Department of
Environment and Conservation

Your ref:
Our ref:
Enquiries: Dr K Atkins
Phone: 9334 0425
Fax: 9334 0278
Email: ken.atkins@dec.wa.gov.au

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Dan Huxtable
Senior Consultant
Strategen
PO Box 383
LEEDERVILLE WA 6903

Dear Mr Huxtable

FIONA STANLEY HOSPITAL PROJECT

I refer to your emailed requested of 4 March 2008 requesting the Department of Environment and Conservation to provide an objective assessment of the submission prepared by Strategen in response to a request made by the Department of Environment, Water, Heritage and the Arts (DEWHA) for additional information on potential impacts of the proposed Fiona Stanley Hospital development on the Grand Spider Orchid population at the nearby Beckley Bushland site.

Please find attached an assessment of the submission and the issues raised by DEWHA regarding this project proposal.

If you have any further questions, or wish to have points of clarification, please contact my Manager of Species and Communities Branch, Dr Ken Atkins on 9334 0425, or email ken.atkins@dec.wa.gov.au.

Yours sincerely

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for Keiran McNamara
DIRECTOR GENERAL

30 April 2008

Att.

REVIEW OF THE DRAFT STRATEGEN DOCUMENT: 'FURTHER INFORMATION REQUIRED FOR ASSESSMENT BY PRELIMINARY DOCUMENTATION UNDER THE EPBC ACT' FOR THE FIONA STANLEY HOSPITAL PROJECT

The draft document providing responses by Strategen to a number of questions raised by the Department of Environment, Water, Heritage and the Arts in regard to the threatened flora *Caladenia huegelii*, was provided to the Department of Environment and Conservation for comment. The following advice is provided in regard to each of the questions and the draft responses.

4.1 Is the Beckley Bushland orchid population an important population?

The information presented by the proponent is taken from information provided to the proponent by the DEC. The presentation of the information is generally supported, with the following comments:

- The reference to *Caladenia huegelii* surviving for most of its life underground is not accurate, as it has a surface leaf for some time prior to flowering. However, the outcome is as stated, that the species cannot be effectively surveyed other than when the plants are flowering.
- The variability in the ability to survey for this species requires that multi-year data is used in making any conservation assessment.
- The data available shows that *Caladenia huegelii* is found in some 34 populations. Four populations are regarded as critical to the survival of the species, being known to contain in excess of 100 plants over areas of land that are sizeable enough to ensure long term survival of the species. Eight populations (including Beckley Bushland) are of medium size (as referred in the document) being known from greater than 10 plants during any survey period. The remaining populations are either extinct or have never been known to contain more than 10 plants.
- The medium sized populations are regarded as being important for the conservation of the species, as they represent greater diversity in areas of occupancy for maintaining representation in this species, than would be achieved by the four largest populations alone.

Thus while the Beckley Bushland contains only 1.7% of the known plants, the very uneven distribution of plant numbers between known locations, and the limited number of larger populations, makes this population important despite the apparent low numbers.

While DEC supports the relative importance of the population, it is also recognised that the small area of habitat retained to support this population, and the isolated nature of this habitat, places some risk to the longer term viability of the population of plants at this site. The site will be dependent on ongoing management if it is to persist into the future. Such management was

part of the conditional approval for the past clearing of part of the Beckley Bushland.

4.2 Does the hospital site contain both likely wasp habitat and wasp population?

The proponent has provided a detailed account of the known information on the wasp pollinator for this species. The DEC agrees that the potential for the Project Area to contain the appropriate wasp species, or its habitat, cannot be determined without extensive collecting, or detailed wasp baiting trials. Such trials would involve the collection of *Caladenia huegelii* flowers, or use of cultivated plants, to attract wasps in the Project Area. The use of natural flowers for this purpose would be unlikely to be supported.

It is noted that other wasp pollinated orchid species (eg *Caladeniq arenicola*) were found within the Project Area. While no evidence is provided, if these species are being naturally pollinated, then it would be assumed that the site was supporting similar wasp species to those which would pollinate *Caladenia huegelii.*

Previous studies into the wasp pollination of these species was undertaken when *Caladenia huegelii, C. arenicola* and some other *Caladenia* species were taxonomically incorporated into the one 'species'. At that time, the pollinating wasps were observed to have some differences, but that these different forms only associated with different morphological forms of the 'species' – which were subsequently split into at least *Caladenia huegelii and C. arenicola.* Since the formal separation of this species complex into the individual species known at present, the singularity of the wasp pollinators has not been proven, but is implied from the earlier studies. Recent work at Kings Park is exploring this issue, and the work appears to be confirming that the wasp pollinating *Caladenia huegelii* is morphologically different to that which pollinates *Caladenia arenicola,* and hence it is probable that these will be determined to be different wasp species. The presence of *Caladenia arenicola* in the Project Area thus does not predict that the *Caladenia huegelii* pollinator would occur in that bushland, but conversely it does indicate suitable habitat for what are presumably closely allied species.

The actual habitat requirements of the wasp species are not known. It is known, however, that the wasps are not dependent on the orchids (the orchids just use sexual deception to attract the wasps for pollination), and the wasp will feed on other flowers. Thynnid wasps (which include the wasps which pollinate these *Caladenia* species) utilise a range of plants as nectar sources and are often abundant on flowering plants in the Myrtaceae and Proteaceae families when active. Species of these families would be present in the Project Area.

Irrespective of the presence of *Caladenia huegelii* plants in the Project Area now, prior to the construction of the Kwinana Freeway, the contiguous nature of the bushland between Beckley Bushland and the Project Area could have resulted in the wasp occurring within the Project Area, and it is highly likely

that plants growing within the Project Area would be suitable for feeding. There is thus no reason to assume that the specific wasp species would not be found in the Project Area.

The current suitability of the Project area as habitat for the wasp cannot therefore be proven, but it is likely to contain suitable areas of habitat, and quite probably, individuals of the species.

4.3 If so, in what locations does the habitat exist?

With regard to potential feeding habitat, it is likely that potential feeding areas exist in the Project Area, but there is insufficient information to identify effective feeding areas. Hence, the location of active feeding areas is not possible with existing information and knowledge.

The response from the proponent is thus considered appropriate.

4.4 Will the proposed development retain sufficient wasp habitat in a suitable location to sustain the wasp's possible role as a pollinator for the orchid population?

As detailed above, there is no available information on wasp habitat, or the minimum habitat area requirements, for this species. An assumption could be made that with the relatively short flight distances of the wasp species, that relatively small areas of vegetation could sustain the species. However, with no information on the ecology, life history or genetic requirements of the species, this cannot be stated in a definitive manner.

There is also a low likelihood that if present, that the wasps would be able to access the Beckley Bushland under current configuration (refer question 4.5).

The area of vegetation identified to be retained in the north east section of the Project Area appears, on superficial inspection of the aerial photograph, to be similar in structure to the retained area of Beckley Bushland, and is in a similar topographical location. On this basis there is a reasonable presumption that if the wasp was present at the site, that this area of bushland may well be suitable habitat for the species. The bushland is also of a similar size to the current Beckley Bushland, and would thus presumably have similar viability as habitat as is presented by Beckley Bushland.

Thus, while the question cannot be answered definitively, with existing knowledge, the proposed retention of the bushland area in the north east section of the Project Area would appear to be the most appropriate location in terms of vegetation, topography, and proximity to Beckley Bushland if the wasp was present in the area, and was to be maintained as a potential source for pollination of *Caladenia huegelii* in Beckley Bushland.

4.5 What impediments are there – both before and after the proposed development – to wasp access from the development site to the Beckley Bushland?

The information presented in this response is consistent with the understanding of DEC on the movement patterns of the pollinating wasp species. DEC consider that it is unlikely that the wasp would or could fly between the two sites, but would not discount this as a possibility until adequately researched.

The information available on the ecological requirements of the species indicates that the male wasp (the mobile wasps) are unlikely to fly over extensive open areas, where they would be susceptible to overheating. This is supported by the research information on distances travelled.

The cleared distance between the Project Area and the Beckley Bushland is 280m, which is over twice the distance observed for the movement of male wasps in the stated research. Thus while this does not determine that wasps will not travel this distance, or that different species will have differing abilities, it does indicate a reduced likelihood of such distances being travelled.

The cleared nature of the land between the sites would also be a factor in preventing travel, both due to the potential for overheating, and the lack of incentive to embark on such travel. The incentive to travel would presumably be due to the attractance of the pheromone emitted by female wasps or (by deception) *Caladenia huegelii*. However, it is considered highly unlikely that the pheromone would be effective over 280m, as it is normally operational over tens of metres, rather than hundreds.

The impediments to wasp access from the development site to the Beckley Bushland are thus existing now, and would not change with the development. The impediments relate to the current distance of cleared land that separates the sites which appear most likely to be too great for the wasp to traverse, would prevent pheromone transfer between the sites and hence no attraction to embark on such a flight, and would cause overheating of any wasp that did attempt to do so.

4.6 What is the long term viability of the Beckley Bushland Grand Spider Orchid population given the proposed development taking into account the ecology for the wasp pollinator?

The long term viability of the Beckley Bushland is considered to be independent of any development in the Project Area, given the lack of probable interaction of pollinators between the sites.

The maintenance of the Beckley Bushland as a viable site for *Caladenia huegelii* will be dependent on the continuing implementation of the weed and hydrology management plans.

There is no information to suggest that the site does not contain its own population of the pollinating wasp, and is evidently habitat for the associated mycorrhizal fungus – both ecological components required for the persistence of this species.

The relevance of the issue of genetic interaction in reference to inbreeding suppression raised by the proponent in the draft response is not known. *Caladenia huegelii* is known to occur in a number of relatively isolated occurrences on the coastal plain. Given the presumed short flight distances of the pollinating wasp, it might be assumed that these separated populations have retained some degree of genetic isolation (which is enhanced now due to historic land clearing) and hence may not necessarily be dependent on a high rate of gene flow to maintain genetic health. This is, however, not supported in an historical context by the genetic information available for this species.

The presumption of between-population gene flow is supported by the genetic information presented in Question 4.8, which stated that there is little genetic difference between populations, but high differentiation within populations, which implies historical outbreeding. Hence it is presumed that there has been an historic flow of genetic material between populations in the past, but the current within-population diversity and outbreeding strategy provided by the wasps will presumably maintain genetic health in these isolated populations for some time.

Thus the potential impact of a lack of genetic contact with other populations is not known, and nor is it known if this would result in any level of inbreeding depression within a population within the foreseeable future. It certainly is not known if isolation will be detrimental to the persistence of the species at a site such as Beckley Bushland.

If this was found to be an issue in the future, then relocation of plants, or artificial pollination, could be implemented at this and other sites as part of the overall management of this species.

Irrespective of these findings, the probable lack of current contact with the Project Area means that the development of that land will not change the situation for Beckley Bushland.

4.7 What mitigation measures are proposed to reduce any indirect impacts on the orchid population from clearance of wasp habitat?

The issue of precedence (re the Beckley Bushland approval) raised by the proponent in answer to this question is not considered to be relevant, as any assessment must be able to utilise current knowledge, which may change from earlier assessments.

However, the conclusion reached by the proponent is supported as the development of the Project Area does not appear to have any impact on the Beckley Bushland or the *Caladenia huegelii* growing in it.

4.8 What relevant information on the Grand Spider Orchid is there from recent local developments, including any local translocations of the Grand Spider Orchid?

The comments provided by the proponent for this question are support by DEC. Translocated orchid plants can persist for a number of years on the nutrient store within the tuber, and hence success of a translocation will take several years to determine. Such translocations are only undertaken as salvage activities.

Note the references to the Kings Park Botanic Gardens Authority should refer to the Botanic Gardens and Parks Authority.

Author: Dr KJ Atkins, Manager Species and Communities Branch,
Department of Environment and Conservation