Annex I

Lismore to Mullumbimby Electricity Network Upgrade - Aboriginal Heritage Assessment
(ERM, 2008)

FINAL REPORT

Country Energy

Lismore to Mullumbimby Electricity Network Upgrade *Aboriginal Heritage Assessment*

October 2008

Environmental Resources Management Australia
Building C, 33 Saunders Street
Pyrmont, NSW 2009
Telephone +61 2 8584 8888
Facsimile +61 2 8584 8800
www.erm.com

FINAL REPORT

Country Energy

Lismore to Mullumbimby Electricity Network Upgrade *Aboriginal Heritage Assessment*

October 2008

Reference: 0051706_Aboriginal Heritage_FINAL

For and on behalf of:
Environmental Resources Management Australia

Approved by: Murray Curtis

Signed: 

Position: Managing Partner

Date: 22 October 2008

CONTENTS

EXECUTIVE SUMMARY

1	INTRODUCTION	
1.1	Study Definitions	1
1.2	Project Outline	1
1.3	Methodology	6
1.3.1	Background Research and Register Searches	6
1.3.2	Community Consultation	6
1.4	Authorship	6
2	ENVIRONMENTAL CONTEXT	
2.1	Topography, Geology And Soils	7
2.2	Climate	7
2.3	Vegetation and Natural Resources	8
2.4	Availability Of Resources	8
2.5	Land Use And Disturbance	9
3	ARCHAEOLOGICAL BACKGROUND	
3.1	Ethnohistory	11
3.2	Previous Aboriginal Heritage Investigations	11
3.3	AHIMS Register Search	13
3.4	Predictive Model	21
4	CONSULTATION	
4.1	Stage 1: Start up meeting (Wednesday 14th May 2008)	23
4.2	Stage 2: Survey Days	23
4.3	Stage 3: Post Survey Meeting (Friday 22 August 2008)	23
5	IMPACTS	
5.1	Determination of Archaeological Zones	25
5.2	Impact Management of the Archaeological Zones	25
6	SURVEY METHODOLOGY	
6.1	Determination of Survey Areas	27
6.1.1	Areas to be Surveyed in this Assessment	27
6.1.2	Areas Requiring Survey if Ground Disturbance is Proposed	27
6.1.3	Areas Requiring Survey When the Preferred Route Options are Known	28
7	SURVEY RESULTS	
7.1	Lismore South Substation to Lismore BSP Substation and Lismore BSP Substation to the Existing Alstonville Power Line	33
7.2	Underground Transmission Lines linking Ewingsdale Substation	35

CONTENTS

7.3	SUFFOLK PARK SUBSTATION RESULTS	37
7.3.1	SITE 12	37
7.3.2	SITE 7	37
7.3.3	PROPOSED LINE ROUTES CONNECTING THE NEW SUBSTATIONS TO THE EXISTING NETWORK	37
7.4	BRUNSWICK HEADS SUBSTATION RESULTS	38
7.4.1	BH GRINDING SITE 1 56J E 552435 N68 41165	41
7.5	DISCUSSION OF RESULTS	42
7.5.1	NEW TRANSMISSION LINE CORRIDORS	43
7.5.2	NEW SUBSTATIONS	43
8	ABORIGINAL HERITAGE LEGISLATION	
8.1	NSW LEGISLATION	45
8.1.1	ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (NSW)	45
8.1.2	NATIONAL PARKS AND WILDLIFE ACT 1974 (NSW)	46
8.1.3	HERITAGE ACT 1977 (NSW)	46
8.2	COMMONWEALTH LEGISLATION	47
8.2.1	ABORIGINAL AND TORRES STRAIT ISLANDER HERITAGE PROTECTION ACT 1984 (COMMONWEALTH)	47
8.2.2	ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (COMMONWEALTH)	47
9	FURTHER HERITAGE REQUIREMENTS, MANAGEMENT AND MITIGATION MEASURES	
REFERENCES		
ANNEX A	ABORIGINAL CONSULTATION LOG	
ANNEX B	METHODOLOGY LETTER	
ANNEX C	EFFECTIVE COVERAGE TABLE	
ANNEX D	SITE TYPES TABLE	
ANNEX E	BH GRINDING SITE, NPWS SITE CARD	

LIST OF TABLES

TABLE 3.1	ARCHAEOLOGICAL STUDIES OF THE LOCAL REGION	12

LIST OF FIGURES

FIGURE 1.1	LINE ROUTE: MULLUMBIMBY TO LENNOX HEAD	3
FIGURE 1.2	LINE ROUTE: LENNOX HEAD TO ALSTONVILLE VIA BALLINA	4
FIGURE 1.3	LINE ROUTE: LISMORE TO ALSTONVILLE	5
FIGURE 3.1	MULLUMBIMBY TO EWINGSDALE DECC AHIMS RECORDS	15
FIGURE 3.2	EWINGSDALE TO SUFFOLK PARK DECC AHIMS RECORDS	16
FIGURE 3.3	SUFFOLK PARK TO LENNOX HEAD DECC AHIMS RECORDS	17
FIGURE 3.4	LENNOX HEAD TO ALSTONVILLE DECC AHIMS RECORDS	18
FIGURE 3.5	ALSTONVILLE TO EAST LISMORE DECC AHIMS RECORDS	19
FIGURE 3.6	LISMORE UNIVERSITY TO LISMORE BSP DECC AHIMS RECORDS	20
FIGURE 6.1	ABORIGINAL ARCHAEOLOGY SURVEY AREAS: MULLUMBIMBY TO LENNOX HEAD	29
FIGURE 6.2	ABORIGINAL ARCHAEOLOGY SURVEY AREAS: LENNOX HEAD TO ALSTONVILLE	30
FIGURE 6.3	ABORIGINAL ARCHAEOLOGY SURVEY AREAS: LISMORE TO ALSTONVILLE	31
FIGURE 7.1	NEW TRANSMISSION LINE SURVEYS UNDERTAKEN NEAR LISMORE	34
FIGURE 7.2	TRANSMISSION LINE SURVEY AT EWINGSDALE	36
FIGURE 7.3	PROPOSED BRUNSWICK HEAD SUBSTATION SURVEY RESULTS	40

LIST OF PHOTOGRAPHS

PHOTOGRAPH 7.1	TRANSECT A	35
PHOTOGRAPH 7.2	VIEW OVER TRANSECTS E, F AND G.	35
PHOTOGRAPH 7.3	GROUNDCOVER OVER MUCH OF THE SURVEY AREA	35
PHOTOGRAPH 7.4	GROUND COVERAGE WHERE VISIBILITY AT BEST.	35
PHOTOGRAPH 7.5	SITE 12	38
PHOTOGRAPH 7.6	SITE 12, AREA TO BE POTENTIALLY IMPACTED	38
PHOTOGRAPH 7.7	EXPOSURE AT SITE 12	38
PHOTOGRAPH 7.8	VIEW OF SITE 7	38
PHOTOGRAPH 7.9	EXPOSURE ALONG NEW LINE ROUTE	38

PHOTOGRAPH 7.10 VIEW OF PART OF LINE CORRIDOR 38

PHOTOGRAPH 7.11 AREA OF SURVEY FOR BRUNSWICK HEADS SUBSTATION 39

PHOTOGRAPH 7.12 GRASS OVER THE SURVEY AREA SHOWING VERY LIMITED VISIBILITY 39

PHOTOGRAPH 7.13 EXAMPLE OF A GRINDING BOWL 42

PHOTOGRAPH 7.14 EXAMPLE OF GRINDING GROOVES 42

PHOTOGRAPH 7.15 EXAMPLE OF A GRINDING BOWL 42

EXECUTIVE SUMMARY

This report details the findings of an Aboriginal archaeological heritage assessment and surveys of the proposed Mullumbimby to Lismore 132kV transmission line. The Project Area comprises a transmission line between Mullumbimby, Ewingsdale, Skinners Shoot, Broken Head, Tintenbar, Ballina, Alstonville and Lismore (see *Figures 1.1 to 1.3*). Land use within the Project Area is mixed and includes private land, agricultural and pastoral properties and road reserves. It is proposed to upgrade the 66kV transmission line to a 132kV transmission line and construct new 132kV transmission lines. The Project also involves the construction of two new substations and upgrade of six other substations.

The background research undertaken prior to the survey indicated that there have been 171 Aboriginal archaeological sites previously recorded within a five kilometre radius of the Project Area.

Areas of Aboriginal archaeological sensitivity (i.e. potential for Aboriginal sites to be present) were determined by a site prediction model and from a meeting with stakeholders to establish areas of concern within the Project Area. Survey areas were then based on a combination of areas where the upgrade will require ground disturbance as well as areas deemed sensitive.

Four surveys were undertaken, and two remain to be undertaken within the Project Area. The two surveys of the new transmission line corridors near Lismore and at Ewingsdale found no new archaeological sites. The survey of the two possible areas for the proposed Suffolk Park substation found no new Aboriginal sites, but both areas contain sand deposits and thus hold the potential for Aboriginal burials. Site 12 is the preferred option from a heritage perspective as Site 7 is suggested to contain black sands by the local Aboriginal community and has a higher possibility of containing burials. At the location of the proposed substation at Brunswick Heads a new Aboriginal site was located; BH Grinding Site 1. This site consists of several grinding bowls and grinding grooves. At some time in the past, the stones containing the bowls and grooves have been relocated from the field area to under trees within the paddock. Although features of the site have been relocated, the site still holds the potential for more evidence of food processing such as hearths and possibly even shelters.

The heritage management and mitigation recommendations are for monitoring by the (Local Aboriginal Land Councils) LALCs of any deviations from existing corridors that involve excavation or vegetation clearance that disturb the ground surface in those areas identified as potentially significant within the Project Area, a burial management plan to be put into place for the proposed Suffolk Park substation site, as well as monitoring of this site during vegetation clearance and earthworks. A Cultural Heritage Induction of the construction crew supervisors is recommended to take place prior to construction. The BH Grinding Site 1 should be further investigated through controlled archaeological excavation prior to the substation construction.

1 INTRODUCTION

1.1 STUDY DEFINITIONS

Country Energy commissioned Environmental Resources Management Australia Pty Ltd (ERM) to undertake an impact assessment of Aboriginal cultural heritage values for the proposed Lismore to Mullumbimby Electricity Network Upgrade (referred to a 'the Project'). The Project involves a mixture of upgrading the existing transmission line from 66kV to 132kV, the construction of new 132kV transmission lines and construction of new electrical substations as well as the upgrade of existing substations.

The cultural heritage assessment includes background research of the archaeological and cultural heritage issues relevant to the Project Area, consultation with the relevant Aboriginal Communities, several Aboriginal archaeological surveys, and management and mitigation measures.

1.2 PROJECT OUTLINE

The Project includes the installation and operation and upgrade of 66kV and 132kV electricity transmission lines, construction of two new substations and upgrading of six substations between Lismore and Mullumbimby, via Ballina, on the NSW Far North Coast (refer to *Figures 1.1* to *1.3)*. The following works will be undertaken:

1. Upgrade, including any necessary realignments or deviations of transmission lines:

    a. Mullumbimby to Ballina - 66kV power line from the Mullumbimby substation to the Ballina substation, to 132 kV; and

    b. Ballina to Alstonville - 66kV power line from the Ballina substation to join to the new 132kV Lismore/Alstonville transmission line, to 132kV.

2. Construction of new transmission lines:

    a. Brunswick Heads feeder loop - 132kV transmission line from the Mullumbimby to Ewingsdale transmission line to the Brunswick Heads substation;

    b. Lismore to Alstonville - 132kV transmission line from the Lismore 132kV bulk supply point substation to join to the upgraded Alstonville to Ballina 132kV transmission line near Alstonville;

    c. 66kV power line from Lismore South 66/11kV substation to the Lismore 66kV switching station; and

    d. two underground 66kV power lines from Lismore bulk supply point substation to Lismore South substation.

3. Construction of new substations:

    a. 132/11kV substation at Brunswick Heads (the Brunswick Heads substation); and

    b. 132/11kV substation at Suffolk Park (the Suffolk Park substation).

4. Upgrade of substations:

a. Mullumbimby 132/66/11kV substation (Mullumbimby substation) to 132/11kV;

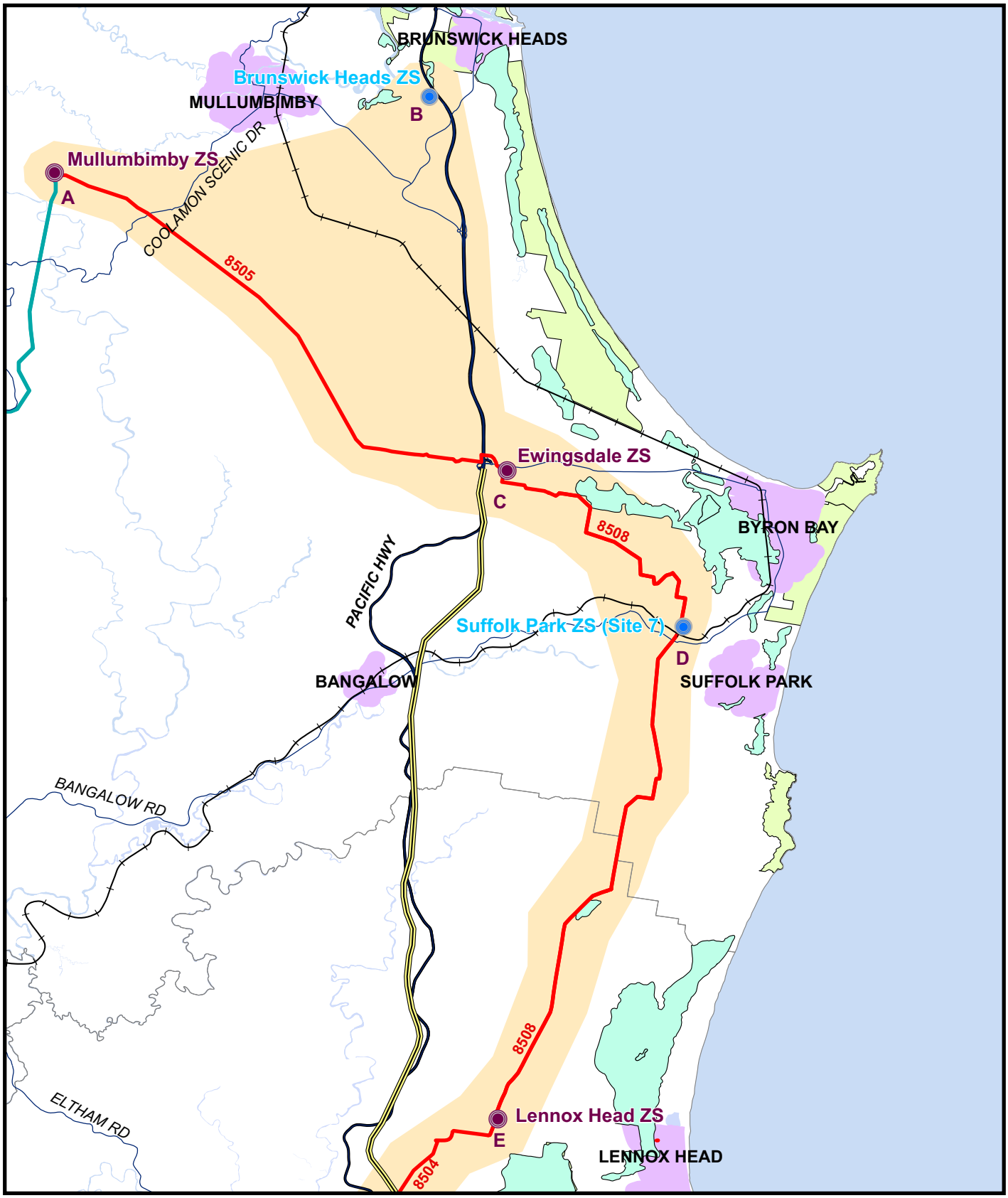
b. Ewingsdale 66/11kV substation (Ewingsdale substation) to 132/11kV;

c. Lennox Head 66/11kV substation (Lennox Head substation) to 132/11kV;

d. Ballina 66/11kV substation (Ballina substation) to 132/66/11kV;

e. Lismore 132/66/11kV bulk supply point (Lismore substation); and

f. Lismore South 66/11kV substation (Lismore South substation).



Legend

- Substation
- Proposed substation
- Casino-Murwillumbah Railway
- Pacific Highway Upgrade
- Main roads
- Highway
- Existing 66kV
- Existing 132kV
- Built up areas
- Project Area
- Water features
- National Parks
- SEPP14 Wetlands

Client:	Country Energy		
Project:	Lismore to Mullumbimby Upgrade		
Drawing No:	0051706_01	Suffix No:	A0
Date:	15/09/2008	Drawing size:	A4
Drawn by:	TH	Reviewed by:	MC
Source:	Department of Lands 2008		
Scale:	Refer Scale Bar		

N

0 0.5 1 2 3 4 km

Figure 1.1

Line Route: Mullumbimby to Lennox Head

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

ERM

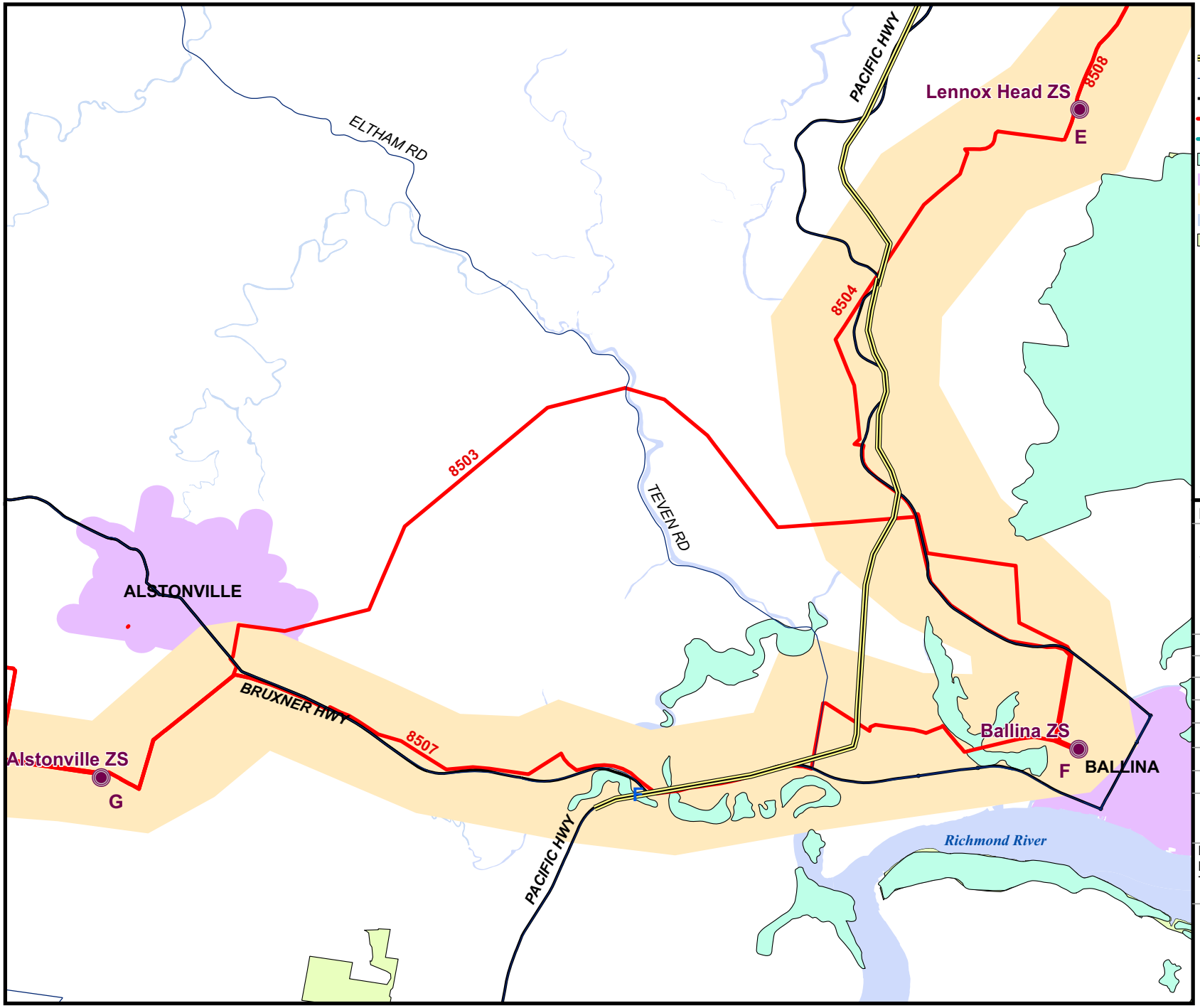


Figure 1.2

Line Route: Lennox Head to Alstonville via Ballina

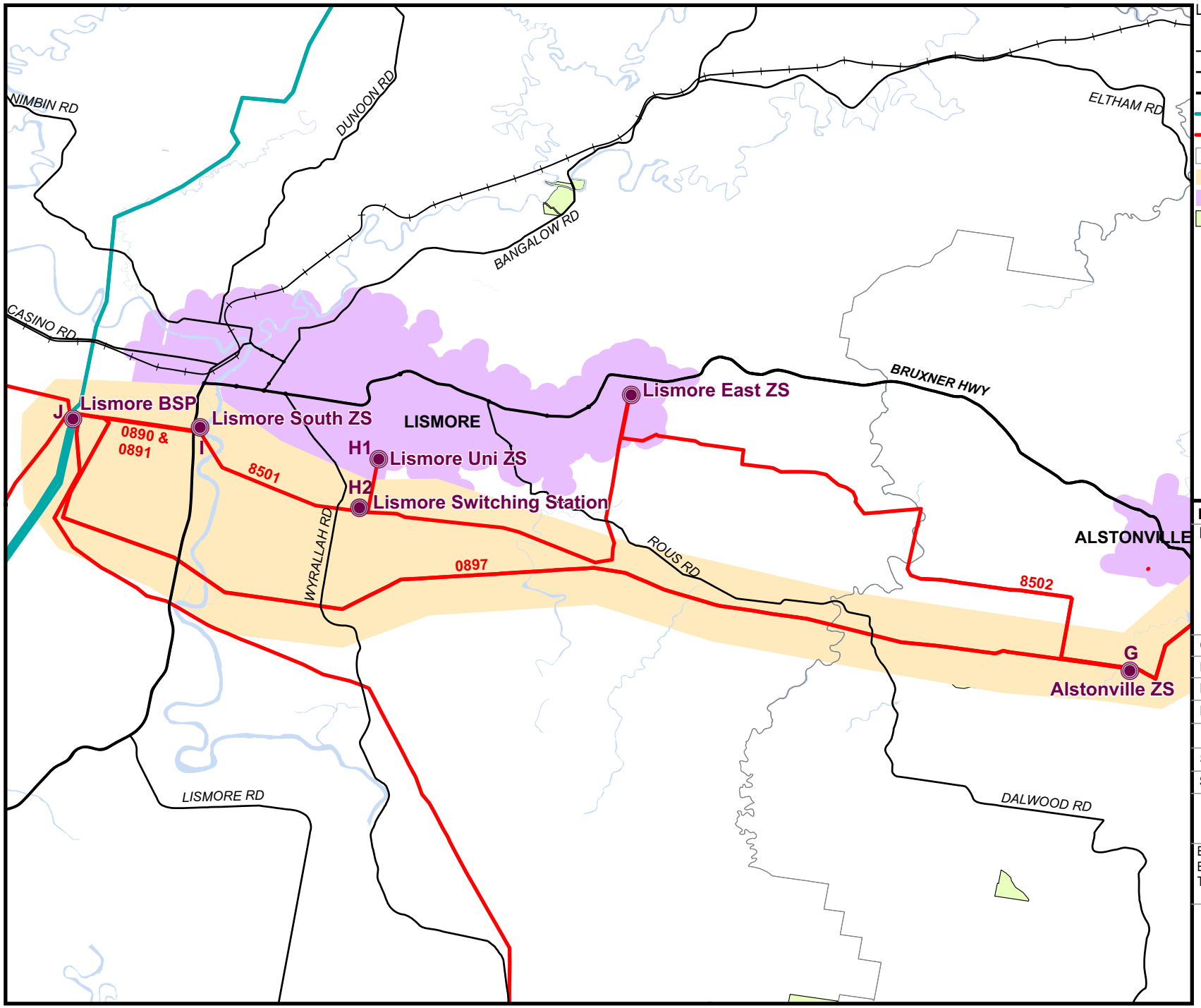
Client:	Country Energy		
Project:	Lismore to Mullumbimby		
Drawing No:	0051706_01	Suffix No:	A0
Date:	15/09/2008	Drawing size:	A4
Drawn by:	TH	Reviewed by:	MC
Source:	Department of Lands 2008		
Scale:	Refer Scale Bar		

N

0 0.3 0.6 1.2 1.8 2.4 km

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

ERM



Legend

- Substation
- Casino-Murwillumbah Railway
- Main roads
- Highway
- Existing 132kV
- Existing 66kV
- LGA boundaries
- Project Area
- Built up areas
- National Parks

Figure 1.3
Line Route: Lismore to Alstonville

Client:	Country Energy		
Project:	Lismore to Mullumbimby Upgrade		
Drawing No:	0051706_01	Suffix No:	A0
Date:	28/08/08	Drawing size:	A4
Drawn by:	TH	Reviewed by:	MC
Source:	Department of Lands		
Scale:	Refer Scale Bar		

N

0 0.5 1 2 3 4 km

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

1.3 METHODOLOGY

The assessment of Aboriginal heritage issues for the proposed electricity network upgrade from Lismore to Mullumbimby involved a number of tasks which are outlined below.

1.3.1 Background Research and Register Searches

The main method used in background research involved a review of relevant archaeological reports lodged in the Department of Environment and Climate Change (DECC) Archaeological Reports Library at Hurstville. The relevant register for Aboriginal sites is the DECC's Aboriginal Heritage Information Management System (AHIMS) Database, which was searched before field survey began in order to ascertain the types and frequency of sites in the area. The Ballina, Lismore and Byron Shire Local Environment Plans were also searched for "Indigenous Places".

1.3.2 Community Consultation

As this project incorporates three Local Aboriginal Land Councils (LALC's) and three Local Councils community consultation was undertaken in a staged approach in accordance with DECC's draft *Interim Community Consultation Requirements for Applicants* dated December 2004 (interim Guidelines). A start up meeting with stakeholders was undertaken to give community members a comprehensive understanding of the Project and to gather pertinent information about the region. This also allowed interested community members to be involved, assisted in determining areas of concern in the Project Area and helped to identify where surveys should be undertaken. A series of pedestrian surveys were then undertaken with Aboriginal community members over those identified areas of concern. A post survey meeting was also held to update the community members on what was undertaken and what is being recommended in the draft report, and to give the communities the chance to comment on the draft findings.

1.4 AUTHORSHIP

This report was written by ERM Heritage Consultant, Dr Diana Neuweger. Background information was compiled and written by ERM Heritage Consultant Jaclyn Ward. The QA review was undertaken by ERM Principal Heritage Consultant, Oona Nicolson. The Aboriginal heritage surveys were undertaken by Aboriginal stake holder groups, ERM Archaeologist Malcolm Hutchinson and ERM Heritage Consultant Dr Diana Neuweger.

2 ENVIRONMENTAL CONTEXT

Environmental factors affect how the landscape has been used in the past. These factors thus influence where archaeological and heritage sites may be found. A review of these factors provides a basis for evaluating the presence of sites within the landscape.

2.1 TOPOGRAPHY, GEOLOGY AND SOILS

The majority of the Project Area is located in a region collectively termed as the 'Big Scrub'. 'Big Scrub' refers to an area that was once the largest continuous tract of lowland subtropical rainforest in Australia. The precise boundaries of the 'Big Scrub' are contentious, however Mills and Wilkinson have asserted that the Big Scrub is inclusive of the Mullumbimby, Byron Bay, Broken Head, Ballina and Lismore areas (1994: 6). The 'Big Scrub' is part of the lowlands of the Tweed Shield Volcano erosion caldera formed approximately 20.5 to 23.5 million years ago and is one of the largest calderas in the world (Australian Heritage Database).

Mount Warning represents the original neck of the Tweed Shield Volcano and forms a prominent landmark of the area. Basaltic lava flows covered the older sedimentary geology, infilling the valleys of that landscape. Differential erosion of the basalt lava flows from the Tweed Shield Volcano has caused the landscape to form sloping hills, valleys and plateaus.

Undulating basaltic plateaus are part of the former 'Big Scrub' subtropical rainforest and consist of undulating hills and valleys. Soils in this region are generally krasnozems and brownish-red krasnozems, which are highly acidic and originate from the decomposition of basalts from Mount Warning (Byrne 1996: 2). Basalts give rise to krasnozems on the plateaus and prairie soils on the slopes. Where rhyolites are evident, they have weathered to produce yellow podzolic soils (Australian Heritage Website).

Alluvial soils border the larger watercourses and are variable in composition. Soils vary from sandy loams (sedimentary parent material) to deep loams (basalt parent material). Basaltic alluvials are most prevalent and consist of brown clay loams (Collins 1992: 11).

Soils on the coastal lowland plains are generally characterised as aeolian and heath soils. This soil profile is created through wind blown deposits of sand with little soil development. Podzolic soils have formed on older sedimentary outcrops where vegetation cover is present. The Byron Bay and Suffolk Park areas feature Mesozoic Triassic-Jurassic sandstones, siltstones, claystones and conglomerates of the Bundamba Group.

In swampland areas, waterlogged peat soils are found bordering aeolian deposits. Soils in these areas are composed of dark organic matter that is relatively homogenous in profile (Collins 1992: 11).

2.2 CLIMATE

The climate of the Project Area is defined as a sub-tropical climatic zone and is characterised by mild winters and hot, humid summers. Annual mean rainfall is recorded at 1800mm with peak rainfall months during February and March. The driest months of the year are in late winter to early spring (Collins 1992: 8).

2.3 VEGETATION AND NATURAL RESOURCES

Various vegetation types are represented in the Project Area. The predominant landform in the study area is characterised as undulating basaltic plateaus. The original vegetation of the basalt plateaus was characterised as warm subtropical rainforests that occur on altitudes of less than 800 metres (Australian Heritage Database). This landform, known as the 'Big Scrub', had more diverse vegetation types than any other in NSW. Subtropical rainforest vegetation would have included typical rainforest with a dense treed canopy with vines and an understorey of tropical plants (Collins 2003: 8). This vegetation was interspersed with areas of sclerophyll forest, grassland, swamps and drier types of rainforest (Mills and Wilkinson 1994: 8).

The coastal lowlands would have supported a range of vegetation types including, inter-tidal mudflats supporting mangrove communities, sandy flats supporting low xeromorphic species like the native yam, and wetlands supporting Melaleuca stands with an understorey of reeds and swamp species. Swamp areas situated on well drained peats supported bracken fern.

2.4 AVAILABILITY OF RESOURCES

The range of native flora from the vegetation type outlined above would have provided a wide variety of resources for Aboriginal peoples before European contact.

The coastal lowlands would have been the most productive landform in terms of Aboriginal food resources. Freshwater swamps were important food resource areas attracting a large array of water fowl and providing Aboriginal people with eggs, molluscs, fish and tortoise. The Bungwall fern (*Blechnum Indicum*) with edible roots was a staple of the Aboriginal diet in some regions and found on well drained peat swamps. The sandy flats in the coastal lowlands produced the native yam (*Ipomoea pes-caprae*) which was also a major component of the Aboriginal diet (Collins 1992: 64). Other tubers and roots eaten by Aboriginal people included Rush roots (*Typha angustifolia*) and the Blue water lily tubers (*Nymphaea gigantea*) (Collins 1992: 64).

The undulating volcanic plateaus produced a variety of sub-tropical rainforest resources. Aboriginal peoples collected a variety of fruit, seeds, bulbs, shoots, and stems from species found in the sub-tropical rainforest. Some species utilised by Aboriginal peoples included the red apple (*Acmena brachyandra*), the fruit of the broad leaf lilly pilly (*Acmena hemilampra*), the leaves and shoots of the Bangalow palm (*Archontophoenix cunninghamiana),* and the seeds, bulbs and shoots of Cunjevoi (*Acronychia paucifolia*) (Collins 2003: 10). The rhizomes of various fern species were also obtained from the volcanic plateaus.

Estuarine river systems were important food resource areas for their rich supplies of oysters. Estuarine environments, like those present in Ballina, provided many food resources including, estuarine and river fish, crustacean, shellfish and plant foods. Mangrove flats provided fruits, like the grey mangrove fruit (*Avicennia marina*) and the native yam (*Ipomoea pes-caprae*), while the cypress pine was utilised for its resin in hafting.

Areas associated with large watercourses and smaller drainage systems were the focus of exploitation by Aboriginal peoples. Species hunted in these environments were black swans, ducks, ibis, quail, fish and crustaceans. Areas away from watercourses, such as hills, ridgelines and dry elevated locations, would have been utilised as camping locations.

Many items of material culture were made from the vegetation resources in the region.

Items of wood were extensive and included unbarbed spears and shields made from the wood obtained from Iron barks and Mangrove trees (*Avicennia officinalis*). Bark was also an important resource with Tea tree bark (*Melaleuca quinquenervia*) used for the construction of huts and the bark of the Kurrajong (*Brachychiton populneus*) was utilised for the manufacture of fishing lines and nets (Davies 2000: 13). Cordage for nets was also made from the fibre of the stinging tree and fern rhizomes.

The diverse range of flora available in the subtropical rainforests of the study region would have supported a large number of animals that were hunted by Aboriginal peoples. Species commonly hunted in the area included swamp wallabies and pademelons (*Thylogale sp.),* carpet snakes (*Morelia spilots*), lace monitors, flying foxes (*Pteropis poliocephalus*) and brush turkey (*Alectura lathami*). Dingoes and possums were also hunted as was a variety of rainforest bird species.

Faunal species hunted in the coastal lowlands included those from sclerophyll forests and from heathland communities. Many species of marsupials, reptiles and birds were hunted, some of which included the koala, swamp wallaby, grey kangaroo, lizards, snakes and emus.

A plentiful supply of raw stone material is evident in the study region, which Aboriginal people used for the manufacture of stone tools. The Project Area is well placed for accessing a diverse range of raw stone, most of which is available from the Mount Warning Volcanic Complex. Stone materials in the region include quartz, siltstone, sandstone, claystone, basalt, greywacke, obsidian, slate and chert. Surface exposures of stone were almost certainly exploited by Aboriginal people prior to European settlement.

2.5 LAND USE AND DISTURBANCE

The land in the Project Area has been subject to large amounts of disturbance since the arrival of European peoples. From the 1840s, cedar cutters arrived on the Richmond River and began clearing the area termed the Big Scrub'. Disruptive activities within the Project Area include the large scale clearance of vegetation for farming activities, road development, excavation works for the installation of services and prior transmission line installation.

The construction of dry stone walls by European settlers, both to establish property boundaries and as a method of land clearance, would have contributed to the reduced probability of locating surface evidence of in situ-campsites.

The activities noted above would have the potential to disturb the Aboriginal archaeological record in the Project Area. The ground disturbances caused by these types of activities have the potential to disturb, redeposit or completely destroy Aboriginal cultural material. Archaeological sites are most likely to have survived in areas that have had the least ground disturbance.