

APPENDIX 1

Planning NSW's Advice



Department of
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Development and Infrastructure
Assessment
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Mr Ian Stenhouse,
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CSR Radymix,
P.O. Box 400,
PARRAMATTA NSW 2124

Dear Mr Stenhouse,

Proposed Modification Extractive Industry, Jandra Quarry
Our Reference: G92/00678

Thank you for your advice that you will be seeking a modification to the development consent for expansion of the Jandra quarry for the extraction and processing of hard rock and associated facilities in Greater Taree Local Government area issued by the Minister on 30 March 2000.

Applications should be lodged with the Department's Information Centre (Ground Floor, Governor Macquarie Tower, cnr Bent & Phillip Streets Sydney; or GPO Box 3927 Sydney 2000).

The application should address the requirements of S115 of the Regulations(2000) and for applications under s96(2) of the Environmental Planning and Assessment Act, 1979, 15 copies of a completed Statement of Environmental Effects (SEE) are required.

The SEE for applications under s96(2) should cover the following matters:

- justification for the use of section 96(2) to modify the consent, by demonstration that the development as modified would be substantially the same development as the approved development.
- a detailed description of all elements of the proposed modification and the land on which these elements are to be located;
- a description of how the modification affects the operation of the development as approved by the Minister;
- a map showing the current development with all proposed new or modified elements clearly marked;
- a schedule of property descriptions to which this application applies, together with ownership details;
- a copy of all current development consents for the subject development (both Minister's consents and Council consents) and any previous modifications;
- a description of the environment of the area;

- details on water management and sediment controls and impacts on water quality and sedimentation downstream;
- impacts on flora and fauna;
- an assessment of the potential environmental impacts of the proposed modifications, by reference to the relevant matters in section 79C of the *Environmental Planning and Assessment Act, 1979*, including noise, dust and visual impacts.
- a report on threatened species, populations or ecological communities, or their habitats, including the following:
 - (a) a description of the study area, including details of the types and condition of the habitat(s) in, and adjacent to, the land to be affected by the proposal;
 - (b) a list of those threatened species, populations or ecological communities known to occur in the same or similar habitats in the region; and
 - (c) an assessment of the likelihood of those species, populations or ecological communities identified in b) occurring within the study area given the habitat requirements of the species, populations or ecological communities and the habitats present within the study area.

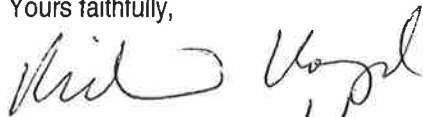
The Regulation prescribes the following application fees for modifications:

- applications under s96(1) – \$350 or 50% of the original application fee, whichever is the lesser (unless the original application fee was less than \$100, then the fee is 50% of the original application fee);
- applications under s96(2) – \$100 or a maximum of 50% of the original application fee, whichever is the greater (unless the original application fee was less than \$100, then the fee is 50% of the original application fee); plus an advertising fee of \$500.

A copy of the original Development Application or receipt should be forwarded prior to lodging your application to assist in the calculation of the fee.

If you have any enquiries about this matter, please contact Val Smith on (02) 9391 2384.

Yours faithfully,



Richard Lloyd

22/6/01

Senior Environmental Planner
Development and Infrastructure Assessment

APPENDIX 2

Flora and Fauna Assessment

REPORT ON ECOLOGICAL ASSESSMENT

for

**Proposed Overburden Placement Area
Part Lots 2,11,12,13,14 & 15 DP 790056
Jandra Quarry**

including

**SEPP 44
(Koala Habitat Assessment)**

**SECTION 5A (EP&A Act)
(Threatened Species Assessment),**

**SECTION 79C(EP&A Act)
(Impact on Natural Environment Assessment)**

and

**Assessment of Environment Protection &
Biodiversity Conservation Act Requirements**

Prepared by **B J SALTER**
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4 December 2001

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SUMMARY

This Report addresses the legislative requirements in relation to SEPP 44 Assessment (Koala Habitat Protection), Section 5A EP&A Act Assessment (Impact on Threatened Species), Section 79C EP&A Act Assessment (Impact on the Natural Environment) and the Commonwealth's Environment Protection and Biodiversity Conservation Act Assessment.

Development Consent is being sought for expansion of the approved quarry site to provide additional space for the deposition of overburden. These Assessments are the ecological requirements of a Development Application/EIS being prepared by CSR Limited.

The quarry is located on Lots 2, 11, 12, 13e, 14 and 15 DP 790056, with an area of 118 ha, located adjacent and south of the Pacific Highway between Taree and Nabadac.

Development of a overburden deposition area will entail the removal of forest over an area of about 2.2 ha as well as utilisation of a further 0.9 ha that has been previously cleared. This area is located adjacent the existing/proposed quarry expansion site.

Of the 118 ha area encompassed by the Lots, an area of about 20 ha will eventually be cleared for quarry development (includes the 3.1 ha of this proposal). The remainder is likely to remain forested. The general area has been partly developed as grazing land/highway/rural residential development.

Vegetation occurring on the site is dry sclerophyll regrowth forest (2.2 ha of the 3.1 ha site). Ecologically, the main feature is the presence of one habitat tree (tree with hollows). However, similar and better trees occur outside the proposed overburden within forest that probably will be retained indefinitely. This forest on the site is similar to much of the forest found in this locality.

Flora surveys, fauna observations and analysis of impact have been undertaken to determine the likely presence of threatened flora and fauna and the possible impact of the proposal on any species present or likely to be present. Additionally, potential impact on native flora and fauna generally has also been assessed. Surveys detected the probable presence of a threatened bat. No threatened flora species occur or are likely to occur. Previous surveys (and an employee report) detected the presence of three other threatened fauna species on the Lots (not necessarily near the site of the proposed overburden deposition area).

In relation to these assessments, first the site was not "core koala habitat" and therefore it is not necessary to prepare a Koala Plan of Management. Second, it was determined that the Proposal will not have a significant impact on any potentially occurring threatened flora or fauna species nor their habitats. The Section 79C Assessment determined that the proposal should have minimal impact on flora, fauna and biodiversity. An Environment Protection and Biodiversity Conservation Act Assessment determined that there would be no significant impact on any matter of national environmental significance.

Similar conclusions were also adopted as a result of the previous EIS undertaken 2 years ago for quarry expansion.

Accordingly, these considerations should not prevent development consent being granted for this proposal.

To ensure that a significant impact on potentially occurring threatened species does not occur and impact on biodiversity is minimised, a precautionary approach has been adopted and Recommendations have been suggested as requirements for inclusion in any development consent granted.

ABBREVIATIONS AND SYMBOLS

dbhob – diameter breast height over bark

EIS – Environmental Impact Statement

EP&A Act – Environment Planning & Assessment Act

EP&BC Act – Environment Protection and Biodiversity Conservation Act

E - *Eucalyptus*

FIS – Fauna Impact Statement

GTCC – Greater Taree City Council

ha – hectare

^{IS} - Introduced species

m asl – metres above sea level

NP&WS – National Parks & Wildlife Service

pers comm - personal communication

pers obs - personal observations

^{PS} - Protected species – Sch 13 NP&W Act

SEPP – State Environment Planning Policy

SFNSW – State Forests of NSW

SIS – Species Impact Statement

^{TS} - Threatened species – TSC Act (1995)

TSC Act - Threatened Species Conservation Act

INTRODUCTION

1 GENERAL

This Report has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act 1979 and Regulation, the Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act.

The author of this Report and field assessor was Brian Salter, aided by a technical assistant. As a professional forestry and ecology consultant with 33 years total experience, I consider my credentials as an environmental scientist are more than adequate to undertake SEPP 44, Section 5A and 79 C (EP&A Act) and the recent Commonwealth Environment Protection and Biodiversity Conservation Act Assessments - a task which I have undertaken many times previously (see CV – Attachment 8).


To the extent possible these Assessments were undertaken in an objective manner based on a concept proposal provided by the client. To reach some of the conclusions required, it is necessary that "judgements" and "reasoned logic" be applied - due to the limitations of available data. Availability of data is obviously governed by both time and cost of surveys. Additionally, literature providing general wildlife research undertaken and available results for use as references and to support judgements/conclusions is inadequate in many aspects. Various references and bibliography were used in the preparation of, and as background to this Report (see Attachment 7 – this list has some references not necessarily used for these specific assessments).

Information presented in this Report is not intended to necessarily support the Proposal and opinions are as objective as possible.

The Report addresses requirements of:

- SEPP No 44 (Koala Habitat Protection) Assessment – PART A.
- Section 5A (EP&A Act) Threatened Species Assessment – PART B.
- Section 79C (EP&A Act) Requirements – PART C.
- Environment Protection and Biodiversity Conservation Act Assessment – PART D.

Recommendations are in PART E and Attachments in PART F.

Prepared by:  (BRIAN SALTER)

Date: 28 November 2001



2 LOCATION AND DESCRIPTION OF STUDY SITE

The study area is a 3.1 ha component of an area of about 118 ha owned by CSR Pty Ltd and operated as a hard rock quarry known as Jandra. This quarry is located adjacent and south of the Pacific Highway between Taree and Nabadac - see Attachment 1.

The study area (hereafter referred to as the *Site*) investigated is a component of the area encompassed by Lots 2, 11, 12, 13, 14 and 15 DP 790056 – hereafter referred to as the Lots. Area of the Lots is about 118 ha.

Given that an EIS has been previously prepared for the quarrying activity and subsequently development consent granted, and that the current proposed addition to the quarrying activity involves a specific adjacent area of about 3 ha – the area studied will be mainly confined to that specific area. The boundaries of the *Site* were identified from a 1:2 000 Plan and with advice from the quarry management – see Attachment 2.

The *Site* is mostly forested. Some minor clearing has taken place in the past for the deposition of overburden, an unutilised explosive magazine site and an access track – see Attachment 3.

Forest cover comprises mature eucalypt regrowth forest. Within this forested area, past disturbance has included the clearing activity listed above and timber harvesting probably about 40 years ago.

Topography is moderate. The *Site* falls on slopes of about 10-15° to the east from a north-south running ridge, to the upper headwaters of a subsidiary drainage line of Bungwahl Creek – see Attachment 2. These ephemeral headwaters only carry run-off for short periods after heavy rainfall. Altitude ranges from 64 m asl to about 36 m asl.

The general area near the *Site* is variously developed. Nearby and mainly to the west, major vegetation removal has occurred for the quarry and for associated infrastructure. The extent of development is shown on Attachment 1. This development has both 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).

Likely future expansion of the quarry will occur adjacent and south of the *Site* and further west. The remainder of vegetation on the Lots (about 98 ha) is not proposed to be disturbed – see Attachment 1.

The EIS found that “a potential wildlife corridor currently extends in a north south direction between the existing quarry area and the semi cleared farmland in the east of the study area” – see 5.5.2 of the EIS. Progressive revegetation was proposed to minimise the “loss of wildlife function in the area”.



3 PROPOSED DEVELOPMENT AND POTENTIAL IMPACTS

CSR Ltd advise that it is proposed to provide for additional space to place overburden to permit continued and efficient operation of the Jandra Quarry (see Attachment 2). This will require:

- expanding the placement area towards the east by the clearing of approximately 2.2 ha of forested vegetation over a period of 10-15 years (as well as utilising about 0.9 ha already cleared).
- construction of the overburden placement area is to be by forming a series of terraces commencing at the base of the slope and moving up-hill. Each terrace "lift" will be 5 m high and a berm will be left for access to tree planting.
- a standoff of approximately 10 to 15 metres from the ephemeral creek is proposed and sediment controls will be in place to prevent sediment migration into the watercourse.

For the purpose of impact assessment, the possible potential impacts of the proposal on threatened fauna and on threatened flora can be broadly grouped as:

Potential Direct Impacts

- harm or remove individuals and/or communities of fauna and flora
- loss of habitat including loss of roosting/nesting sites and foraging substrates
- reduction in biodiversity, including management of ecological communities and their habitats and incremental loss of habitat

Potential Indirect Impacts

- on individuals of fauna by fragmentation of habitat and loss of connectivity
- on individuals and populations by increasing stress levels to unacceptable levels
- impact of human presence eg noise, light, dust, increased weeds
- increased predation by feral animals
- removal of connection corridors and remnant vegetation
- impact on soil erosion and water quality

These potential impacts on fauna and flora will be considered in the Eight Point Test analyses undertaken.



PART A

SEPP 44 (KOALA HABITAT) ASSESSMENT

1 LEGISLATIVE REQUIREMENTS

Following a preliminary site inspection, the *Site* was investigated and assessed on 17th and 22nd November 2001.

The purpose of inspection was to determine the presence or otherwise of "Potential Koala Habitat" as defined in SEPP No 44. Additionally, if "Potential Koala Habitat", then determine whether "Core Koala Habitat" exists. Further, if "Core Koala Habitat" exists, then consider preparation of a Plan of Management.

"Potential Koala Habitat" means "areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component".

"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".

2 DETERMINATION OF "POTENTIAL KOALA HABITAT"

2.1 Methodology and Analysis

2.1.1 Methodology

Within the forested area of the *Site*, vegetation consists of Open Dry Sclerophyll Forest. This vegetation is dominated by the following species in decreasing order: Tallowwood, White Mahogany, Bloodwood and Grey Gum - with lesser occurrences of Ironbark, Spotted Gum, Blue Gum and Turpentine. Understorey is limited mainly to smaller eucalypts and some Forest Oak. Shrub layer is variable. Groundcover is native grasses and Spiny Matt Rush

The proposal will remove trees and other vegetation and have possible additional impacts as specified above. These impacts on koalas have been assessed in this study.



Note: This Assessment was undertaken principally within the *Site* – not necessarily the full area of the Lots. Note however, that a previous SEPP 44 survey/assessment (component of EIS) covered the full area of the Lots. Further, current surveys extended beyond the *Site* into adjoining forest. (Reference Circular B 35 Department of Planning 22 March 1995, inter alia states that surveys are to concentrate on areas proposed for disturbance, ie in this case only about 2.2 ha of the 118 ha Lots.

As the vegetation is relatively uniform (all dry sclerophyll), no differentiation between the two communities that occur was considered necessary. Surveys to assess whether vegetation is Potential Koala Habitat were based on establishing a number of randomly located 0.1 ha circular plots over the full forested area of the *Site*. In all, nine plots were established (see Attachment 4).

Within these plots, all overstorey and understorey trees (>10 cm dia) were identified and counted.

The results of these surveys are in Attachment 5. A summary of all plot data is as follows:

SPECIES		OVERSTOREY		UNDERSTOREY	
Botanical Name	Common Name	No	%	No	%
<i>*E. microcorys</i>	Tallowwood	31	23	25	14
<i>*E. propinqua</i>	Small-fruited Grey Gum	23	16	24	13
<i>E. umbra/acmenoides</i>	White Mahogany	25	18	51	29
<i>Corymbia maculata</i>	Spotted Gum	11	8	34	19
<i>Corymbia intermedia</i>	Pink Bloodwood	25	18	20	11
<i>E. siderophloia</i>	Northern Grey Ironbark	20	14	13	7
<i>Lophostemon confertus</i>	Brushbox	-	-	2	1
<i>Syncarpia glomulifera</i>	Turpentine	2	1	7	4
<i>E. saligna</i>	Blue Gum	3	2	4	2
TOTAL		140	100	180	100
* Schedule 2 species		54	39	49	27
Potential koala habitat			Yes		Yes

Note: *E. propinqua* included as a "Schedule 2 Species" due to close similarity to *E. punctata* (a listed Schedule 2 Species).



2.1.2 Analysis of Results

In relation to the total for all plots, both overstorey and understorey had a component of Schedule 2 Species >15% (54% and 49% respectively). It was not considered necessary to determine the distribution of Schedule 2 species other than for the broad vegetation occurrence. However, analysis of the data indicates that all plots had a relatively high occurrence of Schedule 2 species within the overstorey and understorey (overstorey ranges from 23% to 72% and understorey ranges from 8% to 42%). Similarly, all plots had an overstorey composition of Schedule 2 species >15%, and all but two of plots had an understorey composition >15%.

2.2 Conclusion

In accordance with the provisions of SEPP 44 it is concluded that the Dry Sclerophyll Forest is "Potential Koala Habitat" as defined by SEPP 44, ie Schedule 2 species content >15%. As development will impact on the forested vegetation within the development envelope, it is therefore necessary to determine whether this vegetation is "Core Koala Habitat".

3 DETERMINATION OF "CORE KOALA HABITAT"

Further investigations were undertaken to determine the likelihood of the site being "Core Koala Habitat". SEPP 44 specifies "Core habitat" to be:

- ⇒ "an area of land with a resident population of koalas"
- ⇒ "attributes such as breeding females (that is, females with young)"
- ⇒ "recent sightings of and historical records of a population"

3.1 Factors Determining Core Habitat

The following matters were considered in determining whether Core Habitat occurs.

3.1.1 Tree Species – Number

Schedule 2 primary browsing tree species occur in high numbers, averaging 54% in the overstorey and 49% in the understorey. Whilst a full tree count was not made over the *Site*, extrapolation of the plot data indicates an approximate total of 138 overstorey Schedule 2 species trees and 125 understorey trees occur on the *Site* and will be removed. Other favoured feed tree species (Ironbark) occur.

Given this, on this factor alone the site is desirable koala habitat and as most trees are regrowth of relatively low site height, this site could be expected to be favoured by koala populations. Further, other secondary browsing tree species also occur, eg *E. siderophloia*. Other trees and shrubs known to be "shelter trees" for koalas, such as *Allocasuarina* occur however, generally this species is not well developed over the *Site* with understorey having poorly developed crowns.



In the Draft Koala Habitat Atlas (prepared for GTCC – June 1997), of 31 tree species beneath which faecal pellets were found in that Study, the species occurring on this *Site* ranked as follows:

<i>E. microcorys</i>	No 3
<i>E. carnea (umbra)</i>	No 6
<i>E. siderophloia</i>	No 7
<i>E. propinqua</i>	No 9
<i>Corymbia intermedia</i>	No 15

This indicates that of the five most commonly occurring species on this *Site*, whilst not the most favoured feed tree species for koalas in the Manning, four rank in the top ten most favoured tree species.

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 comprise greater than or equal to 50% of the dominant overstorey species".

3.1.2 Presence of Koalas

The possible presence of koalas has been determined as follows:

- Site observations:

Following a preliminary site inspection the following surveys were undertaken on 17 and 22 November 2001:

- daylight observations and surveys for koalas or evidence of koalas including search for high use trees - on two days during assessment of vegetation, together with specific koala usage (scat search) and additional observations associated with Section 5A assessments by two persons for a period of 11 person hours.
- spotlight surveys (two) were undertaken using two spotlights for a period of 8 person hours.
- broadcast koala call playback tapes were undertaken on two nights from one location.
- These observations were by random meander over the full area of the *Site* and also extended into adjacent forested areas. No koalas were sighted nor heard.

- Anecdotal Evidence: The quarry manager and a resident on the site were interviewed to ascertain possible sightings (unrecorded in databases) of koalas. The manager stated that an employee had sighted a koala at the quarry entrance in the past week. These persons have neither seen nor heard any other koala anywhere in the area, nor know of anyone else detecting any other koala.



- **NP&WS Wildlife Data Base:** A search of the Wildlife Atlas database dated 20 November 2001 indicates records of koalas within 10 km to be as follows:

Record	Distance (km)	Direction	Year Sighted
1	4	NW	1974
2	4	NW	1993
3	4	N	1993
4	6	N	1949
5	8	SW	1996
6	8	SW	1996
7	6	W	2000
8	7	W	2000
9	8	W	2000

It is noted that there are very few records and the closest recent sighting is 4 km distant. Therefore based on this information, it could be reasonably concluded that koalas occur only in very low numbers in the area.

- **Other Studies:** Greater Taree City Council's survey and Koala Society records indicate the presence of Koalas as follows:

Record	Distance (km)	Direction	Year Sighted
1	3	NW	Unknown
2	5	N	Unknown
3	5	NE	Unknown

Note: There is no information available on these records. It is possible and likely that some are duplicate records of the same animal, some may be releases, some could be many years old and some may be unreliable records. Nevertheless, these records indicate that a sparse occurrence of koalas occurs – but few in the vicinity of these Lots.

Additionally, studies were undertaken as a component of the EIS quarry expansion application and also further studies were undertaken by North Coast Forestry and Ecology Services as a pre clearing requirement. These investigations did not reveal the presence of koalas.

- **Scats:** Thorough searches by two persons beneath a large number of both primary and secondary feed tree species were undertaken over the two days in the area. No scats were located.
- **Scratches:** Although a dubious indicator, there were no scratches which could be definitely attributed to koalas on the many trees observed. Those occurring probably were from goannas or possibly Brushtail Possums.



3.1.3 Site Nutrient Levels

Koalas prefer feed trees growing in high nutrient level areas. This site is a low level nutrient area. Species indicative of higher site quality, eg *E. grandis* do not occur and soil types are generally shallow and poor. Further, studies indicate that often koalas do not utilise favoured feed tree species if growing in low nutrient sites (reference Vanessa Standing's Report for Kempsey Shire and GTCC Koala Habitat Study). In the Draft Koala Habitat Atlas prepared for GTCC the occurrence of favoured tree species and high nutrient soil types were listed as the major limiting factors affecting distribution and abundance of koalas in the Manning.

3.1.4 Vegetation Disposition

The general area near the study site is variously developed – either as a quarry, cleared pasture, rural properties and a major highway. Whilst this has occurred, it is not to a degree that would totally prevent movement of koalas through the *Site* nor through the Lots.

The question of connectivity is further addressed below in Part B (Eight Point Test for koala) and Part C (Section 79 C) assessment.

3.1.5 Adjacent Development

A major active quarry occurs within the Lots and immediately adjacent the *Site*. Although koalas are often sighted near development, in this case it is considered that noise, vibration and dust deposition would likely preclude regular occurrence. Any presence is more likely to be transient.

3.1.6 High Use Studies

Determination of the presence of high use (or core) koala habitat areas using NP&WS/SFNSW protocols - based on presence/count of scats and/or a mother and joey could not be undertaken due to the total absence of scats and detected animals (on the *Site*). Accordingly, no high use areas (SFNSW methodology) were located. Generally the SFNSW form of survey is more appropriate for larger areas. Further, there were no railway track "runway" trees observed which indicate high use.

AKF methodology (AKF 1995) of determining the tree species that are "primary browse trees", or activity levels that determine whether the area contains a "socially stable breeding aggregate", were in the main satisfied by the amended methodology. Given the extensive searches for scats and the nil result, had plots been established then an activity level $\geq 30\%$ (for "plots") could not occur. This indicates that the area is not likely to contain home range trees and/or an area of major activity currently being used by koalas with well defined home range areas.

Therefore it could not be concluded that on this *Site* any of the tree species is a primary browse species, nor could it be concluded that the *Site* contains a "socially stable breeding aggregate".



3.2 Discussion and Conclusion

Although no evidence of koala occurrence was found on the *Site*, this is not to say that it is not possible for a sparse population of ranging koalas to occur on the Lots – for instance one was sighted at the quarry entrance in the past week. A low population level could be normal for koala populations in the area due to the lower nutrient levels in comparison to higher population densities found at Port Macquarie, Coffs Harbour and Port Stephens. In the Manning, koalas are generally found in low densities over dispersed areas without the aggregations of individuals found in other areas. Accordingly, core koala habitat is not readily definable or identifiable for such low populations.

Koalas have home ranges of varying extent. It is natural that males require a home range overlapping that of breeding females, ie a larger range. Whilst the number of animals which may use the *Site* as their home range may be lower than in high nutrient areas, it is possible that the *Site* is part of a home range. Although the area of forest to be removed by the proposal is only 2.2 ha, this may be a minor component of the core habitat of a dispersed population that interacts at breeding time. However, a significant area of habitat occurs elsewhere on the Lots (up to 98 ha) - most of which will not be directly disturbed. Therefore, any impact on koalas by part removal of this very small area of habitat could only be minimal - and could not be significant. Indirect disturbance (noise, vibration, dust etc) will not be significantly increased beyond the levels addressed in the EIS – hence need not be considered in this Assessment.

For reasons elaborated elsewhere it is not considered that removal of up to 2.2 ha of forest will reduce or have significant impact on the connectivity to other areas of habitat.

Based on these considerations it is therefore reasonable to conclude 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 above review the subject site is not considered to be “Core Koala Habitat”, and according to the provisions of SEPP 44, a Koala Management Plan is not required.



Although the forest cover on the *Site* is Primary Koala Habitat in the GTCC 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 ha of "good quality" habitat will be removed by the proposal. It is unlikely that removal of such a small area will have any impact.

However, DUAP should encourage Council to consider addressing continued incremental loss of habitat by appropriate studies and zoning as well as the preparation of either Vegetation Management Plans and/or a Koala Plan of Management for the Greater Taree City Council Area and/ or a localised DCP. Such Plans require State/Federal Government over-riding principles – that address need for development as a result of population increase. Ad hoc studies of single Lots/*Sites* thereof is not a preferred method to assess incremental loss of habitat. However, in this case there is no other additional proposed development known for this area. Should significant further development proposals be forthcoming, then the issue of continued incremental loss of habitat will require closer analysis.

4 RECOMMENDATIONS

Whilst preparation of a Koala Management Plan is not mandatory, recommendations to mitigate impact on koalas are appropriate. In this case DUAP should consider inclusion of the Recommendations (see Part E) in any development approval.

See Part E at end of the entire Report.

5 ATTACHMENTS

See Part F attached at the end of the entire Report.



PART B

SECTION 5A (EP&A Act)

THREATENED SPECIES ASSESSMENT

1 LEGISLATIVE REQUIREMENTS

It is necessary that an assessment be undertaken in accordance with Section 5A of the EP&A Act, specifically to determine if the proposed development has a significant effect on threatened species, populations or ecological communities or their habitats.

In respect to the Threatened Species Conservation Act (1995), Section 5A of the EP&A Act sets out the factors to be considered in deciding whether there is likely to be a significant effect on threatened species etc, and hence if a Species Impact Statement is required. The requirements of the test are set out in Attachment No 6.

The test is also referred to in Section 79C of the EP&A Act.

2 FLORA

2.1 Survey Methodology

Flora surveys and observations of the site were undertaken by B J Salter and a technical assistant on 17 & 22 November 2001. An initial site inspection indicated that the vegetation on the *Site* comprised a community of Dry Open Sclerophyll Eucalypt regrowth forest.

These vegetation communities, structure, floristic composition and habitat components were then verified and further identified by numerous random observations. Targeted surveys for a list of possibly occurring threatened flora species were undertaken. Nevertheless, virtually all flora occurring was identified.

Survey and assessment concentrated where disturbance is to occur, ie the 2.2 ha forested area required for overburden placement.



2.2 Survey Results

The *Site* (3.1 ha) comprises the following vegetation alliances:

- clearing (0.9 ha)
- mature dry open sclerophyll regrowth (2.2 ha)

These surveys indicate the occurrence of the following communities and species:

Clearing

Clearing has occurred as follows:

- Area A - for previous deposition of overburden (0.6 ha)
- Area B – for previously intended explosive magazine (0.2 ha)
- Area C - access track (0.1 ha)

These sites have no vegetation other than grass/weed cover present.

Mature Dry Open Sclerophyll Regrowth Forest

Overstorey (in decreasing frequency of occurrence)

BOTANICAL NAME	COMMON NAME	OCCURRENCE
<i>E. microcorys</i>	Tallowwood	23%
<i>E. umbra/acmenoides</i>	Narrow-leaved/Broad-leaved White Mahogany	18%
<i>Corymbia intermedia</i>	Pink Bloodwood	18%
<i>E. propinqua</i>	Small-fruited Grey Gum	16%
<i>E. siderophloia</i>	Northern Grey Ironbark	14%
<i>Corymbia maculata</i>	Spotted Gum	11%
<i>E. saligna</i>	Blue Gum	3%
<i>Syncarpia glomulifera</i>	Turpentine	2%

Species proportions reflect averages for the full 2.2 ha forested area of the *Site*. Observations indicate though that a subtle variation in species distribution and occurrence occurs in that Spotted Gum occurs (but does not dominate) on part of the *Site* (see Attachment 3).

Within the White Mahogany/Tallowwood stand the following species occur in decreasing order – White Mahogany, Tallowwood, Pink Bloodwood, Northern Grey Ironbark, Grey Gum, Turpentine, Blue Gum and Spotted Gum.



Within the "Spotted Gum" stand the following species occur in decreasing order – Tallowwood, Grey Gum, White Mahogany, Pink Bloodwood, Spotted Gum, Northern Grey Ironbark and Blue Gum.

It is considered that given the small area involved and that Spotted Gum does not dominate – then a distinction in this report between these variants is not warranted.

Therefore, overstorey can be categorised as a Tallowwood/White Mahogany Community. This forest is commonly known as a Dry Hardwood Forest Community – which is noted for the variability in species dominance. Note however that the original dominant vegetation compositions have been considerably altered by past selective harvesting and subsequent regrowth. Inherent variations can also be expected. Therefore, definitive (absolute) classification as a specific Community (or ecosystem) must be treated with caution.

This vegetation is considered to best fit the description of Ecosystem 36 *Dry Grassy Tallowwood* (as defined in *Forest ecosystems Classifications for UNE and LNE CRA Regions*). This variability in dominance of species can and does govern the Title adopted for the ecosystem present. Therefore caution is 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. No comparison with classification adopted for the Draft GTCC Vegetation mapping was undertaken – as this is draft mapping and is inappropriate for such a small area.

The stand overall is best described as mature regrowth – evidence exists of logging about 40-50 years ago. There has been little disturbance to the overstorey since that harvesting. Average size of dominants is about 30-40 cm dbhob, with scattered trees being up to about 50 cm dbhob. Site height is about 35-40 m. There is only one tree with "habitat" value – ie with hollows.

Understorey (in alphabetical order)

BOTANICAL NAME	COMMON NAME
<i>Allocasuarina torulosa</i>	Forest Oak
<i>Corymbia intermedia</i>	Pink Bloodwood
<i>E. acmenoides</i>	Narrow-leaved White Mahogany
<i>E. microcorys</i>	Tallowwood
<i>E. saligna</i>	Blue Gum
<i>E. propinqua</i>	Small-fruited Grey Gum
<i>E. siderophloia</i>	Northern Grey Ironbark
<i>E. umbra</i>	Broad-leaved White Mahogany
<i>Lophostemon confertus</i>	Brushbox
<i>Syncarpia glomulifera</i>	Turpentine

Understorey is minimal and comprises mainly young eucalypts and generally sparse, suppressed and poorly developed *Allocasuarina torulosa*.



Shrubs (in alphabetical order)

BOTANICAL NAME	COMMON NAME
<i>Acacia floribunda</i>	White Sally
<i>Acacia longifolia</i>	Sydney Golden Wattle
<i>Acacia maidenii</i>	Maiden's Wattle
^{IS} <i>Ageratina adenophora</i>	Crofton Weed
<i>Breynia oblongifolia</i>	Coffee Bush
<i>Callistemon salignus</i>	Willow Bottlebrush
<i>Cordyline stricta</i>	Palm Lily
<i>Glochidion ferdinandi</i>	Cheese Tree
<i>Hibbertia aspera</i>	No common name
<i>Hibbertia obtusifolia</i>	No common name
<i>Jacksonia scoparia</i>	Dogwood
^{IS} <i>Lantana camara</i>	Lantana
<i>Leucopogon juniperinus</i>	Prickly Beard-heath
<i>Maytenus silvestris</i>	Narrow-leaved Orangebark
<i>Notelaea longifolia</i>	Large Mock-olive
<i>Oxylobium ilicifolium</i>	No common name
<i>Ozothamnus diosmifolius</i>	White Dogwood
<i>Persoonia linearis</i>	Narrow-leaved Geebung
<i>Polyscias sambucifolia</i>	Elderberry Panax
<i>Rhodamnia rubescens</i>	Shrub Turpentine
^{IS} <i>Solanum mauritianum</i>	Wild Tobacco Bush
<i>Xanthorrhoea macronema</i>	Grasstree

The shrub layer is relatively sparse. No one species dominates – *Acacia* sp. and *Oxylobium* sp. probably dominate.



Ground Cover

BOTANICAL NAME	COMMON NAME
<i>Andropogon virginicus</i>	Whisky Grass
<i>Dianella sp.</i>	Blue Flax Lily or Blueberry Lily
<i>Eustrephus latifolius</i>	Wombat Berry
<i>Hibbertia scandens</i>	Climbing Guinea Flower
<i>Imperata cylindrica</i>	Bladey Grass
	Other Native Grasses
<i>Lomandra longifolia</i>	Spiny-headed Mat Rush
^{1S} <i>Onopordum acanthium</i>	Scotch Thistle
<i>Pteridium esculentum</i>	Bracken
<i>Rubus hillii</i>	Molucca Bramble
<i>Sarcopetalum harveyanum</i>	Pearl Vine
<i>Solanum brownii</i>	Violet Nightshade

Groundcover is dominated by grasses and Spiny-headed Matt Rush.

2.3 Threatened Species or Communities Detected

None of the above detected species or ecological communities are listed as threatened in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 No 101 (up to and including amendments dated 26 October 2001).

Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any threatened species, if present, was not detected.

2.4 Threatened Species Recorded within 25 km of the Site

A review of TSC Act Schedule 1 & 2 species recorded within 25 km of the *Site* was undertaken (source - NP&WS Wildlife Atlas Database dated 21 November 2001).



These species are:

- *Acacia courtii*
- *Allocasuarina defungens*
- *Asperula asthenes*
- *Cynanchum elegans*
- *Grevillea guthrieana*
- *Hibbertia hexandra*
- *Hakea archaeoides*
- *Parsonsia dorrigoensis*
- *Thesium australe*

None of these species were detected on the *Site*, nor were they during previous surveys of the Lots. Further, virtually all species occurring have been identified. Either habitat is unsuitable, or as most species occur in populations rather than single plants – it is most unlikely that any species if present was not detected.

Regardless of lack of detection, these species were considered for an Eight Point Test analysis (see 4.2 and Attachment 6).

2.5 Threatened Species Not Recorded Within 25 km of the *Site* - but which may occur

A review was undertaken of other species which could occur in this locality and within habitat as found on the area (Source - SFNSW Bulahdelah Management Area Plan/ NP&WS List of the Threatened species for Northern Zone/Northern *Site* SFNSW Draft Rotap prescriptions/Students Flora of North Eastern NSW/Flora of NSW – G Harden, previous studies, eg Jandra Quarry EIS, other nearby studies and personal knowledge including a researched Occurrence List - based on known distribution and habitat preference) indicates possible presence of the following species.

Schedule 1 - Endangered Species (dry sclerophyll and woodland species)

- *Caesia parviflora* var *minor* (herb)
- *Grevillea caleyi* (shrub)

Schedule 2 - Vulnerable Species (dry sclerophyll and woodland species)

- *Bothriochloa biloba* (grass)
- *Grevillia obtusiflora* (shrub)
- *Syzygium paniculatum* (tree)
- *Tetratheca juncea* (shrub)



This is not to be taken as an all inclusive list but rather an indicative list. As a result of this review it was determined that it is unlikely that any other species could occur. Species that could possibly occur within the adjacent riparian vegetation alliance have not been considered as there will be no disturbance to this vegetation.

None of these species were detected on site, nor were they during previous broader surveys over the Lots. Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any species if present was not detected.

Hence none of the species, populations or ecological communities listed as threatened in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 No 101 (up to and including amendments dated 26 October 2001) occur or are likely to occur.

Regardless of lack of detection, these species were considered for an Eight Point Test analysis (see 4.2 and Attachment 6).

3 FAUNA

3.1 Habitat Value Assessment

Ecological investigations and assessment of the habitat values of the *Site* for fauna are a pre-requisite of surveying - to determine target species and design of appropriate survey methodology to detect possibly occurring fauna. Habitat value was assessed for the vegetation community present, particularly in the areas where the main disturbances would occur as a result of the proposal, that is, forested areas within the proposed overburden placement envelope. Other considerations included the prediction of threatened fauna that may occur (see **Part B Nos 3.4, 3.5 and 3.6**) and the nature/extent of proposed disturbance/non-disturbance (see **Introduction No 3**). Based on these considerations appropriate determination was made on the nature, intensity and location of surveys necessary to assess fauna presence.

The Mature Regrowth Dry Sclerophyll Forest overstorey within the development envelope has not been significantly disturbed in recent times. Past disturbance has been timber harvesting, minor clearing for tracks (0.1 ha), the clearing of 0.6 ha 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" – large old tree with hollows, occurs. This tree is a Bloodwood of about 80 cm dbhob and has two hollows of about 30 cm dia and four of about 10 cm dia - (see Attachment 4).

Observations carried out indicate that some of the microhabitat features occur that are considered necessary 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.



An indication of presence or absence of these microhabitat features is shown in the following Table and Notes.

MICROHABITAT FEATURE	PRESENCE
Old growth/large diameter trees with large hollows	✓ ₁
Dead standing trees with hollows or branching structure suitable for nests	-
Dense groundcover	-
Fallen hollow logs on the ground and hollow stumps	✓ ₂
Rocks or rocky outcrops or cliffs	-
Wet or moist sclerophyll or sub tropical or warm temperate rainforest	-
Caves, tunnels or cliff faces with crevices	-
Dense undergrowth, particularly associated with extensive edges to open forest or grassland	-
Well grassed (not mown) areas adjacent forest	-
Accessible base hollows (bat habitat)	-
Dense <i>Allocasuarina</i> stands	✓ ₃
Other specialised vegetation and/or foraging substrate, eg mature <i>Banksia</i> or <i>Xanthorrhoea</i> , Lilly Pilly, rainforest fruiting species, littoral rainforest, heath, floriferous plants and sap source trees. (See above re <i>Allocasuarina</i>)	✓ ₄
Winter flowering eucalypts	✓ ₅
Mistletoe	-
Open woodland	-
Proximity to other areas of habitat/corridors	✓ ₆
Trees with decortivating bark	-
Primary koala feed tree species	✓ ₇
Permanent, semi-permanent or ephemeral water bodies, aquatic habitats or wetlands. Pools with associated soaks, seepages or bogs. Swamps or habitats with sedges and other Cyperaceae.	-

✓ Occurs

- Does not occur or insignificant in number



Notes:

- 1 Hollow trees represent habitat for hollow – dependent vertebrates. Only one tree with this habitat value was identified on the *Site* (see Attachment 4 for location). This was not a classic trees, ie did not have large diameter/many hollows/varying size hollows/several species/well distributed spatially. 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 ^{TS}Glossy Black-Cockatoo.

Whilst only one habitat tree occurs, these are in decline generally and could be critical to the survival of local threatened species, however only one species (probably) detected. No widespread search of adjacent habitat was possible, however general observation (and previous EIS investigations) indicates limited occurrence of similar habitat trees.
- 2 Logs on the ground occur in relatively low numbers, mainly the result of a logging operation at least 40 years ago (no significant fire since). Diameters are very variable and are up to 100 cm 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 the Brush-tailed Phascogale. A few old stumps also occur.
- 3 Does not occur as a dense stand as such. Only individual scattered and suppressed fruiting trees occur in the understorey. Young poorly developed regrowth is common. Whilst no crushed cones were found beneath these mature trees, they still could be food substrate for the ^{TS}Glossy Black-Cockatoo. Lack of abundance is likely to preclude use.
- 4 Pink Bloodwood 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 occur as Ironbark. This species represents about 14% of the overstorey and will provide a food resource for arboreal mammals during the winter months.
- 6 The general area near the *Site* is variously developed. Nearby and mainly to the west, major vegetation removal has occurred for either the quarry or for associated infrastructure. The extent of development is shown on Attachment 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 Tallowwood and Grey Gum occur on the *Site*. These are Schedule 2 species under the provisions of SEPP 44. 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 will be completed for each species detected or considered "likely" to occur.

3.2 Survey Methodology

3.2.1 Previous Surveys

An EIS was prepared in 1999 by ERM Australia Pty Ltd for an expansion of the Jandra Quarry. This EIS included detail on the methodology used to undertake flora and fauna surveys and impact assessment. These surveys covered the full area of the Lots and were adequate to meet EIS requirements.

Additional surveys were also undertaken by North Coast Forestry and Ecology Services in October 2000 as a component of pre clearing requirements. These surveys concentrated on the areas proposed for clearing but also extended over most of the Lots. Surveys included diurnal and nocturnal observations of flora and fauna, spotlighting and call playbacks – with emphasis on detection of threatened species.

3.2.2 Current Surveys

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 of the site.

Surveys were comprehensive, however special attention was given to targeting detection of those threatened species listed in **Part B Nos 3.4, 3.5 and 3.6** below.

Surveys undertaken can only provide a snapshot of occurrence of species over a very limited seasonal period. In this case surveys occurred (late spring) during the period when some fauna (particularly amphibians, bats and some small ground mammals) are becoming more active. Some migratory bird species would not occur at this time of year. Some short term temporal variability in species occurrence can also be expected associated with species movements.



Therefore, given; the condition, nature, extent and disposition of the habitat; the proposal and retention areas remaining on the Lots - the survey methodology adopted is considered appropriate to enable the assessment of impact as required by Section 5A and 79C (EP&A Act). Ground, arboreal and pitfall trapping methods were not considered necessary. Regardless of the results of surveys, impact of the proposal will be considered on each of the species deemed to have more than a nil possibility of occurrence - see later. (Attachment 4 shows location of some surveys).

Surveys were undertaken as follows:

Diurnal Surveys

Diurnal inspections were undertaken by two observers on three days; a preliminary inspection and on 17 and 22 November 2001. Observations were undertaken over daylight periods in the afternoons whilst establishing vegetation and habitat composition, targeted flora and fauna surveys and koala scat searches. In all approximately 11 person hours were spent on these observations. These surveys were on foot by random meanders. During the surveys weather was warm (max 27°C), clear and still.

Surveys included the following observations, with concentration on targeted threatened species (and their habitats) considered to have a possibility of occurrence on the site:

- searches for key habitat components and location of potential macro and micro habitat areas likely to be favoured by threatened species (also to provide appropriate sites for spotlight search) eg rocky outcrops, heath, mature Banksias or *Xanthorrhoea*, wetlands, winter flowering eucalypts, tree hollows etc.
- search and identification, aided by binoculars, of all fauna species sighted or heard. Incidental sighting records were also kept.
- concentrated searches for site specific fauna species eg ^{TS}Glossy Black-Cockatoo in *Allocasuarinas*, koalas and reptiles. These searches, whilst based on a random meander, targeted likely preferred habitat areas.
- nest, den and roost sites of all birds especially owls and raptors.
- nests and dens of hollow dependent fauna, especially ^{TS}Yellow-bellied Glider, ^{TS}Squirrel Glider, ^{TS}Brush-tailed Phascogale and ^{TS}Glossy Black-Cockatoo.
- latrine and den sites of the ^{TS}Tiger Quoll.
- ^{TS}Yellow-bellied Glider "V" notches and other incisions.
- crushed cones beneath *Allocasuarina* spp.
- distinctive scats and pellets eg owls, koalas, predator scats of ^{TS}Tiger Quoll.



- scratches on trees.
- diggings, burrows, traces and tracks, skeletal remains.
- diurnal calling amphibians at wetlands, dams, streams, soaks and seepages (calls compared on the spot with pre-recorded calls of threatened frogs).
- any special habitats such as caves, mines, tunnels or old buildings, bridges, accessible tree hollows (bat habitat) or fruit bat camps.

Nocturnal Surveys

The following surveys were also undertaken on two nights (17 and 22 November 2001) by two observers. Weather was clear, still and mild (min 15°C). Moon was 1/8 waxing. These surveys included the following:

- Listening for calls, landings, scratchings.
- Spotlighting on two occasions (ranging from 1945 to 2145) for 8 person hours using two spotlights/observers. Survey was by random meander on foot, concentrating on the proposed overburden deposition area but also extending into surrounding forest, with concentration on any preferred habitat identified during diurnal searches, eg tree hollows, dead trees and the most likely habitat for arboreal mammals, ground mammals and large owls.
- Stag Watching. Included spotlighting and listening at the main habitat tree from dusk onwards (and others outside the *Site*).
- Amplified call playbacks of the ^{TS}Koala, ^{TS}Yellow-bellied Glider, ^{TS}Barking Owl, ^{TS}Eastern Grass Owl, ^{TS}Masked Owl, ^{TS}Powerful Owl, ^{TS}Sooty Owl, ^{TS}Squirrel Glider and Sugar Glider were undertaken from one location over two nights between 1930 to 2130 hours (see Attachment 4). This provided coverage over all the *Site* and a large component of the adjacent forested areas on the Lots. Notation of responses (if any) were made.
- Amphibian detection. Amphibian searches were undertaken in probable habitats, ie the ephemeral drainage line (outside the proposed overburden deposit area – but subject to possible indirect impacts). These searches were during diurnal surveys, but mainly after dark between 1930 and 2100 hours. Survey included listening and recording in all likely habitats and search by spotlight. Some calls were identified on site and all calls heard were recorded and later identified or verified by comparison with recorded calls for the full range of frogs that occur in north eastern NSW. As no endangered frogs were heard calling, it was not necessary to attempt to capture and further confirm identification of all frogs heard at the site. No call playbacks of any species of threatened frog (to obtain responses) were considered necessary. Note that survey period is not within the principal call period for some threatened frogs. However there is no habitat on the site suitable for any of the threatened frogs - see species profiles.



- **Bat Detection.** It was not considered necessary to capture or identify any Megachiroptera or Microchiroptera bats by harp net or mist net trapping (no *Kerivoula papuensis* habitat occurs). However, listening and observations for the Queensland Blossom Bat (*Syconycteris australis*) and the less likely Queensland Tube-nosed Bat (*Nyctimene robinsoni*) was undertaken. Acoustical sampling using Anabat detection methods was also undertaken on two nights. Detection was undertaken on the Site and also along nearby roads and tracks. As for frogs, the timing of surveys was not ideal to detect some threatened bats – but weather was relatively warm for the period preceding survey. However, the proposal is most unlikely to have a significant effect on bats given: small area of vegetation disturbance proposed, minimal number of hollow potential habitat trees to be removed and due to the mobility of this fauna.

These surveys are considered more than adequate given the nature of the habitat, the species likely to occur and finally, the anticipated impact of the proposal.

3.3 Survey Results

3.3.1 Previous Surveys

Flora and Fauna survey results 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 nor 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). It is unlikely that these detections were on the Site.

Flora and fauna survey results from the previous completed pre clearing surveys did not locate any additional threatened species.

3.3.2 Current Surveys

Site surveys and inspections revealed the presence of the following fauna:

Diurnal

The following are the results from diurnal surveys:

Birds

Australasian Crow (*Corvus orru*)
 Brush Cuckoo (*Cacomantis variolosus*)
 Common Koel (*Eudynamis scolopacea*)
 Dollar Bird (*Eurystomus orientalis*)
 Grey Fantail (*Rhipidura fuliginosa*)
 Laughing Kookaburra (*Dacelo novaeguineae*)
 Noisy Friarbird (*Philemon corniculatus*)



Reptiles

Nil

Amphibians

Some heard but all listed under Nocturnal results.

Mammals

Kangaroo or wallaby (heard)

Some Microchiropteran bats (possible^{TS}) were observed at dusk (see under nocturnal surveys).

There were no other species sighted.

Other Ecological Investigations and Results

- Thorough searches were made beneath most of the scattered understorey of *Allocasuarina*. No crushed cones were found. This indicates unlikely bird presence and nil use of the *Allocasuarina* by the ^{TS}Glossy Black-Cockatoo.
- Some trees had scratches but none were identifiable. Probably from either goanna or Common Brushtail Possums.
- No incisions for sap sucking - specifically no ^{TS}Yellow-bellied Glider notches (larger L or V shaped incisions) nor ^{TS}Squirrel Glider notches, were found.
- Scats of a wallaby were the only scats detected.
- Bandicoot diggings were found.
- No skeletal remains were found.
- No nests were observed on site.

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

