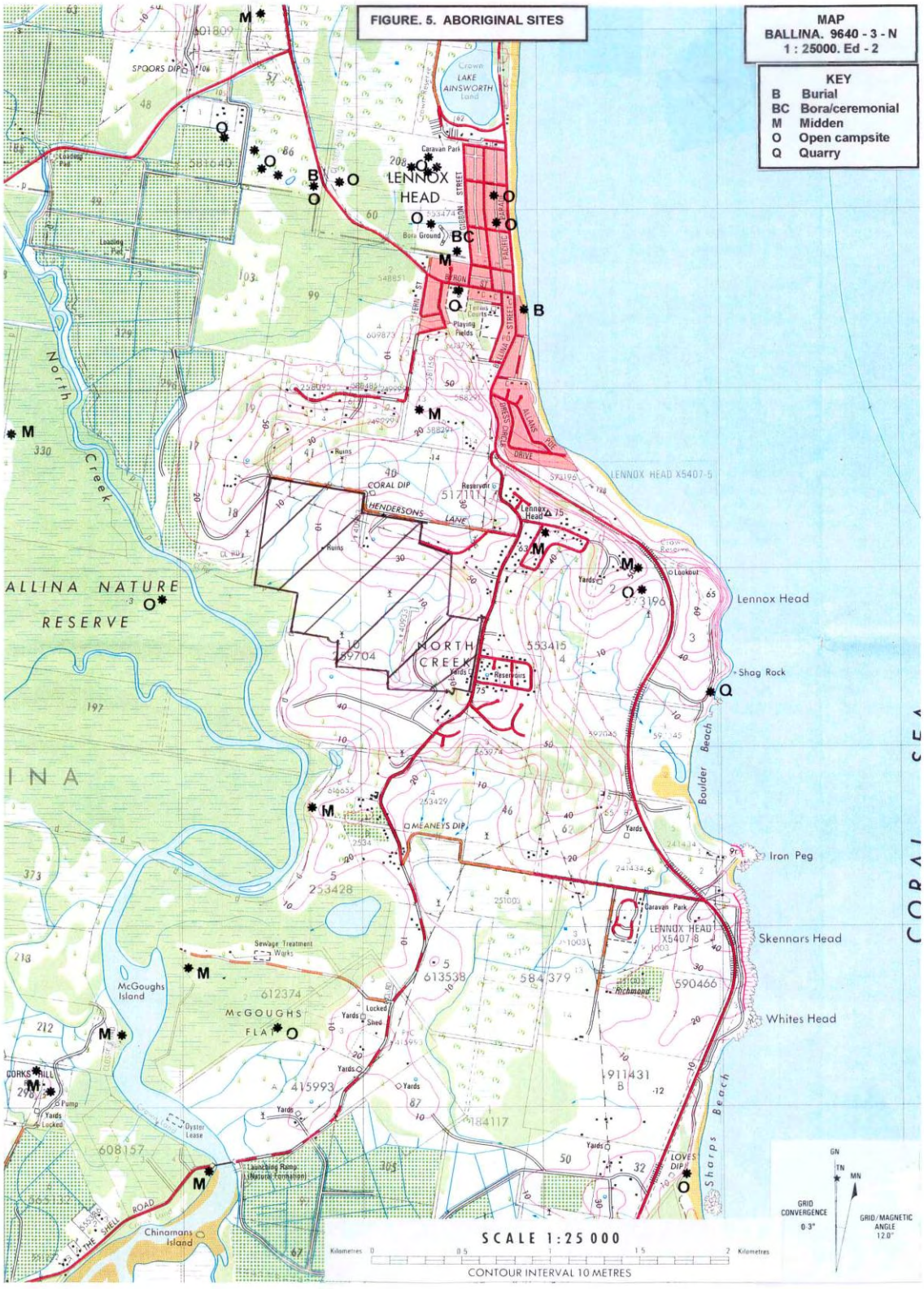
Vegetation on slopes and crests is predominantly open grassland interspersed with narrow bands of sclerophyll regrowth and some littoral rainforest species (Tuckeroo) in streamlines. The lower drainage basin carries sedgeland reeds and grass extending west to a swamp sclerophyll forest dominated by Casuarina glauca and mangrove.

2.2 Landuses

The study area has long since been cleared of its original forest cover, which was probably a mixed wet sclerophyll, littoral rainforest. The surface area in these forests was invariably covered by small to medium boulders and stones which were cleared and heaped, made into walls etc. so that cattle grazing or agriculture could take place. The impact upon above ground or surface Aboriginal sites or cultural materials could be expected to have been highly destructive. Archaeological evidence in elevated situations similar to the study area eg the Alstonville plateau, the Teven/Tintenbar hills or other former "big scrub' areas, is confined to a small number of stone flakes and isolated artefacts. Present land use is cattle grazing only.

FIGURE. 5

Ab sites



3. CULTURAL CONTEXT

3.1 Settlement and movement

The Aboriginal people of the lower Richmond region were part of a larger linguistic group, the Bundjalung, which inhabited the area between the Clarence and Logan Rivers extending west to Tenterfield. Dialect groups composed of interlinked family groups occupied distinct areas within the wider Bundjalung association. Land belonged to individual clans whose territorial boundaries had been established in mythology (Creamer 1974). The study area is located within the territory of the Arakwal people, with the Bundjalung to the west and the coastal Minjanbal to the north of Byron Bay (Tindale 1974; Crowley 1978). Contact between local clans and more distant groups took place for the purposes of exchange, inter-marriage, armed conflict and during times of seasonally abundant food supply. Populations on the coastal plain were high, possibly reflecting the wide variety and high productivity of coastal ecologies. Ainsworth (1922) is the most detailed of early sources for this area, writing specifically of the Aboriginal people of east and west Ballina. Ainsworth (1922 : 43) recorded that in 1847 there were between 400 and 500 in the native tribes belonging to east and west Ballina. Bray (1901) records that Ballina people often mixed with the Coodjingburra a coastal horde/clan group extending from the Tweed to the Brunswick Rivers.

Models to describe possible patterns of settlement and movement in the region vary. One suggests that clan groups ranged between the seacoast and foothills of the coastal ranges on a seasonal basis (McBryde 1974). Early sources support this view to some extent as there are records describing the movement of inland groups of the Clarence to the coast during winter (McFarlane 1934 ; Dawson 1935 : 25). A second model suggests that movement of coastal people was not frequent, and that semi-sedentary groups moved north and south within the coastal plain rather than to the upper rivers (Coleman 1982). The model is based on reports of numbers of small villages composed of dome-shaped weatherproof huts between the mid NSW coast and Moreton Bay. Flinders described a small group of huts in the vicinity of Yamba in 1799, and Perry described two villages on the banks of the lower Clarence in 1839. Similar sightings were reported by Rous on the Richmond (McBryde 1974), Oxley on the Tweed (Piper 1976) and in Moreton Bay (Hall 1982). The 'solid' construction methods described for these huts seem to suggest occupation for periods of months at a base camp rather than a constant wide-ranging pattern of low-

level landuse. Godwin (1999) argues that neither of the above 'models' is supported by the archaeological record and that local conditions dictated exploitation strategies on the north coast of N.S.W.

Early sources indicate that coastal clans remained within a defined territory in small family groups, which gathered en masse at times of abundant food resources. Ainsworth recorded that the Ballina people usually camped in divisions at different places excepting during the oyster season, when they assembled unitedly at Chickiba on North Creek, "where the large oyster banks on the foreshore to this day mark the old feeding grounds" (1922 : 45). While Ainsworth is not specific as to the oyster season, he does refer to an annual migration to the beaches in the month of September for salmon fishing.

Movement across established tribal boundaries is documented by Petrie (1932) and Bundock (1898). Bundock described the Richmond Aborigines attending bunya nut feasts in the Bunya Mountains of south-east Queensland. These gatherings occurred every fourth year, attracting groups to their own traditionally defined camping areas and serving to promote trade and strengthen kinship networks across a vast area of western Queensland, south-east Queensland, and north-east N.S.W.

3.2 Economy

According to Ainsworth (1922 : 43 - 44) the coastal people between Ballina and Byron Bay relied on 'fish and oyster and the varied products of the chase'. He refers to the spearing of salmon on the beaches and the netting of estuarine fish by means of a 'tow-row', a finely meshed net attached to a stick of bamboo bent in the shape of a bow. He is not specific about which estuarine fish were caught by this method, although an excavation of a North Creek shell midden did indicate the exploitation of flathead and bream (Bailey 1975 : 55). Ainsworth places an emphasis on the consumption of oyster to the exclusion of other estuarine, coastal rock platform and open shore molluscs, all of which are recorded in local shell middens (Bailey 1975; Campbell 1982; Hughes 1991). Modern research supports Ainsworth's assessment as to the prominence of oyster at least for certain periods in the diet of the Ballina group to the extent that this species comprises the greatest volume of estuarine shellfish represented in Aboriginal middens (Hughes 1991).

Terrestrial animal foods mentioned by Ainsworth (1922 : 43) include pademelons, wallabies, bandicoots, and 'iguanas'. He reports that flying foxes provide a source of food and were easily brought down with the boomerang and pademelon stick. Bundock also records the hunting of flying fox, "by going into the camps where they sleep during the day, when it is raining heavily, as they will not fly". (Bundock 1898). At Byron Bay immediately north of the study area flying fox were so prolific and reliable that the natives though often shifting camp, seldom went far away on account of this source of food supply (Anon nd : 1).

Ethnohistorical records are largely directed towards descriptions of hunting techniques which employed large groups of people and obvious types of technology requiring demonstrable physical skills - the use of spears, clubs, boomerangs, the 'tow-row' (net) etc. As a result, the role of plant foods in the local economy is often understated or overlooked entirely. Certainly, vegetable foods are given no particular prominence in Ainsworth's recollections at Ballina. He refers to yams obtainable in the scrubs, and to a bread made from nuts which grew on the coastal headland (Ainsworth 1922 : 43). McFarlane (1934) placed greater emphasis on the role of vegetable foods "the woods supply much variety in the shape of fruit or berries but every description of vegetable contributed to the digestive requirements of the collector of food necessities".

Commentary on material equipment from the north coast is provided by McBryde (1978). Her sources refer to shields (McFarlane 1934; Dawson 1935), single point fire-hardened spears, three types of boomerang (Dawson 1935), clubs - nulla nulla and pademelon sticks, bark and palm leaf bags, wooden water vessels, possum rugs, cane and shell necklaces and stone knives (Bundock 1898).

4. ARCHAEOLOGICAL CONTEXT

4.1 Prehistory

Evidence for occupation of coastal northern N.S.W. and southern Queensland dates into the Pleistocene at Wallen Wallen Creek on North Stradbroke Island, where a cultural sequence dating between 20,560 ± 250 years BP and the early Holocene period has been investigated. Analysis of faunal material from the site indicates an

economy initially based upon the hunting of terrestrial animals, changed to one based upon a reliance on marine fish and shellfish. The change was directly linked to changing local ecologies caused by rising sea levels (Neil and Stock 1986).

Coastal sites in northern N.S.W. date to within the Holocene period. The earliest of these is a shell midden at the base of Sexton Hill on the lower Tweed River where an occupation phase was dated between 4,700 BP and 4,200 BP (Appleton 1993 : 34). Faunal material showed a predominance of oyster, cockle and whelk by volume, in addition to remains of pademelon, kangaroo, bream, whiting, flathead and schnapper. The stone component exhibited few diagnostic traits, only four artefacts appearing to be of a deliberately manufactured shape (Appleton 1993 : 17 - 18). An earlier excavation of a shell midden 2.5 km further upstream yielded a basal date of 605 ± 90 BP. A column sample revealed compacted fish bone remains at the lower levels, with a greater content of shellfish in the upper levels. Bone points were also recovered. It was concluded that the diet, initially based upon fish and possibly terrestrial fauna, changed to one more reliant upon shellfish, which probably reflected the gradual siltation of the Tweed River to a mudflat ecology (Barz 1980a), in that location at least.

A shell midden on Chickiba Creek was found to have accumulated between 1,750 BP and c. 100 BP (Bailey 1975 : 52). Shell samples from Angels Beach area are dated between 800 BP and 530 BP, with one sample at 900 - 1,000 BP (Rich 1994 : 195). Stone artefacts were assessed on technological grounds to date to within the past 2,000 years (Rich 1994 : 161). Bailey's basal date of 1,750 BP suggests that the modern resource-rich environment may not have been productive enough at an earlier time to support any more than small groups. By contrast, the Tweed River estuarine site below Sextons Hill was in use some 3,000 years earlier than this (Appleton 1993).

Beach foreshore sites investigated to date have been associated with more recent phases of occupation than estuarine sites. Foredune sites typically take the form of narrow bands of pipi shell, or surface scatters of pipi and a few stone artefacts. Pipi horizons at South Ballina and Broadwater have been dated to 260 years BP and 200 years BP respectively (McBryde 1982 : 77). A more substantial pipi midden (#4 - 6 - 61) investigated on the foreshore at Byron Bay had been used between approximately 1,000 and 400 years BP. The 80 cm deep midden deposit was overwhelmingly dominated by pipi shell, with minor inclusions of periwinkle, limpet,

sand snail, oyster and cartrut. Bream was the most abundant vertebrate species. Although in lower quantities relative to bream, a broad range of fauna was represented in the midden, including other types of fish, tortoise, macropods, bandicoot, possums, rodents, birds and reptiles. The midden's stone assemblage was characterised by primary flaking debitage which reflected the poor knapping quality of the raw materials used. All of these materials are believed to have been collected from intertidal pebble beds adjacent to the site (Collins 1994).

4.2 Previous surveys in the Lennox Head locality

The review of previous archaeological assessments forms part of the basis for making predictive statements as to the type of sites and the environmental contexts in which they might be found. Previous assessments can be grouped into two broad categories: those studies which have assessed areas of estuary, wetlands and dune fields and a second group which have assessed areas of the low rolling hills which carried the rainforests known locally as the "big scrub". The boundaries and distribution of the rainforest coincided with the boundaries of the red soils (Kraznozems) which developed on decomposing basalt lava flows (Blackmore : 1989). This assessment on the basis of soil type and topography belongs to the second group of studies which have attempted to assess former 'big scrub" areas.

4.2.1 Surveys in former 'big scrub' areas

Studies within the 'big scrub' area of the Alstonville Plateau include Mills (1997, 1998), Piper (1994a, 1994b, 1994c, 2001). Of these studies only the Mills impact assessment of the proposed Alstonville bypass road has found any archaeological materials. Sites found include three open campsites. The materials at these sites were found as a result of pit testing up to 1 metre followed by washing and sieving. Three locations of up to 7 stone waste flakes on chert material were recovered from the basalt soil matrix. The Piper studies at Pearces Creek north of Alstonville, Tucombil and Uralba found no archaeological materials. However, the Pearces Creek study (Piper 1994a) did investigate a report by an informant of an early settler who, nominated the location of a 'blacks camp' and stone axes at the time of European selection. The study could not confirm the existence of a campsite nor stone axes or whether the camp had been in use before of after the clearing of the original rainforest. Studies across the wider 'big scrub' area included Mills &

Wilkinson 1994; Kuskie 1993; Davies 1991 in Collins 1996 : 24). None of these studies have produced any archaeological materials. The only exception being the Collins (1992) study which found one open campsite of three flaked chalcedony artefacts close to the Wilson River at Booyong near the northern extent of the 'big scrub'. A study over an extensive area of former 'big scrub' country adjoining Wollongbar to the west found a singe stone axe at the surface on level ground at the junction of a non perennial stream and Maguires Creek (Piper 2001 : 26).

A study by Piper (2002) of a former rainforest ridge on Emigrant Creek Dam at Teven failed to find any archaeological evidence although ethnographic sources refer to the Aboriginal use of the general area for ceremonial and siliceous stone procurement. (Collins 1996 : 13, 31). In 1992 J. Collins assessed 28.5 ha of land immediately north of this study area. Only 5% of the study area could be effectively inspected due to heavy grass cover. No sites were found. (Collins 1992 : 14). Piper (1999) also investigated the area immediately south of the existing Pacific Pines estate. The study included the same red basalt soil slopes as this study area, 500 metres to the south. No sites were found on the hillslopes and hillcrests. One site of an estuarine midden was recorded on the bank of North Creek at the junction of hillslopes and tidal mud flats. (Piper 1999 : 36).

4.2.2 Surveys on the coastal plain and estuaries

Archaeological work on the lower Richmond has largely focused on the Richmond River estuary, and coastal dunes and plains between Lennox Head and South Ballina. With the exception of Bailey (1972), the majority of studies have been concluded in response to impact assessments. The greatest concentration of recorded sites in the lower Richmond region occur along the foreshores of North and Chickiba Creeks, and across dunefields north of these creeks, extending northward to Lennox Head and Newrybar. Studies in these areas have been completed by Stockton (1974), Godwin (1986), Bonhomme (1988), Cane (1993b), Piper (1994), Hughes (1991), Dallas *et al* (1991) and Rich (1994), Collins and Piper 2000). These studies have resulted in the recording of 16 shell middens comprising estuarine and beach species in addition to stone artefacts, and 13 open campsites featuring low-density shell scatters and stone artefacts.

Godwin (1986) recorded 26 sites in the vicinity of the North/Chickiba Creek estuary and proposed a model whereby evidence for use of the estuarine unit would be

restricted to levees and raised sand areas. This model is equally applicable to the dunefield/wetland complex between Lennox Head, Newrybar Swamp and the western foothills. Godwin (1986) concluded that the wetlands were unlikely to contain large sites, and that discard would probably be restricted to the odd stone tool. The dune system and any raised landform elements close to food gathering areas were considered to be potentially extremely sensitive, with the likelihood of sites being reflective of a wide range of activities. Due to the relatively large number of impact assessments completed since Godwins (1986) assessment in the Ballina area, patterns of site distribution have become clearer and site locations less difficult to predict. Using available date, Collins (1996) quantified the relationship between site locations and landform units, finding that 91% of sites recorded between Ballina and Lennox Head were associated with sand substrates on creek banks or dunes. The slopes of hills that define the western edge of the coastal plain were found to be devoid of recorded sites. (Collins 1996 : 16 - 20). The basalt soil high ground areas between the coastline and Newrybar Swamp in which the study area is located are equally devoid of recorded sites.

The earliest recording of sites in the Lennox Head area appear to have taken place in 1968-1969. The Sim Report (1968) indicates the presence of foredune middens north to Lake Ainsworth. It is not clear which sites listed in the present N.P.W.S. register were the result of recordings made in 1968, but an open campsite (#4 - 5 - 31) recorded by Oakes in 1969 may have been one previously referred to in the 1968 report. The site contained pebble tools, large flakes and flaked pieces on the foreshore adjacent to Pacific Parade. McBryde (1974), who conducted studies of a generalised nature at Lennox Head, recorded a burial (# 4 - 5 - 18) in the foredune, while Starling (1974) recorded a midden/open campsite (# 4 - 5 - 29) in a foredune near Lake Ainsworth. Bailey (1972) recorded four shell middens in the Lennox Head area (# 4 - 5 - 29, # 4 - 5 - 49, # 4 - 5 - 52 and # 4 - 5 - 54). Sites 4 - 5 - 48 and # 4 - 5 - 54 are located on North Creek south-west of Lennox Head. All four of the Bailey sites occur on Pleistocene sand sheets adjacent to wetland.

Studies on Pleistocene dune sheets west of Lennox Head found an extensive open campsite/burial (# 4 - 5 - 94) in the ecotone between sand sheets and wetlands. (Navin 1991; Navin and McConchie 1991), Dallas *et al* (1991). The site was the focus of the archaeological investigation detailed in Collins and Piper 2000. The initial assessment of Site # 4 - 5 - 94 (1991) was that it was an extensive and concentrated site with major archaeological potential. Artefact types including a large

number of backed blades, blade and multi-platform cores, and uni and bifacial pebble tools. Identified raw stone materials included chert, chalcedony, jasper, basalt, limestone, quartz, quartzite and river/beach pebbles (Dallas 1991 : N.P.W.S. site file). Its potential archaeological significance combined with the presence of one known human burial, meant that the site was of particular cultural significance to the Jali Local Aboriginal Land Council. (L.A.L.C.). It was recommended that Site # 4 - 5 - 94 be further recorded and mapped prior to final assessment.

An archaeological investigation by Collins and Piper 2000, at Site # 4 - 5 - 94, found Aboriginal cultural materials were exposed intermittently from east to west for approximately 525m. These materials were identified at six 'focal points" on a sand rise between the dunefield extending to the north and drained wetlands to the south. The study required that a shovel and auger test pitting investigation be conducted within four of the focal points. (Area A, C, D, E) and at a 50 metre radius of Area B where a known human burial and a potential for others, precluded sub-surface investigation, 46 stone artefacts and 41 pieces of midden shell were recovered from 23 of the 68 test pits. Forty-five test pits contained no archaeological evidence. The results suggested that low-level scatters of artefacts will occur in surface sand across the sand rise and the sand plain. (Collins and Piper 2000 : 3).

The major focal point of the investigation of Site # 4 - 5 - 94 referred to as Area B is the only known open campsite/burial in a sand plain environment remaining in the north coast region and one of the few surviving sites with links to the Lennox Head Bora Ground (Collins and Piper 2000 : 3 - 4). A sample (# 281) of the stone artefact component was dominated by white siliceous stone (53.4%), mudstone (18.9%, siltstone (14.2%) other materials included chert (5.7%), chalcedony (2.5%) and other (5.4%). (Collins and Piper 2000 : 29). These materials were believed to have been procured locally from three probable sources; Lennox Head headland, shingle beds fringing the Lennox Head/Ballina shoreline and Tintenbar c 7km west of the study area. (Collins and Piper 2000 : 68). The total lithic assemblage was dominated by micro-debitage (36.7%) and unmodified flakes and blades (32.8%). Other artefact types included pebble fragments (10.7%), flaked pieces (6.2%), multi-platform (3.4%), single platform (0.3%) and bipolar (1.7%) cores, flake and nuclear tools (each 2.3%), rejuvenation flakes (0.6%), backed blades (0.6%) and block fractured pieces (0.3%). Unmodified pebbles made up 2.3% of the assemblage (Collins and Piper 2000 : 56).

The investigation concluded, "although its archaeological value was undoubtedly diminished due to the activities of illegal collectors, Site # 4 - 5 - 94 is a regionally unique site type with further research potential". The value of the site was enhanced through its proximity to the Lennox Head Bora Ground and links which it appears to have with the Bora Ground locality. On this basis the site as a whole is assessed to have a high level of scientific/archaeological significance. (Collins and Piper 2000 : 76). The site is considered to be of a high cultural/social significance stemming particularly from the existence of a known burial and a potential for others. (Collins and Piper 2000 : 75).

In 1992 Collins conducted a survey on the dunefield in the vicinity of the Lennox Head Bora Ground (# 4 - 5 - 29) north into a proposed housing subdivision. During the survey, a total of 154 stone artefacts were recorded at four separate locations (# 4 - 5 - 105, # 4 - 5 - 106 and # 4 - 5 - 108) north from the Bora Ground. It was recommended that previously registered midden material adjacent to the Bora be investigated to determine its spatial extent, and that an investigation of the recorded artefact scatters be undertaken to establish whether *in situ* subsurface archaeological material was present. The result of the subsurface (shovel test pit) component of the investigation were reported by Collins in March 1993(a). The investigation concluded that one area (Area B; Site # 4 - 5 - 105) contained materials assessed to be *in situ* and therefore of archaeological significance. It was recommended that a Consent to Destroy be granted to the proponent to allow the proposed subdivision to proceed providing a 10m easement encompassing Site # 4 - 5 - 105 was excluded from the development. It was further recommended that an embankment south-west of the Bora Ground be retained and protected in its present condition. Although highly disturbed, the embankment contains archaeological materials, which are of high cultural heritage value due to their likely direct link with Bora Ground use.

Prior to the 1993 investigation it was assumed that the Bora Ground, strategically placed between beach foreshore and extensive former swamps, would have been a major focus for Aboriginal occupation. However, the low-density of artefacts (4.8 per 100m^2 and lack of extensive concentrated occupation deposit suggested that the area as a whole had not been subject to intensive prehistoric use. On the basis of the available evidence, it was concluded that shell deposits and reduced beach pebbles adjacent to the Bora Ground were most likely directly associated with its use, but that this was not necessarily the case with artefact finds further to the north which

probably represented a prior function-specific activity by small local foraging groups (Collins 1993a : 31 - 33).

A Pleistocene dunefield at the western margin of Newrybar Swamp was surveyed by Bonhomme (1988). The sand mass extends for 4-5km from Sandy Flat north of Ross Lane. It is elevated at around 3m AHD above the floodplain, and runs parallel with the base of coastal uplands. The Bonhomme study found three sites in a 1.7km section of the dune north of Ross Lane. These included a midden (# 4 - 5 -70) and two open campsites (# 4 - 5 - 68 and # 4 - 5 - 69). The midden # 4 - 5 - 70) was described as a very extensive site spread over 100m x 100m, containing subsurface shell in a layer 10cm thick. One hundred and fifty artefacts were exposed at the site, including a broken grindstone, hammerstones, cores and retouched flakes. The shell material was predominantly pipi. Artefacts had been made from volcanic river pebbles, chert and chalcedony (Bonhomme 1998 : 29 - 30). The two open campsites recorded by Bonhomme (1998 : 25 - 28) were located south of the midden on the same dune and comprised low-density scatters of stone artefacts. A sample of artefacts included cores, flakes and flaked pieces fabricated on chert, chalcedony, quartz crystals and while siliceous stone.

These sites were subsequently investigated by Cane and Nicholson (1989) in response to an application for a Consent to Destroy ahead of mineral sandmining. One open site (# 4 - 5 - 68) and the midden (# 4 - 5 - 70) were augered to determine their subsurface content, revealing a low-density of materials. In all, 138 artefacts were collected from the three sites and the artefact content expanded to include backed blades and ochre. Cane and Nicholson concluded that the material was less significant than it had first appeared. They suggested that the sites were representative of a larger distribution of artefacts that extended throughout the dune complex in the Newrybar and Lennox Head area. The sites were interpreted as dinner-time camps associated with the activities of small groups ranging from North Creek, or transit camps at which materials were discarded between non-specific locations (Cane and Nicholson 1989 : 30 - 33).

The most extensive archaeological investigation of sites on Pleistocene sand substrate has been that conducted by Rich (1994) at what is now known as Angels Beach Estate, Ballina. This study resulted in the recovery of 40,000 shells and shell fragments, bone fragments, a piece of ochre and 9,000 stone artefacts.

Rich's investigation at Angels Beach Estate produced results, which are largely in accord with those from other studies in the Lennox Head-Ballina area, revealing an assemblage of unmodified flakes, backed blades, cores, hammerstone, uni and bifacially faked pebble tools, manufactured chiefly on chalcedony, chert and acid volcanic beach/river pebbles. Bone and shell fragments indicated exploitation of estuarine shellfish and terrestrial animals in addition to fish. Rich concluded that evidence for the spatial distribution of intra-site activities, specifically meat butchering and tool manufacturing, suggested that the sites were not the product of itinerant or random occupation, but of repeated occupation by groups larger than a single family unit (Rich 1994 : 204). Radiocarbon determinations for shell samples revealed an occupation phase dating between c. 100 BP and 530 BP. On technological grounds, stone working events were dated to within the last 2,000 years (Rich 1994 : 9).

4.3 Registered sites

A quantitative analysis of 53 sites between the Richmond River and Lennox Head concluded that a "strong correlation is apparent between the distribution of sites and specific environmental characteristics" (Collins 1996 : 16). Collins' analysis revealed 88% (n=44) of all sites to be within1.5km of marine water. The only exception to this distribution pattern are a midden (# 4 - 5 - 70) and two campsites (# 4 - 5 - 68 and # 4 - 5 - 69) located on Pleistocene dines approximately 4km west of the modern shorelines. Collins calculated that 91% of the recorded sites are associated with sand substrates on creek banks and dunes.

The N.P.W.S. site register includes 18 sites in an area of approximately 35km^2 centering on Lennox Head. Of these, 10 are open campsites and 7 are shell middens. Two burials are recorded in addition to the well-known ceremonial area, the Lennox Head Bora Ground (# 4 - 5 - 29). All of the recorded sites, with exception of three listed as located in coastal foredunes (# 4 - 5 - 30, # 4 - 5 - 31 and # 4 - 5 - 18), occur in a sand dune wetland context. Collins (1992) recorded four open sites on the western edge of Lennox Head. These are open campsites (# 4 - 5 - 105, # 4 - 5 - 106, #4 - 5 - 107 and # 4 - 5 - 108). Later shovel testing (Collins 1993a) indicated that only # 4 - 5 - 105 contained *in situ* subsurface materials.

The open campsite/burial (# 4 - 5 - 94) which was the initial focus of an archaeological investigation (Collins and Piper 2000) was recorded by Dallas in 1991. The site is located on an elevated (2-3m AHD) dunefield bordered by wetland to the south and east.

Sites have been recorded in the vicinity of Lennox Head since 1969 when an open site comprising pebble tools and flaked pieces was located in an eroding coastal foredune (# 4 - 4 - 31). In 1974, McBryde recorded a burial in the foredune (# 4 - 5 - 18) and Starling recorded stone artefacts and shell material adjacent to the Bora Ground (# 4 - 4 - 29) and a midden immediately south of Lake Ainsworth (# 4 - 5 - 30). An open campsite was also recorded in the vicinity of Lennox Head Public School (# 4 - 4 - 9), this site consisted of pipi shell and stone artefacts. Bailey (1974) recorded four estuarine/wetland shell middens west of Lennox Head (# 4 - 5 - 48, # 4 - 5 - 49 and # 4 - 5 - 54) as part of a detailed study focused on the North Creek sites.

All of the sites referred to above occur on sand-based ground adjacent to wetlands or the estuarine North Creek. The study area contains no environmental contexts characteristic of the sites referred to above. The only site in the Lennox Head area recorded in red basalt derived soils is a probable quarry site at Lennox Headland. (Site name: Lennox Headland. Collins and Piper 2000 : 68) Nodules of siliceous stone erode from a basalt soil in a cliff face c 30m above a rock platform and pebble beach. A unifacial pebble tool at the site indicates the location was used for a purpose but does not necessarily confirm its status as a quarry although siliceous stone of the same types is found in middens and open campsites throughout the Lennox Head area. The site is c 1.3km north east of the study area.

The review of relevant documentation has indicated that studies over slopes and low hills on red/brown basalt derived soils have produced very little archaeological evidence of Aboriginal use/occupation. Evidence is limited to a few stone waste flakes, isolated artefacts and a possible quarry site. Each of the studies (Section: 4.2.1 : 16) undertaken in these context considered to have been within the former 'big scrub' have concluded that European land uses particularly wholesale intensive land clearing has dispersed or destroyed most evidence of transit through or occupation of the 'big scrub'. Heavy vegetation cover has reduced the 'detectability' of cultural materials by surface inspections to a minimum in each the coastal uplands studies. Ethnographic sources indicate the coastal uplands between the shoreline and Alstonville plateau were used by Aborigines for ceremonial/spiritual purposes,

raw material procurement of wood/fibre, siliceous stone, food and medicinal plants and animals accessible via established transit corridors. The archaeological evidence for these activities between the Alstonville plateau and the shoreline between Lennox Head - Ballina has been minimal. The potential for Aboriginal sites to be found in the study area appears low, unless unusual circumstances exist eg: extensive areas of surface visibility, rock shelters, outcrops of suitable stone or uncleared forest. None of these circumstances exist in the study area.

4.4 Potential site types in the study area

The potential for the following types of sites to occur is assessed as follows:

4.4.1 Isolated finds

These will consist of single stone artefacts, which may have been randomly discarded during fabrication or breakage. They may occur in almost any environmental context exploited by Aboriginal people. They are commonly stone axes, single cores, hammer stones, bevelled pounders and abraded pebbles. Their presence may indicate that more extensive scatters of stone exist or existed nearby, perhaps obscured by vegetation or dispersed by mechanical means. Predicting isolated finds is impossible, their detection in the dense ground cover of the study area is unlikely.

4.4.2 Open campsites

41% of known sites in the Ballina-Lennox Head area are open campsites. They consist of scatters of stone artefacts and possibly bone and hearths. Their exposure to the elements means that evidence of food resources used on the site (with the exception of shellfish) is usually lacking. In the Lennox Head area open campsites are invariably found in elevated positions adjacent to creeks or wetlands. An open campsite containing a large component of shell refuse may be described as a midden. They invariably consist of low or high density scatters of primary and secondary flakes in addition to the types of artefacts found as isolated finds. Open campsites may contain burials as in the case of site # 4 - 5 - 94 when located on sand strata. Given the lack of open campsites found on red basalt soil to date due to the destructive impacts of land clearing and the heavy vegetation cover rendering detection unlikely I consider the potential low.

4.4.3 Middens

Middens are campsites which are dominated by shellfish remains. 39% of known sites in the Ballina-Lennox Head area are middens. At Lennox Head, middens are usually situated near a source of shellfish and comprise predominantly, mature oyster, pipi, whelk, cockle and cartrut species in addition to terrestrial animal and fish bone, stone artefacts, charcoal and ash from fireplaces. Human burials have been associated with a number of middens between the Tweed and Richmond Rivers (Barz 1980; Bailey 1972; Lourandos 1979).

Middens may be composed of deep compacted debris reflecting consistent use over long periods of time, or thin scatters of shell which reflect use on a single occasion by a small group, perhaps in transit or gathering food away from a large campsite. All recorded middens have been located in elevated positions beside estuarine waterways or on elevated sand substrates close to wetlands. The dominant species found in estuarine middens is oyster, while locations away from the waterways contain pipi or combinations of estuarine, open beach and rock platform species. To date no shell middens have been identified on basalt soil uplands. A low potential applies for the presence of shell middens in the study area.

4.4.4 Quarry sites

A stone quarry in this general locality may occur where a source of opaline silica exists, as reported at Tintenbar (Collins 1996 : 31) or other siliceous types of stone eg chert, chalcedony, silcrete occur. To date the only confirmed quarry sites recorded in the broad coastal zone between Ballina and the QLD border are on the Tweed Coast where greywacke outcrops have been excavated at several locations. (Piper 1976 : 94). As there do not appear to be any suitable rock outcrops or known sources of siliceous material in the study area the potential for quarry sites is low or nil.

4.4.5 Scarred trees

The majority of scarred trees on the north coast result from the removal of bark for use as covering, shields, containers or canoes. No doubt as an outcome of the widespread and intensive level of land clearing which has been carried out, only one

scarred tree has so far been discovered in the wider study locality. This tree (Bel - 1, N.P.W.S. registration number unknown) carries a single oval scar around 1m long and 30cm wide and standing on a flat adjacent to wetland bordering Belongil Creek at Byron Bay. The tree species has not been reported (Envirosciences 1994).

There are no trees other than regrowth within the study area therefore no potential exists for scarred trees.

4.4.6 Burial sites

All burials recorded to date in the Ballina-Lennox Head area occur in coastal dunes and or sandy soil substrates. They are most commonly found as individual or small group interments in association with middens. On the lower Richmond, burials have been recorded at Patch's Beach (N.P.W.S.), South Ballina (Lourandos 1979) and in middens along the banks of the estuarine system (Bailey 1972). At Lennox Head, burials have been discovered in foredune contexts as well as on Pleistocene sand sheets west of the village. A burial (# 4 - 5 - 18) is recorded in foredunes and one known burial is associated with an open campsite (# 4 - 5 - 94) on the dunefield adjacent to the Lennox Head/Byron Bay Road. Most of the known burials have been located by accidental means through mechanical disturbance or natural erosion. The high acidic nature of the soils in the study area and the additional impact of land clearing etc make it highly unlikely a human burial could remain intact. I consider the potential for the study area to contain burials as low or nil unless midden sites were found, where the preservative effects of leached alkaline water through shell may preserve bone materials.

4.4.7 Ceremonial sites

There is no potential for the study area to contain ceremonial sites in the order of Bora grounds, which contain raised features in the form of earth/mounds or stone mounds. Bora grounds in this region are without exception found in sand based ground. There is a reference to a ceremonial event having taken place in 1847 at Tintenbar on the Emigrant Creek flats attended by up to 300 Aborigines. This confirms the use of rainforested areas for both ceremonial and economic purposes.

(Murray undated : 3 in Collins 1996 : 13). However archaeological evidence for ceremonial purposes in this area is nil. Given the generally sloping nature of the study area it is highly unlikely the area was suitable as a bora ground location. Also given the 'completeness' of clearing in the 1880's there is no possibility of a stone or earth ceremonial structure surviving.

5. ABORIGINAL CONSULTATION

An inspection of the study area has been carried out by the consultant and Jali L.A.L.C. Sites Officer Arthur Ferguson on 21.1.2001. Since that date the Jali L.A.L.C. has made major changes to its personnel to the extent that the previous Heritage Committee and Executive could not make a written response to the results and outcomes of the inspection on 21.1.2001. New arrangements were made with the present Jali L.A.L.C. to re-assess the study area for the benefit of the present Heritage Committee and Executive. To this end it was arranged that Sites Officers Troy Anderson and Robert Brown would accompany the consultant in an assessment of the study area. This was carried out on 16.7.2003. Again no cultural heritage materials were found. The Jali L.A.L.C. written response to the assessment of the study area is contained in Appendix. A.

Figure. 6.

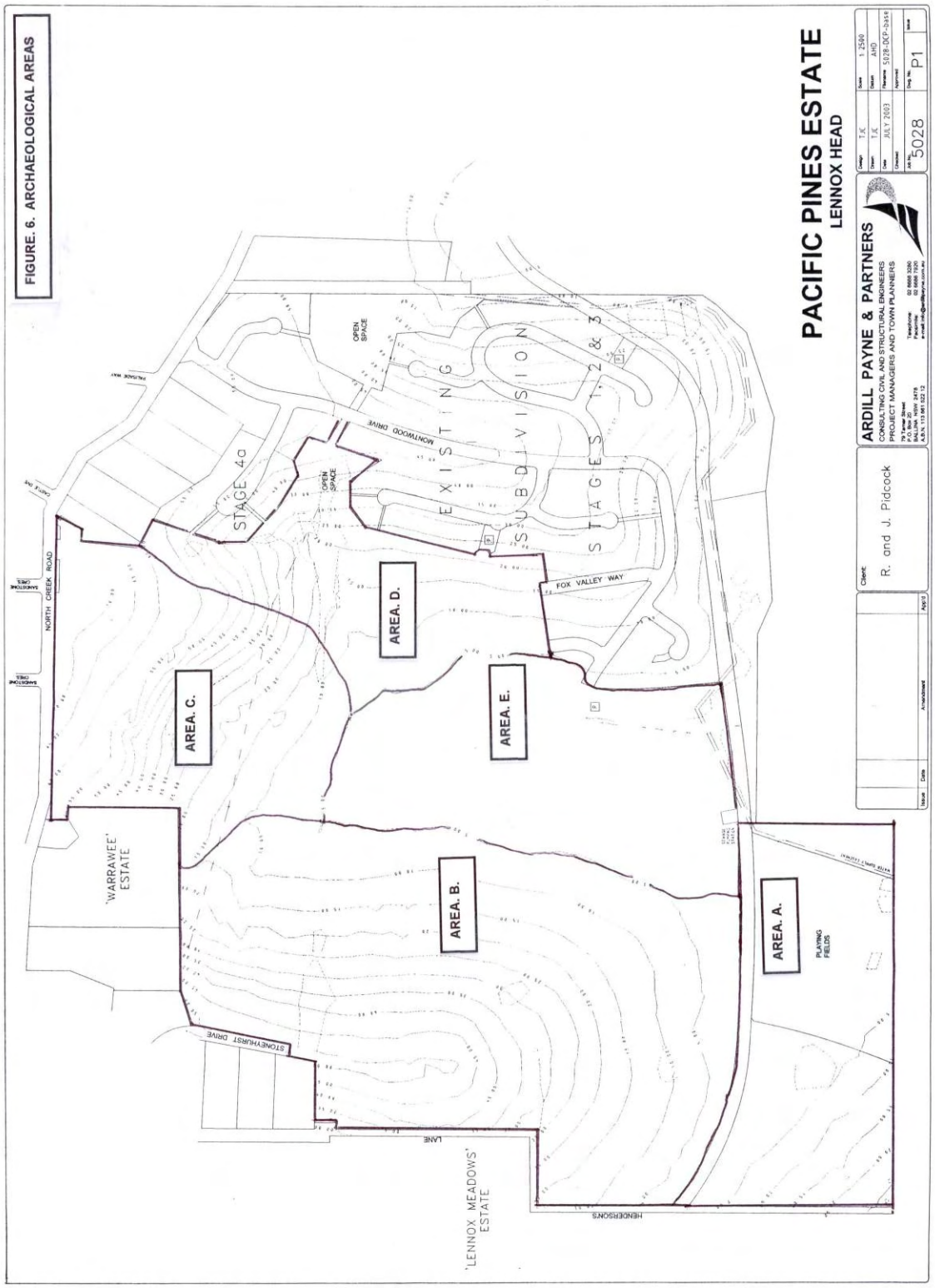


FIGURE. 6. ARCHAEOLOGICAL AREAS
PACIFIC PINES ESTATE
LENNOX HEAD
ARDILL PAYNE & PARTNERS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
PROJECT MANAGERS AND TOWN PLANNERS
Client
R. and J. Pidcock
Design T.K
Drawn T.K
Date JULY 2003
Checked
Scale 1:2500
Datum AHD
Filename 5028-DCP-base
Approved
Job No 5028
Dwg No P1
Issue
Issue Date Amendment App'd
EXISTING SUBDIVISION STAGES 1, 2 & 3
STAGE 4a
OPEN SPACE
OPEN SPACE
MONTWOOD DRIVE
FOX VALLEY WAY
NORTH CREEK ROAD
AREA. A.
AREA. B.
AREA. C.
AREA. D.
AREA. E.
PLAYING FIELDS
'WARRAWEE' ESTATE
'LENNOX MEADOWS' ESTATE
STONEYHURST DRIVE
LANE
HENDERSONS

Figure. 7.
Areas of visibility

6. FIELD SURVEY

6.1 Potential for site preservation and detection

The conditions for preservation and detection are the same for each of the archaeological units across the proposed sub-division. The study area is essentially a continuous west facing slope (c 10 - 30%) and a lower drainage basin (c < 10%). It is considered that the method and widespread manner of land clearing across all of the study area would have had an undefined but probably highly destructive impact upon Aboriginal sites. The typical pattern of European land use in the late nineteenth and early twentieth century was the clear felling of the existing forest, and the removal over a period of time, of as much surface stone as possible in an attempt to establish pasture grasses or small areas of crops. It was the common practice to remove as much stone as possible and use it for stone walls or dump the material in mounds or in narrow gullies, steep slopes or wash outs.

The effect on Aboriginal sites of these methods, has been the removal of trees which may have had carving or scars from the removal of bark for sheeting, shields or containers. Any cultural object composed of fibrous material eg containers, nets, cordage, wooden implements/weapons would have long since decayed had they been stored or discarded in the former forest. Stone artefacts and debitage from their fabrication are highly likely to have been dispersed from their original (*'in situ'*) positions and dispersed laterally and horizontally by cattle, ploughing, and natural impacts eg erosion, slumping. Ceremonial sites in the nature of raised earth circles or stone cairns or mounds can be given no possibility of remaining intact within the study area. The archaeological significance or the scientific value of archaeological materials such as stone artefacts lies in their potential to reflect aspects of prehistoric life, which can be more confidently interpreted from materials which have remained as the occupants of a site left them.

As there are no suitable rock outcrops for the quarrying of siliceous stone or more coarse materials such as greywacke, quarry sites are not considered a possibility. While it is considered the type of sites referred to in Section 4.4 have a low potential to remain '*in situ*' it must be allowed that if open campsites existed, stone artefacts either singly or as artefact scatters may still exist. However the conditions of detectability from a surface survey make it improbable they could be found. The

amount of surface area possible to inspect is approximately 3% of total area. The level of visibility on hillcrests, slopes, drainage basin/watercourses is restricted by a generally heavy grass cover, reeds and some clearing heaps. Small areas of surface visibility occur on part of the hillcrest unit and northern lower slopes. (Figure 6: 28). These are caused by mechanical spreading of soil, excavation for power lines or on cattle pads and around water tanks. Visibility while limited in extent is 80% - 100% where ground surface is visible.

6.2 Survey strategy and method

Given the restriction imposed by vegetation cover on the amount of surface area that could be inspected it was decided that inspecting all visible surfaces was the most practical method of assessing the archaeological sensitivity of the study area. The surveys (21.1.01 and 16.7.03) were carried out on foot with Sites Officers of the Jali L.A.L.C. Prior to the field inspection none of Land Council's Site Officers were aware of sites or culturally significant features in the study area. All parts of the study area are accessible on foot although heavy ground covers severely limited surface visibility. Where exposed surface areas were found the consultant and Sites Officers conducted transects where the exposure was extensive enough to do so. When the exposed surface was small eg c 10^2 m, or very narrow eg cattle pads, spot checks were employed. Details of slope, visibility %, surface area, ground cover were recorded by reference to the draft Master Plan and contour plan. Photographs were taken to provide evidence of general conditions and visibility. It appeared that all tree growth was re-growth, but were inspected for evidence of Aboriginal carving or scaring from bank removal. For ease of orientation and description the survey was treated as five broad zones, Areas A - E. The zones are broadly consistent with the main landform elements. Their general features are as follows:-

Area. A. (Plate: 2).

Slope 6% falling east, heavy grass cover, camphor/lantana thickets, basalt stone piles. Exposure 1.5%. Visibility 80%. Type. Soil/gravel scatter.

Area. B. (Plate: 3, 4).

Hillcrest. Slope 2%, heavy grass cover, mechanical excavations, boulder heaps. Exposure 20%. Visibility 50%. Type. Mechanical.

Hillslopes. Slope 20% falling south and west, heavy grass cover, regrowth lines of wet sclerophyll, farm ruins, fig trees. Exposure 5%. Visibility 100%. Type. Cattle pads.

Area. C. (Plate: 5, 6, 7)

Hillcrest. Slope 2% falling west, short grass cover, soil spread from neighbouring building site. Exposure 10%. Visibility 50%. Type. Mechanical.

Hillslope. 20% falling west, heavy grass cover, camphor thickets. Exposure 0%. Visibility 0%.

Area. D. (Plate: 8)

Hillslope. Slope 20% falling north, heavy grass cover, camphor and wet sclerophyll in stream line. Exposure 0%. Visibility 0%.

Area. E. (Plate: 9)

Drainage basin. Slope 1% stream fall west grass, reed, clearing heaps. Exposure 5%. Visibility 20%.

6.3 Survey coverage

Table 1 indicates the extent to which survey data provides sufficient evidence for an evaluation of the distribution of archaeological evidence in the study area. An evaluation of survey coverage provides an estimation of the potential for a landform unit and or sub element/s to reveal archaeological evidence. This procedure is a preferred method outlined in N.S.W. N.P.W.S. Aboriginal Cultural Heritage, Guidelines for Archaeological Survey Reporting, Appendix 4. 1997 : 44 - 48. The figures in Table 1 do not provide exact percentages but reasonable estimates.

Table. 1.

AREA	LANDFORM ELEMENT	AREA (approx.) c(Ha)	AREA OF EXPOSURE %	AREA OF EXPOSURE (Ha) %	VISIBILITY %	AREA FOR DETECTION	% LANDFORM FOR SITE DETECTION
A	Hillslope	12.0	1.5	0.18	80	0.144	1.2
B	Hillcrest	0.5	20	0.1	50	0.05	10.0
	Hillslope	17.5	5	0.8	100	0.8	4.5
C	Hillcrest	3.0	10	30	50	15.0	20.0
	Hillslope	7.0	0	0	0	0	0
D	Hillslope	6.0	0	0	0	0	0
E	Swamp	9.0	5	4.5	20	0.9	10.0

Total area for detection: c 3% of the study area.

6.4 Field survey results

- No Aboriginal sites nor cultural materials were found from the field inspection of the proposed extension to the Pacific Pines Estate off North Creek Road, Lennox Head.

- No recorded Aboriginal sites nor cultural materials were identified that could be destructively impacted by works at the Pacific Pines Estate.

- The Jali L.A.L.C. have not identified any cultural materials nor attached any significance to any part of the area and have no further objection to the proposed sub-division.

6.5 Conclusion

The known distribution of sites is clustered on the estuary, wetlands, sand dunes, sand sheets of the coastal plain between the Richmond River and Broken Head. The low hills composed of basalt derived soil between the shoreline and Newrybar wetlands on which the study area is located and the vast expanse of low hills broadly described as the Alstonville plateau to the west, have 'returned' little archaeological evidence from archaeological assessments. It is maintained in this report that

because the red/brown kraznozem soils are considered to have supported rainforest and wet sclerophyll forest the study area was probably part of the former 'big scrub'. The lack of evidence of Aboriginal occupation from surveys over open basalt hills and slopes has been attributed initially to the highly destructive impacts of land clearing for dairying and agriculture (Section 2.2). The 'detectability' of what may still exist is invariably hindered by poor visibility due to heavy vegetation cover and or the materials may be too widely scattered and buried. There is a clear lack of archaeological evidence in rainforested areas where clearing for dairying and agriculture has taken place compared to rainforest areas where logging only has been the major European landuse.

The type of landform elements and environmental contexts that prevail in the study area are quite distinct from those of the coastal plain where the majority of sites have been recorded. The type of sites known to exist (Section 4.4) in the Lennox Head area were considered to have a low to nil potential to occur within the study area. Given the low potential for sites to occur and the low possibility of detecting significant archaeological materials, the study area was considered to have a low level of archaeological sensitivity.

The field inspection could find no evidence of archaeological materials within the study area. The Jali L.A.L.C. have indicated (Appendix A.) that they place no significance on any Aboriginal site in the study area or attach any significance to any part of the study area.

Only 3% of the total ground surface was able to be inspected due to the limited areas of surface visibility. Where there were areas of surface visibility the levels of visibility were in the order of 20% - 100% varied by the density of grass cover. Visibility on ridge crests and upper slopes of the northern and eastern boundaries had been caused by mechanical disturbance. Although the ridge crest which now carries North Creek Road may have provided a transit corridor between the Richmond River and Lennox Head and artefacts might be expected, none were found. The western slopes falling to North Creek are unlikely to have provided suitable level areas for campsites where significant quantities of archaeological materials could remain '*in situ*'.

While it must be conceded a low level of cultural materials may have been discarded in the study area I consider that it is highly probable intense clearing and cultivation

of sugar cane in particular, would have dispersed these materials rendering their archaeological significance low. I consider the methods used were the most suitable to the conditions at the time of the field assessments. To date three assessments (Collins 1992, Piper 1999, 2003) have assessed a continuous 125.5 ha portion of cleared hillcrests and slopes west of North Creek Road with a nil result. I consider the results of these studies and this study reflect the low density nature of archaeological material in the study area.

7. RECOMMENDATION

As there were no Aboriginal sites or cultural materials identified during the survey, recommendations as to management of specific sites is not required. The Jali L.A.L.C. have made two recommendations (Appendix. A.) concerning what the Land Council considers to be culturally significant areas.

- The Jali L.A.L.C. recommends "a strip of natural rainforest" be retained as food sources it contains, "are essential in maintaining our Culture". (Appendix. A.).

  Reference to the Proposed Master Plan shows the area referred to in the Jali Recommendation as the strip of Open Space extending south of Stoneyhurst Drive. The area has been identified for its floristic attributes and will be retained as the Jali L.A.L.C. has recommended.

- The Jali L.A.L.C. recommends "what appeared to be a natural spring source…. be preserved as again natural water sources are ingrained richly into our cultural stories and therefore very significant to us". (Appendix. A).

  Reference to the Proposed Master Plan shows the area referred to in the Recommendation as the eastern end of the Open Space corridor that carries waters to the Water Quality Control Pond. It would appear at this time that the Recommendation has been accommodated within the PMP. However, further consultation may be required to identify more precisely the specific area of concern to the Jali L.A.L.C. and how preservation of the location might best be achieved. Possibly enhancement through native tree planting might identify and preserve the location of the spring source.

- Jali L.A.L.C. have made a third recommendation which is intended to mitigate destructive impacts upon potentially concealed, "culturally significant items". The Jali L.A.L.C. recommends, "that nominated representatives from Jali L.A.L.C. be engaged to monitor initial excavations". (Appendix A). As the development is extensive and may come to fruition over a long period of time I would suggest that monitoring be carried out by strip sampling by blade scrape of the ridge crest of Area B and Area C. To implement the Land Councils recommendation I would suggest the Proponents and Project Manager/s give prior warning to the Land Council of the programme of works and that costs of monitoring be negotiated with Jali L.A.L.C.

- I also recommend that should the development of Pt Lot 217 DP 1017615 and Lot 216 DP 101615 at North Creek Road proceed it is recommended that if in the process of monitoring by Jali L.A.L.C. representative or in the process of works at any time it is believed materials of an Aboriginal origin are found works at the locations must stop immediately. The N.P.W.S. Regional Office - Coffs Harbour and Jali L.A.L.C. must be advised and advice sought as to the most appropriate course of action to follow. Works must not proceed in the specific location without written consent of the N.P.W.S. and Jali L.A.L.C. Prior to any vegetation clearing and initial earthworks contractors be advised of the legal requirements of the National Parks & Wildlife Service Act (1974) that in regard to Aboriginal sites or relics : it is an offence to knowingly disturb, deface, damage or destroy, or to permit the disturbance, defacement, damage or destruction of a relic without first obtaining written consent to do so from the Director General of the N.P.W.S.

REFERENCES

AINSWORTH, J. 1922 Reminiscences 1847 - 1922. Beacon Printery, Ballina.

ANON. (nd.) Aborigines of Byron Bay. MS Richmond River Historical Society.

APPLETON, J. 1993 The archaeological investigation of a shell midden at Sextons Hill, South Tweed Heads, North Coast, N.S.W. Report to Ian Hill and Associates.

BARZ, R.K. Estate) 1980 Report of the Terranora Midden. (Lilley Waters Report to Sinclair Knight & Partners.

BAILEY, G.N. 1972 Excavation of a shell mound at Chickiba Creek on the lower Richmond River. Report to the N.S.W. National Parks and Wildlife Service.

1975 Role of molluscs in coastal economies: the results of midden analysis in Australia. Journal of Archaeological Science, 2(1):45-62.

BELSHAW, J. 1978 Population distribution and the pattern of seasonal movement in northern N.S.W. In I. McBryde (ed) Records Of Times Past, Australian Institute of Aboriginal Studies, Canberra.

BONHOMME, T. 1988 Archaeological survey of an area proposed for sand mining at Newrybar Swamp, N.S.W. Report to R.W. Corkery and Co. Pty. Ltd.

BRAY, E. 1923 Manuscript, Richmond River Historical Society, Bundjalung file.

BRAY, J. 1899 'On dialects and Place Names' Science, Vol. 12.

1901 'Tribal Districts & Customs'. Science Vol. 4, No. 1.

BUCHAN, R. 1978 Investigations of the Terenia Creek Cave. Report to N.S.W. N.P.W.S.

BUNDOCK, M. 1898 Notes on the Richmond River blacks. Manuscript, R.L. Dawson (ed.), 1940. Mitchell Library, Sydney.

BYRNE, D. 1983 The Five Forests: An archaeological and anthropological investigation. Report to N.S.W. N.P.W.S.

1984 Archaeological And Aboriginal Significance Of The New South Wales Rainforests. Report to the Department of Environment and Planning

BYRNE. J.J. 1946 'More About the Tweed Aborigines', The Tweed Daily. January 5th

CALLEY, M.J. 1959 Banjalang social organisation. Unpublished Ph.D. Thesis, University of Sydney.

CANE, S and A. NICHOLSON.
1989 Further archaeological investigation of Newrybar Swamp, N.S.W. Report to R.W. Corkery and Co. Pty. Ltd.

COLEMAN, J. 1982 A new look at the north coast: fish traps & villages. In S. Bowdler (ed.), Coastal Archaeology in Eastern Australia. Australian National University, Canberra. pp. 1 - 10.

COLLINS, J.P. 1992 Archaeological Assessment of Part Lot 104 and Part
Portion 60, Megan Crescent, Lennox Head, N.S.W. Report
to Gutteridge Haskins and Davey.

1992 Byron Shire Aboriginal Heritage Study. Draft Report
to the Byron Bay Shire Council.

1992 Archaeological Assessment of Portions 40 & 41, Henderson Lane, Lennox Head, N.S.W. Report to Gutteridge Haskins and Davey Pty. Ltd., Coffs Harbour.

1993 An Archaeological Investigation of part Lot 104 and Portion 60 Megan Crescent, Lennox Head, N.S.W. Report
To Gutteridge Haskins and Davey Pty. Ltd.

1993 Archaeological assessment of four parcels of land at East Ballina, N.S.W. north coast. Report to G.H.D. Pty. Ltd.

1994 Archaeological Investigation and conservation of Aboriginal Midden Site 4 - 5 -61at the Pass Byron Bay, N.S.W. Unpub report to the Cape Byron Headland Reserve
Trust, Cape Byron, N.S.W.

COLLINS, J.P. 1996 SH 10 - Pacific Highway Proposed Ballina Bypass. Stage 1 : Corridor Selection Aboriginal Archaeological Assessment. Report for Connell Wagner Pty. Ltd.

COLLINS, J. and A. PIPER.
2000 An Archaeological Investigation Of Portions 86 And 103 Lennox Head. Report to David Ardill & Associates, Ballina.

CREAMER, H. and R. KELLY.
1979 The Significance of Terenia Creek to Aboriginal People of the Bundjalung Tribe. Report N.S.W. N.P.W.S. September, 1979.

CREAMER, H. and L. GODWIN.
1984 Ethnology and archaeology on the North Coast of N.S.W. Archaeological Research Queensland.

CROWLEY, T. 1978 The Middle Clarence Dialects of the Bandjalang. Australian Institute of Aboriginal Studies, Canberra.

1991 'Chipping At The Past': a northern N.S.W. perspective. Paper presented at the Understanding Ancient Australia Conference. U.N.T. Darwin.

DALLAS, M., K. NAVIN and D. McCONCHIE
1991 Archaeological investigation of the proposed Lennox
Head bypass. Report to PPK Consultants Pty. Ltd.

ENVIROSCIENCES 1994 An archaeological survey of the proposed Belongil Sporting fields, Byron Bay, N.S.W. Report to Byron Shire Council.

DAWSON, R.L. 1935 Aboriginal Words & Names of the Lower Clarence River District. W.C. Penfold and Co., Sydney.

FLICK, W. 1934 A Dying Race. Beacon Printery, Ballina.

GODWIN, L. 1986 An Archaeological Survey of the proposed Ballina - coast linking road. Report to David Ardill & Associates.

1999. Two steps forward, one back : Some thoughts on settlement models for the north coast of N.S.W. In Hall, J and McNiven, I.J. (eds) Australian Coastal Archaeology, ANU Canberra.

KUSKIE, P.J. 1993 Further archaeological investigations of the proposed route of Optus Communications' fibre optic

cable between Grafton and Brunswick Heads, N.S.W. Report to Optus Communications Pty Ltd.

LOURANDOS, H. 1979 Report on an eroded shell midden with burials off Empire Vale Road, South Ballina. Report to the National Parks and Wildlife Service.

McBRYDE, I. 1974 Aboriginal Prehistory in New England. Sydney University Press.

McBRYDE, I. Undated (1976) Environment, Subsistence Economics, Site Activities, And Cultural Tradition As Determinants of Assemblage Variation In New England Prehistory.

1976 Subsistence patterns in New England prehistory. Occasional Papers in Anthropology, 6:48-68.

1978 (ed) Records of Times Past. Australian Institute of Aboriginal Studies, Canberra.

McFARLANE, D. 1935 'The Clarence River Aborigines'. Daily Examiner, 25 January.

MILLS, R. and WILKINSON. 1994 Archaeological survey of the Lismore to Mullumbimby transmission line. Report to Sinclair Knight Merz.

MILLS, R. 1997a Proposed Realignment of the Bruxner Highway for The Alstonville Bypass. Report for N.S.W. Road Traffic Authority.

1997b Report on Sub Surface Archaeological Testing Programme. Maguires Creek. Report for N.S.W. Road Traffic Authority.

1998 Report on Archaeological Testing Programme for Alstonville Bypass and Modifications of the Kayes Lane Interchange. Report for N.S.W. Road Traffic Authority.

MOEHEAD, E.D. undated In the Big Scrub near Lismore. In E. Bray (ed.), Signed reminiscences of some pioneers of early Lismore. Richmond River Historical Society Collection, 1922.

NAVIN, K. 1991 An archaeological survey for the Ballina/Lennox Head

sewage augmentation program. Report to the N.S.W. Public

Works Department.

NAVIN, K and D. McCONCHIE
1991 Further archaeological and geomorphological Investigations of the Ballina/Lennox Head sewage augmentation project. Report to the N.S.W. Public Works Department.

NEAL, R. and E. STOCK.
1985 Pleistocene occupation of the south-east Queensland coastal region. Nature, 323:618-721.

PETRIE, C. 1932 Tom Petrie's Reminiscences of Early Queensland. Angus and Robertson, Sydney.

PIERCE, R.G. 1971 The effects of aquatic foods on the diet and economy of the Aborigines of the north coast at the time of first settlement, B.A. (Hons) Thesis, University of New England, Armidale.

1977 The evidence of J. Ainsworth on the diet and economy of the Ballina horde. In I. McBryde (ed.), Records of Times Past. Australian Institute of Aboriginal Studies, Canberra. pp.115-121.

PIPER, A. 1976 Ocean Beach to Mountain Top. The Tweed Valley In Prehistory. unpub. B. Litt thesis. U.N.E.

1994a An archaeological survey at 'Alcheringa', Pearces Creek Road, Pearces Creek Alstonville, N.S.W. Report to David Ardill and Associates.

1994b An archaeological survey at Tuckombil Quarry, Gap Road, Alstonville N.S.W. Report to David Ardill and Associates.

1994c An archaeological survey at Stokers Quarry, Gap Road Uralba, Tuckombil N.S.W. Report to David Ardill and Associates.

1997 An Archaeological Survey, Gwynne's Quarry, Jiggi, N.S.W. A Report to N.S.W.. N.P.W.S.

PIPER, A. 1999 An Archaeological Assessment at North Creek Road,
Lennox Head, N.S.W. Report for Steele & Associates Pty.
Ltd. Ballina.

2001 An Archaeological Assessment At Wollongbar Village, Via Lismore. Report to Ardill Payne and Partners, Ballina.

2002 An archaeological Assessment At Ross Lane Lennox Head N.S.W. Report to Ardill Payne & Partners, Ballina.

2002 An Archaeological Assessment At The Proposed Water Treatment Plant, Emigrant Creek Dam, Teven North Coast, N.S.W. Report for N.S.W. Department of Public Works and Services.

PIPER, A and J.P. COLLINS
2001b An Archaeological Investigation Of Lot 400 and Lot 426, Manly Street, Ballina. Report to Kovalan Pty. Ltd., Ballina.

RICH, E. 1994 Archaeological salvage of Angels Beach Estate North Ballina, N.S.W. Report to Ballina-North Creek Aboriginal Sites Management Committee and Ballina Shire Council.

SPEIGHT, J.G. 1990 (et al) Australian Soil and Land Survey. Inkata Press. Sydney.

STARLING 1974 Report on the Aboriginal site survey in northern coastal N.S.W. Report to the National Parks and Wildlife Service.

STOCKTON, J. 1974 Archaeological survey of Bel-Air Estate, Ballina. Report held by N.P.W.S.

SULLIVAN, S. 1978 Aboriginal diet & food gathering methods in the Richmond & Tweed River valleys as seen in early settler records. In I.McBryde (ed.) Records of Times Past. Australian Institute of Aboriginal Studies, Canberra.

TINDALE, N. 1974 Aboriginal Tribes of Australia: Their Terrain, Environmental Controls, Distributions, Limits and Proper Names. Australian National University Press, Canberra.

APPENDIX. A.

CORRESPONDENCE

JALI L.A.L.C.

APPENDIX. B.

PLATES

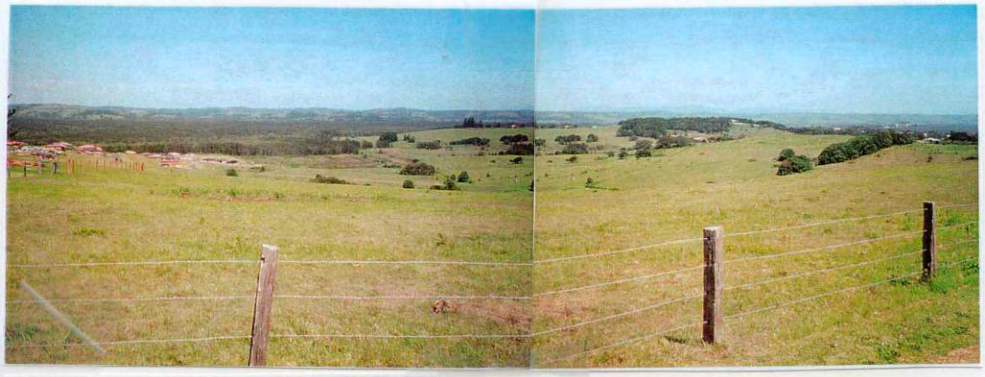


Plate 1. View west. Overview of study area from hillcrest on North Creek Road. Area. C.

Plate 2. View south east. Typical vegetation cover. Area. A.

Plate 3. View east to Area. B. Poor surface visibility.

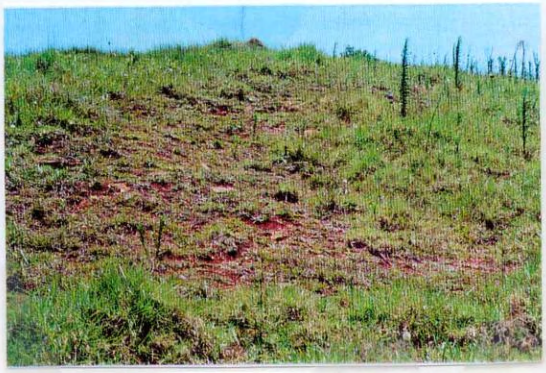


Plate 4. View east. Area. B. Mechanical disturbance. Visibility c. 50%.

Plate 5. View south, eastern extent of Area. B looking to slopes of Area. C. Visibility poor/nil.

Plate 6. View north east. Hillcrest and slope. Area. C.

Plate 7. Hillcrest Area. C. Soil spread from adjoining building site. Visibility c. 50%.

Plate 8. View south west to Area. D.

Plate 9. View east into Area. E. Dumped fill from existing estate.

ABSTRACT

The following report presents the results and outcomes of an assessment for Aboriginal sites and relics at the proposed expansion of the Pacific Pines Estate, North Creek Road, Lennox Head, N.S.W. The 56 ha property is designated as Pt Lot 217 DP 1017615 and Lots 216 DP 101615 and zoned 2(b) Residential under the Ballina Shire Council LEP 1987. The archaeological assessment is to provide supporting material to a Master Plan required under State Environmental Planning Policy No. 71 - Coastal Protection (SEPP 71). The Proponents of the Master Plan are Robert & Judith Pidcock.

The study area is a west facing moderate to gentle slope falling to a narrow band of wetland on North Creek. The present vegetation is confined to narrow lines of wet sclerophyll/rainforest regrowth. A heavy cover of grass covers most of the lower and upper slopes. A central drainage basin extending from the base of the lower slopes carries run-off to North Creek and supports a cover of sedgeland reeds and grass. The red/brown krasnozem soils of the study area indicate it once supported the sub-tropical rainforests of the 'big scrub'. These forests in this area were first cleared from the 1860's and used for the cultivation of sugar cane, dairy farming and other small crops. The impact on Aboriginal sites which may have existed on the slopes of the study area would be highly destructive. (Section 2). Archaeological evidence in elevated basalt derived soils in the former big scrub areas eg the Alstonville plateau, the Teven/Tintenbar hills is confined to a small number of stone flakes and isolated artefacts.

The N.P.W.S. Aboriginal sites database, lists of sites, (Figure 5 : 11) indicates that almost all of the known sites are located on sand dunes and sand sheets in the vicinity of Lennox Head village and on elevated situations close to North Creek. These sites are a ceremonial area (Bora ground), burials, middens, open campsites and a possible quarry site. From the review of relevant documentation it was concluded that a low potential for Aboriginal sites existed. (Section 4.4). The field assessment was carried out with Sites Officers of the Jali Local Aboriginal Land Council on the 21.2.01 and 16.7.03. The initial assessment found no Aboriginal sites or relics could be located. However due to internal reasons the Land Council Heritage Committee nor Executive could provide a written response to the assessment. A second assessment was arranged with current Jali L.A.L.C. Sites

Officers, Troy Anderson and Robert Brown. No Aboriginal sites or relics were found. The Jali L.A.L.C. written response to the assessment (16.7.03) is contained in Appendix A.

While the literature review suggested an overall low potential for Aboriginal sites existed a potential for single stone artefacts or scatters of artefacts could not be ruled out. However the generally poor surface visibility made it improbable they could be found if they existed. The assessment was carried out by sampling those areas where soil exposures permitted. The amount of surface area possible to inspect was limited to approximately 3% of total area, due to the generally heavy grass cover. Surface visibility where it existed (Figure 7 : 29) was in the order of 20% - 100%.

As a result of the field inspection no Aboriginal sites nor cultural materials were found nor any were sites found which could be impacted by works at the Pacific Pines Estate. As no specific cultural issues arose as a result of the field inspection specific recommendations as to site management are not required. The Jali L.A.L.C. have made two recommendations (Section 7) in regard to areas they consider culturally significant. The first refers to retention of a strip of regrowth rainforest extending south of Stonyhurst Drive that contains food sources, "essential in maintaining our Culture". (Appendix A). This recommendation has been accommodated in the Master Plan as the location is designated open space for its floristic attributes. The second Jali L.A.L.C. recommendation refers to retention of "what appeared to be a natural spring source… as again natural water sources are ingrained richly into our cultural stories and therefore very significant to us" (Appendix A). The recommendation has been accommodated within the PMP as it is the eastern end of the Open Space corridor that carries water to a Quality Control Pond (Figure. 3 : 7). However further consultation with the Jali L.A.L.C. is required to determine more precisely the area of the spring and how it might be retained and or enhanced, possibly through native vegetation planting.

A third recommendation of Jali L.A.L.C. intended to mitigate destructive impacts upon concealed "culturally significant items," recommends, "that nominated representatives from Jali L.A.L.C. be engaged to monitor initial excavations." (Appendix A). As the proposed development is extensive and may come to fruition over a long period of time I would suggest that monitoring be conducted by strip sampling by blade scrape over the surface of the ridge crest of Area B and Area C.

(Figure. 6 : 27). The precise area of the blade scrape/s would need to be negotiated between the Jali L.A.L.C., the Proponents and the Projects' Manager.

It is recommended by the Consultant that should any materials believed to be of Aboriginal origin be found during monitoring or at any other time during development works, work at and adjacent to the material/s must stop and the N.S.W. N.P.W.S. Regional Archaeologist and Jali L.A.L.C. be advised as soon as possible. The N.P.W.S. will advise as to the most appropriate course of action to follow. Works should not proceed without written advice of the N.P.W.S. and Jali L.A.L.C.