Appendix 3

Preliminary Indigenous Heritage Assessment of Somersby Plateau, Somersby

KAYANDEL ARCHAEOLOGICAL SERVICES

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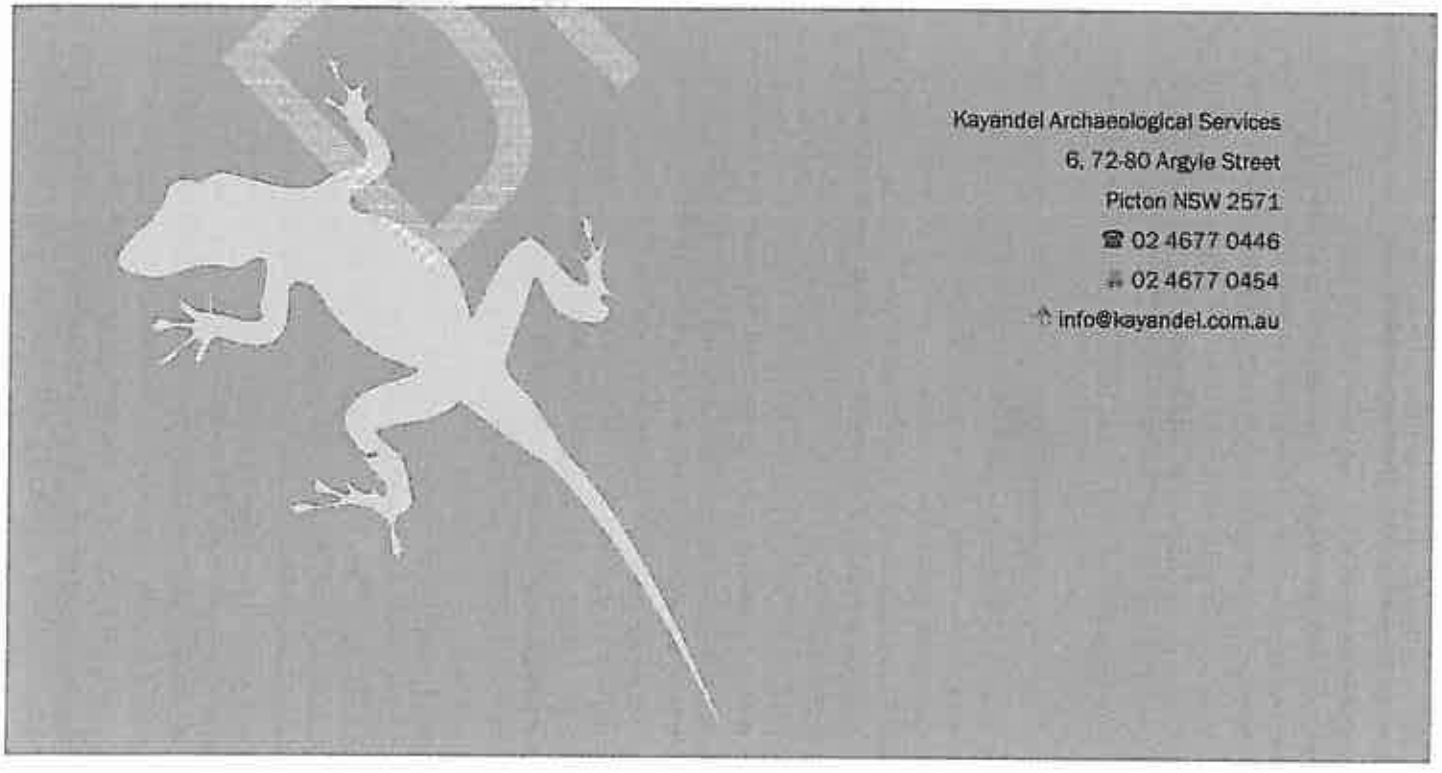
August 2007

Prepared for
Andrews Neil Pty Ltd

KAYANDEL
ARCHAEOLOGICAL SERVICES



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EXECUTIVE SUMMARY

TO BE COMPLETED ON FINALISATION OF DRAFT

This archaeological assessment and the management recommendations contained herein will be independently reviewed by the Cultural Heritage Services Division of the NSW Department of Environment and Climate Change (DECC) and the relevant Aboriginal community.

The DECC and the Aboriginal community will make consideration of the findings of the consultants report and the recommendations in relation to the management heritage places. Formal approval for all actions outlined should be sought from the relevant authority prior to the completion of any works. At no time should automatic approval of the management recommendations stated above be assumed.

CONTENTS

1. INTRODUCTION

Kayandel Archaeological Services (KAS) has been commissioned by Andrews Neil on behalf of the East Somersby Land Use Strategy Trust (ESLUST) to undertake an Indigenous Cultural Heritage Assessment for a land use study for two distinct parcels of land in the Somersby area, west of Gosford (Figure 1). This report presents the findings of an archaeological field survey and assessment of Aboriginal archaeological sites within a 2km radius of the study area and provides an assessment of the potential for previously unidentified or unregistered Aboriginal sites to be present over the study area.

The study area comprises two areas, throughout this report they will be referred to as the Northern (Area 1) and Southern (Area 2) Precincts. The two study areas (Figure 1) are located on the Somersby Plateau, approximately 7 km north-west of Gosford, and to the east of the Sydney-Newcastle Freeway (F3). The overall size of the two study areas is estimated at 109.88 ha.

The Northern Precinct is situated to the east of the F3 and bounded to the south by Reeves Road and totals 31.94 ha. It is comprised of Lot 12 in Deposited Plan 263427 (21.53 ha) and Lot 41 in Deposited Plan 771535 (10.41 ha).

The Southern Precinct is to the east of the F3 and bounded by Debenham Road to the south and totals 77.94 ha. Lots comprising the Southern Precinct are Lot 4 in Deposited Plan 261507 (30.55 ha.), Lot 3 in Deposited Plan 261507 (30.25 ha), and Lot 2051 in Deposited Plan 559231 (17.41 ha.).

Study Area	Lot	Deposited Plan	Land Size (approx.)
1	Lot 12	DP 263427	21.53 ha
1	Lot 41	DP 771535	10.41 ha
2	Lot 4	DP 261507	30.55 ha
2	Lot 3	DP 261507	30.25 ha
2	Lot 2051	DP 559231	17.14 ha

1.1. Kayandel Archaeological Services Personnel

Production of this report relied upon a collaborative process involving a number of KAS staff.

Background research and initial consultation was completed by Deborah Farina and Alie Youman.

Fieldwork, Interpretations and recommendations were undertaken by Lance Syme (Principal).

Jakub Czastka (Senior Archaeologist) conducted the peer review of this report.

Mapping of AHIMS data was completed by Darrell Rigby and site plans were completed by Lance Syme and digital transfers and enhancement completed by Alie Youman.

1.2. Proposed Works

The ESLUST has commissioned this assessment to inform a rezoning application for submission to Gosford City Council. An integral part of such a study includes an assessment of past land use(s) and any resulting archaeological sensitivities and/or future land use constraints.

Given the early stage in the rezoning process there is no concept plan presently developed. Therefore the purpose of this document is to inform of any opportunities and constraints that may exist within each study area.

1.3. Study Aims And Objectives

The objective of this study is to produce a report identifying previous Aboriginal settlement patterns of the two study areas, with a particular view to identifying any past Aboriginal land use, and areas of archaeological potential and constraints for future land use. The following tasks were undertaken to achieve these objectives:

- Identification of statutory requirements relevant to the project. Overviews of these Acts are set out in Appendix 1;
- A search of the relevant State and Federal heritage registers and listings, including the Department of Environment and Climate Change (DECC) and the register for registered native title claimants;
- Identification of Aboriginal Land Councils, Elders and other interested parties through consultation with DECC and advertisements;
- A review and analysis of existing reports relating to the study area and its immediate environs;
- Consultation with Aboriginal communities and other stakeholders in the area;
- Undertaking an archaeological and cultural survey with the participation of the identified Aboriginal stakeholders;
- Assessment of archaeological and cultural heritage values;
- Evaluate known and potential impacts; and
- Preparation of mitigation and management strategies.

1.4. Limitations

In accordance with the study brief, the study includes consideration of Aboriginal cultural heritage in the Somersby area. Although Aboriginal archaeological sites have been identified from the AHIMS database, no in-depth analysis or investigation has been undertaken to determine the extent or integrity of these sites. Further, the density of vegetation within the study area, as highlighted in previous investigations, means that some sites may not be identified until it is cleared during any development. Management measures for potential sites and objects are included in the recommendations. In making these recommendations KAS is conscious that no present impacts have been proposed for the study area(s). Accordingly detailed management recommendations have not been proposed.

2. METHODOLOGY

The assessment reported here involved the completion of an archaeological pedestrian field survey and recording of the specified study area as shown in Figure 1. A breakdown of the various tasks that have been undertaken to achieve the objectives of the consultancy brief is provided below.

2.1. Background Research

Prior to the assessment being completed, the following tasks were undertaken:

- A review of the relevant archaeological reports and site cards for the study area and surrounding region that are held within the DECC AHIMS Register;
- Interpretation of the topographic context and landform units of the study area; and
- Plotting of known Aboriginal sites as identified by the AHIMS search onto the Gosford (9131-2-S) 1:25,000 Third Edition Topographic Map.

2.2. Field Survey

The study area was inspected utilising a pedestrian survey technique. The survey was completed over the whole of the northern precinct and c. 45% of the southern precinct.

The field survey was carried out on the 24th, 25th and 26th of July 2007. Conditions for completing the survey were excellent. This is particularly true for the identification of engravings on rock platforms during periods where the sun is at an acute angle to the land surface.

The details of the survey coverage are discussed in further detail in Section 6.

For the purpose of completing analysis of the survey coverage data, the study area has been separated into five discrete survey units, which relate specifically to the lots which comprise the study areas (See Section 1). Within these survey units it was necessary to further differentiate on the basis of topography, levels of exposure and density of vegetation.

The field survey strategy was designed to increase the potential to identify archaeological material. Assessments were also made on levels of disturbance from previous land use, survey variables (ground visibility and archaeological visibility) and the archaeological sensitivity of the area.

3. PARTNERSHIP WITH INDIGENOUS COMMUNITIES

The Department of Environment and Climate Change (DECC) has adopted the following heritage management principles (NPWS 1997:8-10):

- DECC recognises that Aboriginal culture is living and unique and recognises the right of Aboriginal people to protect, preserve and promote their culture;
- DECC recognises that Aboriginal people are the rightful cultural owners of Aboriginal cultural heritage information and Aboriginal sites and objects;
- DECC encourages Aboriginal participation in assessment and salvage work and supports direct negotiation between Aboriginal communities and developers; and
- DECC encourages Aboriginal communities to carry out their own assessments, including oral history and anthropology.

3.1. STAKEHOLDER CONSULTATION

In keeping with the DECC *Interim Community Consultation Requirements for Applicants* (2004) (Consultation Guidelines), KAS undertook a series of print advertisements to identify Aboriginal community groups with a cultural attachment to the Somersby Area. These advertisements where placed as follows:

- National Indigenous Times (28th June 2007);
- Central Coast Express Advocate (29th June 2007)

Additionally KAS was aware of a number of groups with a known cultural attachment to the Somersby area. These groups were contacted directly and invited to register their interest in the project. KAS also undertook a search with the Office of the Registrar of Aboriginal Corporations on 3rd July 2007 to identify additional community groups.

The following groups registered as stakeholders as a result of the consultation and advertisements:

STAKEHOLDER	REPRESENTATIVE
Darkinjung Local Aboriginal Land Council	Roger Sentence
Guringai Tribal Link	Tracy Howie
Warada Landcare Project	Greg Peters
Individual Stakeholder	Dr Keith Gleeson

Table 1: Registered stakeholders

On 25 June 2007 a letter was forwarded to each of the identified stakeholders advising of the project's background, a proposed methodology and timetable for the fieldwork, and a request for permission to examine a restricted document identified by Dr Keith Gleeson in a previous study, namely the *Somersby Industrial Park Aboriginal Heritage Study for Plan of Management* (Three Volumes; AMBS February 2002).

On 26 June 2007, Roger Sentence of Darkinjung Local Aboriginal Land Council supplied a letter giving KAS conditional permission to access the restricted report. On June 28th, Dr Keith Gleeson supplied a letter to KAS allowing access to the same document. On 3 July 2007, a letter was received from Tracey Howie of Guringai Tribal Link Aboriginal Corporation granting permission to gender specific officers of KAS to access the restricted report. These letters are reproduced in Appendix 4.

Consultation was subsequently carried on with all registered stakeholders throughout the duration of the project cycle.

4. ENVIRONMENTAL CONTEXT

The natural environment of an area influences not only the availability of local resources such as food and raw materials for artefacts but also determines the likely presence and/or absence of various archaeological site types which may be encountered during a field investigation.

Resource distribution and availability (such as the presence of drinking water, plant and animal foods, raw materials of stone, wood and vegetable fibre used for tool production and maintenance) is strongly influenced by the nature of soils, the composition of vegetation cover and the climactic characteristics of a given region.

The location of different site-types (such as rock-shelters, middens, open campsites, axe grinding grooves, engravings etc) are strongly influenced by factors such as these along with a range of other associated features which are specific to different land systems and bedrock geology.

Detailing the environmental context of a study region is an integral procedure that is necessary for modelling potential past Aboriginal land-use practices and/or predicting site distribution patterns within any given landscape. The information that is outlined below is considered to be pertinent to the assessment of site potential and site visibility within the specific contexts of the current study.

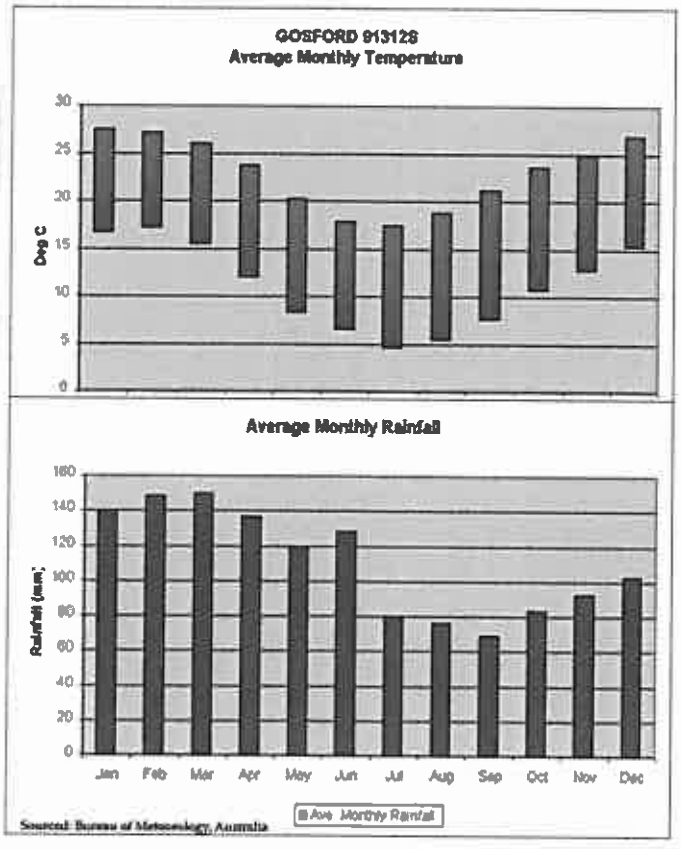
4.1. Climate

The climate of the Gosford area is considered as temperate maritime, and is characterised by warm to hot summers and cool to mild winters.

The Gosford Narara research station reports that the average annual rainfall is 1,321 mm, with approximately 250 to 650 mm per month. These rain periods, however, are not evenly spread over a month, but rather made up of intense rainfall in a matter of days. Higher rainfall is recorded in the months of February and March, and again in May and June.

January and February are usually the hottest months in the Gosford area, with an average maximum of over 27°C. July is the coldest month, with an average daily temperature of 17°C.

Frosts are not common in the Gosford area. Whilst negative temperatures are recorded,



only 3 days have registered in the past twenty years.

The microclimate of an area is also influenced by factors such as rain shadows, aspect and topography, prevailing wind direction and frost hollows. These influences would seem particularly present in the terrain of the study area, resulting in frosts and localised temperatures and conditions often dependant on elevation.

In the past 10,000 years, changes in climatic conditions affecting south east Australia, largely a result of receding/melting ice sheets in the Northern Hemisphere and Antarctica caused sea levels to rise and led to increased rainfall and temperatures. This increase in rainfall and temperature, commenced approximately 18,000 years BP (before present), and peaked at around 6,000 years BP. Temperatures then decreased slightly until 1,500 BP. For the past 1,000 years however, temperatures and rainfall have increased slightly to reach present conditions.

4.2. Topography, Geology and Soils

The two study areas are situated on the Somersby Plateau, an extension of the Hornsby plateau, between the McDonald Ranges to the west and the Watagan mountains to the east (Murphy, 1993:2). The topography is an undulating region on Hawkesbury sandstone (ibid). The area is composed of broad ridges to moderately inclined slopes, characterised by small hanging valleys, sandstone bedrock and wide benches between 10-100m wide with low broken scarps between 1-4m in height. Local relief ranges between 20-120m, with an average of 70m.

The study areas fall within the Sydney Basin geological survey area, with the geology of the study area being that of the Hawkesbury Sandstone formation. This geological formation is the most dominant of geologies in the Sydney Basin, and is largely made up of quartz sandstone with shale lenses (Herbert 1983:18). It is believed that the Hawkesbury Sandstone formation was formed in the Triassic period, approximately 200 to 250 million years ago.

The Hawkesbury Sandstone formation is a quartz-rich sandstone, and mainly medium to coarse grained, although it can vary from fine to very coarse grained (Ibid). Hawkesbury Sandstone is composed of approximately 68% quartz, 2% rock fragments and clay pellets, 1% feldspar and 1% mica (Ibid:19). The remainder of the Hawkesbury Sandstone is comprised of 20% clay matrix, cemented by 6% secondary quartz, and 4% siderite, an iron compound (Ibid).

Quaternary[1] geological contexts are a product of scarp retreat and erosion of soil cover, particularly on slopes. Quaternary deposits of gravel, sand, silt and clay are centred on river valleys, often as sequential river terraces. Slopes have been subject to various episodes of stability, erosion or burial. These have been noted to affect both the age and nature of soil cover laterally as well as vertically (Walker 1989). Coastal areas were also influenced by sea level changes causing the evolution of estuaries, drowning of river valleys and development of coastal barriers such as dunes.

1. _____

[1] The Quaternary is the current geological phase.

The soils in the region of Somersby are variable depending on the underlying geology and relief. The two study areas lie within three main soil landscapes: Somersby (so), Sydney Town (st), Hawkesbury (ha) as well as the possibility of disturbed terrain (xx) (see Figure 4).

The majority of the study area is made up of the Somersby and Sydney Town soil landscapes with margins of the study area overlapping the Hawkesbury soil landscape. Southern portions of the study area also reveal disturbed terrain as a result of previous human activity (Section 4.5).

The topography of the Somersby soil landscape comprises of gently undulating to rolling rises on the deeply weathered Hawkesbury Sandstone plateau (Murphy, 1993:25).The soils are moderately shallow to deep (100-300 cm). The major soil materials consist of dark brown loamy sand or sandy loam, which occurs as topsoil (A Horizon), an earthy yellowish brown sandy clay loam (B Horizon), a pallid grey sandy clay (B_3 or C Horizon), a friable sandstone (C Horizon) and a saturated pallid greyish yellow brown sandy clay loam (B or C Horizon). This last soil material tends to occur as subsoil in wet areas (Ibid:26). These soils tend to have very low fertility, are strongly acidic, as well as being sodic and therefore vulnerable to erosion. Steeper slopes and poorly drained areas have moderate limitations for urban development.

The Sydney Town soil landscape comprises of undulating to rolling low hills and moderately inclined slopes on quartz sandstone. Soils are shallow to deep (up to 150cm). The major soil materials are loose brown sandy loam (A_1 Horizon), earthy bright brown sandy clay loam (B horizon), strongly pedal clay (B or C Horizon), and grey massive mottled sandy clay loam (B_2 or B_3 Horizon) (Murphy, 1993:69).

Both the northern and southern study areas are predominantly an even mix of the Somersby and Sydney Town soil profiles. However the south-western corner of the southern study area abutting the F3 freeway also shows an area of disturbed soil as a result of human activity, such as construction of the freeway and associated road works, including a disused quarry in western margins of the Southern Precinct. This soil disturbance will have an impact on the archaeological potential of that particular area. Moderate to severe sheet erosion and rilling have occurred where the vegetation has been extensively cleared for development.

The Northern Precinct is situated in the headwaters of Narara Creek. In general this precinct presents with a gently sloping northerly aspect. Within Survey Unit A, a small un-named watercourse with incised margins was identified. This creek line was oriented in a north-north-westerly direction and flows to Narara Creek beyond the northern boundary. In the southern portions of Survey Unit A there was a noticeable increase in the level of ground water present. This increase in ground water was also noticeable through the middle and south eastern portions of Survey Unit B.

The Southern Precinct creates the entire headwaters of a small unnamed tributary to Narara Creek to the south east of the study area. This Survey unit is a series of four east-west ridgelines with interspersed drainage lines. The northern, western and southern margins all feed to three ephemeral creek lines that flow beyond the eastern boundary prior to merging and finally on to Narara Creek. The general aspect of the Southern Precinct is east.

4.3. Vegetation

The vegetation of an area is dependent upon the geology and soil landscapes. This in turn provides an indication of the type and locations of resources available to Aboriginal groups in the past. Soil fertility determines the type

of vegetation cover. The vegetation in both the Somersby and Sydney Town soil landscapes is predominantly low eucalypt open-woodland and scrub, with species such as scribbly gum (*Eucalyptus haemastoma*), brown stringybark (*E. capitellata*), red bloodwood (*E. gummifera*), smooth-barked apply (*Angaphora costata*), Sydney peppermint (*E. piperita*) and old man banksia (*Banksia serrata*) (Murphy, 1993:68). Undergrowth shrubs include grey spider flower (*Grevillea* spp.), flaky-barked tea-tree (*Leptospermum attenuatum*) and drumsticks (*Isopogon* spp.), whilst poorly drained areas include heath banksia (*Banksia ericifolia*) and dagger hakea (*Hakea teretifolia*).

It should also be noted that an endangered plant species has been identified in the study area, and occurs in both the Somersby and Sydney Town soil landscape generally. The plant, the Somersby Mintbush (*prostanthera junonis*), appears to flourish in a broad corridor of which the study area forms part (see Figures 2 and 3).

Further, the scribbly gum has been identified as a koala feed tree species, and therefore is potentially a koala habitat. Should a development application be made, the land may be considered environmentally sensitive pursuant to *State Environmental Planning Policy No. 44 – Koala Habitat Protection*.

4.4. Resources For Subsistence

As outlined previously, a wide range of floral and faunal resources were seasonally available to Aboriginal groups in the study area. Past climatic changes and modern land use have however altered the distribution of vegetation and amount of water available, which in turn influence the distribution of plants and animals.

A study of the Wyong Gosford area (Vinnicombe 1980) identified several edible plant types, in addition to avian and terrestrial fauna within the study area. Large macropods formed an important food source, such as the Eastern Grey kangaroo (*macropus giganteus*) and the Wallaroo (*Macropus robustus*), Red-necked Wallaby (*Macropus rufogriseus*), Rock Wallaby (*Petrogale penicillata*) and the now extinct small wallaby and pademelons (*Thylogale* sp.) also featured (ibid). Even smaller marsupials, such as Long-nosed Rat-Kangaroos (*Potorous tridactylus*) or Brush-tailed Possum (*Trichosurus vulpecula*) were exploited with the latter used by Aboriginal people for its fur. Finally, flying foxes (*Pteropus poliocephalus* and *Pteropus scapulatus*) were also important in the diet of past Aboriginal groups. Flying foxes were generally beaten from their roosts or smoked out by lighting a fire beneath the tree and then cooked on the coals in a ground oven (Isaacs, 1996).

An additional food source for Aboriginals was recognised in the reptilian population (Attenbrow, 2002, Vinnicombe, 1980) and plants were also highly valued for their medicinal and material properties. The most important staple foods in south-eastern Australia were Murnong or Yam Daisy (*Microseris lanceolata*) and Cumbungi or Reed Mace (*Typha* sp.). Murnong was common before the introduction of cattle destroyed most of it (Zola and Gott 1992).

In the Brisbane Waters area, east of the current study area, Burrawang (*Macrozomia cummuni*), a type of edible nut, was utilised. This type of nut is poisonous if not soaked in water for several days (Hunter 1793 In Vinnicombe 1980). Around 8 km north of the study area, in Somersby, the Gigantic Lily (*Doryanthes excelsa*) roots were used in the preparation of cake-like food. Its long stems were also used as spear shafts (Vinnicombe 1980). Grass Trees (*Xanthorrheoea resinoa* and *Xanthorrhoea arborea*) were common, the centre shoots of which are edible. The plants stalks were used for spear shafts and the resin for hafting stone barbs on spears and mending canoes (Vinnicombe 1980).

A now-destroyed midden located on the Floraland Nursery was investigated by Dallas (1981). She recovered shells and stone materials. The shells were analysed and identified as black nerite or periwinkle (*Melanerita atramentosa*) and lightning turban (*Subninella undulata*). These shell types are commonly found in open rocky coastal habitats such as that located 10-12 km east of the study area. Other molluscs such as scallops, mussels (*Mytilus planulatus*) and oysters (*Ostrea angasi* or *Crassotrea commercialis*) were also recovered.

Permanent water sources were accessible to Aboriginal groups in the valleys, as evidenced by the extensive network of creeks located around the study area. An alternative water source from seepages near ridge tops was possible, where perched water systems or aquifers are located. Variable climatic conditions affected the availability of water and subsequently influenced the way Aboriginal people moved through the landscape over time.

4.5. Disturbance and Visibility

I. Disturbance – Past Land Use

Impacts such as logging are known to increase erosion with removal of tree cover. Butzer & Helgren (2005) and Gale & Haworth (2002) provide details specific to the Tablelands of NSW. These processes have been identified in previous archaeological surveys in and around the study area (Heritage Concepts 2006; Koettig & McDonald 1983), redistributing soil and sediment across the landscape. The potential impact on Aboriginal sites includes reworking of artefact scatters and burial of grinding groves or rock art sites. Silting of creek lines and erosion of steeper slopes also continues to be an issue (Figure 5).

During the 19th Century the land in and around the study area was logged for timber. Recent impacts in the vicinity of the study area include the construction of the F3 motorway to the west of the study area, Reeves and Debenham Roads, unformed tracks, clearing for pasture and power line easements along the northern boundary. Aerial photographs show the presence of scattered rural housing in the southern portion of the study area, as well as some land clearing surrounding those dwellings. To the east of this, land has been subdivided for rural housing, which raises the possibility of imminent land clearing adjacent to the study area. The northern precinct is also west of Gosford Animal Shelter. The main impacts specific to the study area itself would largely be the product of historical logging and clearing for pasture, but construction of adjacent infrastructure has undoubtedly influenced the integrity of the landscape within the study area.

II. Visibility

There are a number of factors to be considered when assessing visibility over a study area. These include but are not limited to, the time of day, aspect of the sun, vegetative cover, weather conditions and soil matrix.

On the day of the survey visibility within the study area was generally rated between moderate and low.

Moderate areas were characterised by areas of exposure associated with open ground under established trees, ground surface visibility associated with previous earth works and areas of larger exposure within pasture.

Areas of low visibility were characterised by native and introduced species of grass cover and scrub. Certain areas also revealed colluvial fan deposits mantling breaks of slope and foot slopes.

The environmental background is important in order to give a context to the archaeological record. With respect to Aboriginal archaeology, land formation processes may impact upon the type and frequency of archaeological remains. Past climate may also impact upon the location and types of resources available, which in turn would impact upon settlement and mobility patterns of past Aboriginal groups in the area.

5. ARCHAEOLOGICAL CONTEXT

Brisbane Water is the name given to the harbour area towards the Western side of Gosford. This was thought by early Europeans to be the home of the coastal Guringai (Ku-ring-gai) people. The Guringai occupied an area ranging from the northern side of Sydney Harbour along the coastal fringe to the lower reaches of Lake Macquarie near Newcastle. Another group, the Darkingung (sic) people occupied an area to the west of Mangrove Creek ranging towards Rylstone and then north into the Cessnock and the Wollombi areas. Mt. Yengo is a flat topped mountain in the Darkingung (sic) country and stands approximately 350 metres above the surrounding plateau (McDonald, 1993:84). The mountain is a visual focus in the landscape and remains a highly significant cultural and religious site to local Aboriginal groups.

Governor Arthur Phillip and a small group of officers and marines made a brief exploration of Broken Bay and a tributary called the "north-east arm" in 1788, after establishing the settlement at Sydney Cove just five weeks before. Phillip made a further exploration in 1789 and this tributary subsequently came to be called "Brisbane Water". The small exploration party included a marine by the name of Watkin Tench. Tench wrote two manuscripts, the second 'A Complete Account of the Settlement at Port Jackson' (Tench 1789) depicted the natural environment of Port Jackson and its surrounds; the early efforts to establish food production, exploratory trips into the hinterland; and, most interestingly, the first interaction between Europeans and the Australian Aborigines. The first known white settlers to the Gosford area took up land on the ocean shores in the 1820's with varying agricultural and oceanic based endeavours.

5.1. Ethnohistorical Context

European historical accounts of past Aboriginal practice are often subjective and succumb to the prevailing morals and beliefs of the time. For this reason the following information is possibly an embellished reflection of Aboriginal culture in the Somersby area and best understood as a non academic record subject to culturally insensitive viewpoints and is potentially variable in nature.

Perhaps the first account of Aboriginals in the Hawkesbury area of Broken Bay came from Watkin Tench (1789):

> *"Here also the river received the name of Hawkesbury, in honour of the noble lord who bears that title. Natives were found on the banks in several parts, many of whom were labouring under the smallpox. They did not attempt to commit hostilities against the boats; but on the contrary shewed every sign of welcome and friendship to the strangers."*

John Fraser (1892) used the term *Kuringgai* to refer to the Aboriginal people inhabiting the central coast region of New South Wales:

> *"The next great tribe is the Kuringgai on the sea coast. Their 'taurai' (hunting ground or territory) is known to extend north to the Macleay River, and I found that southwards it reached to the Hawkesbury. Then, by examining the remains of the language of the natives about Sydney and southwards, and by other tests, I assured myself that the country thereabout was occupied by sub-tribes of the Kuringgai"*
>
> Threlkeld, L. E. (1892)

Fraser also notes that the Kuringgai were surrounded by the Wachigari and the Paikalyung to the north, the Kamalarai to the northwest, the Wiradhari to the West and the Murrinjari to the south.

Norman Tindale (1974) in a later document mentions that "the Awabakal are the central... of a series of tribes to which the arbitrary term Kuringgai has been applied by Fraser." He divided the area Fraser labelled Kuringgai into several tribal groups, including the Tharawal, Eora, Dharuk, Darkinjung, Awabakal, Worimi, Birpai, Ngamba, and some others. Tribal boundaries are extremely difficult to reconstruct; however, it is thought that the area was inhabited by three different linguistic groups; the Darkinjung, the Kuringgai, and the Awabakal speakers.

There are documented occurrences of trade between coastal and inland Aboriginal groups. Vinnicombe (1980) reports spears made from Xanthorrhoea stalks were exchanged for belts and cords made from opossum fur. McCarthy (1939) reported the high ridgeline (Hunter Ridge) extending north through Somersby to the Hunter River and south to Brisbane Water and the Hawkesbury as an Aboriginal travel route passing through the hinterland parallel to the coast and also between the Upper Hunter and Gosford.

An estimate of the size of the Aboriginal population by Butlin (1993) prior to European contact numbers a minimum of 1,500 people. Introduced diseases such as smallpox, measles, pneumonia and tuberculosis reduced the population to a couple of hundred by 1789 (Bennet 1968 in Hughes *et al* 1994). Between 1821 and 1827, the population was further decimated from 200 down to 65. One Aboriginal group, known as the Narara 'horde' was recorded in the 1827 Gosford District census. They consisted of ten Darkinjung and Guringai Aboriginal men, women and children living in the Narara valley (du Cros & Rich, 1986; Tracy Howie 2007, pers. Com.).

Another significant factor causing the deaths of Aboriginal people was perpetrated by white settlers massacring the Aboriginal population. The Town and Country Journal dated 6 March 1875, relates that Aboriginal men were 'ruthlessly slaughtered' when reacting to settlers stealing their land and women.

5.2. Regional Context

The Sydney region has been inhabited by Aboriginal people for at least 20,000 years, and possibly longer (see Nanson et al 1987). Archaeological sites from the Blue Mountains and Hawkesbury/Nepean River System have provided the earliest evidence of occupation within the region. Stockton and Holland (1974) produced a radiocarbon date of c22,000 years BP from a site at Kings Tableland in the Blue Mountains. Excavation of the Greaves Creek rock shelter site of Walls Cave near Medlow Bath has produced a date of c.12,000 years BP (ibid). At Shaws Creek KII, a rock shelter on the west bank of the Nepean north of Penrith, a date of c13,000 BP is recorded (Kohen et al 1984).

Sites on the south coast of New South Wales, such as Burrill Lake (c20,000) and Bass Point (c17,000), provide complimentary dates (Lampert 1971, Bowdler 1970). At the time of these periods of occupation, both sites would have been located within hinterland areas some distance away from the sea. In the case of Burrill Lake, the sea would have been up to some 16 km further east than at present (McDonald 1992). There are no other Pleistocene sites recorded on the Sydney coast. There are however two sites located at Curracurrang and the Prince of Wales Hospital, which are dated to around 7,000 years ago.

It is very likely that a large number of coastal sites of a similar antiquity within the Sydney region have been submerged and/or destroyed by sea-level changes that have occurred in eastern Australia during the last 20,000 years.

On the basis of the available evidence it would appear that the initial occupation of the Eastern seaboard regions was sporadic, and with low population densities. From around 5000 years ago an increasing and continued use of many sites which have been investigated through archaeology appears to have ensued. Evidence for the use and occupation of the Eastern seaboard regions from this period is far more 'archaeologically visible' than for the previous periods.

In support of the likelihood that occupation of the region intensified around this time, the majority of rock shelter and open camp sites which have been investigated to-date contain archaeological deposits, features and artefacts which generally date to c.2,500 BP or less. Kohen (1986) suggests that there was a more intensive use of open sites in the region during the last 1,500 years. This researcher suggests that the majority of camp sites will therefore belong within this time frame.

During the 20,000 years of occupation in the region, and in particular the last 5,000 to 8,000 years, changes in excavated stone tool assemblages have been observed. A number of temporal markers have subsequently been established by archaeologists in an attempt to distinguish what are considered to be the more significant changes in tool types and tool kit composition (e.g. McCarthy 1948, Megaw 1965, Lampert 1971 and Wright 1997).

5.3. Model Of Aboriginal Occupation

The various models of past Aboriginal occupation which have been developed for the wider region and similar landscape contexts i.e. Koettig & Lance (1986) may be extended to tableland environments, McDonald (2004) is pertinent to open plain contexts and Attenbrow (2004) within the region of the central coast. These models indicate that sources of permanent or seasonally reliable water were not just a focus of past Aboriginal occupation but were a necessity for occupation to occur. Therefore it is expected that the greatest evidence of occupation would be found in association with reliable water sources such as creeks (and rivers where they occur). Further, the presence of suitable landforms was also extremely important for occupation to occur. Landform often determines the type of archaeological evidence which will be found or, in many instances, whether any evidence at all can be expected to occur.

Koettig and Lance (1986) developed a general predictive model for the Southern Tablelands, which found that large sites were generally located on alluvial flats close to major water courses, whereas smaller sites were located on undulating hills. Site frequency and size decreased the further the distance from water, and where ground slope was steeper, such as hillsides and ridge sides.

McDonald (2004) found that the Sydney Basin had a complex archaeological record despite modern disturbances, and occupation appears to be older than the recent Holocene. Sites located closer to permanent water sources are generally more complex than sites on ephemeral or temporary water courses, and most sites have subsurface archaeological deposits, in some cases a high density of artefacts, even where no surface manifestations exist. It was also found that even fields that had been ploughed to a depth of 30 cm may still contain intact deposits such as knapping floors. Deep and shallow alluvial sites were found to possess stratigraphic potential.

Attenbrow's study of the Upper Mangrove Creek area (2004) found an abundance of sites, with most site types being found on all topographic features. However, some site types, such as axe grinding grooves, were more likely to be found on valley floors or ridges, whereas sites of all types were less likely to be found on peninsula ridge tops and the main ridge sides.

The expectation is that elements of all three models would be relevant to the study area investigated.

5.4. Previous Investigations

5.4.1. AHIMS Results

A search of the DECC Aboriginal Heritage Information Management System (AHIMS) database conducted on 21 June 2007 revealed 102 known Aboriginal places located within a 2km x 2km area centred on the present study area (AMG search coordinates Zone 56, Eastings: 339819 to 344707, Northings 6299080 to 6306793) (Appendix 2). These 102 sites represent locations at which one or many archaeological features i.e. stone artefacts, rock art or grinding grooves have been recorded.

It should be noted that the list of sites recorded in the DECC database is not exhaustive as only formally recorded sites are included. Further, the absence of Aboriginal sites or site types in the study area does not mean that these sites may not exist within the study area.

As can be seen from Table 2, all site types within or immediately surrounding the study area are either rock engravings or axe grinding grooves. Surrounding the northern precinct, slightly outside the northern boundary are seven grinding groove sites (45-3-1397, 45-3-1402, 45-3-1369, 45-3-1370, 45-3-1371, 45-3-1405 & 45-3-1411). Of the four remaining sites, one (45-3-0044) plotted up inside the present study area and three (45-3-0039, 45-3-0620 & 45-3-1313) slightly outside the western, southern and eastern margins respectively. The site types in the Southern Precinct are an even mix of rock engravings and axe grinding grooves.

In completing the review of background reports detailed in Section 5.4.2 It an additional site was identified within the Southern Precinct. This was recorded by Sim in the 1970's and is referred to as Sim 2/46.

Site ID	Site Type
45-3-1397	Axe grinding groove
45-3-1402	Axe grinding groove
45-3-1369	Axe grinding groove
45-3-1370	Axe grinding groove
45-3-1371	Axe grinding groove
45-3-1405	Axe grinding groove
45-3-1411	Axe grinding groove

45-3-0044	Axe grinding groove
45-3-0039	Rock engraving
45-3-0620	Rock engraving
45-3-1313	Axe grinding groove, rock engraving

Table 2: Aboriginal archaeological/cultural heritage sites on the AHIMS list that fall inside the two study areas.

5.4.2. *Previous Archaeological Research*

A number of archaeological surveys and excavations have been undertaken within the study area for commercial contracting and academic research purposes. This section details the most relevant investigations and highlights the extensive cultural landscape in the study area. The following information will assist with predictive modelling to help identify potential archaeological sites and allows for planning and management recommendations to be made with confidence.

Due to the limited nature of these studies there is insufficient data available to develop a comprehensive regional model of Aboriginal adaptation and population movements in the current study area.

Heritage Concepts Pty. Ltd, April 2007 - Proposed Driver Training Facility (Lot 422 in DP 40341), Reeves Road, Somersby

This study covered an area adjacent to the Reeves Road study area and covered approximately 7.016 hectares. Four transects were covered, with one archaeological or cultural heritage site located. Visibility in the study area was fair, ranging from 30%-70%, however, some portions of the study area were not surveyed due to dense vegetation and accessibility issues.

The site found, named SDS1, (not present entered on AHIMS) was a small grinding groove and potential carving site. It was found in an area covered with lichen growth and organic litter. It comprised a 10 cm x 1.4 cm grinding groove, and a possible carving, depicting a kidney shaped object. According to Aboriginal consultants attached to the Heritage Concepts study, these features are known to occur elsewhere in the Somersby Plateau region.

Heritage Concepts Pty. Ltd, 2006 – Draft Aboriginal and Historical Archaeological and Cultural Heritage Assessment, Proposed High School Site, Pacific Highway, Karlong

The Government Architects Office (GAO) commissioned Heritage Concepts to produce an Aboriginal and Historical Cultural Heritage Assessment for the proposed Karlong High School, located on the Pacific Highway, Kariong NSW. The archaeological survey straddled the Lambert soil landscape which is expressed as a relatively high relief, dominated by erosional processes that decrease the potential for primary context surface and subsurface artefact scatters. The site prediction model developed for the study area pointed towards rock engraving and axe grinding sites to be the most likely in the landscape. The subsequent physical archaeological survey confirmed this model and showed rock engraving sites and axe grinding groove sites to be the predominant site type. Five sites were located during the course of the survey, three of which existed were previously recorded sites. This report is still being finalised at this point and additional information regard site locations is unavailable.

AMBS, 2002 -Somersby Industrial Park: Aboriginal Heritage Study for Plan of Management

Gosford City Council contracted Australian Museum Business Services to conduct a heritage audit of all known Aboriginal sites within the Somersby Industrial Park and to prepare a plan of management. The results of the survey program revealed a possible total of 41 Aboriginal sites within the Industrial park study zone. Of these sites, the AMBS study relocated a total of 27 from 39 Aboriginal sites previously documented plus two new site recordings. The sites included numerous engravings of animals, anthropomorphs (human like figures) and other motif types. It is possible these engravings served a ceremonial purpose and some of the sites within the Industrial Park region were potential components of a male initiation ground. Many of the rock art sites of the region are thought to have formed part of the broader spiritual landscape, relating to Aboriginal cultural practices prior to the nineteenth century. These sites are not thought to be randomly located and representatives from the Darkinjung LALC often referred to them as related to other groups in the Somersby region. A significant issue unearthed as a result of this study related to the deep cultural value of the Somersby Plateau to Aboriginal community groups. It was found that although the creation of a suitable buffer zone around sites could well offer physical protection over time, changes to the landscape resulting from development would forever alter the spatial context within which the rock art was created.

Dallas, 1981 - An Archaeological Survey at Kariong, NSW

The survey area covered 30 hectares, bounded on the north by the Pacific Highway and the south, east and west by Brisbane Waters National Park and Girrabool National Park. The Land Commission of NSW commissioned the archaeological survey as part of a proposed development site around Kariong for both residential and rural residential zones, community and open space zones with provisions for a school plus a shopping complex.

Two engraved sites recorded by Sim in 1951 and a third site reported but not fully recorded by Lough (1980) were unable to be relocated. 10 new sites were recorded during this study. Dallas recommended that all these sites be conserved as they were assessed to be of value both individually and as a group. A group of six sites composed of two engraving sites (sites 1 and 4), an axe grinding groove site (site 2), three shelters, one with art and a deposit (Whale shelter 1, site 5), another with art and possible deposit (Squatter Shelter, site 3) and one with art only (Whale Shelter 2, site 6) were recorded in the northern section of the study area. A second group of three rock engraving sites situated on a rock platform to the south of the survey area was relocated. One rock engraving site was also located in the south eastern section with the central survey section presenting three sites: two rock engraving sites as well as an isolated stone artefact).

Silcox, 1989 -Survey for Aboriginal sites on lot 3 Somersby Industrial Estate

This survey (Lot 3, DP548313), bordered the north side of Somersby Falls Road. The visibility of the survey area ranged between two extremes: either extremely low (0-5%) or exceptionally high (80-100%). In high visibility zones, the search for surface artefact scatters was prioritised, whilst in areas of dense vegetation cover, sandstone surfaces were checked for engravings. Bedrock exposures, found along Piles Creek, were also examined for axe grinding grooves.

Two previously recorded sites (Sim 1973 cited in Lough 1981) were relocated. The first site (45-3-0016) located on a rock ledge on the bank of Piles Creek, around 100 metres north of the boundary of Lot 32, displayed 12 grooves. Silcox (1989) recommended the implementation of a buffer zone and fence around the engravings. The

second site (45-3-0017), found on a flat expanse of sandstone around 40 metres from Somersby Falls Road, showed engravings of three anthropomorphic figures, as well as several grooves.

du Cros & Rich, 1986- Proposed Industrial Development of Crown Land, DP 42612, at Mt Penang, near Gosford

This study covered a 750 x 300m area featuring little exposed sandstone. Ledges and boulders occurred to the west side, adjacent to the reconstructed Wiseman's Ferry Road. The ledges were not large enough to be habitable. The area retained one sandstone platform suitable for engravings and one small platform indicating ground water seepage and rock holes, suitable for axe grinding. Prior surveys (Sims 1973) identified two Aboriginal engraving sites (45-3-0029 and 45-3-0030). 45-3-0029 was relocated during the archaeological survey and displayed a deeply packed circle engraving. Located 5 metres east of the fence bordering the newly constructed Wiseman's Ferry Road section, it measured 70cm in diameter and was situated on the north western edge of a rock platform, measuring 20 metres x 7 metres. It appeared that 45-3-0030 was either destroyed by Wiseman's Ferry Road construction works or laid outside of the survey area.

Koettig & McDonald, 1983 - Report on a Survey for Archaeological sites in the Mt Penang area, Somersby

This study was commissioned by Lester Firth & Associates in advance of a proposed rural residential development and includes our entire current study area near Debenham Road. Eight sites were previously recorded in the survey area, of which five sites were relocated and an additional six sites were identified. Three sites (45-3-0044 and 45-3-0611, Sims 2/44) were unable to be located. Among the four new rock engraving sites, three presented as axe grinding grooves and one as a rock shelter site. Koettig and McDonald recommended the preservation of all the sites either by the creation of buffer zone and fencing for the rock engraving and axe grinding sites, or sealing the deposit of the shelter with rocks and sand.

This survey area is encompassed within the southern precinct of the current study.

J C Lough & Associates, 1981 – Archaeological Survey: Somersby Industrial Estate, Somersby

This study was commissioned by the NSW Department of Environment & Planning. Lough identified a number of sites, particularly those sites in the northern portion of the study area (Reeves Road). On the AHIMS site cards 45-3-1369 and 45-3-1370, 52 axe grinding grooves and 110 axe grinding grooves respectively were uncovered with associated potholes and water channels. Lough states that these two sites in particular could be more extensive.

5.5. Site Type Predictions

Based upon analysis of information extracted from the DECC AHIMS, the local and regional archaeological and environmental contexts expressed above, the types of sites which could be expected to occur within the study area are outlined below (for more detail on site types please refer to Appendix 2).

Open artefacts scatters will be located in areas where ground surfaces are visible and organic litter, grasses and shrubs are absent. The most likely contexts for locating open camp sites include areas of erosion as well as deposition (e.g. colluvial fans).

There were small outcrops of sandstone situated along the unnamed tributaries of Narara Creek which flow through both the Northern and Southern Precincts. These outcrops were flat in nature rather than boulderous and

are of a type consistent with locating grinding groove sites. The geomorphology of much of the study area, i.e. benched sandstone platforms often associated with escarpments, is also a suitable context for the location of rock shelters.

Conditions for the potential for old growth and/or mature trees suitable to retain evidence of Aboriginal carving or scarring is dependent on the nature and distribution of certain environmental parameters such as soils, aspect and drainage. There is limited potential for trees appropriate for cultural modification purposes within the southern portions of the southern precinct.

6. SURVEY RESULTS

6.1. Survey Coverage And Visibility Variables

The effectiveness of an archaeological field survey is heavily reliant upon the obtrusiveness of the Aboriginal site being looked for and the incidence and quality of ground surface exposure. Visibility variables have been estimated for all areas where a comprehensive survey was carried out in the study area. This data provides a measurement with which to gauge and compare the effectiveness of the survey and the level of sampling conducted. They may also be utilised to determine the numbers and types of sites that may not have been identified by the survey.

Ground surface visibility is a measure of the bare ground visible to the archaeologist during the field survey. There are two variables used to assess ground surface visibility.

I. The frequency of exposures encountered by the archaeologist; and,

II. The quality of visiblity within those exposures.

The major factors affecting the quality of ground surface visiblity within an area of exposure are the extent of vegetation and ground litter, the depth and origin of the exposure, the extent of recent sedimentary deposition and the level of visual interference from surface gravels. Two variables of ground surface visibility were estimated during the survey. These being:

I. A percentage estimate of the total area of ground inspected which contained useable exposures of bare ground; and

II. A percentage estimate of the average levels of ground surface visibility within those exposures. This is a net estimate and accounts for all visual and physical variables that have affected the visibility including the archaeological potential of any sediment or rock exposed.

Various Aboriginal site types exhibit different levels of prominence within the landscape. This is an important factor to consider when assessing the impact on visiblity levels. Sites present upon or within rock exposures, such as grinding grooves, engravings and rock shelters, are more likely to be encountered than sites which are located on or within sedimentary contexts with little or no ground surface relief.

If you compare the obtrusive nature of a shelter site against the unobtrusive nature of a rock platform, the shelter sites will be located and inspected on 10 out of 10 occasions. Rock platforms on the other hand have their gross visual presence affected by factors such as obscuring ground litter, flood debris and sedimentation.

Whilst these visibility factors may not affect the gross visual presence of the shelter site, they can impinge upon the finer visual presence within the rock shelter and inhibit the ability of the recorder to locate stone artefacts etc.

Another factor affecting visibility is the presence of small rocks, pebbles and gravels in the exposure. If these particular raw materials are also suitable for stone artefact manufacture it may make stone artefact identification more onerous and difficult.

Due consideration should also be given to the natural occurrence of sandstone platforms suitable for grinding grooves or engravings in addition to the presence of remnant established trees. Both of these are central in identifying survey effectiveness and site patterning.

A total of 89% of the ground surface area of the study area was inspected during the field survey, with 36% being considered useable archaeological exposure.

In view of the survey coverage, archaeologically useable exposures and visibility variables. The effective survey coverage (ESC) was 36.167%.

6.2. Aboriginal Sites

The survey was successful in identifying a number of archaeological sites and evidence for Aboriginal cultural heritage within the study area. The newly identified Aboriginal sites are a combination of grinding groove, rock shelter and engraving sites. The DECC site cards for each site are included in Appendix 4.

Site Name	Site Type	Landform
ES1	Rock shelter with artefacts and deposit	Low Discontinuous Sandstone Escarpment
ES2	Rock shelter with artefacts, art and potential grinding grooves	Low discontinuous sandstone escarpment
ES3	Mondo	Upper Slope
ES4	Scarred Tree	Benched side slope
ESPAD1	Potential Archaeological Deposit	Crest / Upper Slope
Sims 2/46	Engravings	Ridgeline
ES5	Grinding Grooves, abraded channels	Lower slope
ES6	Mondos (2)	Benched side slope
ES7	Mondo	Benched side slope
ES8	Mondo	Benched side slope
ES9	Grinding grooves, mondos (4)	Upper slope
ES10	Abraded grooves and potential water hole	Lower Slope

ES11	Scarred Tree	Ridge

Table 3: Overview of Aboriginal Sites and PAD located during present survey

6.2.1. *East Somersby 1 (ES1)*

GDA 56H 0342472 6304454
Hawkesbury Sandstone

This sandstone shelter is located above a small tributary of Narara Creek at a distance of c.85m from the northern precincts eastern boundary. The shelter is situated below the highest sandstone scarp at a distance of c. 30m south east of the water course. During the current recording stone artefacts, shell material and charcoal were observed and the deposit within and immediately outside the shelter were assessed to be PAD. The watercourse to the north is ephemeral in nature and at this height no surface water was observed in the watercourse.

The site is located at the base of a low discontinuous scarp of sandstone. The shelter is formed by cavernous weathering. The sandstone type is Hawkesbury.

The shelter is c. 10m long x 4m deep x 1.5m high and has an aspect of 355°. The floor is level and dry. The sediment within the shelter was not probed but is estimated to be >15cm and are allo/autochthonous (derived from both outside and inside the rockshelter. The sediments are light grey and silty in nature and is assessed to have height potential to contain in-situ subsurface cultural deposits. The usage living area of the shelter is 10m x 3m .

Raw Material	Type	Dimensions	Features
Grey Basalt???	Broken flake	40x30x10	(longitudinal snap through platform
Pink/Grey Quartzite	Flake	26x21x4	hinge termination , Platform is 100% pebble cortex
Quartz	Flaked Piece	10x12x6	
Quartz	**Scraper**	**14x17x5**	Retouch to external margins consisting of at least 4 negative **flake scars**
Fine Grain Siliceous	Flake	27x28x16	bipolar

6.2.2. *East Somersby 2 (ES2)*

GDA 56H 0342410 6304347
Hawkesbury sandstone

This sandstone shelter is located above a small tributary of Narara Creek at a distance of c.15m from the northern precincts eastern boundary. The shelter is situated below the highest sandstone scarp at a distance of c.20 south of the water course. During the current recording stone artefacts, observed within the rock shelter and the deposit within and immediately outside the shelter were assessed to be PAD.

The watercourse to the north is ephemeral in nature, at this height no surface water was observed in the watercourse.

The site is located at the base of a moderate height discontinuous scarp of sandstone. The shelter is formed by cavernous weathering.

The shelter is c8m long x 3m deep x 1.5m high and has a north westerly aspect. The floor is level and dry. The sediment within the shelter was not probed but is estimated to be >15cm and are allo/autochthonous (derived from both outside and inside the rockshelter. The sediments are light grey and silty in nature and is assessed to have high potential to contain in-situ subsurface cultural deposits. The usage living area of the shelter is 7m x 3m.

Raw Material	Type	Dimensions	Features
Quartz	Flake broken	24x13x5	Right Hand Dorsal, Pebble Cortex to 60% of dorsal surface
Crystal Quartz	flake	13x17x6	Pebble) Bipolar. 2 Negative flake scars on dorsal surface
Quartz	Flake broken	22x10x6	(Left Hand Dorsal) Pebble cortex to 45% of dorsal surface
Jasper	Flake	9x16x4	100% Pebble cortex to dorsal surface
Quartz	Flake	26x10x10	100% cortex to dorsal surface
Grey (soapy to touch		16x14x2	

Rock Art

Colour	Frequency	Type	Description
Cream/Yellow	7	Hand Stencils	
Red	1	Red Linear Indeterminate	

6.2.3. *East Somersby 3 (ES3)*

GDA 56H
Single Mondo

Engraved circle on isolated boulder of Hawkesbury sandstone. Engraving had an external diameter of 17cm and internal of 11cm.

6.2.4. *45-3-1397*

GDA 56H 341811 6304375
Originally located by Lough. It is described as 1 axe grinding groove.

The present study identified 16 grinding grooves. See Figure xxx for site plan.

6.2.5. *East Somersby 4 (ES4)*

GDA 56H 0342004 6303965
Probable Aboriginal Scarred tree

The subject tree is a Narrow Leaf Stringy Bark *Eucalyptus sparsifolia* and is believed to have previously been struck by lightning. Present on the tree are two scars. One was assessed as being of probable Aboriginal origin, the second was assessed as being of possible Aboriginal origin. Measurements where only made of the scar assessed as probable. The scar is ovoid in shape and is symmetrical. The scar does not extend down to the ground level, which is an important consideration for determining Aboriginal scars. The scar has an aspect of 80°.

Girth of Specimen at 1.2m above ground level	7.90m

Internal Dimensions of Scar	75cm Height x 11cm Width
External Dimensions of Scar	116cm Height x 38cm Width
Extent of Regrowth	12cm
Commencement of Scar (internal) above ground level	38cm

6.2.6. PAD in South eastern corner of Northern study are

GDA 56H
During the survey this area was noted a containing large number of naturally occurring water springs within close proximity to each other in the southern eastern corner of the Northern Precinct. Whilst the general area contains a number of discrete springs it was also noted that certain portions remained dry and free from moisture. Members of the Aboriginal community also identified that this alignment of the nearby (immediately east) Transmission Line closely represents a known travelling route for the area.

Given that this immediate area contains a semi-permanent to permanent source of water and possess areas flat and elevated in close proximity and the known travel route the area is identified as PAD, subject to further investigation.

6.2.7. Sims 2/46

GDA 56H 0342382 6301584
This site is not shown on the AHIMS search but is referenced in the Koettig & McDonald (1983:25-26).

The site was originally recorded by Sim in March 1951 and relocated by Koettig & McDonald in June 1983. During the present survey the site diagrams provided by Sim were found to be highly accurate.

Additional items were identified to those originals recorded by Sim or Koettig & McDonald. These items are two mondo's and a cooking hole.

The hole in the sandstone platform has been assessed as being a cooking hole on the basis of the rim being elevated above other areas of the platform. Given this, it has been determined that water would not flow into or pool in the hole via any process not involving human intervention. The only way for water to get into this hole is for it to fall directly into it or be placed in it, not by natural processes.

The first mondo is situated 9m from the head of the kanga/human figure at 8° and the second is 1 m from the kanga/human figure at 270°.

6.2.8. East Somersby 5 (ES5)

GDA 56H 0342360 6301475
This site consists of 9 definite grinding grooves, two potential grinding grooves, a section of abraded channel and water holes. The platform is some 20m x 18m in dimension and slopes gently to the east.

The largest waterhole appears to have been constructed by joining three smaller holes together, hence the kidney shape.

Portions of the rock platform where covered in moss and low level vegetation cover. Given the level of utilisation currently identified on this rock platform the potential for additional features to be present under this material is assessed to be very high.

From analysis of the Koettig & McDonald (1983) report this site is believed to be part of Site 1 (46-3-1313)

6.2.9. *East Somersby 6 (ES6)*

GDA 56H 0342222 6301623
This site consists of two mondo's on low profile sandstone platform eroding out of the soil.

Mondo 1 presents as an engraved circle with a noticeable piece of pebble quartz positioned in its centre.

Mondo 2 is slightly further north along the rock shelf and is difficult to discern from the surrounding rock.

6.2.10. *East Somersby 7 (ES7)*

GDA 56H 0342204 6301638
17.5 cm diameter

This site consist of a single mondo on a sandstone platform eroding out of the soil. The site has an aspect of 130°. The nearby residence is at a bearing of 270°.

6.2.11. *East Somersby 8 (ES8)*

GDA 56H 0342249 6301687
This site consist of a single mondo on a sandstone platform eroding out of the soil. A determination as to this mondos is still being undertaken.

6.2.12. *East Somersby 9 (ES9)*

GDA 56H 034153 6301568
This site is contained upon a large exposure of sandstone slightly east of the existing residence. The sandstone platforom is eroding from the soil and presents with a gentle tilt In an easterly direction.

The site consists of a sname (fire circle), 4 definite mondo's and 2 possible mondo's and a water hole with a single grinding groove

The main exposure of sandstone is 18x 8m with additional areas of exposed sandstone to the south.

6.2.13. *East Somersby 10 (ES10)*

GDA 56H 0342353 6301623
Abraided chennels were identified in this location. Following Mathews (1896) and Mathews (1901) this chanells may represent grooves for the control of water over rock surfaces.

6.2.14. *East Somersby 11 (ES11)*

GDA 56H 0342105 6302207
This site is a Culturally Modified Tree. The tree is a (Stringy Bark) with an approximate height of 15m.

The scar has an aspect of 50°. Diamension are shown below.

Girth of Specimen at 1.2m above ground level	2.5m
Internal Dimensions of Scar	90cm Height x 15cm Width
External Dimensions of Scar	126cm Height x 41cm Width
Extent of Regrowth	13cm
Commencement of Scar (internal) above ground level	37.5cm
Depth of scar	12cm
Regrowth	
Bottom (from base of scar)	9cm
Top (from top of scar)	39cm
Overall width	41cm
Left (from side of scar)	14cm
Right (from side of scar)	12cm

6.3. Landscape Sensitivity Assessment

The archaeological sensitivity of the study area is assessed to be high. The local terrain generally exhibits characteristics of tableland and river flat topography. There is a permanent water source immediately to the north of the study area and an ephemeral water source within the study area.

Evidence is present over this portion of study area for a small degree of soil disturbance from vegetation clearing and pastoral utilisation. The potential for undisturbed cultural material to occur within local deposits is therefore considered to be moderate to high.

Sandstone outcrops exhibiting the essential characteristics for other Aboriginal site types, such as habitable rock shelters, grinding grooves or rock engravings were identified in the study area and the is a high potential for further sites to be identified as visibility improves.

7. PRINCIPAL FINDINGS AND CONCLUSIONS

On the basis of the documentation compiled within this report the following conclusions have been drawn. The consultant is satisfied that the provided recommendations made below will ensure that the Aboriginal archaeological resource and the potential resource will not be adversely affected without prior consideration.

The Somersby Plateau is an area known for its Aboriginal significance, especially from an Aboriginal rock art perspective.

There are a number of identified areas of Aboriginal Heritage Sensitivity or Archaeological Potential within the study area.

The south-eastern corner of the Northern Precinct represents the area with the highest potential for archaeological deposit(s).

Given the limited visibility (particularly within the Southern Precinct) there is an extremely high potential for either known sites to be relocated or entirely previously un-recorded sites to be uncovered during any future ground/vegetation clearing activities. Those impacts will require a s.87 Heritage Impact Permit prior to the commencement of earthworks.

7.1. Assessment Of Archaeological Potential

The following assessment of archaeological potential is made on the basis of landform context, assessed depositional context and the patterning of known Aboriginal sites in the surrounding region.

The study area is assessed to have medium to high potential for unidentified Aboriginal sites to be present in those areas identified as PAD.

Additionally, all areas that possess sandstone platforms are believed to have a high potential for un-recorded sites to the present.

7.2. Aboriginal Cultural Significance

A detailed assessment of cultural significance of the Somersby area has not been carried out as part of this study. However, it is evident that the area has importance to the Darkinjung people and the local community generally, as well as to those who have visited the region regularly over many generations.

This section will be finalised once comments from all the Aboriginal stakeholders has been received.

8. RECOMMENDATIONS

All permits (s.87 & s.90) sought under Part 6 of the National Parks and Wildlife Act 1974 (as amended) will require the proponent to engage in further consultation with the Indigenous community. Please refer to the Interim Community Consultation Requirements for Applicants issued by the Department of Environment and Conservation for the correct methods and procedures required to be undertaken to comply with these guidelines.

The following recommendations are based on:

1. The legal requirements of the National Parks and Wildlife Act 1974 whereby it is illegal to damage, deface or destroy an Aboriginal relic without first obtaining the written consent of the Director General of National Parks & Wildlife Service; and

2. The findings of the heritage study presented in this report.

In making these recommendations KAS is conscious that no present impacts have been proposed for the study area(s). Accordingly detailed management recommendations have not been proposed.

It is recommended that:

- Further detailed Aboriginal heritage investigations are carried out in partnership with the recognised Aboriginal stakeholders;

- This should include provisions for the Aboriginal stakeholders to be brought in to inform the development process prior to the implementation of a concept plan: this is an integral component of the planning process; and

- Establishment of a Cultural Heritage Steering Committee in partnership with the Aboriginal stakeholders, the client and Gosford City Council, to facilitate and manage the long term expectations of all stakeholders in developing a Cultural Heritage Management, Protection and Investigation Plan for the East Somersby Land Use Strategy area.

8.1. Distribution Of Report

One Copy of this report be forwarded to the:

Darkinjung Local Aboriginal Land Council
Roger Sentence
P.O. Box 401
Wyong NSW 2259

Guringai Tribal Link
Tracey Howie
19 Coolabah Rd,
Wyongah NSW 2259

Warada Landcare Project
Greg Peters
431 Wards Hill Road
Empire Bay NSW 2257

Dr Keith Gleeson
41 Clarence Street,
Lake Munmorah NSW 2259

Three Copies of this report be forwarded to the:

The Manager
Northern Aboriginal Heritage Unit
Department of Conservation and climate change
Locked Bag 914
Coffs Harbour NSW 2450

8.2. Independent Review Of Reports

This archaeological assessment and the management recommendations contained herein will be independently reviewed by the Cultural Heritage Services Division of the NSW Department of Environment and Climate Change (DECC) and the relevant Aboriginal community.

The DECC and the Aboriginal community will make consideration of the findings of the consultants report and the recommendations in relation to the management heritage places. Formal approval for all actions outlined should be sought from the relevant authority prior to the completion of any works. At no time should automatic approval of the management recommendations stated above be assumed.

9. REFERENCES CITED

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10. APPENDIX 1: STATUTORY OBLIGATIONS

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

10.1. Introduction

The acknowledgement that history is fundamental to a society's self determination has led to legally enforced protection for significant heritage resources. Numerous statutory bodies are involved in establishing obligations and protocols for investigating, assessing and managing heritage resources. These bodies govern national, state and local resources and may overlap.

10.2. Commonwealth Legislation

10.2.1. Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)

This Act was introduced in July, 1999. Pursuant to s25 of the EPBC Act, any action that has or is likely to have a significant impact on a matter of National Environmental Significance may only progress with the approval of the Federal Minister for the Environment and Heritage. The definition of an action (at s523):

(a) a project; and

(b) a development; and

(c) an undertaking; and

(d) an activity or series of activities; and

(e) an alteration of any of the things mentioned in paragraph (a), (b), (c) or (d).

Where an exception to the above applies, an action will also require approval if:-

1. It is undertaken on Commonwealth land and will have or is likely to have a significant impact;

2. It is undertaken outside Commonwealth land and will have or is likely to have a significant impact on the environment on Commonwealth land; and

3. It is undertaken by the Commonwealth and will have or is likely to have significant impact.

The National Heritage List records places with outstanding natural and cultural heritage values that contribute to Australia's national identity. The Commonwealth Heritage List will comprise natural, Aboriginal and historic places owned or managed by the Commonwealth. Legislation introduced in 2004 offers greater legal protection than that of the EPBC Act. They are:

- *Environment and Heritage Legislation Amendment Act (No. 1) 2003;*

- *Australian Heritage Council Act 2003*;
- *Australian Heritage Council (Consequential and Transitional Provisions) Act 2003*.

Approval under the EPBC Act is required if an action as defined under the EPBC Act will or is likely to have a significant impact on the National Heritage values of a National Heritage place and/or any other National Environmental Significance matter. This action must be referred to the Federal Minister for the Environment and Heritage. It is the Minister's role to decide whether the action will or is likely to have a significant impact on a matter of national environmental significance.

10.2.2. Native Title Act 1993

The Native Title Act recognises and protects native title, and provides that native title cannot be extinguished contrary to the Act. The National Native Title Tribunal (NNTT) is a Commonwealth agency constituted by the Native Title Act and decides the merits of claims made under that Act.

The National Native Title Tribunal maintains the following registers:-

- National Native Title Register;
- Register of Native Title Claimants;
- Unregistered Claimant Applications; and
- Register of Indigenous Land Use Agreements.

A search of the Native Title registers identifies possible traditional owners that may not have representation on Local Aboriginal Land Councils (LALCs) or other Aboriginal groups.

10.3. State Legislation

10.3.1. National Parks & Wildlife Act 1974

This Act affords automatic statutory protection to "Aboriginal objects" where:

> *it is an offence to knowingly destroy, deface or damage, or knowingly cause or permit the destruction or defacement of or damage to, an Aboriginal object or place, without first obtaining the consent of the Director-General of the National Parks and Wildlife Service.*

The Act defines an "Aboriginal object" as:

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

The Act defines an "Aboriginal place" as:

> *Any place declared to be an Aboriginal place under section 84 of the Act.*

An Aboriginal place may or may not contain physical Aboriginal objects.

Under Section 90 of the *National Parks and Wildlife Act 1974*, it is an offence to knowingly destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of an Aboriginal object or Aboriginal place, without the prior written consent from the Director-General of the Department of Environment and Climate Change (DECC). In order to obtain such consent, a Section 90 Consent Application must be submitted and approved by the DECC Director-General. In considering whether to issue a S. 90 Consent, DECC will take into account:

- The significance of the Aboriginal object(s) or place(s) subject to the proposed impacts;
- The effect of the proposed impacts and the mitigation measures proposed;
- The alternatives to the proposed impacts;
- The conservation outcomes that will be achieved if impact is permitted; and
- The outcomes of the Aboriginal community consultation regarding the proposed impact and conservation outcomes.

It is also an offence, Under Section 86 of the Act, to disturb or excavate land for the purpose of discovering an Aboriginal object, or disturb or move an Aboriginal object on any land, without first obtaining a permit (Preliminary Research Permit, Excavation Permit, Collection Permit or Rock Art Recording Permit) under Section 87 of the Act.

- In issuing a Section 87 Permit, DECC will take into account;
- The views of the Aboriginal community about the proposed activity;
- The objectives and justifications for the proposed activity;
- The appropriateness of the methodology to achieve the objectives of the proposed activity; and
- The knowledge, skills, and experience of the nominated person (s) to adequately undertake the proposed activity.

Under Section 91 of the Act, it is a requirement to notify the DECC Director-General of the location of an Aboriginal object. Identified Aboriginal items and sites are registered with the NSW DEC on the Aboriginal Heritage Information Management System (AHIMS).

The National Parks and Wildlife Act 1974 also requires that reasonable precautions are taken and due diligence is exercised to determine whether an action would, or would be likely to, impact on an Aboriginal object or Aboriginal place. Without being able to demonstrate due diligence, a person risks prosecution if Aboriginal objects or Aboriginal places are impacted upon and a Heritage Impact Permit has not been issued.

10.4. Local Statutory Obligations

10.4.1. Environmental Planning & Assessment Act 1979

The Environmental Planning and Assessment Act 1979 requires that environmental impacts are considered prior to land development. This includes impacts on Aboriginal cultural heritage items and places. The Act also requires that Local Governments prepare Local Environmental Plans (LEP) In accordance with the Act to provide guidance on the level of environmental assessment required.

Gosford City Council's main development controls are the following:

- Gosford Planning Scheme Ordinance (PSO) as at 1/09/2006;
- Interim Development Order No.122 (IDO 122) as at 18/08/2006;
- Gosford City Centre Local Environmental Plan 2005 (GCCLEP 2005); and
- Gosford Local Environmental Plan No. 22 (GLEP 22).

These instruments define 'items of environmental heritage' as:

> *A building, work, relic, or place of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance to the City of Gosford.*

The planning instruments make provision for the control of development In the vicinity of heritage items and to conserve and promote heritage values.

10.4.2. Local Government Cultural Heritage Management Plans

Heritage management plans are aimed at encouraging local government to take responsibility for Aboriginal heritage (in consultation with Aboriginal communities and NPWS) and non-Aboriginal heritage (in consultation with the NSW Heritage Office) within its planning and development approvals framework. Heritage studies further aim to ensure that Aboriginal sites are integrated as constraint in the planning and development process. It aims to ensure that appropriate management regimes are developed for heritage so as to provide for the protection of Aboriginal sites in Lap's and DCP's. Heritage plans must provide for the establishment of an Aboriginal Liaison committee, produce an inventory of known/recorded sites and a predictive model which identifies different land systems within the study area and specify the types of sites likely to be found on/within these landforms, and produce a planning instrument detalling strategies for appropriate protection of Aboriginal and non-Aboriginal heritage. Consideration must be given to the range of management options including monitoring of site condition in terms of natural and biological impacts (including humans, animals and insects), development works, and subsidence effects (via mining etc.).

10.4.3. Archaeological Zoning Plans

Cultural heritage management plans often incorporate an archaeological zoning plan (AZP). An AZP assists in visualising areas of archaeological sensitivity and potential and can help in developing management policies for individual sites, a precinct, a proposed subdivision or even a larger piece of land such as an LGA. They are appropriate for areas with a high likelihood of significant archaeological remains being preserved. An AZP does

not include comprehensive site specific research – their intent is to identify whether archaeological features are, or are likely to be, present, not necessarily to access significance. An AZP divides the subject area into units of archaeological potential rated as:

1. High: known archaeological sites or features
2. Medium: potential archaeological sites or features
3. Low: archaeologically sterile sites or features

needs geotech to finalise

11. APPENDIX 2: ABORIGINAL SITE TYPE GLOSSARY

The following is a brief description of the site types that may occur in the current study area.

Artefact Scatters

Artefact scatters are defined by the presence of two or more stone artefacts in close association (i.e. within fifty metres of each other). An artefact scatter may consist solely of surface material exposed by erosion, or may contain sub-surface deposit of varying depth. Associated features may include hearths or stone-lined fireplaces, and heat treatment pits.

Artefact scatters may represent:

- Camp sites: involving short or long-term habitation, manufacture and maintenance of stone or wooden tools, raw material management, tool storage and food preparation and consumption;
- Hunting or gathering activities;
- Activities spatially separated from camp sites (e.g. tool manufacture or maintenance); or
- Transient movement through the landscape.

The detection of artefact scatters depends upon conditions of surface visibility, including vegetation cover, ground disturbance and recent sediment deposition. Unfavourable conditions obscure artefact scatters and prevent their detection during surface surveys.

Bora Grounds

Bora grounds are a ceremonial site associated with initiations. They are usually comprise two circular depressions in the earth, and may be edged with stone. Bora grounds generally occur on soft sediments in river valleys, although they may also be located on high, rocky ground in association with stone arrangements.

Burials

Human remains were often placed in hollow trees, caves or sand deposits and may have been marked by carved or scarred trees. Burials have been identified eroding out of sand deposits or creek banks, or when disturbed by development. The probability of detecting burials during archaeological fieldwork is extremely low.

Culturally Modified Trees

Culturally modified trees include scarred and carved trees. Scarred trees are caused by the removal of bark for use in manufacturing canoes, containers, shields or shelters. Scarred trees are only likely to be present on mature trees remaining from original vegetation. Carved trees are caused by the removal of bark to create a working surface on which engravings are incised. Carved trees were used as markers for ceremonial and symbolic purposes, including burials. Although, carved trees were relatively common in NSW in the early 20th century, vegetation removal has rendered this site type extremely rare.

Fish Traps

Fish traps comprised arrangements of stone, branches and/or wickerwork placed in watercourses, estuaries and along coasts to trap or permit the easier capture of sea-life.

Grinding Grooves

Grinding grooves are elongated narrow depressions in soft rocks (particularly sedimentary), generally associated with watercourses, that are created by the shaping and sharpening of ground-edge implements. Grinding grooves have been identified in the study area.

Isolated Finds

Isolated finds occur where only one artefact is visible in a survey area. These finds are not found in associated with evidence for prehistoric activity or occupation. Isolated finds occur anywhere and may represent loss, deliberate discard or abandonment of an artefact, or may be the remains of a dispersed artefact scatter. Numerous isolated finds have been recorded within the study area.

Middens

Shell middens comprise deposits of shell remaining from consumption and are common in coastal regions and along watercourses. Middens vary in size, preservation and content, although they often contain artefacts made from stone, bone or shell, charcoal, and the remains of terrestrial or aquatic fauna that formed an additional component of Aboriginal diet. Middens can provide significant information on land-use patterns, diet, chronology of occupation and environmental conditions.

Mythological/Traditional Sites

Mythological and traditional sites of significance to Aboriginal people, may occur in any location, although they are often associated with natural landscape features. They include sites associated with dreaming stories, massacre sites, traditional camp sites and contact sites. Consultation with the local Aboriginal community is essential for identifying these sites.

Rock Shelters with Art and/or Occupation Deposit

Rock shelters occur where geological formations suitable for habitation or use are present, such as rock overhangs, shelters or caves. Rock shelter sites generally contain artefacts, food remains and/or rock art and may include sites with areas of potential archaeological deposit, where evidence of rock-art or human occupation is expected but not visible. The geological composition of the study area greatly increases the likelihood for rock shelters to occur

Stone Arrangements

Stone arrangements include lines, circles, mounds, or other patterns of stone arranged by Aboriginal people. These may be associated with bora grounds, ceremonial sites, mythological or sacred sites. Stone arrangements

are more likely to occur on hill tops and ridge crests that contain stone outcrops or surface stone, where impact from recent land use practices has been minimal.

Stone Quarries

A stone quarry is a place at which stone resource exploitation has occurred. Quarry sites are only located where the exposed stone material is suitable for use either for ceremonial purposes (e.g. ochre) or for artefact manufacture.

12. APPENDIX 3

AHIMS #	Site Name	Site description - AHIMS site card
45-3-0016	Flood Falls	Axe grinding groove
45-3-0017	Flood Falls	Axe grinding groove, rock engraving
45-03-0028	Piles Creek	Axe grinding groove
45-3-0029	Piles Creek, Mt Penang	Rock engraving
45-3-0031	Piles Creek	Midden, rock engraving
45-3-0032	Old Gosford Road, Kendall's Rock	Rock engraving
45-3-0033	Old Gosford Road; Gosford 10	Axe grinding groove, rock engraving
45-3-0034	Piles Creek	Axe grinding groove, rock engraving
45-3-0035	Piles Creek	Rock engraving
45-3-0037	Old Gosford Road; Piles Creek; Ca-K-11	Rock engraving
45-3-0039	Old Gosford Road; Piles Creek	Rock engraving
45-3-0040	Old Gosford Road; Piles Creek	Axe Grinding Groove; Rock engraving
45-3-0041	Old Gosford Road, Piles Creek	Rock engraving
45-3-0042	Old Gosford Road, Piles Creek	Axe grinding groove, rock engraving
45-3-0043	Old Gosford Road; Piles Creek	Rock engraving
45-3-0044	Old Gosford Road, Piles Creek	Axe grinding groove
45-3-0045	Old Gosford Road, Piles Creek; Piles Creek Strickland S.F.	Axe grinding groove, rock engraving
45-3-0046	Narara Creek; Strickland SF	Axe grinding groove; rock engraving
45-3-0048	Narara Creek	Axe grinding groove; rock engraving
45-3-0049	Narara Creek	Rock engraving
45-3-0050	Narara Creek	Rock engraving
45-3-0051	Narara Creek	Rock engraving
45-3-0052	Narara Creek	Axe grinding groove; rock engraving
45-3-0456	Old Gosford Road	Rock engraving
45-3-0468	Old Gosford Road	Rock engraving
45-3-0520	Narara Creek	Axe grinding groove; rock engraving
45-3-0521	Narara Creek	Axe grinding groove
45-3-0524	Narara Creek	Axe grinding groove, rock engraving
45-3-0549	Narara Creek	Axe grinding groove
45-3-0550	Narara Creek	Axe grinding groove
45-3-0553	Narara	Rock engraving
45-3-0556	Narara	Shelter with art
45-3-0558	Gosford, Narara Creek	Midden
45-3-0611	Old Gosford Road	Rock engraving
45-3-0612	Old Gosford Road	Rock engraving
45-3-0618	Old Gosford Road	Rock engraving, stone arrangement
45-3-0620	Old Gosford Road	Rock engraving
45-3-0644	Narara Creek	Axe grinding groove
45-3-0901	Narara Creek, Reeves Road	Rock engraving
45-3-1066	Narara Creek	Axe grinding groove
45-3-1313	Mt Penang	Axe grinding groove; rock engraving
45-3-1314	Mt Penang	Axe grinding groove
45-3-1315	Mt Penang	Axe grinding groove; rock engraving
45-3-1318	Mt Penang	Rock engraving
45-3-1319	Mt Penang	Rock engraving
45-3-1321	Mt Penang	Axe grinding groove
45-3-1369	Narara Creek	Axe grinding groove
45-3-1370	Narara Creek	Axe grinding groove
45-3-1371	Narara Creek	Axe grinding groove
45-3-1386	Belltrees K-O-43	Rock engraving
45-3-1387	Narara Creek K-O-43	Rock engraving
45-3-1389	Glen Allen; Narara Creek K-O-43	Axe grinding groove
45-3-1390	Glen Allen K-O-44	Axe grinding groove
45-3-1391	Glen Allen Narara Creek K-O-45	Axe grinding groove
45-3-1392	Glen Allen K-O-46	Axe grinding groove
45-3-1396	Narara Creek K-O-52	Axe grinding groove

AHIMS #	Site Name	Site description - AHIMS site card
45-3-1397	Narara Creek K-O-53	Axe grinding groove
45-3-1398	Narara Creek K-O-54	Axe grinding groove
45-3-1402	Narara Creek	Axe grinding groove
45-3-1403	Mazoe; Belltrees	Rock engraving
45-3-1405	Narara Creek	Axe grinding groove
45-3-1406	Belltrees	Axe grinding groove; rock engraving
45-3-1407	Belltrees	Rock engraving
45-3-1408	Belltrees	Axe grinding groove; rock engraving; waterhole/well
45-3-1409	Belltrees	Axe grinding groove
45-3-1411	Narara Creek	Axe grinding groove
45-3-1455	Old Gosford Road; Gosford Racecourse	Midden
45-3-1456	Old Gosford Road; Gosford Racecourse	Midden
45-3-1943	Strickland State Forest	Axe grinding groove
45-3-1944	Strickland State Forest	Axe grinding groove
45-3-1945	Strickland State Forest	Axe grinding groove
45-3-1946	Strickland State Forest	Rock engraving
45-3-1947	Strickland State Forest	Rock engraving
45-3-1949	Strickland State Forest	Shelter with art
45-3-1951	Strickland State Forest	Shelter with art
45-3-2339	None specified	Axe grinding groove, rock engraving
45-3-2435	Kangoo Road	Rock engraving
45-3-2436	Debenham Road	Shelter with deposit
45-3-2437	Kangoo Road	Rock engraving
45-3-3219	PN-EN-1	None
45-3-3250		Axe grinding groove
45-3-3279	West Gosford 2	None
45-3-3280	West Gosford 1	None
45-3-3281	West Gosford 3	None
45-3-3318	Horticultural Research Station	Scarred tree
45-3-3319	Horticultural Research Station	Scarred tree
45-3-3320		Spear sharpening grooves
45-3-3321		PAD with shell
45-3-3322		Cooking grinding hole
45-3-3323	AGG Dawson Street	None
45-3-3324	Horticultural Research station	Axe grinding groove
45-3-3325		Shelter with art and deposit
45-3-3328		Spear sharpening grooves
45-3-3327	Horticultural research station	Stone arrangement
45-3-3329	Horticultural Research Station	Shelter with art and deposit
45-3-3330	Horticultural Research Station	Axe grinding groove
45-3-3331	Horticultural Research Station	PAD
45-3-3332		Stone arrangement
45-3-3333	AGG Gosford	None
45-5-1598	Unnamed	Rock engraving
45-5-1599	Unnamed	Rock engraving
45-5-1600	Unnamed	Rock engraving

FIGURES

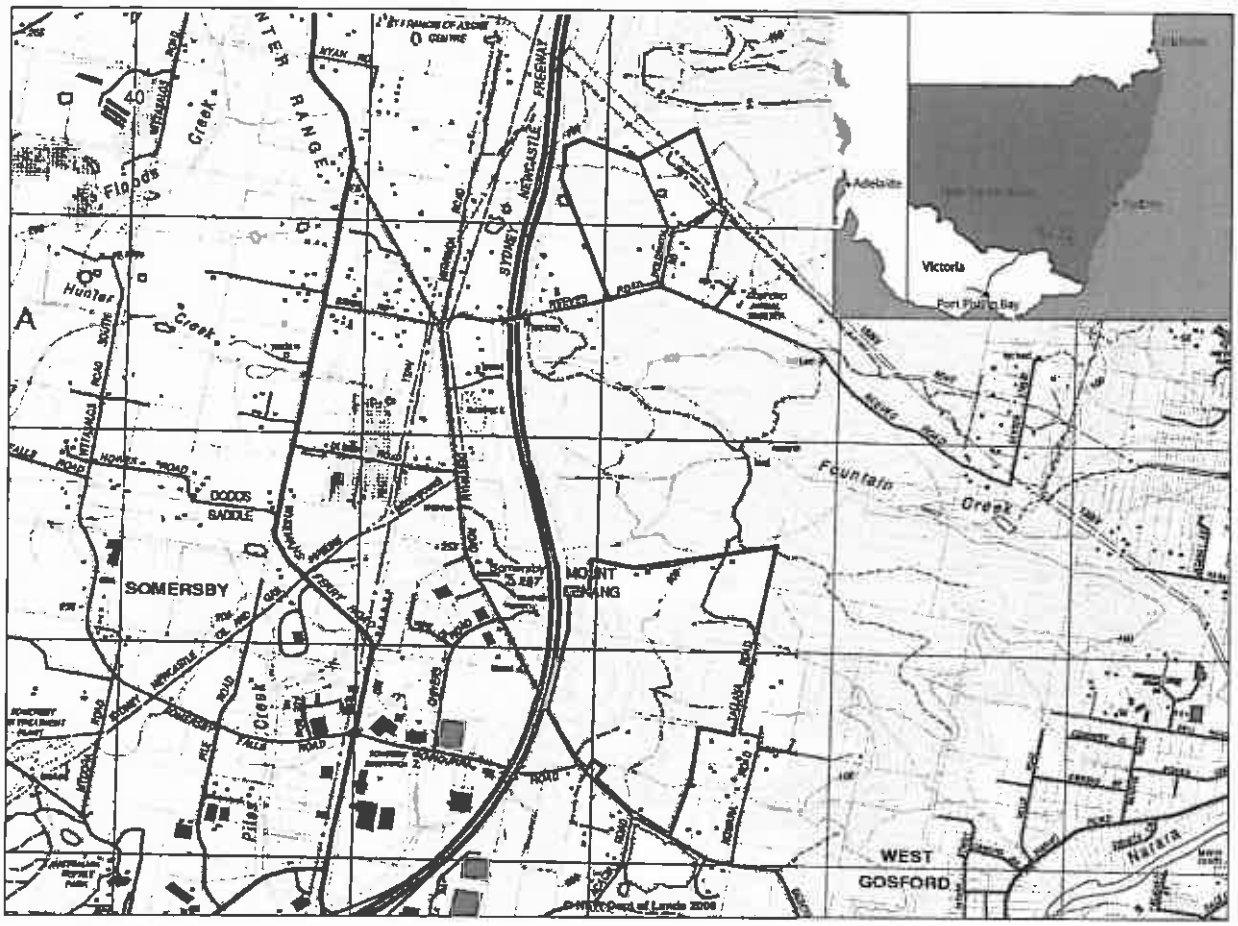


Figure 1: The Study Area

Figure 2: Detail study area

Figure 3:

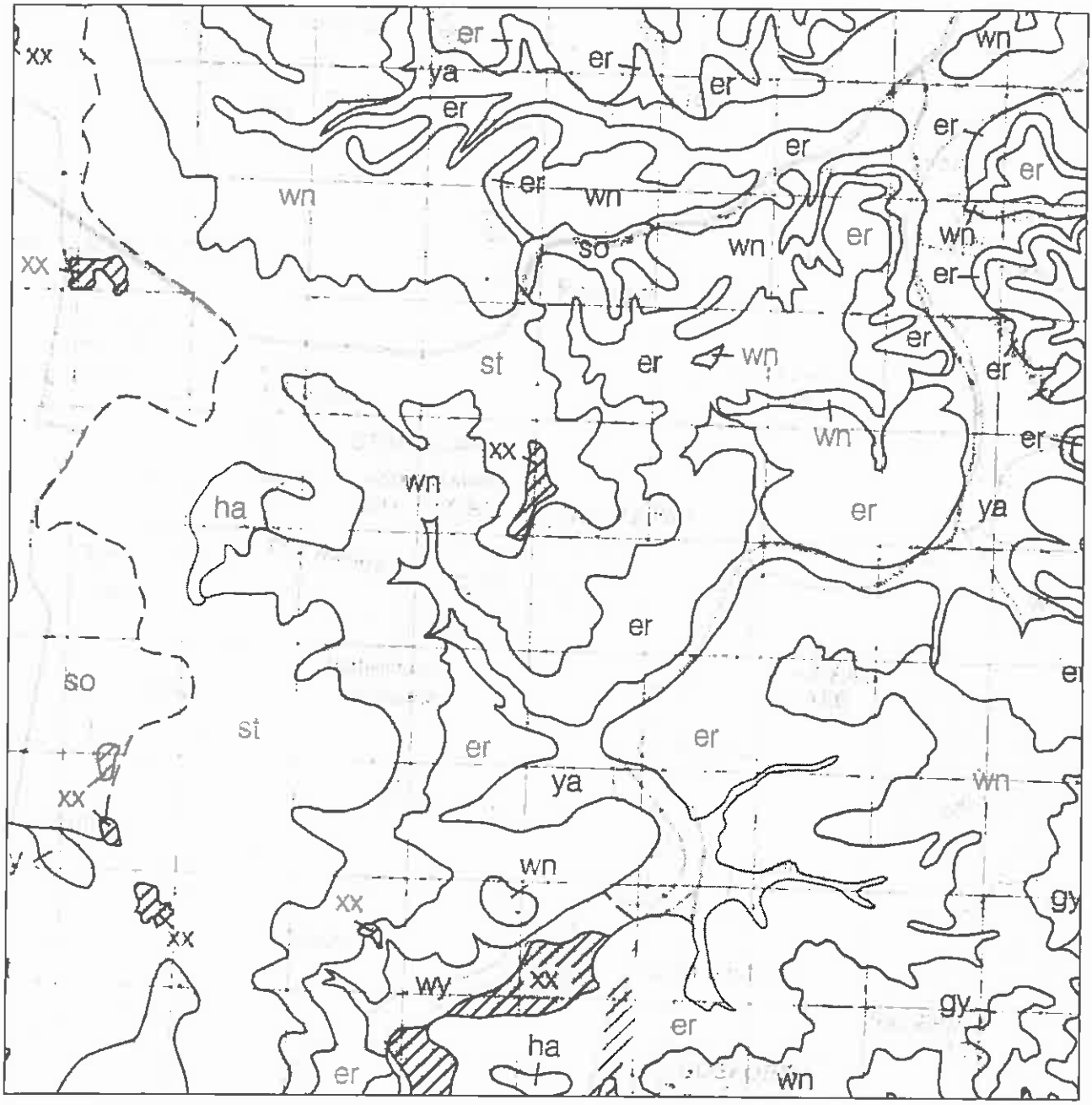


Figure 4: Soil Landscapes of the Gosford-Lake Macquarie – 1:100 000 Sheet

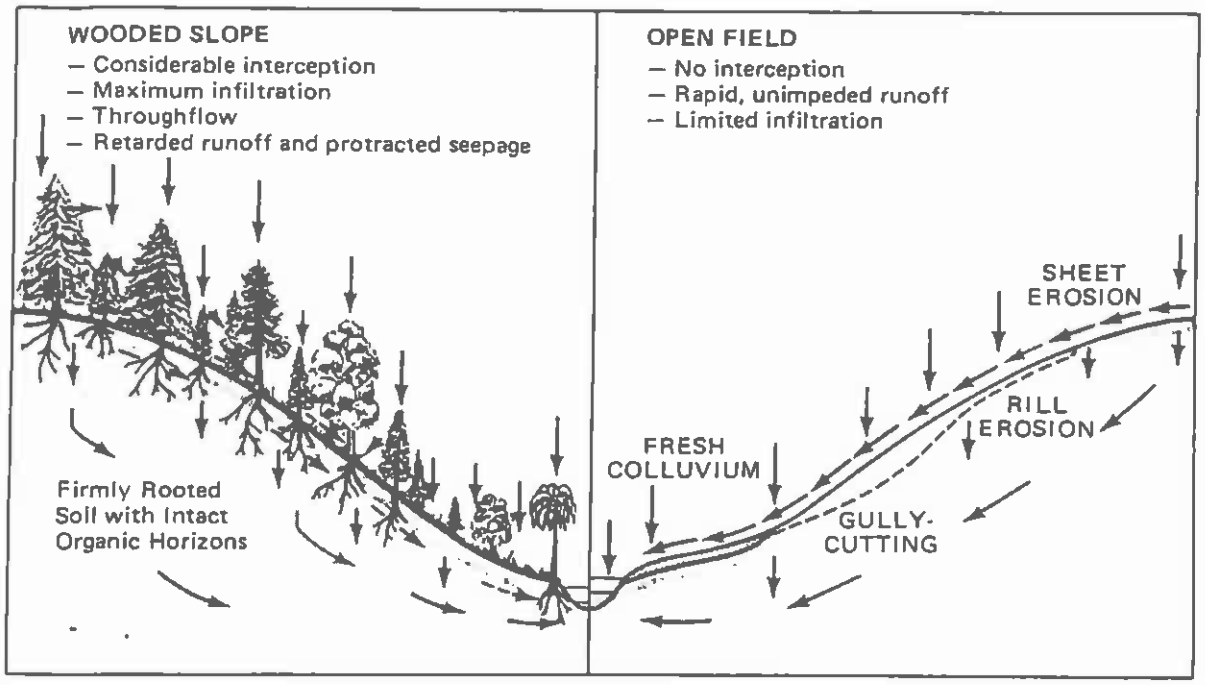


Figure 5: The effects of deforestation on hillsides caused by rainfall. Bush fires would also be a contributing factor to erosion (after Butzer, 1976; Fig 6-2).

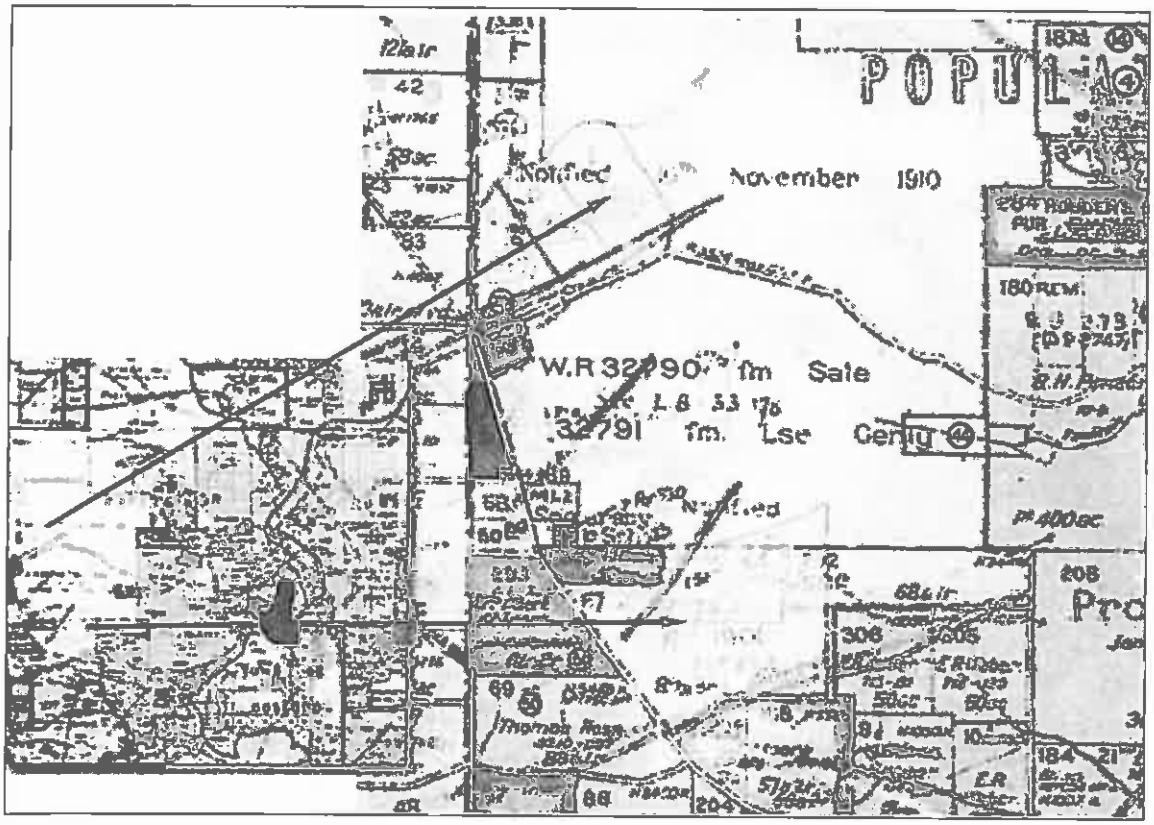


Figure 6: 1929 Gosford Parish Map indicating the two study areas in yellow (Department of Lands © 2007 Parish Map No. 10887001).

PLATES

Plate 1: General view of ES1

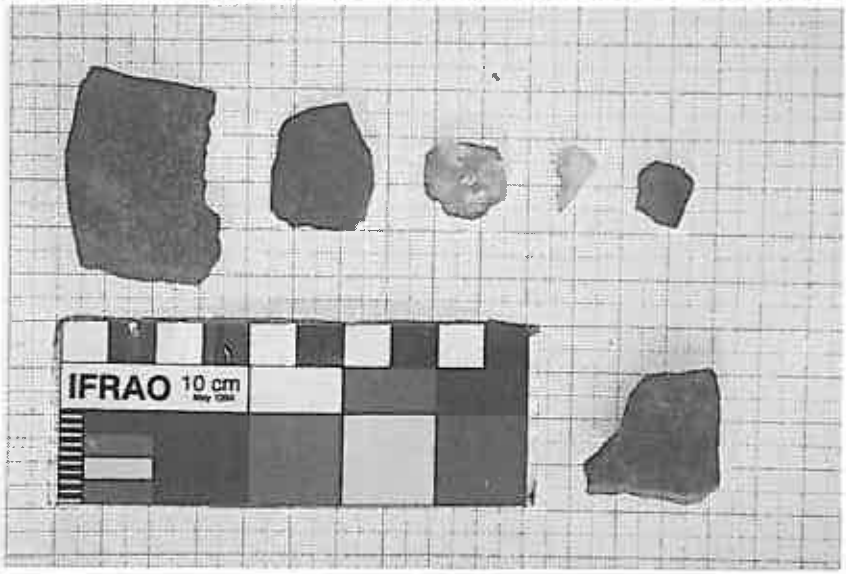


Plate 2: Artefacts present at ES1

Plate 3: Examples of shell present at ES1

Plate 4: General view of ES2

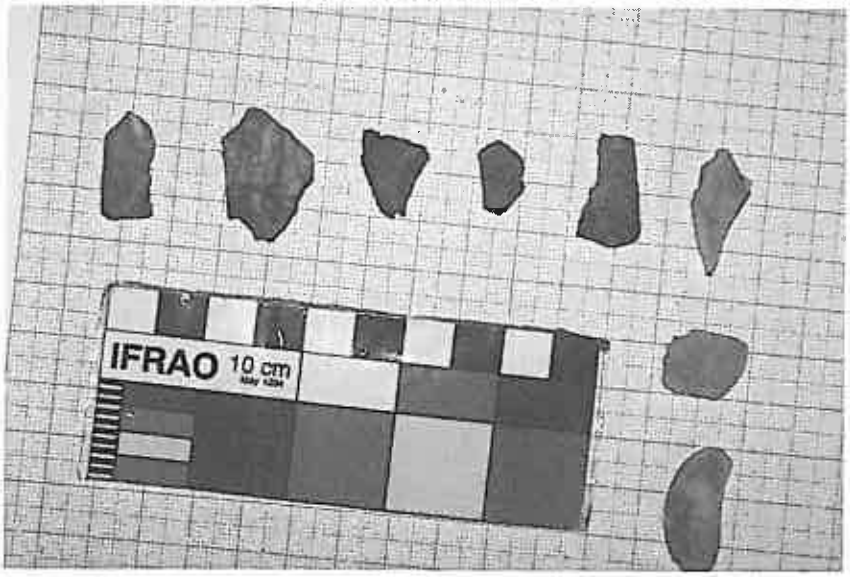


Plate 5: Artefacts at ES2

Plate 6: Red Linear Motif at ES2

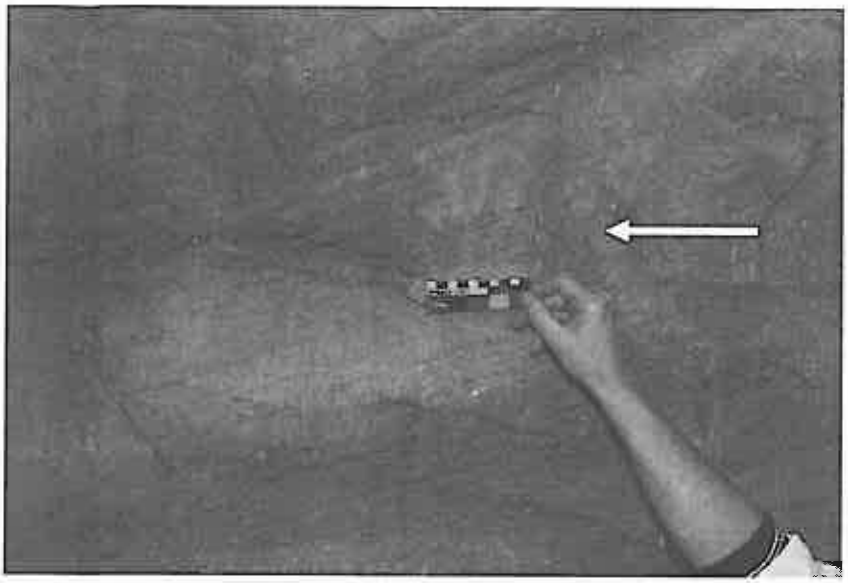


Plate 7: Selection of Hand Stencils from ES2

Plate 8: Grinding Grooves at ES2

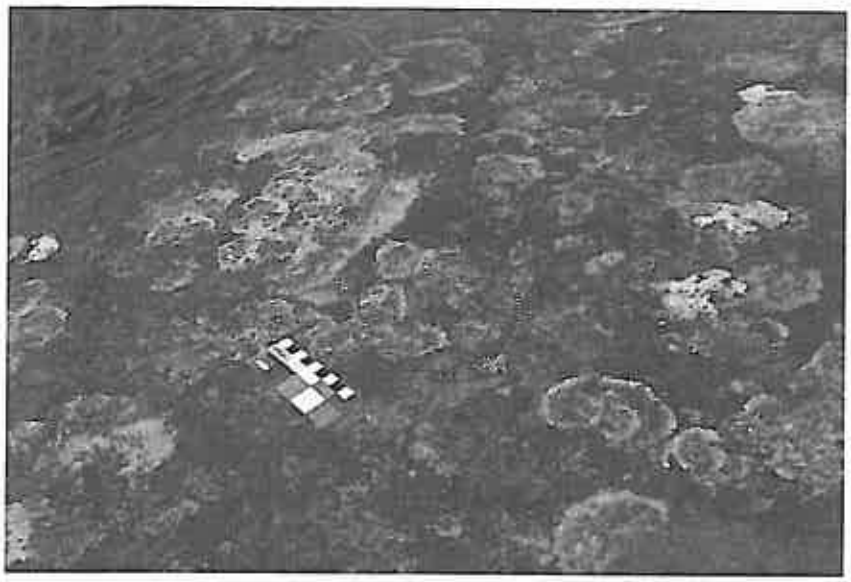


Plate 9: Mondo at ES3

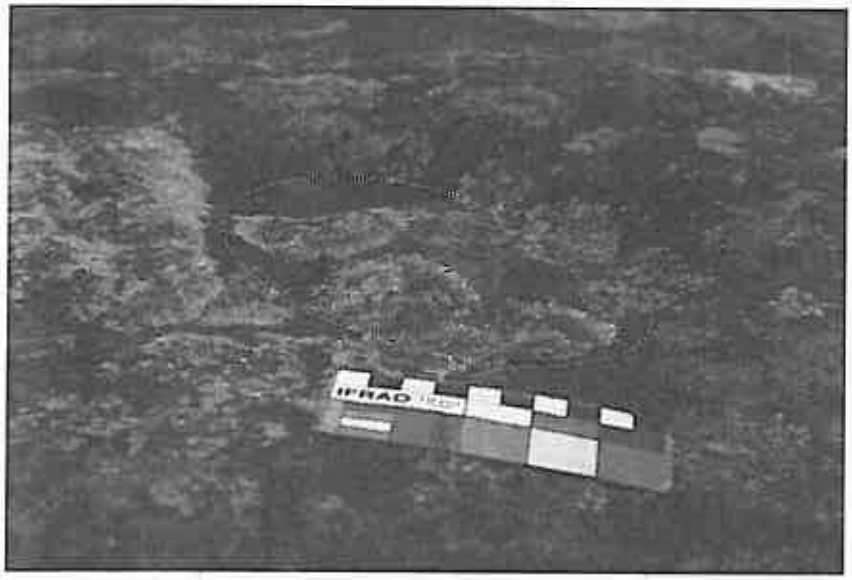


Plate 10: Mondo at ES3

Plate 11: Group 3 (15-3-1397)

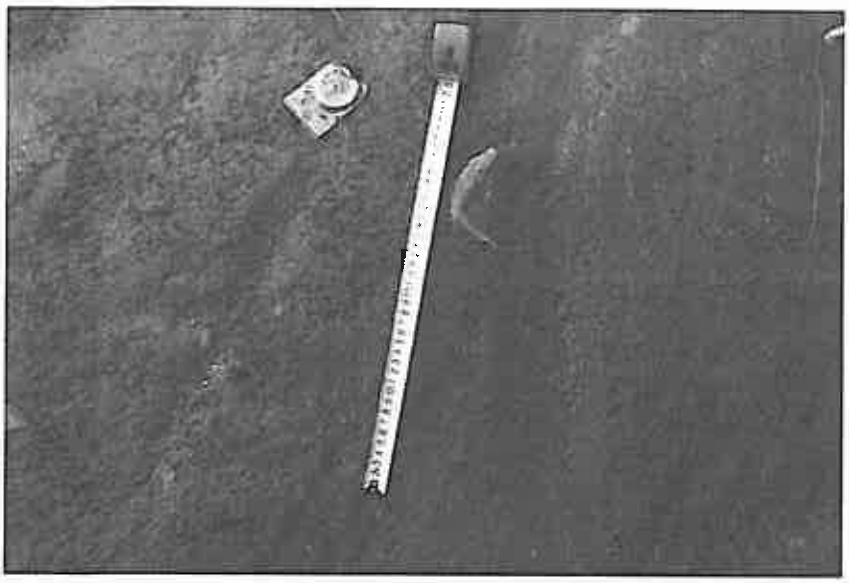


Plate 12: Group 2 (15-3-1397)

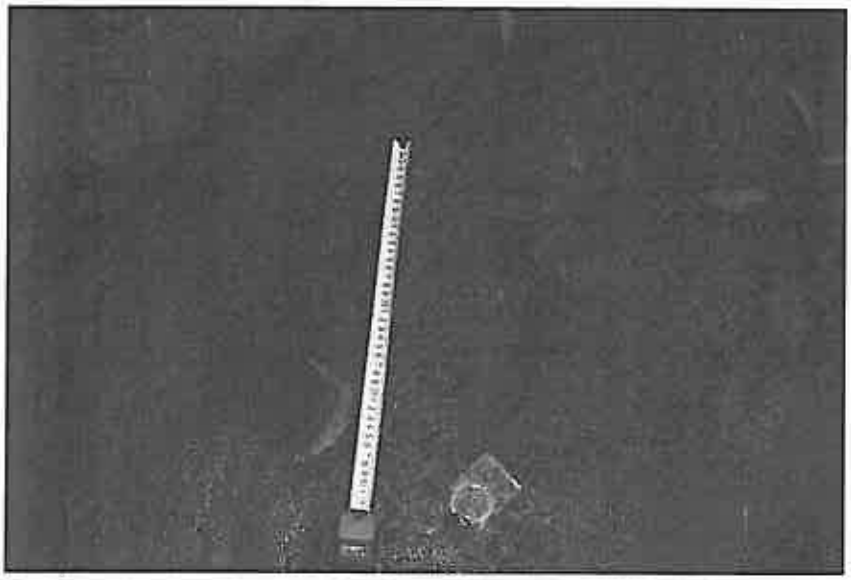


Plate 13: Group 1 (15-3-1397)

Plate 14: Group 1 (15-3-1397)

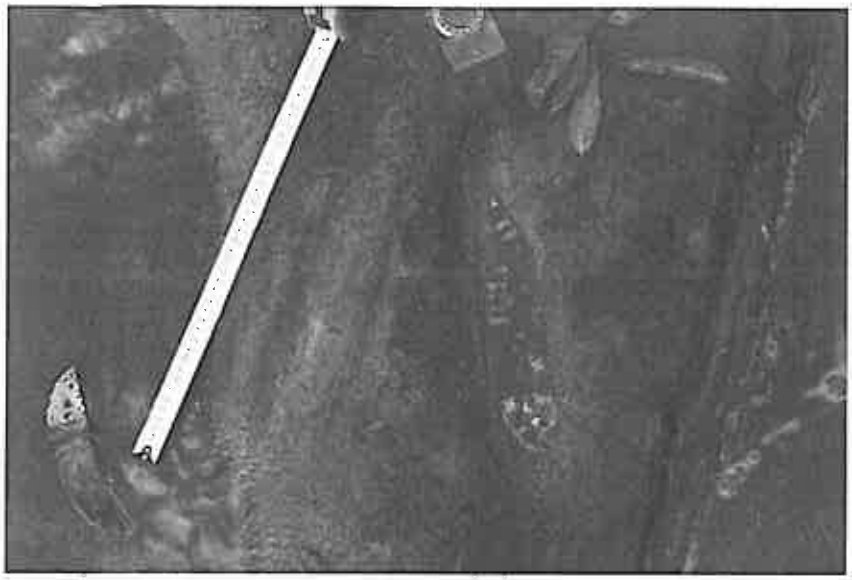


Plate 15: Group 1 (15-3-1397)

Plate 16: Damage to rock platform from grader and assumed to date from F3 construction

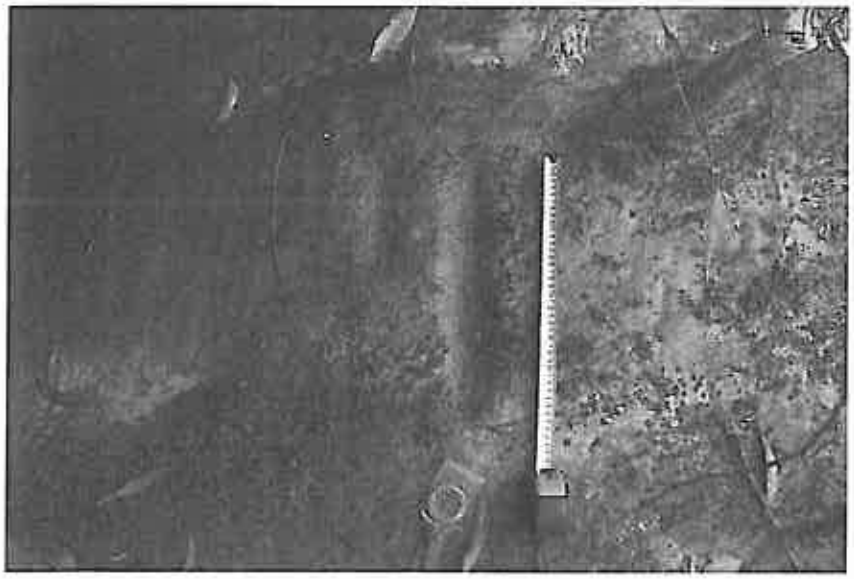


Plate 17: Group 5 (15-3-1397)

Plate 18: View from North

Plate 19: View from South

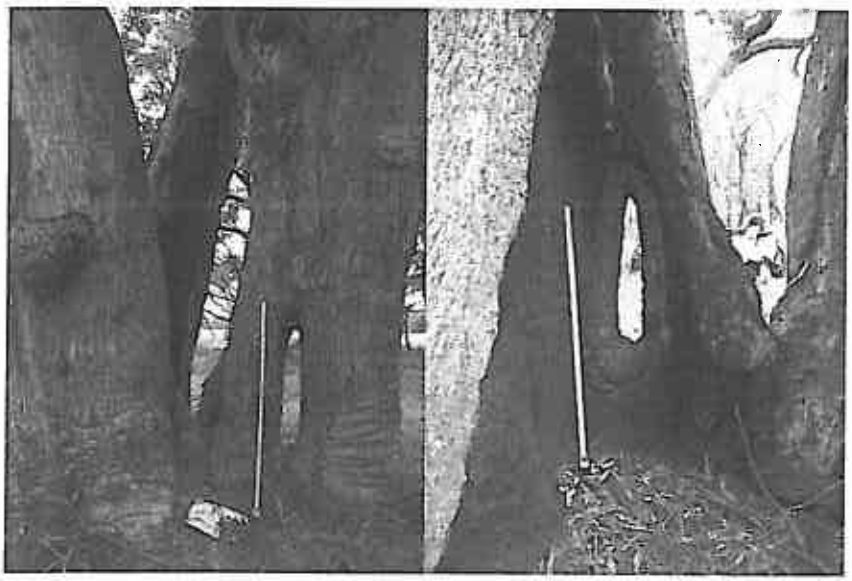


Plate 20: Outside and Inside of scared tree

Plate 21: Scared Tree

Plate 22: Cooking Hole SIM 2/46

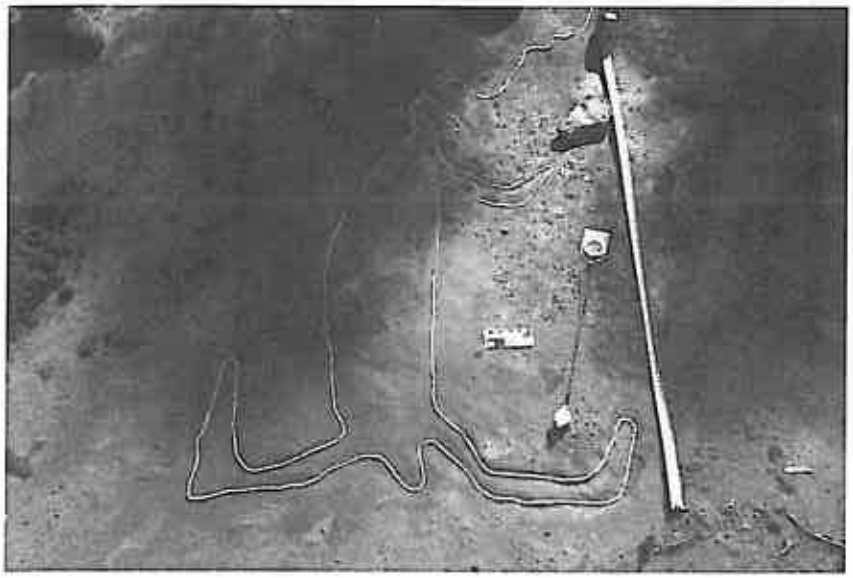


Plate 23: Anthropomorph

Plate 24: Anthropomorph #2

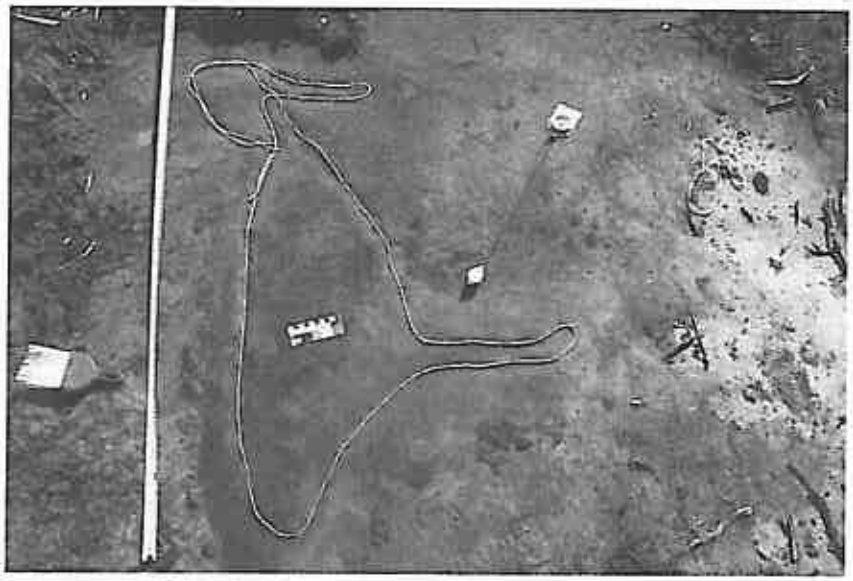


Plate 25: Pelican or Spoon Bill

Plate 26: Mondo beyond cooking hole and feet.

Plate 27:Mondo west of the anthropomorph.

Plate 28: General view of ES5

Plate 29: Modified water hole and grinding grooves at ES5 (yellow wool in grooves)

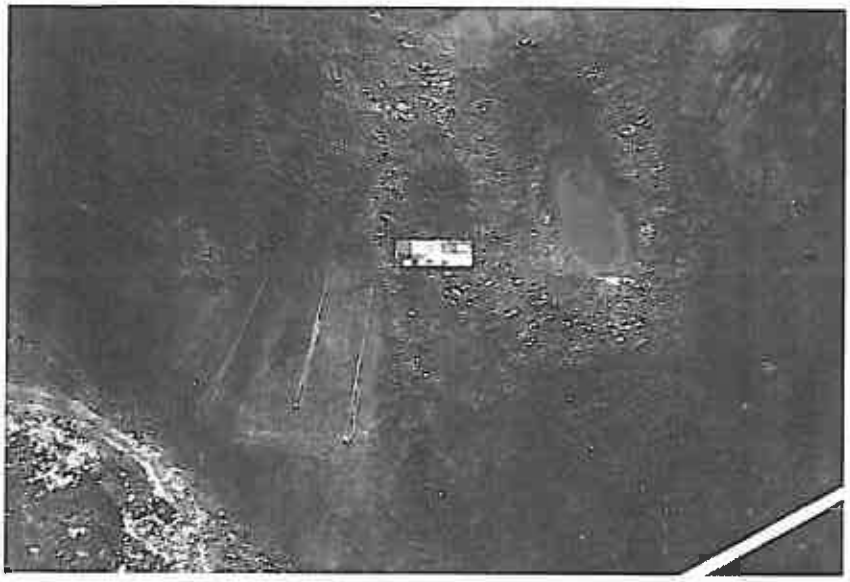


Plate 30: Water hole and grinding grooves (yellow wool in grooves)

Plate 31: Mondo and isolated groove at ES5

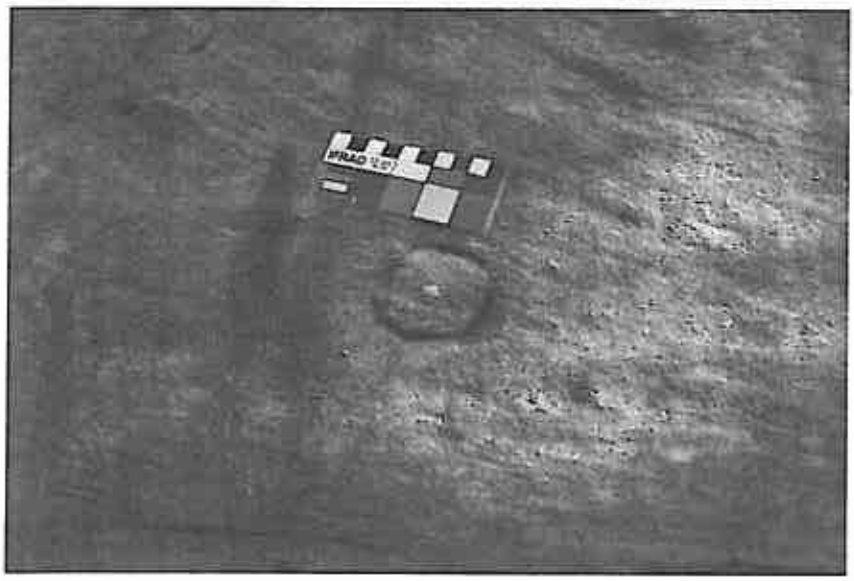


Plate 32: Close up of Mondo #1 at ES6

Plate 33: Wider view of Mondo #1 at ES6

Plate 34: General View of Mondo 1 at ES6

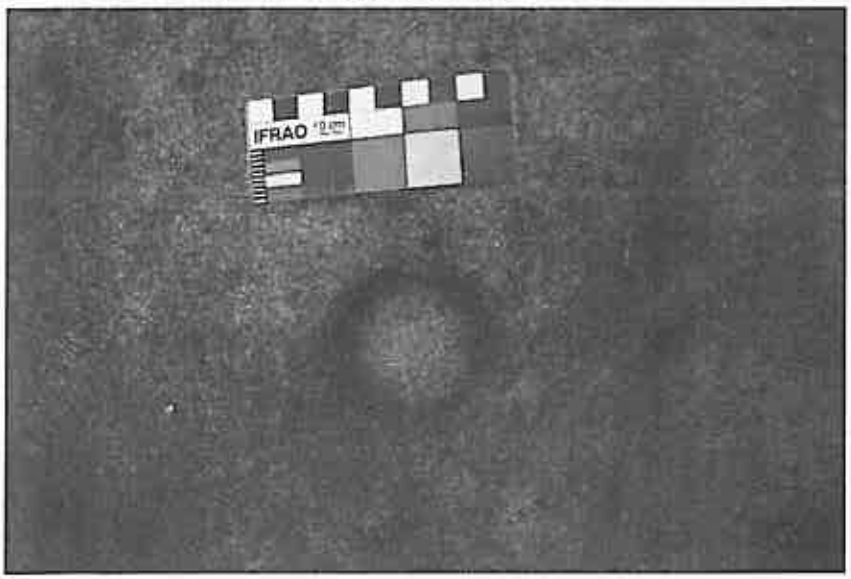


Plate 35: Close up of Mondo #2 at ES6

Plate 36: General view of Mondo #2 at ES6

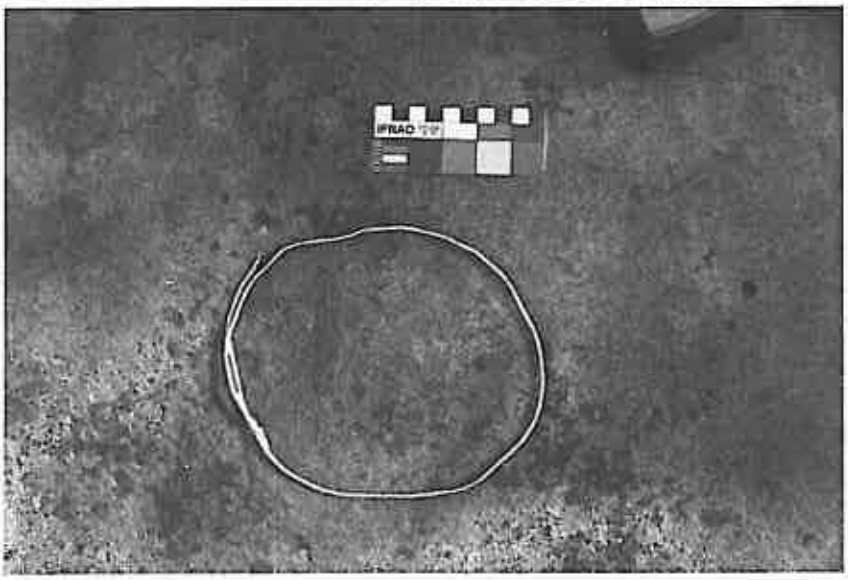


Plate 37: Mondo at ES7

Plate 38: General view of ES7

Plate 39: ES9

Plate 40: ES9

Plate 41: ES9

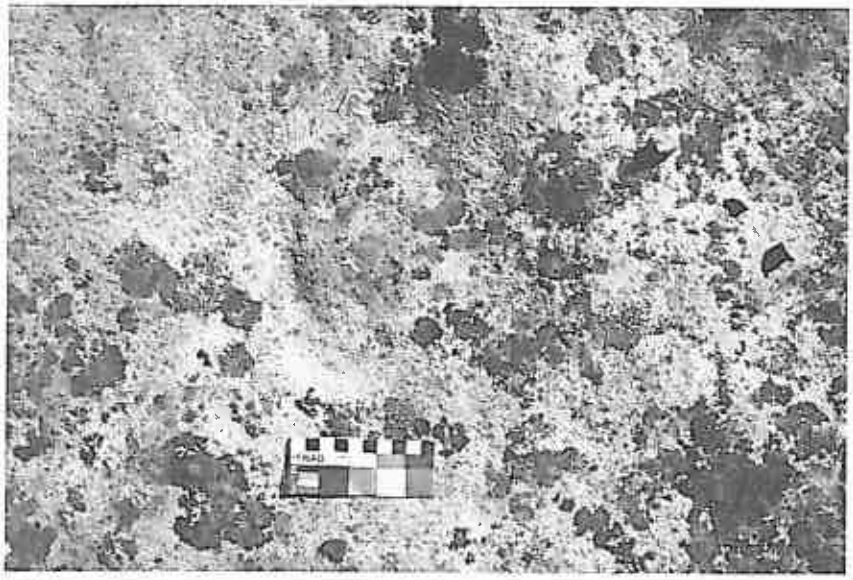


Plate 42 ES9

Plate 43: ES9 – View From North

Plate 44: ES9 – View from south

Plate 45: Water hole and grinding groove at ES9

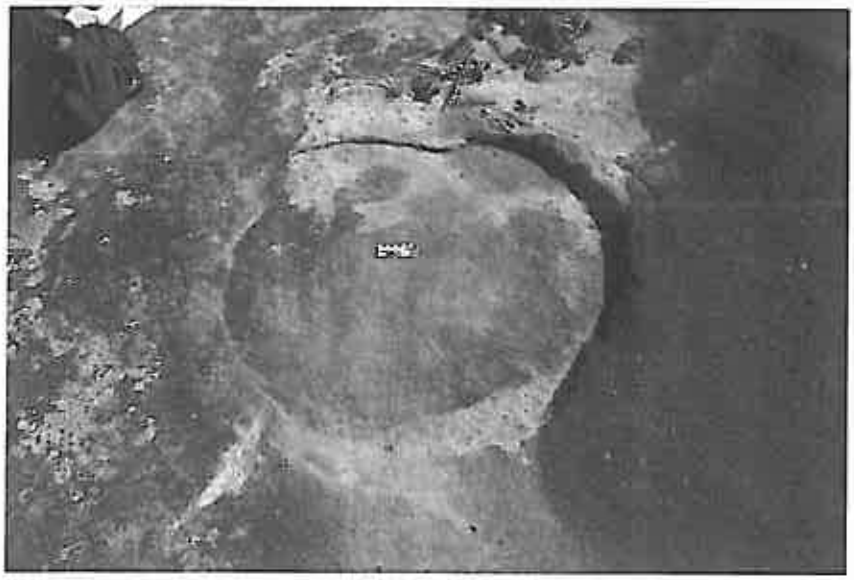


Plate 46: Smane at ES9

Plate 47: Mondo – ES9

Plate 48: Mondo – ES9

Plate 49: Abraded Grooves – ES10

Plate 50: Abraded Grooves – ES10

Plate 51: General View - ES10

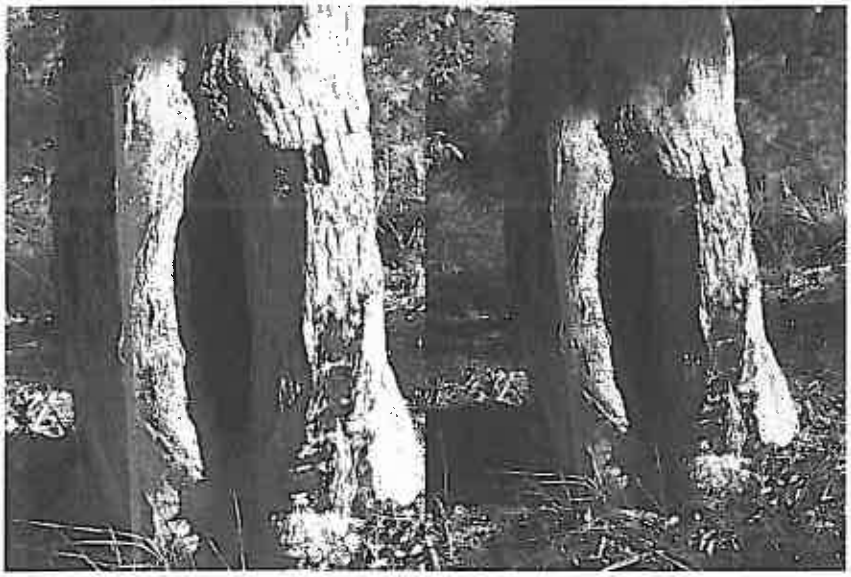
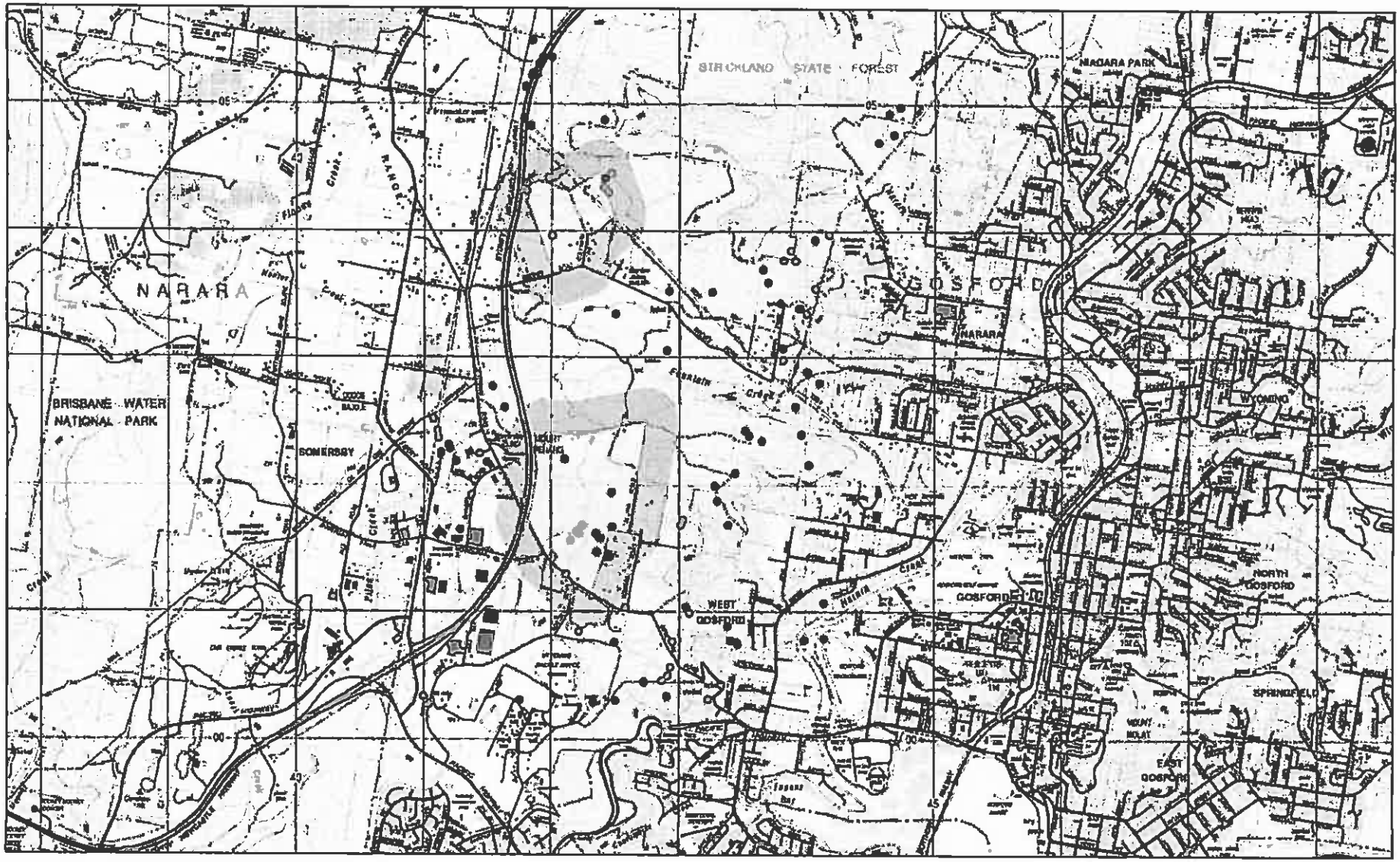


Plate 52: Scared Tree – ES10

Plate 53: Scared Tree – ES10

HERITAGE MAPS

The maps on the following pages are as accurate as possible given the resources available at the time this project was finalised (21/8/2007). All layers of digital mapping contain a degree of error. Scales vary for each map and some misalignment may occur. Only those persons authorised may view, use or draw information from the maps contained in this report

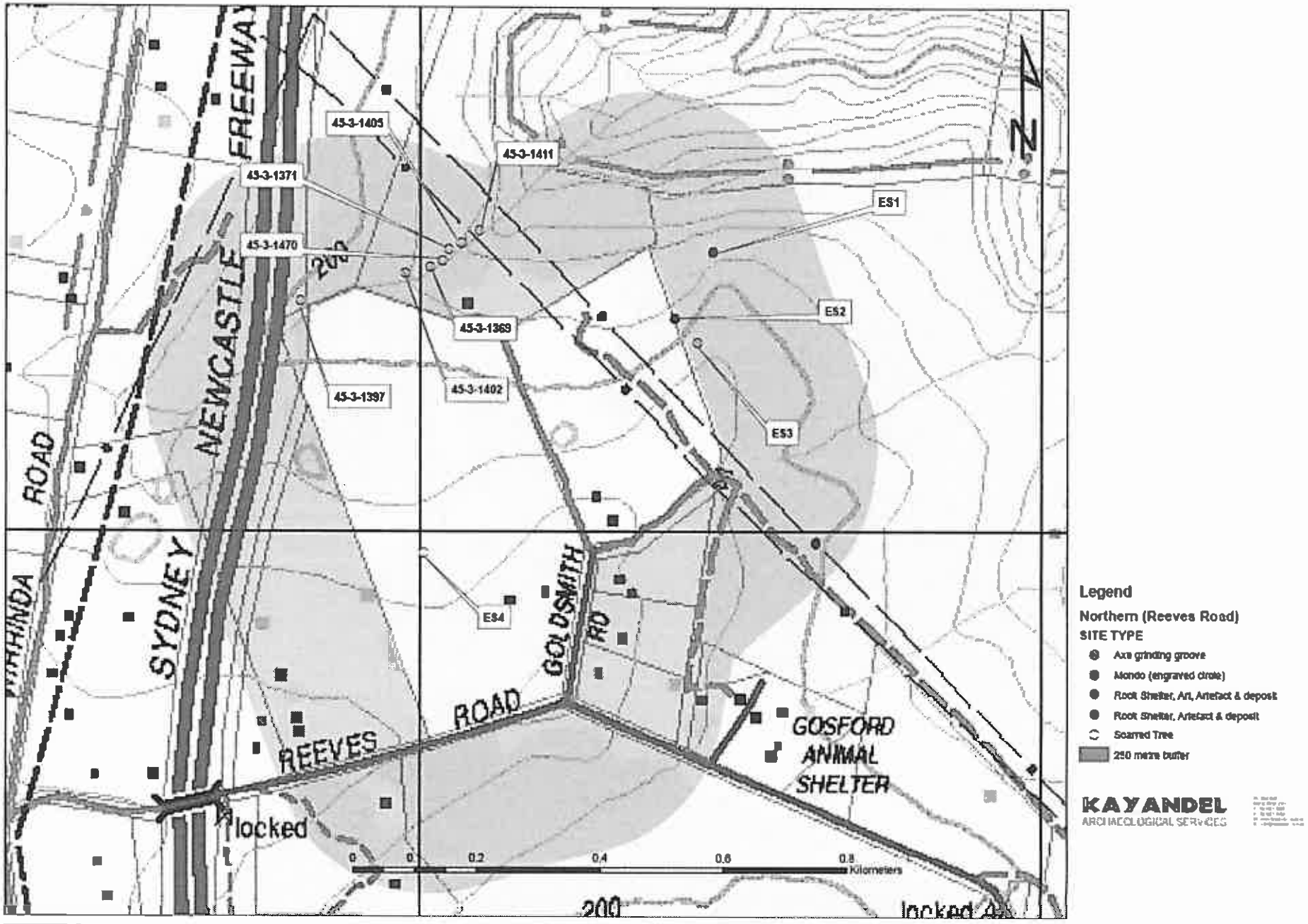


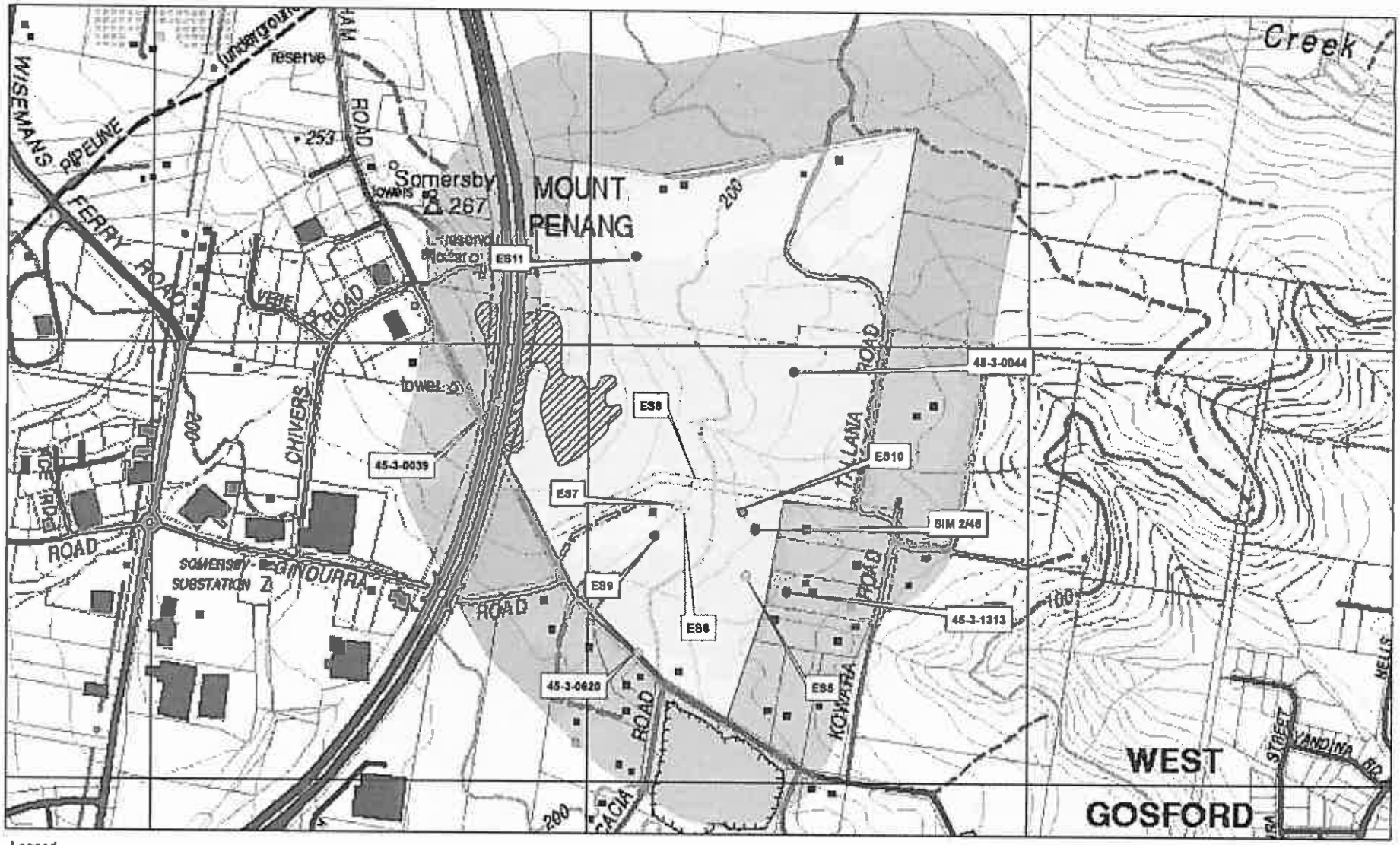
Legend

- KAS sites
- AHIMS sites
- Somersby Poly/Study area
- 250 metre buffer

0 0.5 1 2 3 4 Kilometers

KAYANDEL


45-3-1405
45-3-1411
45-3-1371
45-3-1470
45-3-1369
45-3-1397
45-3-1402
ES1
ES2
ES3
ES4
NEWCASTLE FREEWAY
SYDNEY ROAD
REEVES ROAD
GOLDSMITH RD
GOSFORD ANIMAL SHELTER
Locked
200
0 0.2 0.4 0.6 0.8 Kilometers
N
Legend
Northern (Reeves Road)
SITE TYPE
Axe grinding groove
Mondo (engraved circle)
Rock Shelter, Art, Artefact & deposit
Rock Shelter, Artefact & deposit
Scarred Tree
250 metre buffer
KAYANDEL
ARCHAEOLOGICAL SERVICES



Legend

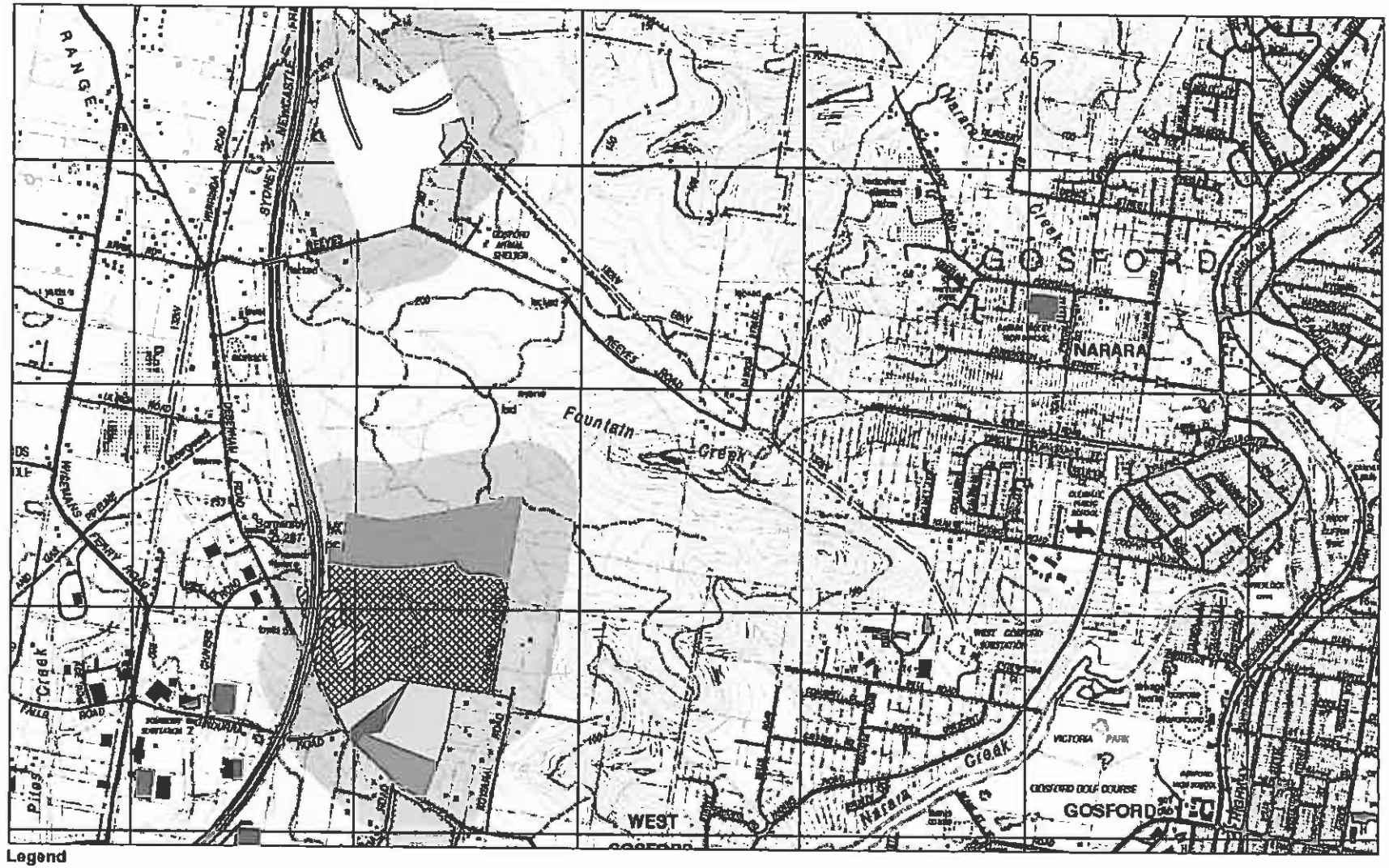
Southam (Debenham Road)

- Abraded Grooves
- Axe grinding groove
- Axe grinding groove, rock engraving
- Grinding grooves, mondo, abraded
- Mondo
- Mondo (engraved circle)
- Mondos
- Rock Shelter, Art, Artefact & deposit
- Rock Shelter, Artefact & deposit
- Rock engraving
- Scarred Tree
- Shams, grinding groove, mondo's
- engravings
- 250 metre buffer
- old quarry
- Somersby Poly/Shale area

0 0.125 0.25 0.5 0.75 1 Kilometers

KAYANDEL

Map Datum: GDA 94. Slight misalignment may exist due to the varied scale of the data. All layers of computer mapping contains a degree of error. Therefore 100% guarantee on the accuracy of the data and area calculated cannot be given. The data is as accurate as possible given the resources available for the project.
RAK August 2017



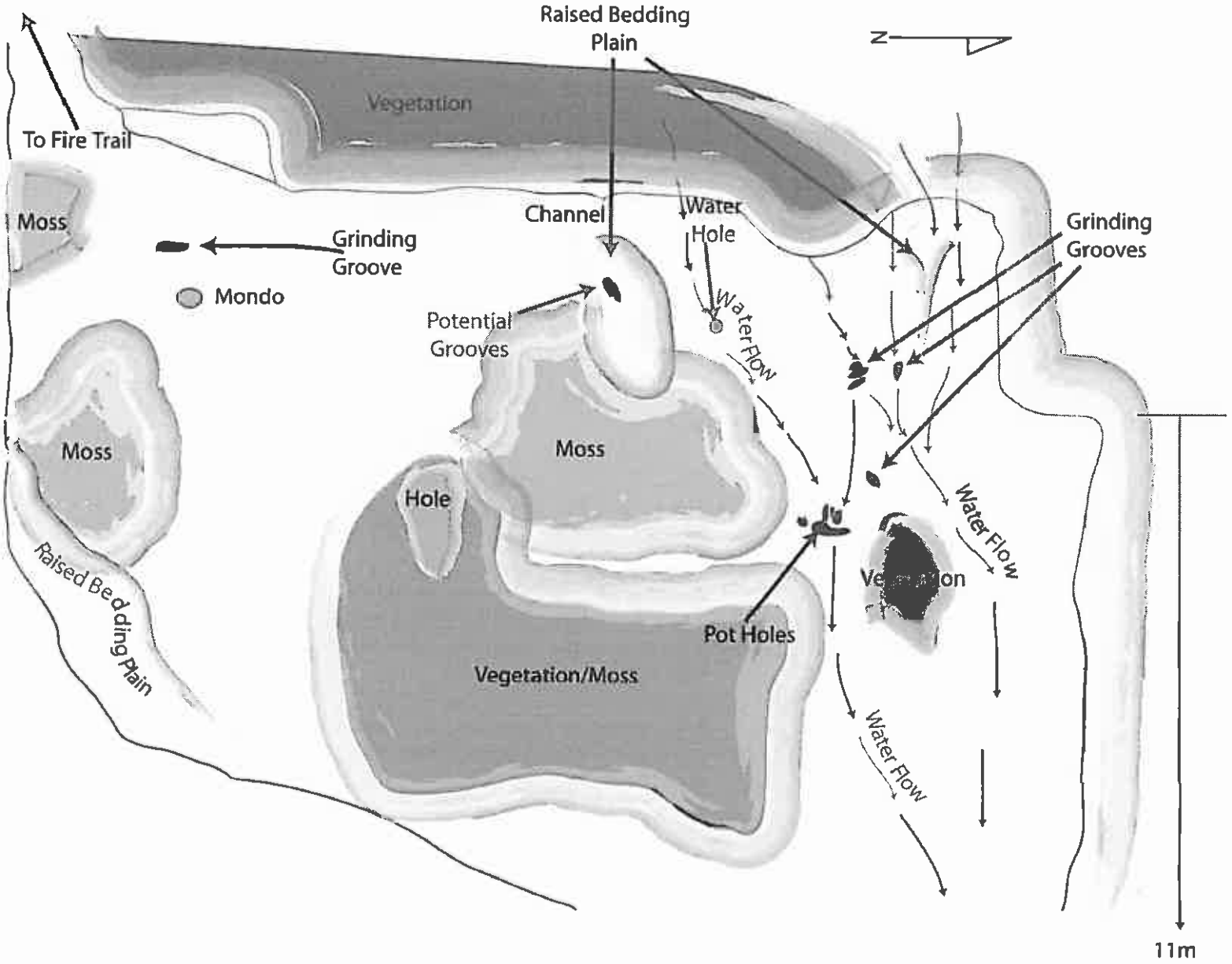
Legend

- Unassessed
- High Platforms
- Moderate - high sensitivity
- Low sensitivity
- PAD
- Potential Sandstone
- Low-Moderate
- quarry
- 250 metre buffer

0 0.25 0.5 1 1.5 2 Kilometers

KAYANDEL

SITE PLANS



Site Plan 1: ES5

Suspected to be Site Plan 1: ES5

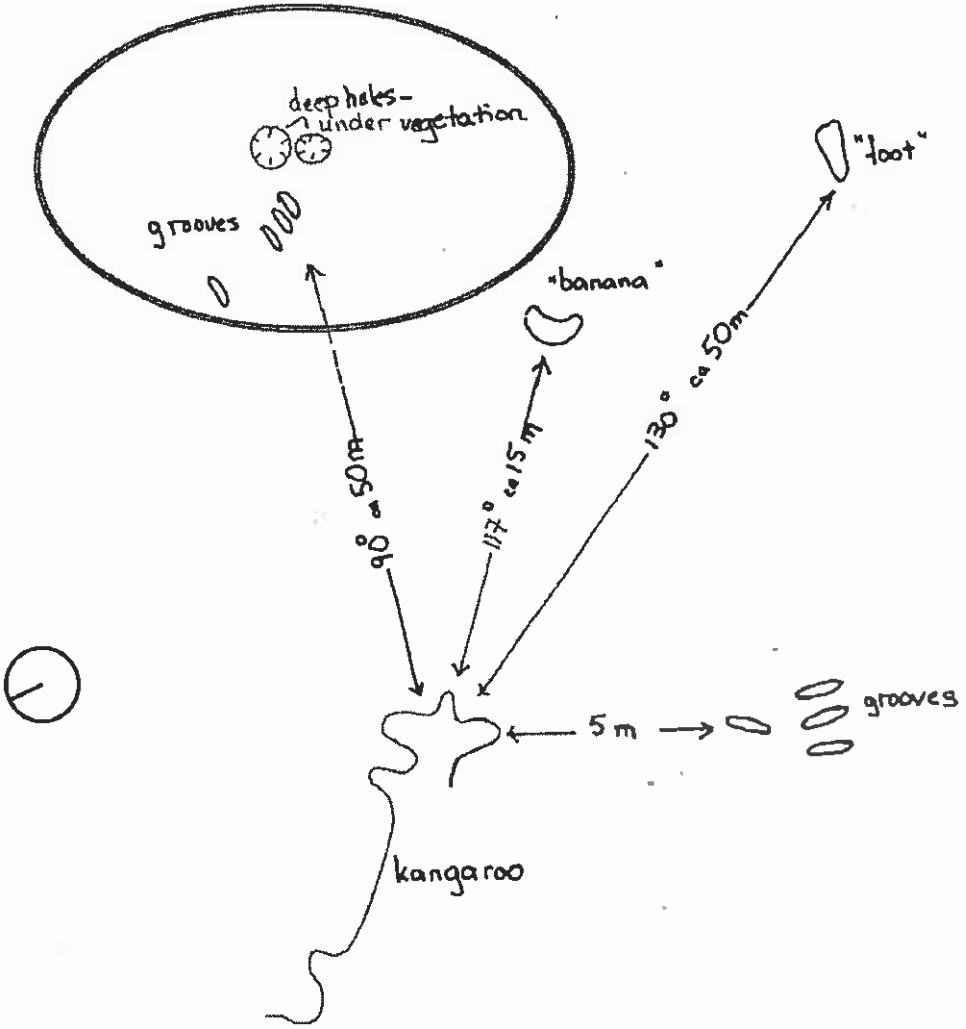
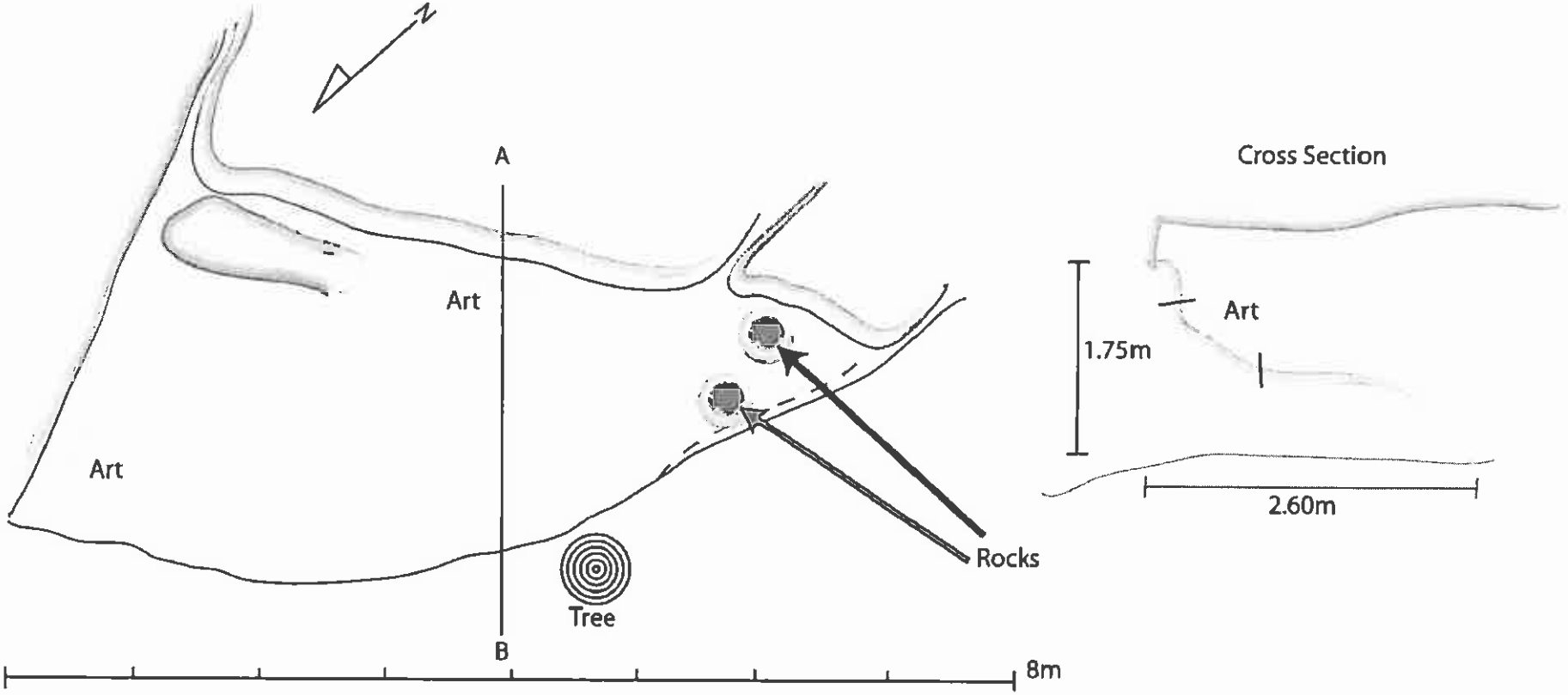
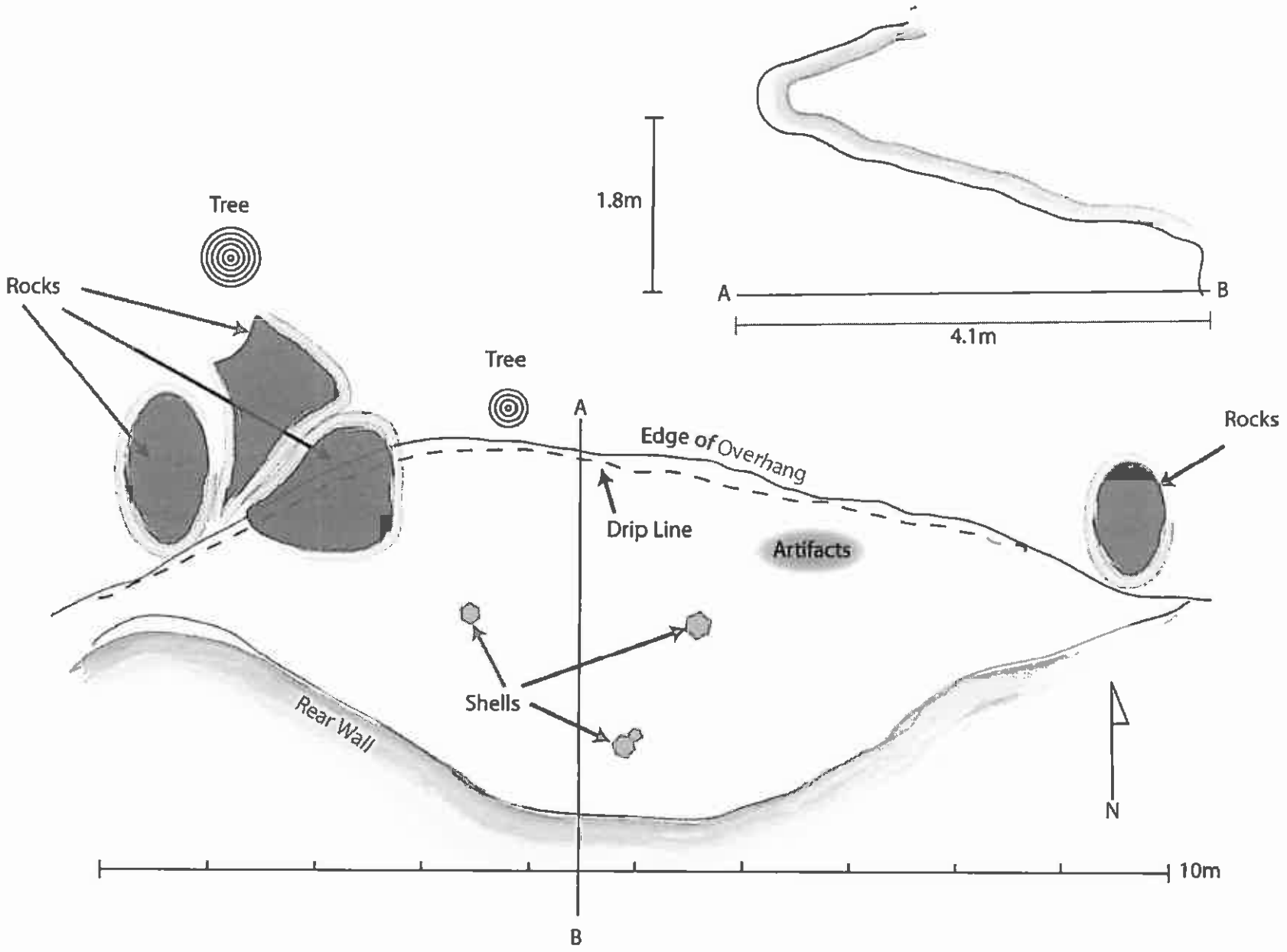


Fig. 7

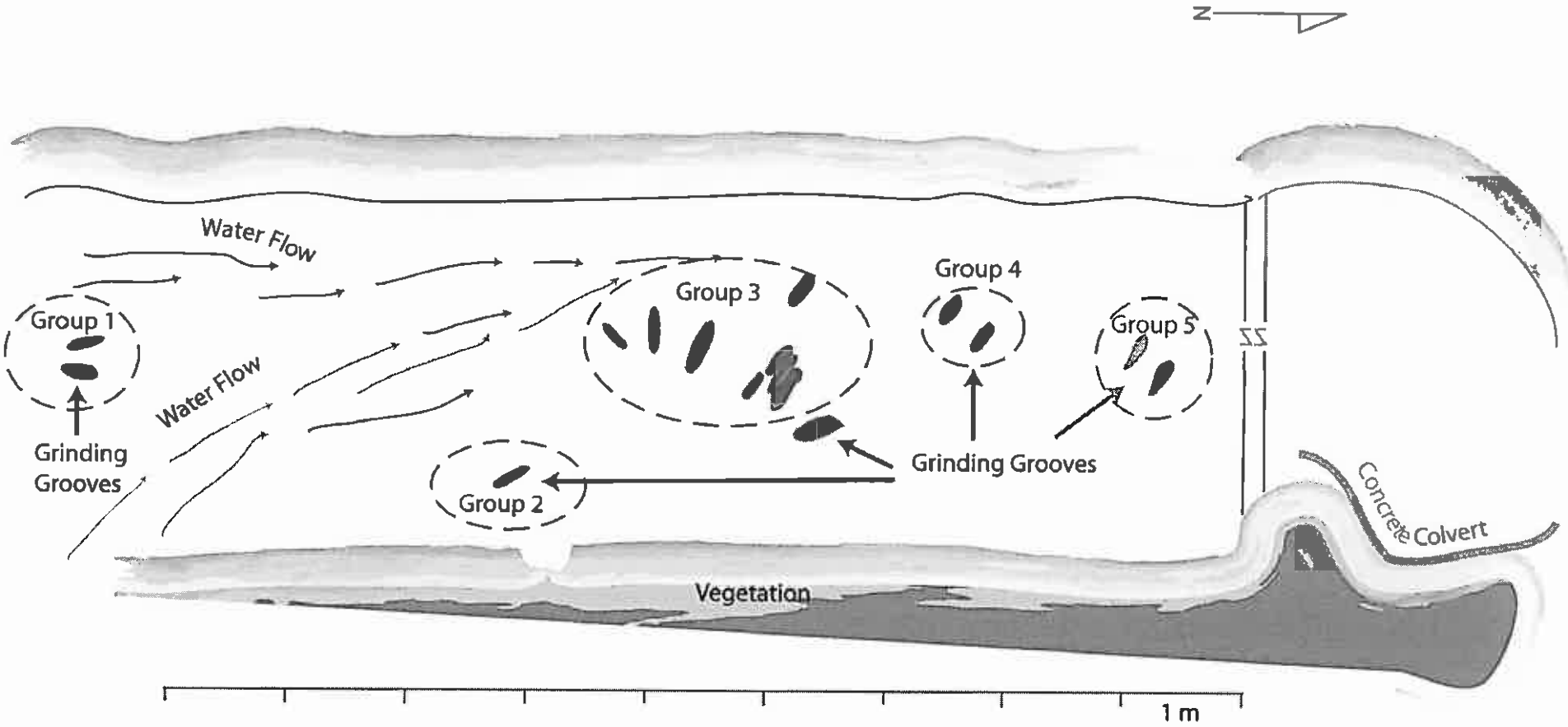
Site Plan 2: 45-3-1313 - Koettig & McDonald 1983



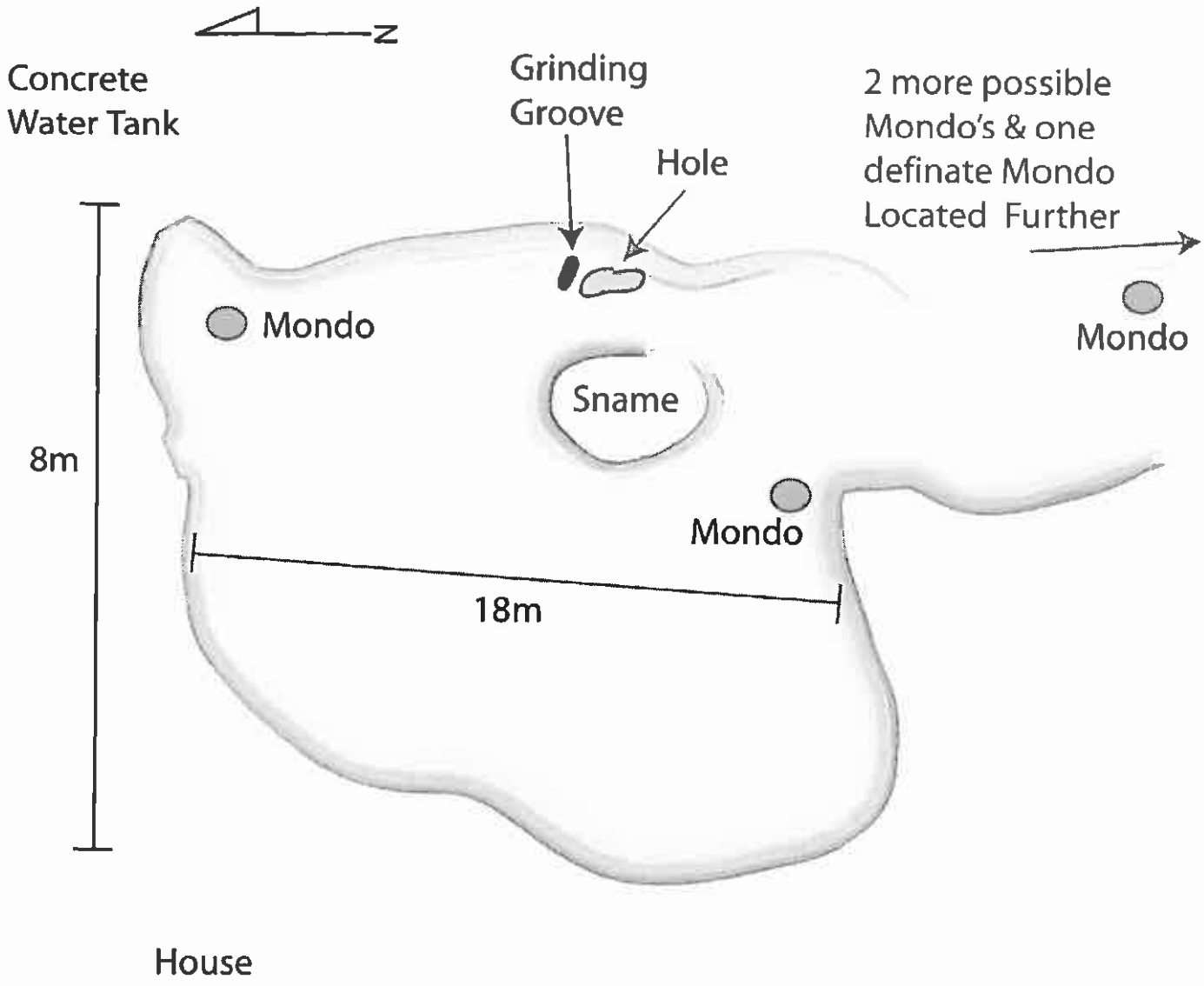
Site Plan 3: ES2



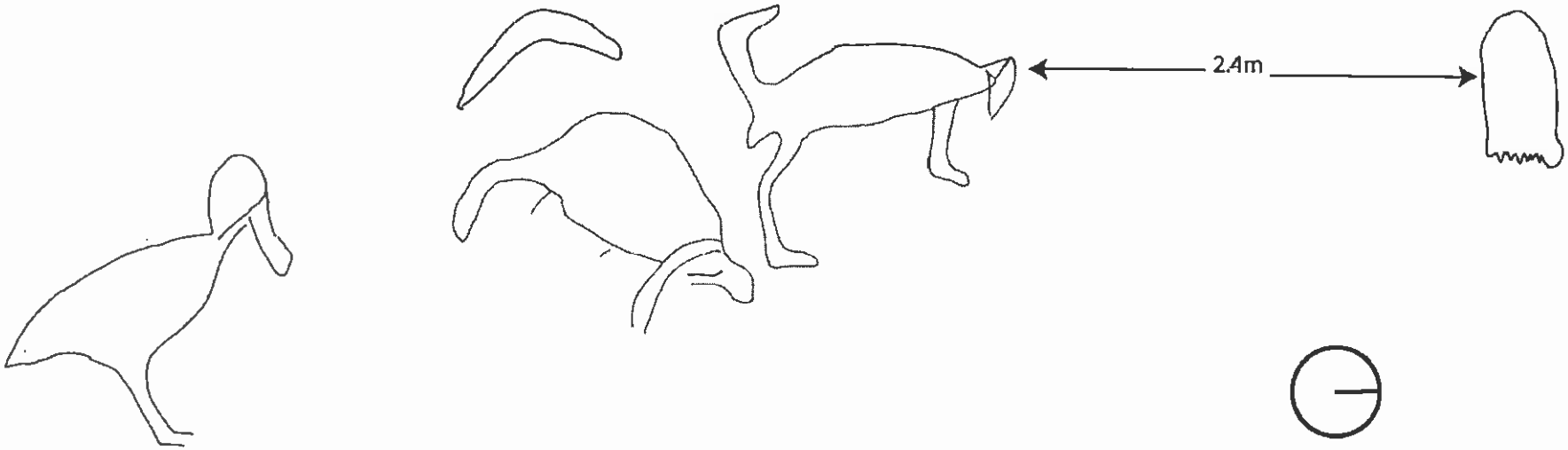
Site Plan 4: ES1



Site Plan 5: 15-3-1397


N
Concrete
Water Tank
Grinding
Groove
Hole
2 more possible
Mondo's & one
definate Mondo
Located Further
Mondo
Mondo
Sname
Mondo
8m
18m
House

Site Plan 6:



Site Plan 7SIM 2/46 - Koettig & McDonald 1983