

Chapter 5

INTERACTIONS WITH THE NATURAL ENVIRONMENT

5.1 INTRODUCTION

Ecological investigations undertaken as part of this SEE involved review of relevant literature, search of applicable National Parks and Wildlife Service databases and field surveys. Ecological investigations aimed to map and describe flora, fauna and fauna habitat existing on the site and to identify the likelihood of any threatened species occurring on the site. From this an assessment of potential impacts has been undertaken and mitigation measures recommended.

5.2 METHODOLOGY

Field investigations were conducted on 17th and 22nd November 2001. The weather conditions experienced were favourable for the undertaking of the survey, being warm (max 27°C), clear and still (Appendix 2, page 22).

The adopted survey methodology was based on:

- extent of previous surveys undertaken and the results of these;
- habitat occurring on the *Site*;
- the condition of the habitat;
- extent and likely impact of the proposal; and,
- the targeted threatened fauna that may possibly occur.

Additionally, to the extent feasible and practicable, surveys aimed to identify the diversity, distribution and abundance of fauna – as an indicator of faunal richness on the site.

Surveys were comprehensive, however, special attention was given to targeting detection of those threatened species listed in **Part B Sections 3.4, 3.5 and 3.6** of the Ecological Assessment (see Appendix 2).

5.2.1 *Flora*

The random meander technique was used for qualitative flora field surveys (Appendix 2 p22). This technique involved walking in a random manner through the *Site* to identify and classify plant species, vegetation communities and habitats. Targeted searches were also made for significant flora species potentially occurring on the *Site*. The conservation status of all communities was determined.

5.2.2 Fauna Habitats

Field investigations were undertaken to identify the type and quality of fauna habitats occurring within the study area. Assessment of the habitat suitability was based on a qualitative assessment of the following factors:

- dominant vegetation type;
- structural vegetation characteristics;
- presence and abundance of hollow-bearing trees;
- level of disturbance;
- density of ground litter, and,
- presence of standing or flowing water.

The field survey included a search for the presence of potential and core koala habitat as defined in State Environmental Planning Policy (SEPP) N° 44 – Koala Habitat Protection, described below.

i. SEPP44 – Koala Habitat Protection

The field survey included a search of the presence of “*potential koala habitat*” and “*core koala habitat*” as defined in State Environmental Planning Policy N° 44 – Koala Habitat Protection (SEPP 44). In SEPP 44 “*potential koala habitat*” is defined as “*areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15 percent of the total number of trees in the upper of lower strata of the tree component*”. In addition to the tree species listed in Schedule 2 it is also necessary to consider tree species that are recognised to be locally significant as feeding resources to koalas.

If “*potential koala habitat*” was identified then further investigations were conducted to assess the presence of “*core koala habitat*”.

In SEPP 44 “*core koala habitat*” means “*an area of land with a resident population of koalas evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population*”. Further investigations to assess the presence of “*core koala habitat*” consist of searching each potential koala food tree for koalas, koala scratches and scats within two metres of each tree bole.

5.2.3 Fauna Habitats

Field studies were undertaken to identify fauna species occurring on the site and determine their distribution and abundance. The following methods were used:

- spotlighting to determine the assemblage of arboreal mammals occupying the Site;
- avifaunal surveys to detect diurnal bird species;
- anabat detection to key bat species;
- amphibian and reptile surveys, and,
- opportunistic fauna surveys during flora surveys including searches for evidence of mammals, birds, reptiles and amphibians.

5.3 RESULTS

5.3.1 Flora

Based on structural characteristics and floristic compositions, two vegetation alliances were identified:

- clearing (0.9ha)
- mature dry open sclerophyll regrowth (*Eucalyptus acmenoides* / *Eucalyptus unbra* / *Eucalyptus microcorys*).

No flora species of conservation significance were recorded during the ecological investigations neither in this study nor in previous surveys of the Lots.

The mature dry open sclerophyll regrowth open forest type dominates the Site. A full description of the plant community both the over-story and the under-story is given in Appendix 2 (page 13). The community is dissected by a track to the powder magazine area.

In terms of conservations significance the definitive and most up to date analysis and database of the conservation status of vegetation communities can be found in a document entitled “*Forest Ecosystems Classifications for UNE and LNE CRA Regions*” dated 1999. The vegetation on the Site best fits Ecosystem N° 36 – *Dry Grassy Tallowwood-Grey Gum*. This ecosystem is listed as having 15.6% representation in the CAR Reserve System (target being 15%). Hence this Ecosystem is not listed as vulnerable, rare or endangered (JANIS Criteria). Equally it is not listed as a priority for voluntary protection of forest ecosystems on private land in NSW North East Region. Alternative titles for the vegetation could be N°71 – *Ironbark* or N° 146 *Tallowwood*. Respectively, these Ecosystems have 16.7% and 39.6% representation in Reserves. Both these titles are however considered inappropriate.

Caution is therefore required in total acceptance of an Ecosystem Title – these Titles are then used as the basis for determining the conservation value of the vegetation present.

Given that the proposed area of vegetation removal is small and is not of significant conservation value – retention is not required based solely on conservation status (Appendix 2 page 40).

5.3.2 *Fauna Habitat*

The Mature Regrowth Dry Sclerophyll Forest is the habitat type found within the *Site*. It has not been significantly disturbed in recent times. Past disturbance has been timber harvesting, minor clearing for tracks (0.1ha), the clearing of 0.6ha for deposition of spoil and a further 0.2 ha for an explosive storage site (not used). Fallen trees and old logging debris occur sparsely. Only one tree with “habitat” values” occurs – a large old tree with hollows.

This tree is a bloodwood of about 80cm diameter breast height over bark (dbhob) and has two hollows of about 30cm diameter and four of about 10cm diameter (Appendix 2 page 18).

Observations carried out indicate that some of the microhabitat features that are considered to host some of the threatened species. These can be considered to be preferred habitat indicators. Such features are indicative of species that may occur, and lack of presence is equally indicative of species that are unlikely to occur.

Microhabitat features observed:

1. **Old growth diameter trees with large hollows:** Found in only one tree. This tree was not a classic tree, that is, it did not have large diameter/many hollows/varying size hollows/several species/ well distributed. Additionally, density is very low (0.4 trees/ha). This tree did not have hollows large enough or the favoured occurrence (eg vertical facing lips) for nests or roosts for Owls or the threatened species (^{TS}) the Glossy Black-Cockatoo.

No widespread search of adjacent habitat was possible, however, general observation (and previous EIS investigations) indicates limited occurrence of similar habitat trees.

2. **Fallen hollow logs on the ground and hollow stumps:** Logs on the ground occur in relatively low numbers, mainly the result of a logging operation at least 40 years ago. Diameters are very variable and are up to 100cm diameter. Some are well decayed with hollows, providing good habitat for a range of species including reptiles and mammals such as Spotted-tailed Quoll and Brush-tailed Phascogale. A few old stumps also occur.
3. ***Allocasuarina* stands:** Only individual scatters and suppressed fruiting trees occur in the under-story. Young poorly developed regrowth is common. Whilst no crushing cones were found beneath these mature trees, they still could be a food substrate for the ^{TS}Glossy Black-Cockatoo. Lack of abundance is likely to preclude use.

4. **Other specialised vegetation and/or foraging substrate:** Pink Blackwood and Grey Ironbark occur and these favoured species will provide a sap source for most of the Gliders. No *Banksia* sp. occurs, some wattles occur but these are sparse and small. An occurrence of *Xanthorrhoea* was found immediately adjacent the *Site* and included about 20 flowering plants. These genus are utilised as a seasonal nectar and gum food source for Gliders.
5. **Winter Flowering Eucalypts:** Winter flowering Eucalypts occur as Ironbark. This species represents about 14% of the over-story and will provide a food resource for arboreal mammals during the winter months.
6. **Proximity to other areas of habitat/corridors:** The general area near the *Site* is variously developed. Nearby and mainly to the west, majority vegetation removal has occurred for either the quarry or for associated infrastructure (see Figure 2.1). This development has reduced habitat values of the Lots – by habitat removal, disturbances and fragmentation of habitat. The *Site* is now on the western fringe of a relatively extensive area of forest vegetation that has not had significant recent disturbance (other than indirect disturbance eg noise and dust). As it is adjacent quarry development, removal of 2.2 ha of vegetation cannot have much additional impact on connective corridors beyond that which has already occurred.
7. **Primary koala feed tree species:** Tallowwood and Grey Gum occur on the *Site*. These are Schedule 2 species under the provisions of SEPP44. Ironbark also occurs – known to be a secondary feed tree species.

Therefore whilst a number of desirable habitat features occur, the extent and quality of these features is minimal. Habitat value is further reduced in that the *Site* is adjacent a major active quarry and is near to a four lane highway.

Although it is considered certain that threatened species would not be dependent solely – or probably not to any significant extent – on habitat as occurs on the *Site*, surveys have been undertaken and an Eight Point Test completed for each species detected or considered “likely” to occur (see Appendix 2).

5.3.3 SEPP44 – Koala Habitat Survey

The koala habitat assessment results indicate that the dry sclerophyll vegetation contains “*potential koala habitat*” as outlined by Clause 7 of SEPP44. This is based on the percentage of koala food trees found in the upper and lower canopy (see Appendix 2 page 4). In the Draft Greater Taree Koala Plan of Management (1998) a site such as this would be classified as “Primary Habitat – floristic associations where the primary food tree species for koalas comprises greater than or equal to 50% of the dominant over-story species”.

Although the *Site* contains “*potential koala habitat*” under SEPP44, no koala scats were found, nor were any scratches resembling those of koalas identified. Evidence from fieldwork concludes that it is unlikely that koalas occur in regularly occurring numbers in this immediate locality and there is insufficient evidence of the factors defining core habitat occurring. These are:

- **“an area of land with a resident population of koalas”** – whilst a koala may transiently occur on the *Site*, it cannot be clearly established that there is a “resident” population as such. Given the small area, general lack of sightings and the absence of scats – it is a reasonable conclusion that a resident population does not occur.
- **“attributes such as breeding females (that is, females with young)”** – no evidence exists that breeding females occur (or have previously occurred) on the area.
- **“recent sightings of, and historical records of, a population”** – no recent sightings (on the *Site*) and no evidence or records of a population as such (no females with young).

Further, given the small area of vegetation to be removed, the area of habitat is not considered to be significant to the survival and well being of koalas. As a consequence of the findings detailed in Appendix 2 Part B, the *Site* is not considered to be “Core Koala Habitat”, and according to the provisions of SEPP44, a Koala Management plan is not required.

Although the forest cover on the *Site* is Primary Koala Habitat in the Greater Taree City Council’s Draft Koala Plan of Management, continued incremental loss of habitat will eventually impact on the life cycle of this animal. In this case only 2.2 hectares of “good quality” habitat will be removed by the proposal. It is unlikely that removal of such a small area will have any impact.

5.3.4 Terrestrial Habitat

5.3.4.1 Previous Surveys

Flora and fauna surveys from the previously completed EIS are fully listed in that document. Whilst a range of flora and fauna species were detected, ***no threatened flora species or ROTAP species were detected.*** Two threatened fauna species were detected on the lots, namely ^{TS}*Pteropus poliocephalus* (Grey-headed Flying Fox) and ^{TS}*Falsistrellus tasmaniensis* (Eastern Falsistrelle).

Flora and fauna survey results from the previously completed pre-clearing surveys carried out by North Coast Forestry and Ecology Services during October 2000 did not locate any additional threatened species (Appendix 2 p24).

5.3.4.2 Current Surveys

The results of the current survey carried out over the *Site* are presented in Appendix 2.

The assessment identified the following fauna:

Animal	Common Name	Scientific Name
Birds	(Diurnal)	
	Australasian Crow	<i>Crocyus orru</i>
	Brush Cuckoo	<i>Cacomantis various</i>
	Common Koel	<i>Eudynamys scolopacea</i>
	Dollar Bird	<i>Eurystomus orientalis</i>
	Grey Fantail	<i>Rhipidura fuliginosa</i>
	Laughing Kookaburra	<i>Dacelo novaeguineae</i>
	Noisy Friarbird	<i>Philemon corniculatus</i>
	(Nocturnal)	
	Masked Lapwing	<i>Vanellus miles</i>
Mammals	Pheasant Coucal	<i>Centropus phasianinus</i>
	Kangaroo or wallaby (heard)	
	Some Microchiropteran bats (possible ^{TS}) were observed at dusk (see below).	
	Anabat Detection	
	Eastern Broad-nosed Bat	<i>Scotorepens</i> sp. (probably <i>orion</i>)
	Eastern Forest Bat	<i>Vespadelus pumilus</i>
	Eastern Forest Bat (or Eastern Mastiff Bat)	<i>Mormopterus</i> sp. (probably ^{TS} <i>norfolkensis</i>)
	Gould's Long-eared Bat or possibly Lesser Long-eared Bat	<i>Nyctophilus</i> sp. (possibly <i>gouldi</i>) or (possibly <i>geoffroyi</i>)
	White-striped Freetail-bat	<i>Tadarida australis</i>
Reptiles	Dwarf Crown Snake	<i>Cacophis krefftii</i>
Amphibians	Only detected in the drainage line adjacent the <i>Site</i> .	

^{TS} indicates Threatened Species

Thorough searches were also made to determine the likely presence or otherwise of ^{TS}Glossy Black-Cockatoo. Some trees had scratches possibly from either goanna or Common Brushtail Possums. No incisions for sap sucking were found – specifically no ^{TS}Yellow-bellied Glider notches or ^{TS}Squirrel Glider notches. Only wallaby scats were detected; bandicoot diggings were not found; no skeletal remains were found and no nests were observed on the *Site*.

Of the species diurnal detected (and species indicators detected and listed above), none are listed in Schedules 1 or 2 of the Threatened Species Conservation Act.

These surveys were considered more than adequate to indicate the presence or otherwise of species given the nature of the habitat, the species likely to occur and the impact of the proposal.

Only one threatened species was detected – Eastern Forest Bat (or Eastern Mastiff Bat) *Mormopterus* sp. (probably ^{TS}*norfolkensis*).

5.3.5 Threatened Species

Only one threatened species was detected – Eastern Forest Bat (or Eastern Mastiff Bat) *Mormopterus* sp. (probably ^{TS}*norfolkensis*). In addition potential habitat exists

within the study area for a variety of threatened species. Appendix 2 Section B outlines the threatened species found to potentially occur in the study area based on the presence of suitable habitat and for some species previously recorded in the locality. Species detected and other species listed to occur within 10 kilometres of the site were considered for the Eight Part Test analysis under the Threatened Species Conservation Act 1995 (TSC Act).

5.4 THREATENED SPECIES CONSERVATION ACT 1995

The TSC Act made substantial amendments to the EP&A Act. Section 5A of the EP&A Act sets out eight factors to be considered in deciding whether there is likely to be any significant effect on threatened species, populations or ecological communities or their habitats.

A number of flora and fauna species have been considered in an Eight Part Test undertaken as part of this assessment. Appendix 2 sets out species considered and the results of the eight-part test. Overall, it has been found that the extent of the proposed habitat removal associated with the proposed quarry development is unlikely to significantly impact on threatened species likely to occur on the *Site*.

The Section 5A Assessment undertaken as a component of the previous EIS prepared for quarry expansion found that the proposal would be “unlikely to have a significant effect on threatened species”. Whilst the current proposal is outside the scope of the EIS, given the nature of the vegetation/habitat to be removed and the survey results – it is a reasonable assumption that the findings of the EIS would similarly apply to the proposed overburden deposit area (*the Site*). Regardless, a new Section 5A Assessment was undertaken.

The conclusions of the Eight Part Test undertaken for the *Site* (see Appendix 2 page 31) states “*it is considered that the impact of the proposal on threatened species will not be significant and a Species Impact Statement is therefore not required*”.

5.5 IMPACT ON THE NATURAL ENVIRONMENT

Section 79C of the EP&A Act 1979 requires “*the likely impacts of that development, including Environmental Impacts on both the natural and built environments and social and economic impacts in the locality*” to be considered.

This section of the assessment is limited to addressing the impact on the natural environment (flora, fauna and biodiversity). These impacts include consideration of the cumulative and indirect impact and likely contribution of the proposal to the threatening processes acting on existing species in the locality. The impact assessment also takes into account existing impacts on the *Site*, particularly those arising from the existing quarry operations and other activities that have altered the composition of vegetation communities and fauna habitats and ultimately the composition of flora and fauna within the *Site*. Further details are provided in Appendix 2 Part C page 33.

5.5.1 Biodiversity

With regard to biodiversity with reference to Section 5A of the EP&A Act, the SEPP44 assessment, the TSC Act and the Commonwealth Environment Protection and Biodiversity Conservation Act it is concluded ***“that impact on biodiversity should not be significant”***.

5.5.2 Flora

This proposal will result in the removal of 2.2 hectares of flora. No protected plants occur on the *Site*, nor have any ROTAP species been detected on the *Site*. The report in Appendix 2 Part C page 33 states, ***“given that the proposed area of vegetation removal is small and is not of significant conservation value – retention is not required based solely on conservation status”***.

5.5.3 Fauna

As determined by survey, occurrence of fauna utilising the *Site* is minimal. Although some protected native species occur (and others could occur) these species will not be impacted upon significantly by the proposal.

As stated in the report in Appendix 2 Part C page 40, while some displacement of individuals must occur, some will relocate to retained or adjacent areas or similar or better habitat.

In this case only up to 2.2 hectares of habitat will be removed. It does not contain any significant special values and is common in the area.

5.5.4 Wildlife Corridors

The *Site* is now on the fringe of a relatively extensive area of forest vegetation that has not had significant recent disturbance (other than indirect disturbance eg noise and dust). As it is adjacent to quarry development, ***removal of 2.2 ha of vegetation cannot have much additional impact on connective corridors beyond that which has already occurred***” (see Appendix 2 Part page 41).

5.6 MITIGATION MEASURES

As stated in Appendix 2 Part E page 52 ***“importantly only one (probable) threatened species was detected near the Site, and the Eight Point Tests did not find the impact of the proposal significant on species that may occur”***.

Mitigation measures to minimise potential impacts of fauna and flora.

- all trees to be cleared will be inspected immediately prior to clearing for koalas,

- ❑ removal of the habitat tree to be carried out in accordance with Section 2 F&F 1.1 of the Site's EPPs (see Appendix 4),
- ❑ an effort will be made to ensure retained vegetation adjacent to the cleared area is not damaged by burning or clearing operations,
- ❑ rehabilitation of the overburden placement will be carried out in accordance with Section 3 of the EPP's (see copy in Appendix 4),
- ❑ development will not encroach into the ephemeral drainage line to the east of the *Site*. Vegetation will not be dumped within 10 metres of the drainage line. Silt fences will be installed and maintained in accordance with Section 1 of the EPP's (see Appendix 4).

The Ecology report in Appendix 2 Part E page 53 concludes by stating, ***“DUAP [Planning NSW] is not prevented by the provisions of SEPP N°44, Sections 5A or 79C of the EP&A Act nor from the requirements of the Environment Protection and Biodiversity Conservation Act from granting consent to the development application. Nor is it considered a Section 91 nor a Section 120 Licence is required from the NP&WS (provided consent is issued)”***.

* * *

Chapter 6

INTERACTIONS WITH THE HUMAN ENVIRONMENT

6.1 NOISE AND BLASTING

A noise impact assessment has been undertaken for the proposed overburden emplacement and is provided in *Appendix 8*. A summary of the assessment is provided below.

6.1.1 Noise Assessment Methodology

The acoustic assessment presented in Appendix 8 is based on readings and the methodology adopted during the EIS of 1999. Equipment on site has not changed since the 1999 study was undertaken. The study methodology comprised:

- Existing background levels were determined using continuous noise logging at three locations surrounding the quarry. Correlation of atmospheric parameter and measured noise levels was made using weather data from Taree Airport;
- Equipment sound power data was obtained from measurements of existing or similar equipment used at the quarry. This allowed predictive noise modelling;
- Noise level modelling was undertaken for existing operations and proposed development Stage 1 and Stage 3 with equipment located in the worst-case scenario locations and operated simultaneously at maximum power. The EPA approval Environmental Noise Model (ENM) was used. Topographical information was used to prepare noise contours around the quarry and single point calculations at the ten nearest residences to the quarry;
- Weather data supplied from the Bureau of Meteorology for Taree Radio Station 2RE was used to assess general wind characteristics of the area and noise levels under adverse weather conditions; and
- Predicted noise levels were compared to EPA noise criteria, utilised in the previous study in order to determine whether the proposal results in an incremental increase in noise impact relative to the approved operation assessed in the EIS 1999.

EPA guidelines were followed in all stages of the acoustical assessment. Assessment of temperature inversions was not undertaken as no nighttime operations are proposed.

6.1.2 Noise Criteria

i. Neutral Atmospheric Conditions

Noise emissions from the proposed development is compared to criteria determined using the Environment Protection Authority's *Environmental Noise Control Manual* (ENCM) (EPA, 1994). Criteria described in the Environment Protection Authority's Draft Stationary Noise Source Policy (EPA, 1998) are also considered. This enables a direct comparison with the previous noise assessment¹.

During autumn, morning offshore winds are typically less than 15 metres per second from the west. In the afternoon, south-westerly winds prevail and rarely exceed 15 metres per second.

The EPA lists objectives for environmental noise in its *Environmental Noise Control Manual* (EPA, 1994). These are that:

- Noise from any single source should not intrude greatly above the prevailing background noise level, generally by more than 5 dB, and,
- Background noise should not exceed an appropriate level for the particular locality and land use. Similarly, the Draft Policy discusses maintaining noise level amenity in the long-term.

The "intrusiveness criterion" is designed to achieve the first objective, and is expressed:

$$L_{A10, 15\text{minute}} \leq (*L_{90}) + 5$$

Where $L_{A10, 15\text{minute}}$ is the L_{10} noise level from the source, measured over a 15-minute period and $*L_{90}$ is the minimum repeatable background level.

To satisfy the second EPA objective, background noise levels should be kept within the "maximum acceptable" noise levels suggested in the EPA's *Environmental Noise Control Manual*. For residences in a rural area these are a night time background noise level of 35 dB(A) and a daytime level of 45 dB(A).

Similarly, the Draft Policy (EPA, 1998) states that total L_{eq} noise levels from stationary sources should be kept within the "amenity criteria". For residences in a

¹ The EPA's NSW Industrial Noise Policy 2000 (INP) requires an Assessment Background Level (ABL) to be determined. Choosing to follow the previous methodology for comparative purposes is considered a more conservative approach as compared with the INP ABL approach.

rural area these are L_{eq} levels of 50, 45 and 40 dB(A) for day, evening and night periods respectively.

ii. *Adverse Weather Conditions*

The “intrusiveness” noise criterion has traditionally been applied under still-isothermal (SI) conditions. Experience indicates that if the criterion is met under these conditions, noise under more adverse conditions is generally (but not always) acceptable.

Experience in similar rural areas such as the Hunter Valley, demonstrates that people become more noise sensitive if night-time noise levels exceed about 40 dB(A) on a regular basis. This is 5 dB above the level that would be set as a noise criterion under SI atmospheric conditions. Hence, one possible formulation for additional criteria would be that noise should not exceed the SI criterion by more than 5 dB on more than ten per cent of occasions throughout a year. This goal would relate to all meteorological conditions.

For the proposal, the following procedure has been used to provide an assessment under the complete range of meteorological conditions, which supplements the assessment under SI conditions:

- An additional “intrusiveness” criterion is used, that under prevailing meteorological conditions, noise levels should not exceed the standard intrusiveness criterion by more than 5dB(A) for more than 10 per cent of the operating period during a year, and,
- Additional calculations are performed to define that probability of occurrence of various noise levels accounting for the range of wind speeds and wind directions (and the interactions between these parameters) that are found at the site.

The production of “tenth percentile” noise levels involves detailed and complex noise level calculations. However, this level of detail of the likely noise environment provides regulatory bodies and residents with a more comprehensive and representative understanding of the extent and level of potential noise impacts from the development. This assessment describes the range of noise levels at each potentially affected residence under prevailing meteorological conditions, as well as graphically indicating the tenth percentile noise level.

Using the probability of occurrence of wind speed and wind direction requires more calculation than would a procedure involving a single set of meteorological parameters. This method of assessment represents best available technology and is among the most comprehensive methods to estimate actual noise levels received at a receptor as a percentage of time accounting for atmospheric effects.

6.1.3 Noise Results

i. Adopted Noise Criteria for Jandra Quarry Operations

Results of background noise measurements and adopted intrusiveness criteria are shown in *Table 6.1*.

<i>Table 6.1</i> Background Noise Levels and Intrusiveness Criteria			
Location	Minimum Repeatable L ₉₀	“Intrusiveness” Noise Criteria, L ₁₀	
	dB(A)	dB(A)	
YALA 3	37.0	42.0	
Loveday	36.8	41.8	
Jones	35.0	40.0	

ii. Neutral Atmospheric Conditions²

Results of modelling are provided in *Appendix 8*. The results indicate that there are no exceedances at any residence during any stage of the development during neutral atmospheric conditions. All residents are below the project criteria.

iii. Adverse Atmospheric Conditions³

One year of weather data supplied by the Bureau of Meteorology for Taree Airport was used to represent general wind vectors for the area. Wind vector percentage occurrence data was combined with corresponding noise levels for the analysis of the complete set of meteorological conditions.

Modelling of noise levels for the range of atmospheric conditions has been conducted for Stage 1 and Stage 3. Criteria used in the EIS 1999 have been adopted for this assessment. The criterion used for these meteorological conditions is that noise levels should not exceed the standard intrusiveness criterion by more than 5dB(A) for more than 10% of the specified time period during a year. That is, noise levels should not exceed 45dB(A) for more than 10% of the specified time period during a year. That is noise levels should not exceed 45dB(A) or 47dB(A) (depending upon location) for more than 10% of the time.

Noise levels for Stage 1 exceed recommended criterion at two locations to the east of the quarry. Stage 3 noise levels are at or below the recommended criteria.

² Taken from the discussion in Appendix 8 “Jandra Quarry Section 996 Modification Noise Assessment”, dated 19 March 2002, page 7.

³ Ibid, pages 7 and 8.

The adopted criterion for these residences is 45dB(A), which should not be exceeded for more than 10% of the time. The 45dB(A) noise level occurs for 13% of the time with noise levels at 46dB(A) occurring for approximately 9% of the time. Therefore a reduction of 1dB(A) would result in compliance.

Analysis of the relative contribution to total noise reveals that the primary crusher is dominant. The crusher is used periodically throughout the operation. Plant items used to feed the crusher are the same items of plant that will be used to construct the overburden emplacement. Removal of the crusher results in noise levels approximately 2dB(A) lower which will result in noise levels complying with the criteria. It is considered unlikely that the crusher will be operating during overburden stripping. Further, the use of the crusher will be coordinated so as not to coincide with adverse wind conditions (west or northwest winds which predominantly occur during winter and autumn) during overburden stripping operations.

It should be noted that higher noise levels are often associated with higher wind speeds, and in these cases background noise levels will also be elevated and this may tend to mask quarry noise.

6.2 HERITAGE AND CULTURAL ISSUES

An archaeological and heritage assessment of the proposed works was undertaken as part of the EIS 1999. A detailed report of the investigations is provided in *Appendix 9*. The study aimed to assess potential impacts on existing archaeological and heritage sites in the study area. Identification of archaeological sites required, surveys of the study area based on existing records of archaeological sites required surveys of the study area based on existing records of archaeological patterns within the broader area and use of subsurface probes where necessary. Work was in conjunction with the appropriate Aboriginal community representatives.

Archaeology and heritage investigations involved a review of previous archaeological investigations in the region, followed by field surveys. From this an assessment of potential impacts has been undertaken and mitigation measures have been recommended.

6.2.1 Background

Review of previous archaeological investigations indicated that ridgeline, saddles, spurs adjacent to water and river terraces are areas likely to contain material of Aboriginal cultural heritage. Within the study area, small sites such as small artefact scatters may occur along the ridgelines and within the saddles. Other heritage items relating to the timber cutting industry and banana farm phase of past land use may also be found. As the site is predominantly a ridgeline, the survey concentrated on the ridge-tops, crests, spurs and saddles. The slopes in the study area are considered too steep to have been suitable for campsites.

6.2.2 Methodology

Fieldwork was undertaken in conjunction with Taree-Purfleet Local Aboriginal Land Council and Forster Local Aboriginal Land Council. The study area was examined on foot along the ridgelines. Other vehicles tracks were also inspected by vehicle and re-inspected where reasonable exposure was found. In addition, the surrounds of the two houses on-site were inspected. One of these had been partly demolished at the time of the fieldwork.

Visibility on site ranged from 80 percent near saddles and ridge top down to between ten and fifty percent on the slopes. This in addition to the high impact of quarry operations was recognised as 'limited visibility'. The assessment also used the current undertaking of the nature of Aboriginal land use in relation to topography in the Hastings Region.

A preliminary research permit was granted by NPWS for the Conducting of subsurface probes to test the areas of insufficient surface visibility considered to have archaeological potential and which would be subject to destruction by the proposed development (*test areas shown on Figure 6.1, and on Figure 3.1 in Appendix 9*). Both ridgeline and slope landforms were tested.

6.2.3 Study Results

A total of seven sites were recorded during the initial field survey (*see Figure 6.1*). Sites J1-J5 contained artefacts. Sites J1, J3 and J5 are small open artefact scatters, site J2 contained potential midden material and J4 is a historic scared tree. Sites J6 and J7 were identified as potential archaeological deposits (PADs).

Transect 5 traversed the area of the overburden emplacement. No sites were identified within this area.

* * *

Taken from Figure 3.1 of the
Jandra Quarry EIS, 1999.



CSR Readyminix
Site Photo -- Jandra Quarry
Archaeology -- Area
Surveyed and Identified Sites
Figure 6.1



Chapter 7

ENVIRONMENTAL PROTECTION AND MITIGATION MEASURES

7.1 SUMMARY OF MITIGATION MEASURES

A substantial component of the justification of the project involves the application of mitigation measures identified throughout this Statement of Environmental Effects. These measures are summarized in Table 7.1 below:

Table 7.1 SUMMARY OF MITIGATION MEASURES

Surface Water Quality

The erosion and sediment control plan to be implemented will adhere to the guidelines and procedures identified in the existing and PNSW approved EMP and EPP's. The control structures will be both temporary and permanent and will include:

- the use of a sediment control dam;
- minimisation of the disturbed. The boundary will be marked and no stripping activity permitted outside this designated area.
- diversion of clean water from undisturbed areas around the workings;
- the installation of temporary erosion and sediment controls, such as geofabric filter devices, prior to commencement of topsoil and overburden removal;
- sequential clearing and rehabilitation;
- regular water quality monitoring of sediment control dams and downstream watercourses, and,
- the regular maintenance of erosion and sediment control structures, particularly after rainfall, to ensure their efficiency.

Air Quality

Mitigation methods to control air quality include:

- monitoring of dust deposition on the property boundaries to verify dust deposition rates and monitor the effectiveness of control procedures;
- regular watering of haul roads and the emplacement during construction phases;
- limiting the speed of vehicles on unsealed surfaces to 40 kph, and,
- rehabilitating disturbed areas.

Noise Control

The following mitigation measures will be implemented to control noise emissions:

-
- use of residential class mufflers on all relevant equipment, and,
 - overburden emplacement will not coincide with use of the primary crusher.
-

Cultural Heritage

Archaeological studies have not identified an artifacts within the area of the proposed development.

Flora and Fauna

The following mitigation measures have been developed to reduce potential impacts of the proposed development on flora, fauna and habitats.

- revegetation of disturbed areas will be undertaken progressively wherever possible to minimize the impact of loss of habitat;
- timed clearing will be implemented to reduce direct mortality of hollow-dependent fauna, and,
- the monitoring programme currently implemented within the EMP and EPP's for the site will be continued to monitor the effectiveness of mitigation measures and the suitability of revegetation techniques.

7.2 ENVIRONMENTAL MANAGEMENT PLAN

An approved environmental management plan (EMP) currently exists for the site and includes:

- a detailed soil and water management plan;
- a detailed landscape and rehabilitation plan;
- details of noise and air quality controls, and,
- an environmental monitoring and reporting programme.

The practical implementations of the plans identified in the EMP are detailed in the EPP's (see Appendix 4). Activities associated with the emplacement of overburden are captured as part of other activities on the site and will be equally applied to the overburden emplacement.

7.2.1 Environmental Monitoring

The environmental management plan includes monitoring. Monitoring includes:

- water quality of the downstream sedimentation dam;
- integrity of erosion and sediment control structures, and,
- dust deposition rates at the property boundaries.

Chapter 8

PROJECT JUSTIFICATION

8.1 ALTERNATIVES TO THE PROPOSAL

It is CSR's aim to fully utilise its resource. This requires the stripping of weathered rock at such a rate to expose the underlying fresh rock. Weathered rock is used in the production of road gravel products, fresh rock is used in high quality engineering applications. Market demands dictate whether CSR can dispose of all weathered rock into the market at a rate to expose the underlying fresh rock.

If weathered rock cannot be disposed of at a sufficient rate, production and supply of fresh rock to the market is not possible. Weathered rock must then be disposed of on site. There are no other locations on the site suitable for the disposal of this material and hence no alternatives to this proposal.

8.2 CONSEQUENCES OF NOT PROCEEDING

The consequences of not proceeding with the overburden emplacement will relate to CSR's ability to service its internal concrete market, the supply of materials for local road works and the long-term commercial viability of the site.

Jandra quarry has been identified as a Regionally Significant existing extraction site. The flow on effect of not proceeding will be the loss of a Regionally Significant operation.

* * *