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NSW NATIONAL PARKS AND WILDLIFE SERVICE

The Manager
Development and Infrastructure Assessment
Department of Urban Affairs and Planning
Governor Macquarie Tower
1 Farrer Place
SYDNEY NSW 2000

ABN 30 841 387 271
Our reference: ZF1096:MB

Dear Sir,

Proposed Carbon Reductant and Wood Processing Facility
Lot 544 DP 736015, Mogo, Environmental Impact Statement

I refer to your letter dated 13 November 2001 regarding the above development application and accompanying Environmental Impact Statement (EIS). This letter presents the National Parks Wildlife Service (NPWS) comments on the proposal. Thank you for the opportunity to comment.

These comments relate to the NPWS' statutory responsibilities for the care, control and management of national parks, nature reserves and state recreation areas as well as the protection and care of Aboriginal sites and relies, and native flora and fauna throughout New South Wales.

ABORIGINAL HERITAGE
The ERM archaeological assessment report has been reviewed by the NPWS Southern Aboriginal Heritage Unit. This report and other Aboriginal cultural heritage references in the EIS are insufficient to allow NPWS to determine the potential impact on the Aboriginal cultural heritage. Additional material needs to be provided to enable a full assessment to take place.

The NPWS detailed assessment of this report is included as Appendix 1.

The documentation of the archaeological assessment contained in the report needs to be supplemented to meet many of the basic requirements of the NPWS "Aboriginal Cultural Heritage: Standards and Guidelines 1998" as required in the EIS Director-General Requirements. Appropriate archaeological survey of the property needs to be carried out. The archaeological report should be re-drafted to incorporate the detailed comments within the sections on Aboriginal cultural heritage assessment.

I also note that there is a need to consult with all relevant Aboriginal community groups or provide documentation of consultation with the Mogo Local Aboriginal Land Council. The NPWS letter of 13 September 2001 indicated that, given the scale of the proposed development, consultation should not just be confined to the Local Aboriginal Land Council. All relevant groups should be consulted including elders groups.

THREATENED SPECIES CONSIDERATIONS
NPWS has reviewed the flora and fauna assessment contained in the EIS documents.

Overall, the EIS needs to provide additional consideration to the full range of threatened species that are known or likely to occur on the site. Consequently, as the EIS now stands NPWS believes it does not meet the statutory requirements of the *Threatened Species*

Conservation Act 1995 in that it provides insufficient information for the Consent Authority to make an informed decision regarding the likely impacts of the proposal on threatened species and their habitat.

The NPWS detailed assessment of this report is included as Appendix 2.

The coverage and range of flora and fauna survey undertaken onsite needs to be expanded and reported in a manner to enable its suitability to be assessed. Critical issues such as adequate survey for some species potentially occurring onsite (such as Yellow-bellied Glider, Southern Brown Bandicoot and Long-nosed Potoroo) are proposed to be conducted at a later time prior to construction commencing onsite. Given that the results of such surveys may have a profound impact on the design of the facility or possibly the feasibility of the proposal, and the results of these surveys may trigger the requirement for a SIS, they should be carried out prior to determination of the application.

It is noted that "no detailed flora surveys were completed specifically for the EIS" Page 14.6. Therefore, the occurrence of *Cryptostylis hunteriana* on the site cannot be discounted. The advice provided in the NPWS letter of 13 September 2001 that *Cryptostylis hunteriana* could possibly be present in the more open areas of the remnants of the *Corymbia gummifera/E. pilularis/E. sieberi* community and it is, therefore, recommended that these areas be surveyed at an appropriate time of the year, still stands. The appropriate survey time is generally December-January, however, exact flowering time in any given year should be determined by visiting a known population and survey timed to coincide with it. The position taken in the EIS that "it is unlikely to occur on site due to the density of shrubs and grasses" (page M. 1) has no scientific basis.

It is noted that the eight-part test carried for the project concluded that the impact of the proposal on threatened species will not be significant. However, given that additional consideration on a full range of threatened species impacts needs be undertaken this position is premature.

Contrary to the EIS description of the site as highly disturbed with greatly reduced values for flora and fauna, much of site remains as bushland. The southern portion particularly contains what was described by Graham-Higgs (1996) as relatively intact forest and unsuitable for development. The footprint of the plant and associated storage areas extends well beyond the highly modified quarry area.

As a basic design principle the undisturbed bushland should wherever possible be retained. The current design entails clearing up to approximately 6 hectares of the southern-forested area. The NPWS remains of the view that the entirety of the *Eucalyptus longifolia* community should if possible be left undisturbed, as previously stated in 1996 in response to the then development application on the subject land. Leaving this area free from development will protect a community identified as having important habitat potential for threatened fauna and will serve as an important buffer to the adjacent wetland.

WETLANDS
The site is immediately adjacent to the large Longvale Swamp wetland system (SEPP No 14 Wetland 184). The position taken in the EIS is that the wetland will not be impacted by the development and therefore no assessment, was undertaken as to its values or significance. However, NPWS considers the development may pose a risk to Longvale Swamp.

Given a large area of the site is in the immediate catchment of the wetland, runoff from major flooding and storm events would likely to represent a pollution threat. The changes in the local hydrology given the extensive site disturbance proposed should also be considered. The Graham-Higgs 1995 report identifies the *E. longifolia* community provides important wetland margin and transition habitat. Given the potential ecological significance of what is at risk there is strong case to apply the precautionary principle, which would at a minimum require assessment of areas that may be impacted including the wetland.

It is noted that the water supply issues remain unresolved. The proposed route through the Candlagan Creek SEPP No.14 wetland system is potentially a significant issue. This should be considered concurrent with the charcoal mill. This would enable the cumulative impacts of the proposal to be fully addressed at this time.

CONCLUSION
The EIS needs to be supplemented with additional material to meet the Director-General of Planning's requirements in relation to Aboriginal cultural heritage and fauna and flora assessment. The NPWS considers the information provided is not sufficiently adequate to permit an informed decision in regard to the potential impact of the proposal on what is potentially an important natural and cultural setting. Critical areas such as the impacts on threatened species and their habitat, wetland ecological values and Aboriginal sites haven't been investigated to an appropriate level.

If you would like to discuss the matter or require further information, please contact, Miles Boak, Conservation Planning Officer at the Southern Directorate Office, on telephone (02) 62989708.

Yours sincerely,

Ian Pulsford
Manager
Conservation Programs Planning Division
Southern Directorate

Wood Processing and Metallurgical Facility EIS

NPWS Response to sections on Aboriginal heritage assessment

Southern Aboriginal Heritage Unit

December 2001

OVERALL COMMENT

The Aboriginal heritage assessment contained in the EIS needs to be supplemented with additional information to meet the standards and guidelines for the preparation of such reports for a project of this scale. It is not adequate to base an informed decision on for the assessment of Aboriginal heritage aspects of the proposal. Further work is required as detailed below to bring the report up to an acceptable standard that is appropriate for determination of the development application.

Further consultation with all relevant Aboriginal community groups needs to take place.

VOLUME 1

The following comments relate to Volume 1 of the EIS, however where issues are dealt with in greater detail within Appendix O, comments have been provided specifically within the section that relates to Volume 2.

Page 4.20, section 4.6.5 - This section is restricted to one table, with no discussion or interpretation, other than:

"Table 4.2 details other legislation that may apply to the proposed project." (my emphasis). Table 4.2 includes the *National Parks and Wildlife Act 1974.* The Aboriginal heritage protection provisions of this Act do apply to the proposed project and should therefore be discussed, within Volume 1, at the same level as other relevant pieces of legislation.

Page 15.1, Chapter 15 Cultural Heritage - This section is a summary of Appendix O. Appendix O is discussed in detail below. The comments relating to Appendix O should be read in conjunction with the following comments.

The indigenous archaeology assessment is provided in Appendix O, not in Appendix N. The assessment is not detailed, in spite of its description as such, and needs to be supplemented to meet the terms of NPWS requirements for such assessments. As is discussed below, much of Appendix O will require revision in order for it to comply with NPWS required standards of reporting.

Pages 15.2 and 15.3, section 15.3 - It is claimed that the Mogo Local Aboriginal Land Council (LALC) was involved in consultation over this proposal. There is however, no documentation from the Mogo LALC within the EIS. This is a major omission and constitutes a significant failure to adhere to NPWS requirements for extensive consultation with all relevant Aboriginal community groups. A written statement provided by Mogo LALC on their letterhead must be included within the EIS. It is NPWS experience that Mogo LALC usually provides such written advice when they have been adequately consulted. NPWS is very concerned at the inadequacies of the consultation process for this EIS.

Although it is stated that, "MLALC's views on the facility is attached to Appendix N (sic)", that is not the case. This omission should be rectified as a matter of high priority.

Page 15.3, section 15.4 - As discussed below, the discussion on regional context is inadequate and is based on research that is out of date.

Page 15.4, section 15.5 - As discussed below, this section is inadequate and fails to discuss or mention the two most recent reports undertaken in the area prior to 2000, notably Kuskie (1993) and Appleton (1995).

Page 15.6, section 15.5.1 - There are more than 19 registered sites within a 6 x 6 kin area around the proposed development site, see below for further discussion.

Pages 15.6 to 15.9, section 15.6.1 - It is disputed that shell middens are unlikely because the site is more than 3 km from the coast. There are middens on the Tomaga River that occur more than 3 km from the coast and middens were found during the original Broulee Anglican College site assessment (Lance and Moffitt 2000:20-23). These middens occur adjacent to swamp margins 2 km from the coast, in situations similar to those found on the proposed development site. Further comments on this issue are provided below.

The predictive model is based on inadequate research and should be re-assessed in the light of comments provided below. Subsurface investigation is required in areas of dense vegetation before any predictive models can be derived for the whole development site. A program of subsurface investigation must be instigated to determine locations of Aboriginal heritage sites in areas of dense vegetation.

Pages 15.9 to 15.10, section 15.7 - There are many concerns in relation to this section, particularly in regard to buffer zones and known sites, and other proposed impact mitigation procedures. These issues are discussed in detail below.

VOLUME 2

Appendix B Director-General requirements - NPWS wrote to DUAP on 11 September 2001 in relation to matters to be addressed during preparation of the EIS. In that letter NPWS advised that a full archaeological survey of the property and any associated infrastructure was required.

The NPWS general guidelines for impact assessment that were included in the NPWS letter indicate that the archaeological assessment should be undertaken in accordance with the NPWS guidelines detailed within the 'Aboriginal Cultural Heritage Standards and Guidelines Kit'. The following review of 'Appendix O archaeological assessment' within Volume 2 of the EIS indicates that the assessment was not undertaken in accordance with the NPWS guidelines and that NPWS requirements for assessment of potential impacts to Aboriginal heritage have not been met. The areas in which Appendix O of the EIS fails to meet the required standard are discussed below.

Page 0.2, section 0.3 - It is stated that the Mogo LALC's views on the proposal are included at Appendix A of the archaeological assessment. There is no Appendix A within the archaeological assessment and no LALC report has been included. This is a major omission and must be rectified.

Page 0.2, section 0.3.1 - It is stated that Native Title claimants have not been consulted because the proposed site is not subject to Native Title Claim. NPWS policy (included within the Standards and Guidelines Kit) is that all Aboriginal community groups with an interest in cultural heritage should be consulted. Therefore consultation with Elders Groups should be undertaken as part of the EIS assessments. Linda Bausch, Southern Aboriginal Heritage Officer, should be contacted in this regard [telephone No. removed].

Pages 0.3 and 0.4, section 0.5 - A detailed map showing the environment and topography of the study area should be provided to complement the text description of the area's features.

The text should also include a more detailed description of permanent alterations to the topography. A map would also be helpful in indicating what is meant by the phrase "… two former knolls …" A map showing the location of previous disturbance activities, such as logging, should also be provided or referred to. What form of 'logging' occurred on the site?

Pages 0.4 and 0.5, section 0.6 - Much of the literature discussed on page 0.4 is considerably out of date. The discussion of Treloar (1985) is based on research that was conducted over 15 years ago. Treloar's (1985) work has been superseded by more recent research, for example that undertaken by Boot (1994) and Knight (1996). Failure to discuss recent research indicates a poor understanding of South Coast archaeology on the part of the report authors. It is also of concern that the report ignores the work of Kuskie (1993) and Appleton (1995). Both these assessments were conducted in locations that are very close to the study area and are particularly relevant to the study area.

Where is the evidence that most sites on the NSW South Coast date from the period 6,00 to 7,000 years ago? Boot (1996b) has found that most coastal sites on the South Coast date to less than 2000 years ago.

Recent research over the last 10 years has shown that the statement, "… Aboriginal occupation ... appears to have been focused around the exploitation of the rich marine resources, while hinterland resources are used to a lesser extent." is not correct. More recent sources should be referred to within this section, in particular Boot (1994, 1996a and b) and Knight (1996).

The discussion on stone tool technology is misleading. It is stated that,

> "Prior to the period between 4,000 and 5,000 years ago, stone flakes ... and cores were the most common types of artefacts. From around 5,000 years ago other artefact types began to appear in the stone assemblages."

This statement implies that stone flakes and cores are not the most common type of artefact in sites less than 5,000 years old, when the reverse is true - stone flakes are the most commonly found artefact type on the South Coast, regardless of age.

There is no description of rockshelter, fish trap, stone arrangement and stone quarry site types even though other forms of site are described.

Page 0.5 - The 1993 report by Navin has never been forwarded to NPWS (the report appears to have been produced for ERM). As the report is unavailable to NPWS staff, a detailed discussion of Navin (1993) must be provided, particularly as Navin's Shoalhaven regional synthesis was used, within the EIS, to develop a set of generalised criteria for predicting site locations. Alternatively three copies of Navin (1993) should be forwarded direct to SAHU NPWS prior to the deadline for comment on the EIS (it has always been a requirement to provide NPWS with copies of such reports).

It is also inappropriate to use Navin (1993), which is apparently based on research in the Shoalhaven region well to the north of Broulee, when a more detailed and more locally focussed regional synthesis is available in Knight (1996). Failure to refer to Knight (1996) demonstrates a poor understanding of the archaeological literature among the EIS authors.

Page 0.7, section 0.6 - Why is there no discussion of the implications suggested by the results of survey and excavation work undertaken at the original Broulee Anglican College site?

Pages 0.7 and 0.8, section 0.6.1 - Why is there no detailed discussion of the potential for subsurface deposits to occur within artefact scatters and middens?

Page 0.8, section 0.6.1 - The discussion on scarred trees is inadequate. For example, carved trees are non-existent on the South Coast - to call them rare is a significant understatement. The discussion on 'bora' grounds is inaccurate. There

are no 'bora' grounds on the South Coast. Raised earth ceremonial rings on the South Coast are called Bunan grounds. Stone rings are not usually classified as Bunan sites by NPWS and others, and the archaeological evidence for such a classification is equivocal. It is incorrect to say that burials "… in many cases are part of burial complexes." In fact, burial complexes or multiple related burials are
extremely rare on the South Coast, and only two examples of locations that contain more than two individuals have been found. It may be significant to this study however, that the largest of these complexes is located at Surfside on the north shore of the Clyde River estuary.

It should be noted that this entire section is poorly researched and demonstrates a lack of archaeological knowledge on the part of the report authors.

Page 0.8, section 0.6.2 - When was the NPWS Aboriginal Site Register search undertaken? Southern Aboriginal Heritage Unit (SAHU) conducted a site search using the same search area of 6 x 6 km around the proposed development site on 4 December 2001. It resulted in 26 registered site records compared to the 19 registered sites listed on table A.1 - How is this discrepancy accounted for? The additional 7 sites include 6 middens and 1 burial (all of which have been on the register for many years). The burial is a particularly important record and it indicates that other burials may occur within the proposed development site. There are no mitigation provisions for burial sites discussed within the EIS.

Because of the discrepancy between the two search results a new search should be undertaken and all site record cards and relevant reports should be examined. It is standard practice to obtain copies of site record cards in addition to a register search, because site register search results are often inaccurate (this is stated on the search result print-out). Examination of site cards will resolve the questions about possible duplicate site records that are discussed in tables A.1 and A.2. An examination of site cards and reports held in the SAHU office revealed that:

58-4-0002 and 58-4-0051 are the same scarred tree site.
58-4-0050 was destroyed under a Consent to Destroy in 1983.
58-1-0588 is an artefact scatter, not a scarred tree.
58-1-0589 is an artefact scatter, not a scarred tree.
58-1-0589 and 58-1-0590 are the same artefact scatter site.

An examination of the two survey reports that relate to these and other sites would also have resolved these questions. It is clear however, that the report authors have not read Kuskie (1993) or Appleton (1995).

Page 0.10, section 0.7 - Navin (1993) is an inappropriate report on which to base analysis of regional trends as it appears to relate to the Shoalhaven Region, which is over 100 km north of the study area. The Navin report has also been superseded by much more recent syntheses of regional trends such as Boot (1994) and Knight (1996). This section should be re-drafted to reflect the most recent research results.

The section also contains the following specific problems:

> There is evidence that different forms of ridgeline support different types of artefact scatter sites. For example, Boot (1994) found that broad, well watered ridges at low altitudes support larger artefact scatters than narrower, higher elevation ridges. Such variation and its implications for the study area should be discussed.
>
> The majority of burial sites on the South Coast occur in coastal dunes behind beaches, on headlands, and along the margins of estuaries. Why has this not been discussed, given that the proposed development site is close to the Candlagan Creek estuary, and that a burial site (58-4-0160, not shown on table A.1) has been recorded 400 m south of Candlagan Creek at Broulee.
>
> There are two known quarry types in this region - silcrete quarries in the Congo area and basalt quarries near Moruya. Why has this not been discussed?
>
> It is possible to predict that no bora grounds exist in the study area. There may be Bunan ceremonial grounds, however. Consultation with Aboriginal communities, particularly Elders Groups, is often a way of determining their location, however the consultation process for this project appears to have been ineffective (considering that no written proof of consultation has been provided).

Page 0.11, section 0.71 - It is disputed that the study area is 3 km from coastal environments and is therefore unlikely to contain middens. The Candlagan Creek estuary extends to within 2 km of the study area. Middens on the banks of the Tomaga River occur up to 3 km from the ocean front (e.g. 58-4-0055), so it not reasonable to argue that middens are unlikely in the study area. South Coast middens have been found well inland from ocean front and estuarine environments.

Pages 0.11 and 0.12, section 0.8, Site inspection (this is an unusual use of terminology in the context of an EIS, and normally implies a cursory, preliminary inspection rather than a full archaeological survey) -There are many problems with this section:

> A map showing survey transects and areas is required. The map should also show all surveyed tracks and ground exposures.
>
> Archaeological visibility conditions must be described, quantified and tabulated in detail according to the methods (or an equivalent accepted method) discussed in the NPWS Standards and Guidelines Kit.
>
> Terms such as "less disturbed areas" and "good surface visibility" are not acceptable. Levels of disturbance, ground surface visibility, archaeological visibility and effective survey coverage must be quantified according to an accepted method.

Data that supports the statement that "survey transects covered approximately 12 % of the study area, ... it is estimated that effective coverage was 1.5 %" must be provided. Methods used to determine these results must also be discussed.

What does the statement "Archaeological sites Site 1 and IF1previously recorded by Barber (1995) were thoroughly examined" mean? How were the sites thoroughly examined when no subsurface investigation was undertaken?

Barber (1995: 7) indicated that there is potential for subsurface deposits at Site 1. Why was subsurface testing at Site 1 not contemplated, or discussed as a possible method of redetermining the site location in the absence of ground surface visibility?

Who may have been responsible for the potential disturbance of Site 1and IF1?

Page 0.12, Section 0.9 - Why is there no discussion of amelioration of potential construction impacts to Site 1, IF1 and unknown sites in this section? Why is there no discussion of the need to undertake investigation of the potential for subsurface cultural deposits that may be impacted during construction?

Page 0.12, Section 0.10 - What is meant by "low-medium archaeological potential"? How was this conclusion reached? A map showing areas of archaeological potential should be provided. How large will be the buffer zones around Site 1 and IF1? A map showing the buffer zones should be provided. How will the size of the buffer zones be determined? Why has the potential for subsurface archaeological material in the heavily vegetated ridges not been investigated? Mitigation measures should be discussed in detail within this section. Who in NPWS was consulted about the recommendations? No staff in SAHU (the appropriate NPWS unit for such consultation) were consulted about these recommendations.

NPWS does not support the proposed management recommendations discussed within the EIS. NPWS would prefer to see the following, recommendations:

Buffer zones around Site 1 and IF1 should be determined on the basis of results of a subsurface testing program designed to identify the extent of each artefact location.

Heavily vegetated areas that provide poor ground surface visibility, particularly on ridges, should be subjected to subsurface testing to determine site locations before any vegetation clearance occurs. Requirements for monitoring should be determined after subsurface investigations are completed.

Recommendation 3 is supported on condition that Aboriginal monitors and construction personnel are provided with appropriate training, and on condition that areas of archaeological sensitivity are determined by subsurface investigation before any clearing or ground disturbing work commences.

All site locations should be fenced and identified to construction personnel after their extent has been determined.

References

Appleton, J. 1995 The archaeological investigation of the site of proposed extensions to existing operations at the Illawong Sand Quarry west of Broulee, Far South Coast, NSW. Unpublished report to R.W. Corkery & Co. Pty Ltd.

Barber, M. 1995 Archaeological survey of proposed gravel quarry extension, on the 'Springwater' property, Parish of Tomago near Broulee, South Coast, NSW. Unpublished report to R.J. and LE. Shepherd Pty Ltd.

Boot, P. 1994 Recent research into the prehistory of the hinterland of the south coast of New South Wales. In Sullivan, M., Brockwell, S., and Webb, A. (eds), *Archaeology in the North: Proceedings of the 1993 Australian Archaeological Association Conference.* North Australia Research Unit (ANU), Darwin.

Boot, P. 1996a Aspects of Prehistoric Change in the South Coast Hinterland of New South Wales. *Tempus* 6:63-79.

Boot, P. 1996b Pleistocene Sites in the South Coast Hinterland of New South Wales. Tempus 6:275-288.

Knight, T. 1996 Batemans Bay Forests Archaeological Project Site Distribution Analysis. Unpublished report to NSW NPWS and the Australian Heritage Commission.

Kuskie, P. 1993 An archaeological assessment of a proposed tourist recreation facility at Lot 3, George Bass Drive, Broulee, NSW. Unpublished report to Niche Environmental Information.

Lance, A. and Moffitt, K. 2000 A cultural heritage assessment of the proposed Eurobodalla Anglican College site, Broulee, NSW. Unpublished report to the Eurobodalla Anglican College Establishment Task Group.

Navin, K. 1993 -No details provided in references within the EIS. No copy of this report has ever been forwarded to NPWS.

Treloar, M. 1985 Topographical analysis of Aboriginal sites of the New South Wales coastal hinterland. Unpublished BA (Hons) thesis, Department of Archaeology and Anthropology, ANU.

Australian Silicon Operations Pty Ltd
Wood Processing and Metallurgical Carbon Facility EIS

CONSIDERATION OF THREATENED SPECIES ISSUES

Summary

Overall, the EIS needs to provide additional consideration to the full range of threatened species that are known or likely to occur on the site. Consequently, as the EIS now stands NPWS believes it does not meet the statutory requirements of the threatened species legislation and does not provide sufficient information for the consent authority to make an informed decision regarding the likely impacts of the proposal on threatened species and their habitat. Details of where the EIS is deficient are provided below together with some general comments on sections of the EIS relevant to threatened species.

General Comments

Section 4.6.1 of the EIS does not provide an accurate interpretation of the application of the Environmental Planning & Assessment Act 1979 (EP&A Act) and Threatened Species Conservation Act 1995 (TSC Act) as they apply to Part 4 assessments. A more correct interpretation is as follows (replacing paragraph 3 of section 4.6.1):

> *Where a proposed development is likely to significantly affect a threatened species, population or ecological community, or is in critical habitat (as defined by Part 3 of the TSC Act), a species impact statement (SIS) must be prepared to accompany the development application.*

The statements on Page 4.18 are very misleading. Licensing under the TSC Act doesn't apply to Part 4 determinations. The reference for a development to have significant impact it has to relate to "critical habitat" of a threatened species has no basis in law.

On page S.10 the EIS states that *"The vegetation buffer has been retained to protect the ecology and to provide visual screening."* The authors imply that all of the ecological values of the site will be protected in this buffer area. This is clearly not the case given that a substantial proportion of intact forest and woodland will be cleared as part of the development. The areas to be cleared provide habitat for a range of flora and fauna, including threatened species, and therefore are of considerable ecological value.

The site has significant ecological sensitivity as it is within the catchment of and directly adjacent to Longvale Swamp, a SEPP 14 wetland. As noted in further detail below, the wetland may provide habitat for a number of threatened species including the Waterwheel Plant *(Aldrovanda vesiculosa)* and the Green and Golden Bell Frog *(Litoria aurea).* While the EIS makes considerable effort to reassure that the wetland will not be impacted by the proposal, other Government agencies with statutory responsibilities in water quality, have raised questions on the hydrological assessment in the EIS. If there is potential for contamination of the wetland via surface runoff and groundwater thorough assessment of the impact on the flora and fauna values of the wetland should be undertaken as required in the Director-General's Specifications for the EIS.

The EIS consistently makes statements about the apparent reduced ecological value of the site due to fragmentation and existing land-use. The basis of impact assessment is to consider each site on its merits based on quantitative and qualitative measures. Therefore, the purported level of fragmentation or disturbance of the site needs to be considered on a scale relevant to the issue or species being considered. For example, the existing tracks and casements on the site are unlikely to pose a barrier to Yellow-bellied Glider movement. Therefore, this level of fragmentation has little consequence for this species. Similarly, the existing disturbance is largely confined to the central portion of the site with areas of intact forest and woodland remaining elsewhere on the site. Therefore, the recurring statements about the diminished ecological value of the site are of little value in informing the reader of the possible impact of the development on the species in question, and may in fact be incorrect particularly in the southern section of the site.

The EIS does not meet parts of the NPWS general guidelines for impact assessment. These guidelines require natural and cultural heritage assessments to be undertaken by suitably qualified people. As such, the guidelines recommend that the following basic details be included in assessments:

a) the qualifications and experience of the person undertaking the work; and

b) a detailed description of survey methodology including survey design, sampling methods, weather conditions, time and duration of surveys and location of any survey sites and transect lines.

With regard to point a) above, the EIS does not document who conducted the surveys for the EIS, nor does it provide details their experience. With regard to point b), Chapter 14 of the EIS does not adequately describe and quantify the survey effort that was conducted as part of the EIS, nor does it provide the full results of the surveys. The following points identify some of the survey matters that have not been adequately detailed in the EIS:

- the results of the survey of hollow-bearing trees are not presented;
- the survey effort for chewed *Allocasuarina littoralis* cones, owl pellets, bandicoot diggings and Yellow-bellied Glider feeding scars is not quantified;
- the location of bandicoot diggings that were found is not provided;
- the number of elliot traps set per night is not documented (a total number of trap nights is provided);
- the number of hair tubes (small and large) that were set is not provided;
- the results of the hair tubing and trapping are not clearly documented (tabulated);

- the location and characteristics of the trees that were stag-watched is not provided;
- the location of the spotlight surveys (both foot and vehicle based) is not provided;
- it is not clear how many (or on which nights) call playback surveys were conducted;

In the absence of this information the efficacy of the surveys cannot be determined. In addition, the presence/absence of certain threatened species cannot be determined with certainty. Consequently, the impact assessment for these species needs to be further clarified. More detailed comments on certain species or groups follow.

Threatened Flora

Despite the recommendations of Dr Stephen Clark (Senior Threatened Species Officer, NPWS Southern Directorate) as cited in the EIS, no targeted flora surveys were conducted specifically for this EIS. Therefore, the occurrence of *Cryptostylis hunteriana* on the site cannot be discounted. The NPWS maintains Dr Clarks' recommendation that *Cryptostylis hunteriana* could possibly be present in the more open areas of the remnants of *the Corymbia gummifera/E. pilularis/E. sieberi* community and it is, therefore, recommended that these areas be surveyed at an appropriate time of the year. This is generally December-January, however, exact flowering time in any given year should be determined by visiting a known population and survey timed to coincide with it.

Instead, the proponents have stated that these surveys (and other surveys for Yellow-bellied Glider, Southern Brown Bandicoot and Long-nosed Potoroo) will be conducted at a later time, during the period recommended by the NPWS. The NPWS considers full consideration of the project would have aided by all required surveys have been undertaken prior to the EIS going on exhibition, given that the results of such surveys may have a profound impact on the design of the facility or possibly the feasibility of the proposal. Further, the results of these surveys may trigger the requirement for a SIS.

In addition, the EIS discounts the possible occurrence of *Aldrovandra vesiculosa* based on an inaccurate interpretation of its preferred habitat (as apparently cited from Aquaphyte Online, 1997). On page 14.13, the EIS states:

> *"This plant (Aldrovandra vesiculosa) requires open water free from a dense biomass of submerged vegetation or floating macrophytes. The swamp habitat on the site contains dense sedges growing within waterlogged depressions. This is not considered to be suitable habitat for this species."*

However, the online newsletter (Aquaphyte Online, 1997) actually states:

> *"It (Aldrovandra vesiculosa) never grows in open water, but only in shallow, loose stands of emergent vegetation* (Phragmites, Typha, Carex) *or in little bays among tussocks of denser vegetation."*

This type of habitat is present in Longvale Swamp. Therefore, on the basis of this information, together with the fact there is a record of this species nearby, Longvale swamp is likely habitat for *Aldrovandra vesiculosa* and it cannot be discounted from occurring in the wetland area on the site. Therefore, the EIS has not given appropriate consideration to this species, The NPWS recommends that additional work needs to be conducted to determine if *Aldrovandra vesiculosa* occurs in Longvale Swamp and whether or not it will be impacted by the development.

Given both the potential occurrence of *Cryptostylis hunteriana* and *Aldrovandra vesiculosa* haven't been considered sufficiently in the EIS, informed decisions regarding impacts on threatened flora cannot be made.

Threatened Fauna

Green and Golden Bell Frog *(Litoria aurea)*

The EIS fails to adequately consider the potential for Green and Golden Bell Frogs to occur on the site and/or within Longvale Swamp and consequently fails to address the potential impacts of the proposal on this species. Chapter 14 of the EIS makes no mention of threatened frogs and only cursory comment on the suitability of the wetland and existing dams on the site as habitat for frogs in general. No surveys targeting frogs were carried out as part of the EIS investigations. This is a substantial oversight given that Longvale Swamp is known to be a historic site for Green and Golden Bell Frogs and is considered to represent excellent potential habitat for this species (Gaia Research 2001a). In addition, Green and Golden Bell Frogs are known to use disturbed or artificial habitats (NPWS 2001). Therefore, the existing dams on the site should be considered potential habitat for this species. Clearly, the EIS has not given appropriate consideration to the Green and Golden Bell Frog and therefore does not provide sufficient information for assessing the likely impact of the proposal on this species. A thorough targeted survey for Green and Golden Bell Frogs should be undertaken on the site and in the adjacent Longvale Swamp. The results of such a survey should then be given appropriate consideration in the relevant sections of the EIS.

Southern Brown Bandicoot *(Isoodon obesulus)* and Long-nosed Potoroo *(Potoro tridacylus*

There are records of Southern Brown Bandicoot and Long-nosed Potoroo within a 5 km radius of the site. The EIS surveys identified diggings of critical weight range vertebrates on the site. Two of the three species of mammal that may have been responsible for these diggings are listed under the TSC Act (Southern Brown Bandicoot - Endangered; Longnosed Potoroo - Vulnerable). Insufficient effort was expended to try and identify which species was responsible for the diggings - nine cage traps were set for one night in the area where the diggings were recorded. The results of both the trapping and hair-tubing failed to identify what species was responsible for the digs. Therefore, the presence of threatened critical weight range vertebrates on the site cannot be discounted. If either species are located on the site the NPWS would strongly advocate the preparation of a SIS.

Clearly, additional surveys need to be undertaken to determine the species responsible for the diggings on the site. The EIS acknowledges this need, but plans to undertake further survey prior to and during construction. As stated previously, this is a totally unacceptable approach given that the presence of these species on the site would, in all likelihood, trigger

the requirement for a SIS. These surveys should have been undertaken before the EIS was placed on public exhibition and should now be undertaken before consideration by the consent authority. In terms of methods to be used, cage trapping is the only reliable method for this type of survey and should be undertaken at greater intensity than the previous surveys for the EIS. The trapping should continue until a positive identification of the animals responsible is achieved. The NPWS can provide draft EIA survey guidelines for the Southern Brown Bandicoot that would be applicable to this situation.

Yellow-bellied Glider *(Petaurus australis)*

As stated elsewhere in this submission, the site should not be considered highly fragmented for Yellow-bellied Gliders - the areas of forest that exist on the site are contiguous forest to the north, east and west. The existing tracks and easement are not a barrier to Yellow-bellied Glider movement. The tree species that occur on the site are known to be used by Yellow-bellied Gliders. Therefore, the forested parts of the site are likely habitat for this species.

While no Yellow-bellied Gliders were detected on-site in the surveys for the EIS (August 2001), four sightings (at least two individuals) and six feed trees were observed on-site in October/November 1995 (Nicholas Graham-Higgs & Associates 1995). Yellow-bellied Gliders have a home range size of up to 60 ha, therefore it is likely that Yellow-bellied Gliders use the site periodically or on a seasonal basis and that it provides important resources at certain times of the year. Additional survey on the site may clarify the use of the site by Yellow-bellied Gliders. The EIS acknowledges the need for further surveys for this species, but plans to undertake them as part of a monitoring program, presumable after consent has been granted. In addition, the EIS only proposes to protect den and feed trees in the buffer area. This approach is totally unacceptable as the results of these surveys may influence the design of the proposal and/or the requirement for a SIS. These surveys should be conducted before the consent authority makes a decision on the proposal.

The statement in the 8-part test that no feed trees will be cleared is likely to be incorrect as six feed trees were identified in 1995 and not all trees were inspected during the surveys for the EIS. Similarly, given that not all hollow bearing trees on the site were inspected or stag watched, the statement that no den trees will be cleared is not substantiated by the data provided. Therefore, even on the basis of existing information, the conclusion of no significant impact on this species cannot be supported at this time.

Further, the conditions of consent that applied to the Development Application that was submitted for the continued operation of gravel extraction from "Springwater" included all of the recommendations made by Nicholas Graham-Higgs & Associates 1995. These recommendations were defined specifically to protect viable amount of Yellow-bellied Glider habitat onsite; namely a threshold level of clearing (no more than 3.3 ha) in the mature forest section of the site, the retention of all large hollow-bearing trees and sap feed trees in the extractive area and staged clearing followed by rehabilitation and revegetation. The proposed application was modified significantly at that time to reduce the level of clearing on site so the development was not seen as having a significant impact on threatened species. This development is proposing a much greater amount of clearing, the majority in areas previously determined as unsuitable due to habitat value, (*Eucalyptus longifolia* community).

The conservation of Yellow-bellied Gliders on the coastal plains of Eurobodalla Shire is of considerable interest to both the NPWS and Eurobodalla Shire Council (ESC) due to the issues raised by Gaia Research (2001b) with regard to the recent development consent that was issued for St. Peters Anglican College, Broulee. As a consequence of that development approval process, the Eurobodalla Shire Council (ESC) and NPWS are currently preparing a conservation strategy for populations of the Yellow-bellied Glider on the coastal plains of Eurobodalla Shire. This conservation strategy will, in the first instance, focus on the Broulee area, which includes the site that is the subject of this EIS and surrounding area. When finalised this will provide a greater context to decision making on Yellow-bellied Gliders habitat in the Broulee area. Given that habitat for the Yellow-bellied Glider occurs on site is part this wider study, consideration of such information is considered critical if an informed decision is to be reached.

A central tenet of the Yellow-bellied Glider Strategy is maintaining or enhancing, connectivity of habitat for the species throughout the coastal plains of the ESC. Gala Research (2001b) contend that the connectivity of Yellow-bellied Gliders in the Broulee area to those more substantive populations to the west of the Princess Highway is limited and that the general area of the proposed site is an important corridor between the two populations. Further loss or degradation of habitat in this area may render this link more tenuous. The NPWS is concerned that the impact of the proposal on the connectivity of Yellow-bellied Glider populations has not been adequately considered and should be subject to further analysis.

8-Part Test

Due to the limitations of the surveys and assessment provided in the EIS (as detailed above), the eight-part test does not provide a thorough assessment of the likely impact of the proposal for all threatened species that are known or likely to occur on the site. Therefore, the NPWS believes that the 8-part test does not provide sufficient information on which to make an informed decision regarding the impact of the proposal on threatened species and the need for a SIS. Further survey work needs to be conducted and additional documentation provided before an adequate assessment of the likely impacts on threatened species can be made.

References

Gaia Research (2001a) Targeted Surveys for Litoria aurea on the Far South Coast of NSW. Report to the NSW National Parks and Wildlife Service.

Gaia Research Pty Ltd (2001b) Species Impact Statement for St. Peters Anglican College Broulee, Eurobodalla Shire. July 2001.

Nicholas Graham-Higgs & Associates (1995) Flora and Fauna Assessment of the Continued Operation of the "Springwater" Gravel Pit, Lot 544 DP 736015, Parish of Tomaga, Shire of Eurobodalla.

NPWS (2001) Draft Recovery Plan for the Green and Golden Bell Frog (Litoria aurea).