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Ms Tonia Robinson

Environmental Officer (Assessments)

Environmental Protection Authority

6 September 2018

Re: Port Latta Wind Farm (DA 2018/019). Request for Additional Information - Supplement to the DPEMP

Dear Ms Robinson,

I am writing in response to correspondence from Dr Martin Read which was provided to Mr Charles Scarafiotti on 21 August 2018 requesting additional information in the form of a Supplement to the DPEMP. This supplementary information is provided below.

Background

The EPA has recently informed us that a nest was known to exist near the boundary of the proposed Port Latta Wind Farm Development. This nest has not been recorded in the Natural Values Atlas and was not detected during eagle nest surveys undertaken specifically for the wind farm. This letter:

1. Describes the activities that have been undertaken since the EPA informed us of the nest.
2. Provides an assessment of the implications of this nest in relation to the project.
3. Provides proposed actions in response to the new nest.

Activities Undertaken

Upon being notified of the nest the following actions were instigated:

- All known information about the nest was sought from the EPA and PCAB.
- Van Diemen Consulting was engaged to conduct observations of the nest site following the Forest Practices Authority (FPA) protocols for approaching potentially active eagle nests.
- The non-detection of the nest was discussed with SFM Environmental Consulting, the company engaged to undertake the helicopter-based nest survey of the region that contains the nest.

Additionally, as committed to in the Port Latta Wind Farm DPEMP, a Bird Utilisation Survey (BUS) was conducted during winter (12-16 August 2018).

The outcomes of these actions are discussed below.

The information provided by the EPA/PCAB in relation to the nest consisted of the nest location and photos of the nest taken when the nest was identified five years ago. As shown in Figure 1, the nest is located 690 m from the closest wind turbine (WTG #2), 680 m from the Bass Highway and less than 1,000 m from the boundary of the Port Latta Landfill site. The nest is also less than 300 m from large areas of cleared pasture used for intensive dairy farming activities (cropping and strip-grazing).

Figure 1: Distances from the newly found nest site

Dr Colin McCoull from Van Diemen Consulting (VDC) visited the nest site on Saturday 25th April 2018. The memo documenting the outcome of his visit is provided as Attachment 1. In summary, he found:

- The nest was inactive and did not appear to have been used for some time (vegetation was growing in the nest and the nest was slumping in the tree).
- No adult or juvenile eagles were observed in the nearby area during the site visit, but a White-bellied Sea eagle (WBSE) was observed near Port Latta when Dr McCoull was driving to and from the site. It was observed about 1 km north west of the nest near the Bass Highway.
- It was not possible to determine whether the nest was that of a WBSE or a Wedge-tailed Eagle (WTE).

The winter BUS (Bird Utilisation Survey) was undertaken during the week starting the 12th August. The report from this survey is provided as Attachment 2. This survey augments the surveys conducted previously during summer, spring and autumn. Each survey comprised five survey days per season. The winter survey has again demonstrated that the proposed wind farm site has a low eagle utilisation rate compared to other Tasmanian sites. Seven movements of WTEs and two movements of WBSEs were observed during the winter survey.

Figure 2, Figure 3 and Figure 4 show the eagle movement data for all seasons. If the label of the point starts with a “2”, this denotes that two eagles were seen flying together. The arrow indicates the direction of flight. The number after the label indicates the height above ground of the flight. Where the birds were roosting or were on the ground, a hexagonal icon is used rather than an arrow. WTE observations from all four seasons are shown on Figure 2 and WBSE observations are shown on Figure 3 and Figure 4.

The location of WTE observations suggests activity associated with the known nests RND #993 and #1048. In contrast, there was no WTE activity observed in the vicinity of the newly documented nest. This supports the observations made by VDC that the nest is not being actively used.

Figure 2: WTE movements across the wind farm (four seasons of surveys)

Figure 3: WBSE movements across the wind farm (four seasons of surveys)

Figure 4: WBSE movements across the wind farm, expanded detail of the area around the landfill (four seasons of surveys)

The maximum number of movements for WTE during spring was 2, summer 3, autumn 11 and winter 7. Using a crude average of the number of flights per observation day, this equates to 1.15 flights per day. It is difficult to empirically compare the WTE utilisation rates between the Port Latta Wind Farm and other wind farm sites in Tasmania because the data have been collected using different methodologies. However, using a basic average of WTE flights observed per survey day, the following was found:

- West Coast Wind Farm - no WTE observed during bird utilisation surveys.
- The combined average for Musselroe, Bluff Point and Studland Bay Wind Farms was 4 flights per day (Hull and Muir 2013. Note that the Musselroe data were collected prior to the construction and operation of the wind farm).
- Low Head Wind Farm - 10 flights per day (Appendix H of the Low Head DPEMP).

- Cattle Hill Wind Farm - 12 flights per day (Appendix H Cattle Hill Wind Farm DPEMP).

This demonstrates that the WTE utilisation rate at the Port Latta Wind Farm site is substantially lower than that for most other Tasmanian wind farm sites.

As described in the DPEMP, aerial surveys were conducted to identify unrecorded eagle nests in the immediate area (within 1 km of the wind farm boundary) after modelling of potential eagle habitat was conducted. Unfortunately, this nest was not detected during these surveys. This issue has been discussed with the consultant who conducted the field surveys and he commented:

> *"There are a number of reasons why a nest could be missed during a search. Looking at the location and photos that you sent through it may have been obscured by the crown shape of the tree, it could also have been directly under the flight path or perhaps a combination of the two. Practically there is not a lot that can be done during the search to combat this except where habitat seems particularly good we re-fly the area at different angles which was done in several locations throughout the search area as can be seen from the flight path that I submitted with my report. I feel it is worthwhile also noting that the nest location is not a usual situation to find a nest in so far as it was on an exposed aspect, near the top of a hill and within a few hundred meters of an intensively managed farm which is why I did not deem it necessary to re-fly this area".*

From the recent photos of the nest taken by VDC, there is green vegetation growing in the nest and there is a reasonably thick canopy around the nest, possibly making the nest more difficult to be seen during a helicopter survey. The GPS records from the helicopter survey show that the helicopter did traverse close to the nest.

Implications to the Proposed Port Latta Wind Farm Development

There is a considerable amount of research being conducted around the World on the impact of wind farms on wildlife, particularly to large raptors (see for example, Hull et al. 2015a, Köppel and Schuster 2015, PNWWRM XI. 2017). This research has highlighted there are two potential impacts of wind farms; disturbance to breeding birds and collisions with moving turbine blades.

It is important that the scientific findings of the most similar species be referenced since there are well recognised differences in how different species react to wind farms along with site differences (Marques et al. 2014). The most relevant studies are those conducted on WTE, and even more relevant are studies conducted in Tasmania. There have been a number of studies into the issue of eagles and wind

farms conducted at the Bluff Point and Studland Bay Wind Farms in north-west Tasmania. Fortunately, most of the studies conducted at these sites have been published in peer-reviewed scientific journals.

The following conclusions arise from these studies:

- Eagles continue to use a wind farm site once the wind farm is constructed and operational. This is positive in the respect that it means they are not disturbed by the presence and operation of the wind farm (and therefore do not suffer any "alienation" effects with its associated loss of habitat), but it means that they can be at some risk of collision (Hull and Muir 2013).
- Eagles breeding at a wind farm with a 500 m buffer between wind turbines and an active nest show no disturbance effects, that is, they breed at the same rate than those away from the wind farms (Hull et al. 2015b).
- There is *no correlation* between collision rates and the distance of wind turbines to active eagle nests that have a 500 m buffer. That is, a wind turbine closer to a nest (with the 500 m buffer) does not have a higher collision rate than turbines further away (Hull et al. 2015b).
- Eagles change their flight paths after a wind farm is constructed (Hull and Muir 2013) and display responses to operating wind turbines that indicate they are well aware of them.
- The factors responsible for collision risk are still not well understood and it is likely there are multiple risk factors. There are several hypotheses about the causes of eagle collisions at Tasmanian wind farms (including age of the eagle, territorial disputes or eagles' displaying behaviour) but no evidence has been found to support any of these, even though the data has been rigorously tested for such patterns. It is important that unless there is evidence for a causative factor in eagle collisions, management responses are not be based on these hypotheses because they would be unlikely to reduce the collision risk or rate.

In summary, observations indicate that eagles are aware of wind turbines, alter how they use a site once turbines are installed and alter their proximity to turbines in response to weather conditions and activity of the turbine. However, they still occasionally collide with turbines and there remain a number of important gaps in the understanding of why this occurs and what, if any, characteristics of a wind farm site may be related to collision risk.

What is clear from the evidence is that there is no relationship between collision rates and proximity of a turbine to an active eagle nest (with a 500 m buffer). Buffers of 500 m are standard at currently operating Tasmanian wind farms and were installed to minimise any potential disturbance effects on breeding

eagles (and based on Forest Practices Authority protocols for forestry operations). These buffers were not implemented as a collision risk mitigation strategy but to mitigate any disturbance effects. The newly identified nest is 690 m from the closest wind turbine, which is greater than the standard buffer for wind turbines and eagle nests at operating wind farms in Tasmania.

The standard environmental management approach (mitigation hierarchy) of avoid, mitigate, offset, is being used here and overseas to attempt to reduce collisions by eagles at wind farms. A number of studies have examined which strategies are proving to be the most effective (see for example, Marques et al. 2014, Arnett and May 2016, Allison et al. 2017, Watson et al. 2018). There is general agreement that the currently most effective strategy to minimise impacts to eagles is to avoid high risk sites (those with either important species or, more relevant, high use by important species). There are some potential options to mitigate once a wind farm is operating, but the evidence for the effectiveness of these is currently lacking, equivocal or the strategy impractical. Offsets are a viable option, but there is general agreement that avoiding a fatality is preferable to offsetting one (e.g. Maruquez et al. 2014 and references therein).

The Port Latta site was specifically selected because it is highly modified following decades of intensive human activities (farming and industry) and consequently has few natural values. Eagles are fairly ubiquitous across Tasmania, although their density varies, therefore the most effective avoidance strategy is to choose a site with a low density (low utilisation) of eagles. The bird utilisation surveys have consistently found that the number of movements by eagles is considerably lower at Port Latta than most other wind farm sites in Tasmania (see the comparison above).

It has been suggested that WTG #2 could be moved further away from the nest, possibly moving it south east so that it is 1,000 m away from the nest. Unfortunately, this is not possible for this specific case for multiple reasons. Wind turbines cannot be located in the “wake” of another turbine unless there is greater than 6 rotor diameters of distance between the turbines (in the predominant wind direction), which correlates to 840 m in the case of using a 140 m rotor diameter, as proposed for this wind farm. This is shown diagrammatically in Figure 5. This requirement means that it is not possible to move WTG #2 south east, because it would be directly “behind” WTG #3 when considering the predominant wind direction (south west). If WTG #2 was moved behind WTG #3, not only energy output would be affected; the wind turbine’s major components would prematurely fail due to the higher fatigue loading caused by the turbulence caused by WTG #3. The wind turbine manufacturer would not allow their supplied turbines to be installed in such a manner.

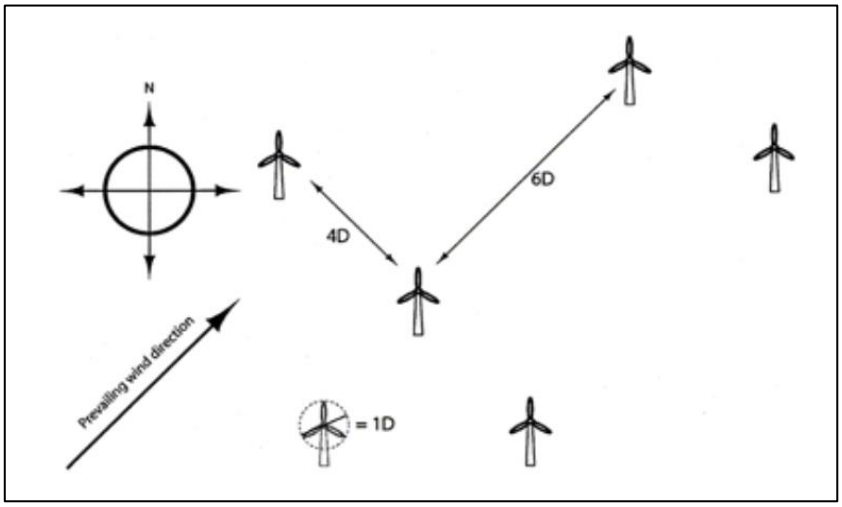

Figure 5: Typical minimum distances between wind turbines

Figure 6 shows the area (shaded in yellow) in which WTG #2 could not be moved to due to the wake interactions of either the wake of WTG #3 interacting with WTG #2, or the wake of WTG #2 interacting with WTG #1. The red circle around WTG #3 and WTG #1 shows the area enclosed by the six rotor diameter separation requirement. Note that this requirement only relates to the predominant wind direction. A wind rose is also shown in Figure 6, showing that the predominant wind direction is from the south west. Figure 6 demonstrates that there is no room to move WTG #2 close to a line between WTG #1 and WTG #3.

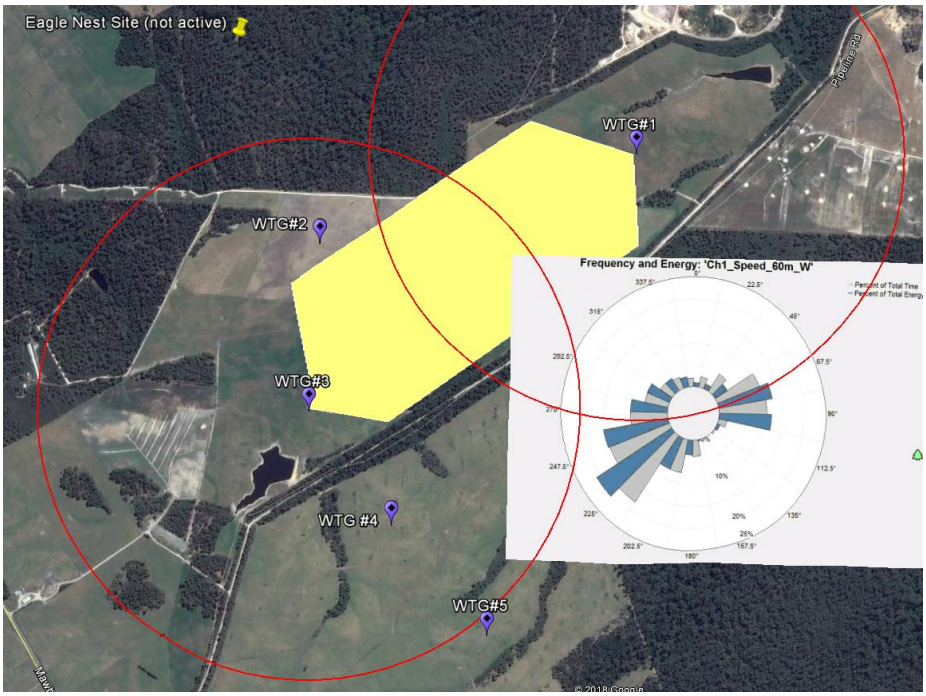

Figure 6: Area that cannot be utilised due to wake effect considerations (shown in yellow). The red circles show an 840m radius around WTG #3 and WTG #1 and the inset wind rose shows that the predominant wind direction is south west.

Other constraints on the movement of WTG #2 include noise constraints (which restrict movement of the turbine in the south west direction) and the farm's pivot irrigation systems which greatly restrict wind turbine placement (see Figure 7).

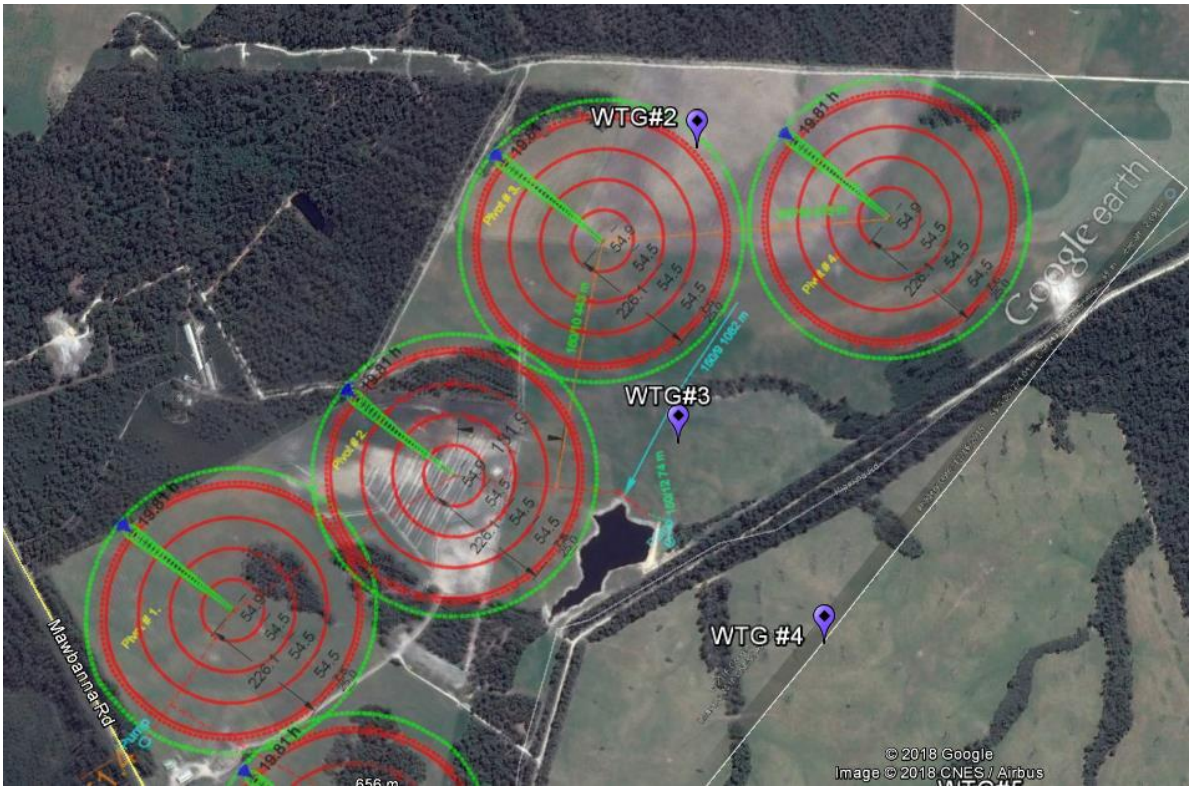

Figure 7: Pivot irrigators restricting wind turbine placement

These pivot irrigation systems are being progressively installed across the Wells' property. The first two irrigators are already installed.

Conclusions and Proposed Actions

This newly documented nest is in poor condition, is unlikely to be used for breeding this year and may not have been used for some years. It is not clear whether it is that of a WBSE or WTE, although Van Diemen Consulting believe it is more likely to be the former due to its proximity to the coast and the fact that WBSEs have been seen in the area. Its location (690 m from the closest turbine) is greater than the standard buffer used at currently operating wind farms (500 m). The evidence from studies at operating Tasmanian wind farms have found that a buffer of this size means breeding activity is not disturbed by the construction or operation of a wind farm and that there is no evidence linking a larger buffer with a reduction in eagle collision risk. It is not possible to move the proposed location of WTG #2 further away from the nest due to impacts to farming activities and the technical requirements of turbine spacing. There are no likely benefits in terms of reducing eagle collision risk, but substantial impacts to the project, by moving this turbine.

Given that there is clear evidence that a larger buffer will not reduce collision risk, that this site has a low eagle utilisation site and it is not practical to move turbines without impacting on farming activities or the wind farm, we do not propose moving WTG #2.

The proposed Port Latta Wind Farm development has approached the eagle issue by the following actions:

- **Avoided** impacts by selecting a highly modified site with few natural values, and low utilisation rates by eagles.
- **Mitigated** potential disturbance impacts by having buffers of the standard 500 m for operating Tasmanian wind farms around eagle nests (the distance of the closest wind turbine to the known eagle nest is a minimum of 1,500 m and to this inactive nest, 690 m).
- **Offset** any mortalities attributable to the wind farm by committing to a monitoring program focussed on eagles and offsetting any mortalities due to wind turbine collisions.

In addition to the commitments made in relation to eagles in the DPEMP, the newly identified nest will be inspected once outside the breeding season to document its condition. During the breeding season (November) it will be checked from a vantage point to determine if there are any signs of breeding activity.

The following will be documented during these visits:

- The condition of the nest.
- Whether the nest has been added to (i.e. signs of nesting).
- The presence of any eagles in the area (and the species).
- Indications of a breeding attempt (eagles on the nest or presence of a chick/s).

The survey during the breeding season will follow the FPA protocols around active eagle nests (FPA Technical Note No. 1). All information collected will be reported in the Port Latta Annual Environment Report and provided annually to the NVA (Natural Values Atlas) to update the record on this nest.

These surveys will be conducted for three years and then reviewed to determine if there is any value in their continuation. They will cease if the nest is no longer present (i.e. falls from the tree, or is deemed unusable).

Regards,

Paul Fulton

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Attachments:

Attachment 1: Memo from Van Diemen Consulting

Attachment 2: Winter Bird Utilisation report

(Provided as separate files)

References

Allison TD, Cochrane JF, Lonsdorf E and Sanders-Reed C. 2017. A Review of Options for Mitigating Take of Golden Eagles at Wind Energy Facilities. Journal of Raptor Research, 51(3):319-333. https://doi.org/10.3356/JRR-16-76.1

Arnett EB and May RF. 2016. Mitigating wind energy impacts on wildlife: approaches for multiple taxa. Human–Wildlife Interactions 10(1):28–41

Hull CL, Bennett E, Stark E, Smales I, Lau J, Venosta M. 2015a. Wind and Wildlife. Proceedings from the Conference on Wind Energy and Wildlife Impacts, October 2012, Melbourne, Australia. Springer. Dordrecht, Heidelberg.

Hull CL, Sims C, Stark E, Muir S. 2015b. Results and analysis of eagle studies from the Bluff Point and Studland Bay Wind Farms 2002-2012. Pp. 95-111 in Hull, C.L., Bennett, E., Stark, E., Smales I., Lau, J., Venosta, M. 2015. Wind and Wildlife. Proceedings from the Conference on Wind Energy and Wildlife Impacts, October 2012, Melbourne, Australia. Springer. Dordrecht, Heidelberg.

Köppel J and Schuster E (Eds.). 2015. Book of Abstracts Conference on Wind energy and Wildlife impacts (CWW 2015). March 10-12 2015, Berlin Germany. Technische Universität Berlin.

Marques AT, Batalha H, Rodrigues S, Costa H, Pereira MJR, Fonseca C, Mascarenhas M, Bernardino J. 2014. Understanding bird collisions at wind farms: An updated review on the causes and possible mitigation strategies. Biological Conservation 179:40-52.

PNWWRM XI. 2017. Proceedings of the Wind-Wildlife Research Meeting XI. Broomfield, CO, November 30 - December 2, 2016. Susan Savitt Schwartz (Ed). Prepared for the National Wind Coordinating Collaborative by the American Wind Wildlife Institute, Washington, DC, 164 pp.

Watson RT, Kollar PS, Ferrer M, Nygard T, Johnston N, Hunt G, Smit-Robinson HA, Farmer CJ, Huso M, Katzner TE. 2018. Raptor interactions with wind energy: case studies from around the World. The Journal of Raptor Research 52 (1): 1-18.