SCIENTIFIC REVIEW OF FLORA AND FAUNA ASSESSMENT METHODOLOGIES UNDERTAKEN FOR THE FOR THE REPORT *"BODANGORA WIND FARM ENVIRONMENTAL ASSESSMENT"*

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Summary

Australian Wildlife Services was consulted to undertake a scientific review of the methodologies and documents relevant to the Flora and Fauna Assessment, part of the Bodangora Wind Farm EA. This included Chapter 9, Attachment G and Attachment H. On review, it was difficult to make an assessment of the likely impact of this wind farm on the flora and fauna present based on the current version of the EA as there was a significant amount of data and mapping missing, including information requested by DGRs and recommended in the *Threatened Species Survey and Assessment: Guidelines for Developments and Activities* (Working Draft) (DEC 2004). A request was placed with the developer Infigen for additional data and maps. These items are outlined below along with summary points on review of the methodologies.

Consistently through Chapter 9 and Attachment G, unquantified or qualified statements are used with use of words such as: much of, the vast majority, are rare, a few, most, almost, often. There is little attempt to make meaningful scientific correlations and arguments between the data and summary text, making it difficult to pass this document as a scientific assessment of likely impact of flora and fauna.

On 11/07/2011, the developer was requested to provide the following additional information, mapping and data they have undertaken or required under the DGRs:

1. Soil mapping that shows the areas of "poor soils" as per 9.2.1 (p103)
2. Mapping of vegetation types and conditions that were assessed as per 9.2.1 (p103)
3. Mapping of habitat condition or quality, including rocky areas, rare wetlands, riparian vegetation and farm dams identified as per 9.2.1 p105 ("*Areas of rocky outcrops have also been identified… especially evident in the central and southern parts of the study area."…."Low-lying flats and riparian zones along watercourses provide some wetland habitat*")
4. Mapping or GPS locations of trees with hollows, especially where "large, mature trees with hollows have been avoided and can be retained to ensure maintenance of the existing habitat." p107
5. Please could they provide justification to why seven of the nine bat survey points are outside of the wind farm project area?

It is likely that further data and mapping will be requested of Infigen so as local stakeholders are able to make an informed evaluation of the quality of the EA and the assessment of the impact on flora and fauna.

Unless further information can be provided, it appears that this assessment of flora and fauna has failed to show targeted and stratified surveys for many threatened species potentially occurring, or historically occurring within the project boundary such as Koalas, Quolls and Superb Parrots. There are statements to the effect that they have undertaken targeted surveys, but these techniques are not described, survey locations nor criteria for target locations are not described, nor data provided. The lack of statistical information also makes it difficult to assess the methods employed by Kevin Mills and Associates. For example, there is a lack of 'species-time' or 'species-

area' curves to assess whether survey effort or survey area was sufficient to represent the majority of species at the site.

Fauna surveys

Superb parrots

Chapt 9 p106 – notwithstanding the pending surveys for superb breeding habitat during spring/summer, data is needed to assess the impact of turbines on Superb Parrot flight paths and habitat fragmentation on their seasonal migrations, food trees and grass, and flight corridors during winter? As well as an assessment of the impact of increased road traffic during construction phase leading to increased flushing leading to road strike. These threatening processes are outlined in the National Recovery Plan for Superb Parrots (Baker-Gabb 2011).

It is not clear whether they undertaken detailed superb parrot feeding vegetation mapping and surveys (flowering trees, acacia species, grasslands and crops) and assessed the proximity of these habitat types to turbines and cleared areas?

The proponent appears to have not contacted BirdLife Australia for their expertise for this species? Nor referenced material within the National Recovery Plan.

Chapt 9 p 113: Will the results of the superb parrot study pending be available for public viewing and comment before proposed construction? This survey is expected to target woodland on ridges - were woodland areas on ridgelines not surveyed previously in both winter and summer for all bird species, including superbs? Targeted surveys should be required for this species for wintering populations, these are more likely to be impacted than summer populations – as they breed further south (see National Recovery Plan Superb Parrot – 2011 & Figure 1 below).

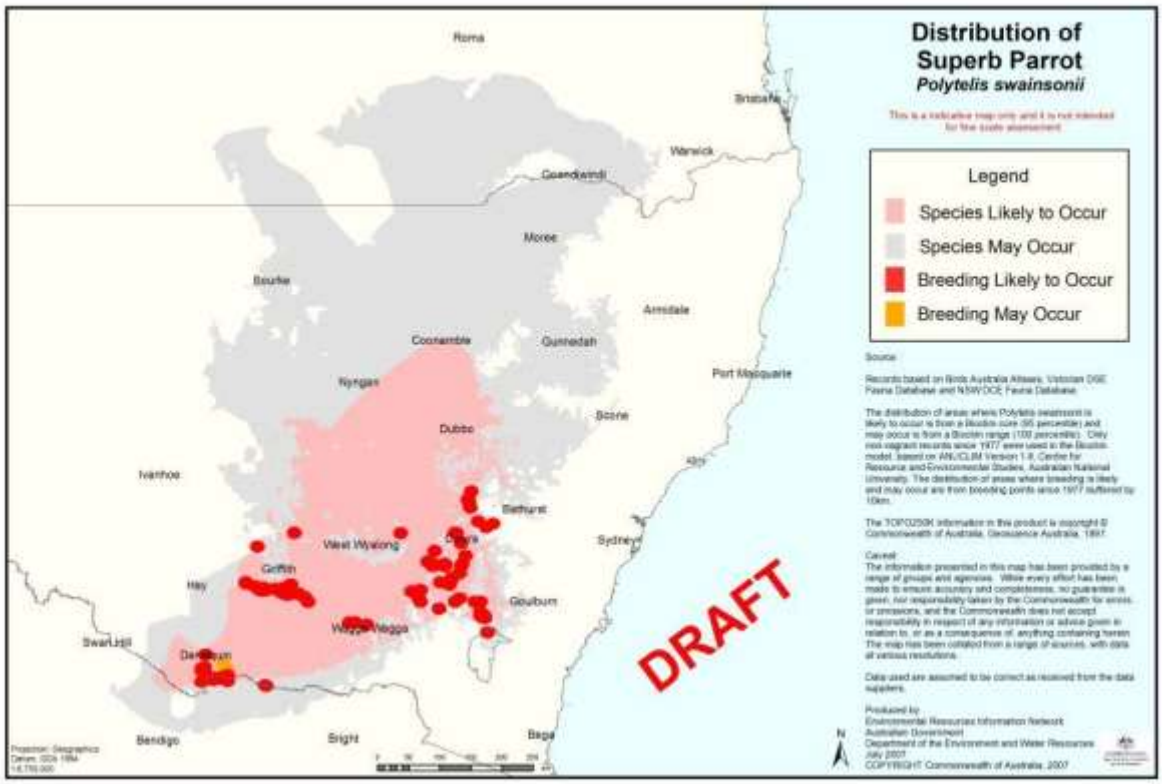


Figure 1. Distribution of the Superb Parrot from Baker-Gabb, D. 2011. National Recovery Plan for the Superb Parrot Polytelis swainsonii. Department of Sustainability and Environment, Melbourne.

Chapt 9 p 109: "*Blade strike is unlikely to be a threat since the parrot is a ground feeder and seldom fly above the canopy*. "

- **These birds frequently fly above the canopy. More references are need here to back up this statement. See Manning et al etc. Their anatomy and body form and flight (wing flap) action are consistent with birds that fly long distances above canopy height.**

Attachment G: 7.3 Impact of the Proposed Wind Farm on the Superb Parrot*: "native grassland utilised for feeding by the parrots is largely absent from the area and very little would be impacted by the wind farm*"

- **please reference this statement, they clearly target non-native grasses and crops in other regions as well as flowering trees, acacia species and plants with lerps - see the National Action Plan**

Other threatened birds

Attachment G 7.2: " *The Grey-crowned Babbler requires natural woodland with a native understorey. Such woodland is rare in most parts of the wind farm site. The wind farm does no impact on any natural woodland, so the impact on the habitat of this species is very unlikely to be significant*."

- **Fair enough except if the woodland is rare in "most" parts of the wind farm site – where exactly DOES it occur. Were these sites targeted – can they provide traverse maps showing where these areas were targeted for this species**?

Chapt 9 p106: Grey crown babbler was observed at one site. However there is no indication of site stratification that targeted this species.

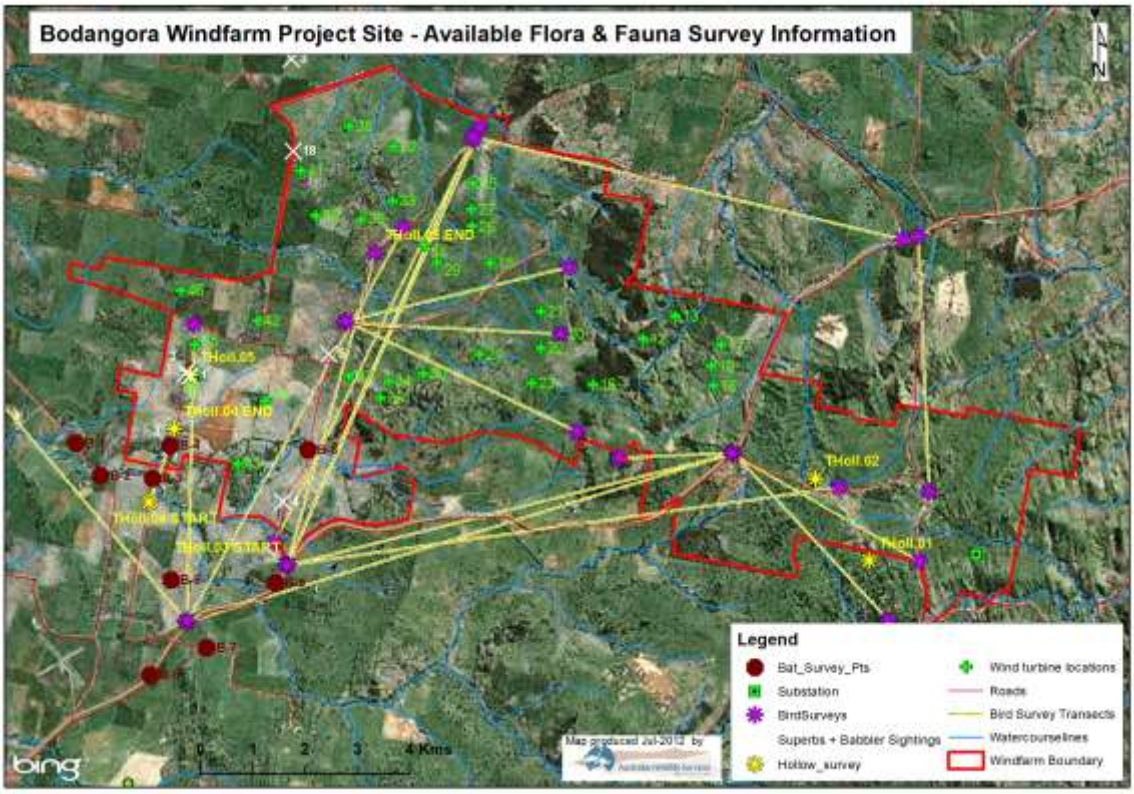
- **How many similar sites did they assess for this species?**

Brown treecreeper

One record of the Brown Treecreeper exists within the project boundary and several others within a 10km radius of the project area (Atlas of Living Australia CSIRO www.ala.org.au). This species was not targeted during surveys.

Survey effort – birds

It is uncertain where the traverses were undertaken for the bird survey. Using line of sight, it appears that many of the traverses were via road (see map below). It was also unclear whether these traverses were also for flora and habitat surveys. What proportion of time was spent on birds during these traverses compared to flora? Was more than one assessor used?



Using line of sight (may be otherwise but information not provided in the EA), the km for each traverse and mins taken for each was determined using ARCGIS (see table below). It is not justified why these methods were taken, how each traverse was stratified between different vegetation types and why some traverses were searched for much longer than others.

Site_no	Location	km*	mins	km/mins	m/mins
BIRD 01	Gillinghall Road	8.633	125	0.069	69.062
BIRD 02	Gillinghall Road, Spicers Road to Mudgee Road.	8.434	60	0.141	140.569
BIRD 03	Badalong Road to Gunnegalerie	4.890	43	0.114	113.727
BIRD 04	Gunnegalerie gate along Mudgee Road to Bodangora	8.780	25	0.351	351.212
BIRD 05	Driel Creek Road - Bodangora Road to Dunedoo Road	7.782	27	0.288	288.236
BIRD 06a	Glen Oak (not sure why two starting pts)	4.384	270	0.016	16.239
BIRD 06b	Glen Oak (not sure why two starting pts)	4.898	270	0.018	18.139
BIRD 07	Landsgrove Ridge - Driel Creek Road û Isali Street x Mudgee Road	8.592	110	0.078	78.110
BIRD 08	Gilinghall Road along Mudgee Road to Gunnegalderie gate	10.912	30	0.364	363.740
BIRD 09	Gunnegalderie property	4.137	140	0.030	29.553
BIRD 10	Gunnegalderie to Mount Bodangora	2.160	110	0.020	19.638
BIRD 11	Bodandora to Meadowlands	End coordinate of traverse not provided			
BIRD 12	Gillinghall Road	9.158	189	0.048	48.457
BIRD 13	Glen Oak property	4.136	184	0.022	22.479

Site_no	Location	km*	mins	km/mins	m/mins
BIRD 14	Along highway and into Gunnegalderie property	10.661	37	0.288	288.130
BIRD 15	North of Bodangora	5.679	60	0.095	94.646
BIRD 16	Gunnegalderie	4.373	300	0.015	14.577
BIRD 17	Gallinghall Road	6.200	65	0.095	95.381
BIRD 18	Bodangora to Meadowlands gate	End coordinate of traverse not provided			
BIRD 19	Gallinghall Road	8.891	35	0.254	254.027

***line of sight – may be otherwise but information not provided in the EA**

Chapt 9 p 108: "*there is no supportive habitat or topographical features present within the project area suitable for large soaring raptors or large waterbirds which would be the most likely to collide with turbines*"

- **This may have been overlooked by the consultant, there is plenty of habitat for large soaring raptors. See wedged-tailed eagle nest photo from local landholder (Figure 2) – all they need is a large mature tree to nest in.**

Figure 2: Wedged-tailed Eagle Nest – South of development area – photo by Mike Lyons.

Koalas and Quolls

There is no mention of targeted Koala surveys despite historical records for the species in the area and presence of food trees. The EA states in Attachment G Section 4.2 Table 4 "*Lack of local records*

suggests species is these species is often dominant or prominent." Three historical records exist within the Atlas of NSW Wildlife (www.bionet.nsw.gov.au) and *CSIRO Atlas of Living Australia (www.ala.org.au):* 6km, 7km and 10km from the project boundary. Local knowledge of the species exists where people remember seeing them when they were growing up.

Attachment G Section 7.2 "*The Spotted-tailed Quoll is not likely to be widespread in the area; the location where the species was observed a few years ago is in the vicinity of the granite country and where there are quite large areas of woodland. One or both habitats may be important for the quoll. There are now no turbines in that area*."

- **It is unclear where this granite country is, nor high quality quoll habitat could this be mapped with proximity to towers and new tracks/transmission lines.**

Vegetation surveys and results

Methods used by the consultant include transect and random meander. These are some of the recommended by the threatened species guidelines (DEC2004) but the guidelines recommend also applying plot-based surveys in addition 'to ensure the survey area is adequately sampled'. Plot based sampling has not occurred in this field survey and flora assessment, and justification why has not been provided. Advantages of plot-based surveys (DEC 2004) are:

- they enable a quantitative examination of species distribution and abundance;
- they are more likely to detect inconspicuous or threatened species, as a smaller area is sampled in a concentrated search; and
- they provide a basis for any subsequent monitoring required.

In outlining methods undertaken, the consultant has not provided information on site locations, survey effort, site stratification, number of traverses/random meanders and they do not provide or summarise the results other than floristic for the entire project area in Appendix 1. They do not provide the recommended information to be recorded (see below) – floristics, structure, vegetation boundaries, or which sites were targeted for specific threatened species.

Could they please provide more information on where the traverses and meanders were? Map? Were these traverses stratified to vegetation type or topography or habitat targeted for threatened species?

Table 5.1 Suggested survey techniques and effort for plant transects (traverses) and random meanders

Survey technique	Suggested minimum effort	Information recorded
Transect	1x100m traverse per stratification unit <2 hectares 2x100m traverses per 2-50 hectares of stratification unit 3x100m traverses per 51-250 hectares of stratification unit 5x100m traverses per 251-500 hectares of stratification unit 10x100m traverses per 501-1000 hectares of stratification unit, plus one additional 100m traverse for each extra 100 hectares thereof	Floristics, structure, vegetation boundaries
Random meander	30 minutes for each quadrat sampled within the same stratification unit as the quadrat	Targeted for threatened species

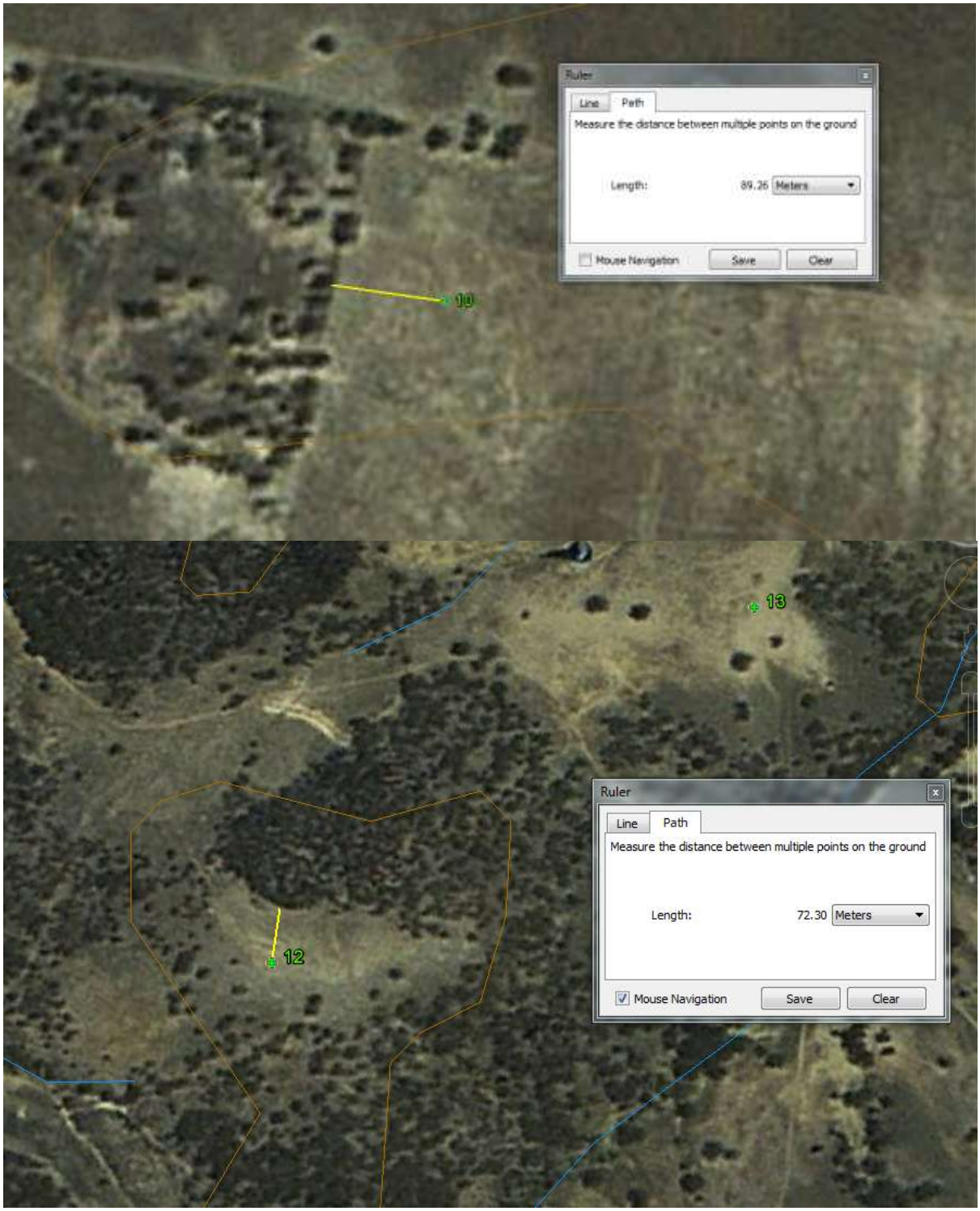
Table 5.2 Suggested survey techniques and effort for plant quadrats

Survey technique	Suggested minimum effort	Information recorded
Quadrat	At least: 1 quadrat per stratification unit <2 hectares 2 quadrats per 2-50 hectares of stratification unit 3 quadrats per 51-250 hectares of stratification unit 5 quadrats per 251-500 hectares of stratification unit 10 quadrats per 501-1000 hectares of stratification unit, plus one additional quadrat for each extra 100 hectares thereof.	Floristics, structure, threatened species

They claim p9 "*each of the proposed wind turbine tower locations was visited and most logical access routes and notes were specifically made on the vegetation and habitat at each site; see Appendix 4*." But it appears that the only data provided for vegetation at each site in Appendix shows only general notes such as "*Exotic grassland; very scattered Eucalyptus albens*" rather than detailed descriptions of vegetation floristics and structure, and condition. Dominant exotic species or dominant understorey species are not specified in Appendix 4, only presence of dominant overstorey. Could this information please be made available?

But conversely to the statement quoted above "*each of the proposed wind turbine tower locations was visited"*, Appendix 4 states that turbines 9-16 were not visited and declared 'cleared paddock'[1]. Inspection of Google Earth at each of these sites shows clearly trees within 50-200 m of each location (see example WTG 10; WTGs 12 & 13).

[1] WTG 9 since removed from wind farm layout.



Turbine sites were not preliminary determined until the second set of surveys was undertaken (see page 102 of main EA document "*The second field survey in July 2011 was undertaken once the preliminary layout of the wind farm had been determined*'). This suggests to the reader that each of the turbine sites may have been only assessed during winter, July 2011, which is unlikely to be appropriate for many forbs etc that actively grow in spring or warmer months. It even states on p9 of Attachment G that October/Spring was the better time of year to detect most species "*the survey was fairly thorough and one survey period was at a good time of the year (spring after good local rain)".*

Attachment G states "…*references consulted as part of the study include the work of Althofer & Harden (1980), Dubbo Field Naturalists Society (1984) and Cumberland Ecology (2005). Contact was also made with the Central West Catchment Management Authority in Wellington for information*." However there is no attempt to summarise or reference the material collected from these sources.

- **What was the information collected from these sources and was it utilised in this study?**

Attachment G Section 4.1: "*At most, tussocky native pasture is found in a few paddocks, sometimes dominated by species of Speargrass Austrostipa spp. and/or Redleg Grass Bothriochloa macra*."

- **Could the consultant please map the vegetation they have assessed – and indicate where these 'few' paddocks are?**

Attachment G Section 7.1: "The vast majority of tower locations and access routes are across cleared and heavily modified grazing land. Some clearing of vegetation is required at a few tower sites, as summarised in Appendix 4.

- **Why isn't this statement quantified if they claim to have visited each of the 33 sites.**

Attachment G Section 7.3: Impact of the Proposed Wind Farm on White Box Yellow Box Blakely's Red Gum Woodland: "*The sites for the wind farm infrastructure do not support this community as defined in the guidelines from the Commonwealth*."

- **At no stage of Chapter 9 or Attachment G is this quantified scientifically other than generalised sweeping statements. Data on each site and stratification unit must be provided including native species present and cover %, exotic species present and cover % AND condition. Then assessments can be made on whether these communities can be listed as per the policy listing information by the Threatened Species Scientific Committee (TSSC).**

Chapt 9 p103: "*The project area supports some stands of modified woodland and scattered paddock trees, although the understory and groundcover to almost all woodland areas is exotic grassland or a mix of native and exotic plants, with the exception of some areas including along roadsides (including Gillinghall Road)"*

- **Which sites did they assess for flora composition within woodland and scattered paddock trees. What is the exotic grass species so dominant? Forbs present? Where they assessed at the right time of year? Not provided in Attachment G.**

Chapt 9 p 103: "*on the ridges, whilst there is almost no native grassland understory remaining, tussocky native grasses are found in a few paddocks, sometimes dominated by species of Speargrass Austrostipa spp. and/or Redleg Grass Bothriochloa macra*"

- **Please provide mapping of these areas with proximity to turbines and cleared areas. Not provided in Attachment G. Ridge vegetation is often the only remaining remnant of woodland areas and to remove these could cause an environmentally tipping point in terms of landscape functionality.**

Chapt 9 p 108: "*Those sites that support native plants, such as road reserves and the granite country, were targeted by the field surveys, notwithstanding no threatened plant species were identified*."

- **How were these targeted? Were they stratified? Where the modified areas assessed also for native grasses and threatened forbs? Not provided in Attachment G.**

Chapt 9 p 109: "*White Box - Yellow Box - Blakely's Red Gum Woodland: Whilst the wind farm will result in some loss of native vegetation that is part of the listed community, the loss is small and high value sites are not involved*."

- **No map of the high value sites provided. Not provided in Attachment G.**

Chapt 9 p 110:"*The Policy Statement prepared by DEH 'White Box – Yellow Box – Blakely's Red Gum Woodland' (2006) provides strict procedures for identifying the community. Almost none of the treed areas in the project area meet the minimum criteria for the community*."

- **Other than stating that the 'majority of the woodland areas do not have a substantially native understory' there is no data or summary of data providing the evidence for this statement. For example: Percentage of sites assessed where understorey was native and % where understorey was non-native; total floristics for each site (not for the entire area) including quantified plant coverage to show that thresholds for this statement are met as per the DEH Policy Statement.**

Chapt 9 p 104: Presence of Threatened Flora "*No threatened plant species have been recorded within 20 kilometres of the project area, or within the project area. Given the highly modified environment within the project area, it is unlikely that any threated species would occur*."

- **Threatened flora has been historically recorded within 20 kms of the project area – this data is shown in Appendix 7 of Attachment G. How is it unlikely that any occur here? Please provide references for this statement.**

Flora, threatened species, Selected Area - 148.83333,-32.58333,149.33333,-32.25000 returned a total of 113 records of 5 species.
Report generated on 11/10/2010 - 21:45 (Data valid to 25/04/2010)

Plants	Map	Scientific Name	Common Name	Legal Status	Count
Fabaceae (Faboideae)					
	☐	*Swainsona recta*	Mountain Swainson-pea	E1	88
	☐	*Swainsona sericea*	Silky Swainson-pea	V	1
Fabaceae (Mimosoideae)					
	☐	*Acacia ausfeldii*	Ausfeld's Wattle	V	4
Orchidaceae					
	☐	*Caladenia arenaria*	Sand-hill Spider Orchid	E1	1
Rutaceae					
	☐	*Zieria obcordata*	-	E1	19

Source: Attachment G

Habitat mapping and condition assessment & proximity to infrastructure

(not undertaken or data not provided)

Attachment G 7.2: "*The Bodangora wind farm avoids all high value vegetation or habitats; components of the wind farm are located to avoid all important native habitats. The development will be mitigated in those areas where there could be some native habitat loss by minimising the footprint of the development and micro-siting components to avoid local habitat features, such as rock outcrops.*"

- ***It is good that the wind farm is located to avoid all important native habitats (although they go onto say that where there could be loss …which is it – avoid all habitat or some habitat loss?) but there has been no assessment provided of habitat quality. Could they please provide habitat quality assessment methods, and mapped results?***

Chapt 9 p107: "*infrastructure has been located to avoid local habitat features, including creeks, high quality remnant woodland, rocky outcrops or other features which could be important to flora and fauna*".

- **These data and habitat conditions need to be mapped or gps points provided to show how these local habitat features have been 'avoided'? This should include non-native habitat. As per the Threatened Species Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (DEC 2004) The habitat assessment should include information on:**
- **landscape features in the study area (e.g. river banks, rocky outcrops, dry slopes, wetlands, undulating terrain)**
- **any other features that could provide habitat such as hollow-bearing trees or culverts**
- **the DECC BioMetric vegetation types.**

Chapt 9 p 105: "Low-lying flats and riparian zones along watercourses provide some wetland habitat, although all wetlands in the area are rare and ephemeral in nature. Farm dams within the

project area provide relatively small areas of open water with little fringing wetland vegetation, only useful for low numbers of a few species."

- **Were farm dams assessed for waterbirds or is this an assumption? If so, please provide literature/reference/evidence for this statement.**

Tree Hollows

"*Of 361 trees which were surveyed as part of the field investigations, 17 percent of trees had at least one hollow. Kevin Mills and Associates consider 17 percent of hollow-bearing trees as 'not common'*" Chapt 9 p105 (also see Attachment G Section 5.1)

a) **In what unit area were these trees assessed eg what percentage of the landscape was assessed or in hectares? Were the surveys stratified by vegetation type?**
b) **If KM&A consider 17 % hollows 'not common' what is the basis and literature for this definition?**
c) **Data not provided: What was the bch of tree species with large hollows? What was the dch of the 73% of trees that did not have hollows. And what species were assessed – only species known to produce hollows or all trees present. Were all trees at a site assessed or were the trees sub-sampled? Why were the sample sizes and sample areas different. Can they quantify the area at each site assessed – including information such as stems per ha or density?**

Minimum clearing

Chapt 9.3.1 p 107: Worst case scenario clearing: What evidence do they have to support that 22 sites have 0 native vegetation or trees? The worst case for all 33 sites is 3.96 ha cleared. This does not include a figure for roads widening and reinforcing.

The impacts of clearing along the length of transmission lines and 39km of upgraded or new tracks have not been included in the 'worst case scenario' for clearing. Furthermore, using 30-40m cleared areas around each tower location, Google Earth showed 16 turbines to be in presence of trees that needed to be cleared. Not the 11 stated in the 'worst case scenario' for clearing (section 9.3.1).

Microsighting

Chapt 9 p 107: **If microsighting is undertaken, will landholders be notified and given the opportunity to protest? Will further surveys of those sights be made?**

Lack of qualification of data represented

Use of unqualified terminology is throughout Chapter 9 and Attachment G. For example Attachment G Section 4.1: "*The study area supports some stands of modified woodland and scattered paddock trees and patches of trees; much of the area is treeless. Within the grazing land, there is often very little native ground cover and native shrubs, in particular, are quite rare… …The understorey in most places is exotic grassland or a mix of native and exotic plants; i.e. native pasture. The majority of the study area is exotic pasture with few if any trees*."

"*At most, tussocky native pasture is found in a few paddocks, sometimes dominated by species of Speargrass Austrostipa spp. and/or Redleg Grass Bothriochloa macra*."

"*Within the grazing land, there is <u>often</u> very little native ground cover and native shrubs, in particular, are quite rare*."

"<u>Almost all</u> of the remnant trees, patches of trees and occasional patch of native grassland in the lower areas are part of the one plant community, the White Box - Yellow Box - Blakely's Red Gum Woodland."

Section 7.3*: "Based on abundance of native understorey and presence of mature trees, <u>almost none</u> of the treed areas in the vicinity of the wind farm meet the minimum criteria for the community."*

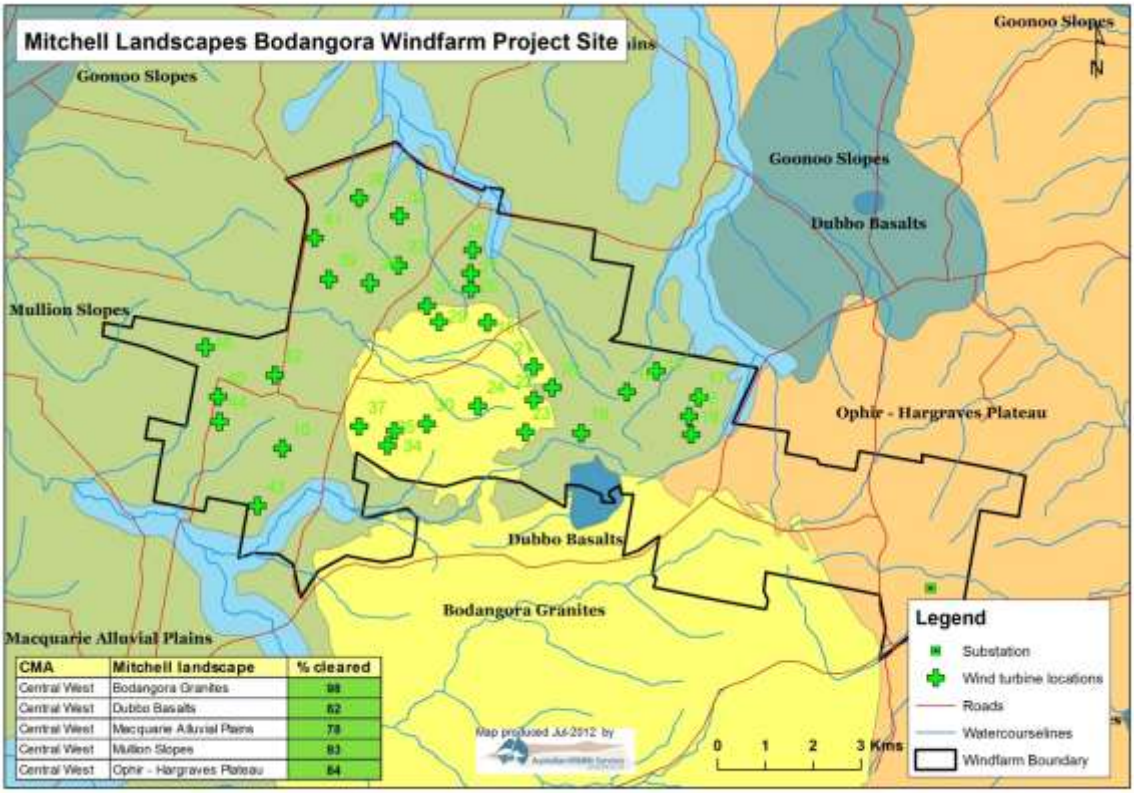
- **The assessment would be more scientifically rigorous if the consultant could quantify or map these areas. There is no indication to the reader what the percentage of any of these vegetation types occur across the landscape and where Especially in relation to proximity to tower locations or areas to be cleared. What percentage of ground cover is exotic or native at each site assessed? What number of forbs were found at each site – if assessed at the correct time of year?**

Mitchell landscapes

While the proponents are not required to satisfy legislation enacted by the *Native Vegetation Act 2003* as the development is being assessed under Part 3A of the EP&A Act, consideration should be given to the Mitchell landscape types affected within the project area. Such highly cleared areas are likely to be in an environmentally or functionally fragile state – where small pockets and remnant of vegetation are important to continue to connect the landscape and habitats. While these landscapes could be better managed to encourage regrowth of healthy systems through grazing management and revegetation, emphasis needs to be put on the importance of retaining remnant vegetation in these areas. The Mitchell Landscapes present in the area are shown in the table below. All landscape types have been highly cleared 78-98%, where it is recommended that no clearing occurs in ecosystems that are more than 70% cleared and not in low condition (Native Vegetation Act 2003).

CMA	Mitchell landscape	Revised % cleared
Central West	Bodangora Granites	**98**
Central West	Dubbo Basalts	**82**
Central West	Macquarie Alluvial Plains	**78**
Central West	Mullion Slopes	**93**
Central West	Ophir - Hargraves Plateau	**84**

Source: *Eco Logical Australia, (2008). Editing Mitchell Landscapes, Final Report. A Report prepared for the Department of Environment and Climate Change.*



Bats

The report 'Matters of National Environmental Significance' provided in the preliminary Environmental Assessment for Infigen for the Bodangora Windfarm (2010) show *Nyctophilus timoriensis** (South-eastern form) / *Nyctophilus corbeni* (Greater Long-eared Bat, South-eastern Long-eared Bat) potentially occurs in the area. During surveys by Greg Richards and Associates Anabat ecolocation methods were used. This is an accepted methodology for assessing many threatened bat species (see Survey guidelines for Australia's threatened bats DEWHA (now SEWPAC) 2010). However it is not an appropriate methodology for assessing for *Nyctophilus* species as the difference between the different species of *Nyctophilus* cannot be distinguished using ANABAT (as per the National guidelines for surveying threatened bats). During the survey by Greg Richards and Associates – 174 calls from *Nyctophilus* species were recorded in woodland areas (and also recorded in creek lines and some in pasture), but presence of threatened *Nyctophilus* species cannot be determined using this method. National guidelines for surveying threatened bats (DEWHA 2010) recommends harp trapping methods. Why weren't these methods employed?

> *Note that *Nyctophilus corbeni* is listed under the EPBC Act as *Nyctophilus timoriensis. Prefered methods to survey for this species include*
>
> Historical distribution of this bat shown in map below showing records to the north and south west. It is unlikely that presence of this species has ever been assessed the project area.

- **Could they please provide the bat ecolocation graphs or samples of each species?**

- P113 (chapt9): "*Monitoring of barotrauma during the first year of operation*" – **this should occur for the life of the wind farm!**

Historical distribution

Nyctophilus timoriensis : Central Long-eared Bat: