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MEMORANDUM

Attention: Glenn Starr, Taumatotara Wind Farm Limited
Date: 9 December 2020
From: Simon Chapman, Principal Ecologist
Subject: Taumatotara (T4) Wind Farm – s92 response – Bats

Dear Glenn,

This memorandum provides responses to the two bat-related s92 requests for further information in relation to your revised application to vary your existing consent. The variation application seeks to increase turbine size (maximum tip height and blade length) at the yet-to-be-constructed Taumatotara (T4) Wind Farm. As part of the revised application the number of turbines will be reduced from 22 to 11.

The bat related s92 questions, together with my responses, are as follows:

First question:

15. The Ecology New Zealand report concludes that “while bird and bat fatalities are unlikely to change with increased blade tip height and rotor diameter, the 50% reduction in turbine numbers is highly likely to reduce fatalities, which could be a positive ecological benefit overall”. Further information is required regarding how these conclusions can be quantified. How exactly was it determined that the bird and bat fatalities are unlikely to change given that no data is presented on what those effects might be in the first instance. How many birds or bats were determined to be impacted by the previous proposal?

Response:

Council previously granted consent for the project with rotor diameters and maximum turbine blade tip heights that provided for a total combined Rotor Swept Area (RSA) of up to 173,000 m². With the proposed amendment to the consent, turbines 12 to 22 will no longer be constructed. The dimensions of the remaining turbines will be increased the overall combined RSA in the consent variation will be increased by approximately 20% to 207,000 m². The locations of the remaining turbines (1 to 11) will be as per the existing consent.

The proposed amendment is in effect a transfer and increase of RSA to be considered in three distinct ways:

1. From the southern end of the site to the northern end (Appendix 1)
2. A transfer from lower height upwards that will increase ground clearance (Appendix 2; Shown in yellow to the higher height as shown in green and added to turbines 1 to 11)
3. The avoidance of turbines near the high-quality native forest habitat for bats adjacent to turbines 17 to 22 (Appendix 4)

For point 1 and as noted in the Ecology NZ report referred to in the question above, published literature on bat mortality at wind farms highlights that deploying a smaller number of large turbines with greater energy output reduces total collision risk¹.

The third point of consideration requires observations and comparisons of the existing potential habitat at Turbines 12 – 22 vs Turbines 1 – 11. What is immediately obvious from aerial image mapping is that the intact native forestry fragments (which is likely to provide relatively high quality areas of bat habitat) are much larger around the (consented) Turbine 12 – 22 turbine block which is proposed to be surrendered as part of this application (Appendix 1). There is also cliff and rocky outcrops along the western flank of turbines 17 to 22 which may form attractive bat habitat. Comparisons of habitat strongly suggest that current or future bat habitats are more likely adjacent to turbine block 12 to 22.

Based on the above points I stand by my original assessment that any potential adverse effects on bats would be reduced by approving the revised proposal. I strongly favour that option over the alternative option of constructing the wind farm as consented.

Rather than collecting bat monitoring data (which is of limited use in collision risk modelling) as requested in the s92 request, I would favour instead applying a condition of consent requiring the use of bat detection and deterrent technology (e.g., NRG Bat Deterrent System²). Such detection-deterrence systems involve the use of ultrasonic sound waves to dissuade bats from entering turbine RSAs. The applicant has indicated that they would not be opposed to such an option.

The deterrent system would activate during conditions when collision risk is high for bats (e.g., during the hours of darkness (plus 1 hour either side), and during turbine start-up). Activating the bat deterrence system would reduce the foraging opportunities for bat populations if bats are present (or become present in the future). However, there is ample alternative habitat of similar and better quality in the wider area.

The benefit of deploying a detection and deterrence strategy for the entire life of the project (compared to a limited detection programme at consenting as requested in the s92 request) is that it future-proofs any changes in bat habitats and activity on-site and in the wider area. One likely future change scenario is that due to significant commercial land use activities (e.g., plantation forestry, quarrying) in areas where bats may well roost. When these plantations are felled, or iron sands mined, then any bat

¹ Thaxter, C.B., Buchanan, G.M., Jamie, C., Butchart, S.H.M., Newbold, T., Green, R.E., Tobias, J.A., Foden, W.B., O'Brien, S., Pearce-Higgins, J.W. (2017). Bird and bat species' global vulnerability to collision mortality at wind farms revealed through a trait-based assessment. *Proc. R. Soc. B Biol. Sci.* 284: 20170829.

² <https://www.nrgsystems.com/solutions/wildlife>

populations would become displaced and search out alternative roosting sites. Note that these activities are done with little or no planning requirement to consider impacts on bats. A recent example of this occurred with plantation forestry harvesting operations to the south-west of the site.

The applicant accepts the incongruity and paradox inherent in the intense focus on this small change to the wind farm project in comparison to other and much larger risk factors to bat population preservation and promotion in the area. The applicant is open to putting in place an ecological enhancement programme focussed on native forest fragments (see Appendix 1 for the suggested areas for pest control as indicated by the red circles). A bat monitoring programme should be run in parallel with these pest control programmes to assess any changes in the local bat population's activity patterns and relative habitat use. Efforts will be made to expand that detection and protection programme in the area subject to neighbouring landowner approvals. Higher quality potential bat roosting and foraging habitats around now surrendered turbines 12 to 22 will be focussed upon subject to landowner approval.

I recommend a consent condition that requires that the applicant establish a pest control programme over a minimum area commensurate with the scale of the project (e.g., 200 hectares of native forest habitat) with the primary objective of protecting key bat habitats on-site and possibly adjoining properties with suitable habitat for protection.

Second question:

19. The original ecology assessment reported that long-tailed bats were present in the wider area (Aorangi Scenic Reserve). That assessment identified that bats may be present in the forest on the cliffs adjacent to the wind farm site and foraging at night within the vicinity of the turbines. Long-tailed bats are classified by DOC as having the highest threat ranking – Nationally Critical. It is therefore expected that for any wind farm site for which there is the potential for bats to be present, survey work will be undertaken to confirm their presence or absence on the site, particularly at the turbine locations (as per the AUSWEA guidelines). As such, further information is required regarding long-tailed bats on the Taumatotara wind farm site, including their distribution and relative abundance at each turbine site, as well as movements across the site in relation to their key habitat requirements (foraging, commuting and proximity to roost sites, including maternity roost sites). This information is fundamental to be able to determine if the proposal will in fact effect this Nationally Critical species.

Response:

Consent has already been granted for a 22-turbine wind farm at this site and, by extension, a total RSA of 173,000 m² and the application to vary that consent includes changes of the type that are widely considered to reduce impacts on bats (i.e., the deployment of fewer large turbines rather than many smaller turbines). As per my response to the question above, I strongly favour the application to vary the consent over the alternative option of constructing the wind farm as consented.

Obtaining the requested information such as relative abundance and roost locations is not a practical option for this site. At sites with large bat populations and favourable terrain and habitat for in-depth bat research (e.g., Eglinton Valley), it can take over a

decade of trapping and radio-tracking to determine basic population parameters such as population size and trend, and build an understanding of important sites for roosting, foraging and commuting. Trapping and radio-tracking is intrusive for bats and there is no guarantee of success.

Some information on bats in the area already exists. The Department of Conservation's database of bat records includes a 2015 bat survey that was carried out approximately 6 km to the south-east of the site. No Bats were detected. All bat database records from the wider area are associated with either the large forest blocks of the main Taumatotara and Taumatatawhero Ranges, or the Ruakuri cave system to the east.

I do not recommend embarking on a bat research programme as has been suggested. Sites like this with large expanses of pasture and few if any bats, such research would be unlikely to succeed in generating any information that would be useful in assessing the application to vary the existing consent. The wind farm has already been granted consent therefore it is the changes to the consented wind farm design that are most relevant. Given that the changes proposed in the application are likely to reduce adverse effects on bats, I consider that revisiting the original assessment of ecological effects is unnecessary.

Conclusion

As stated in my original memo, a 50% reduction in the number of turbines consented coupled with an increase in the size of the remaining turbines (a 20% increase in RSA overall) is highly likely to reduce bat fatalities.

Should the consenting authority consider that maintaining the existing rotor swept area as it is currently consented (and notified) is important, the applicant would accept a consent condition to that effect. That is to maintain the area at 173,000 m².

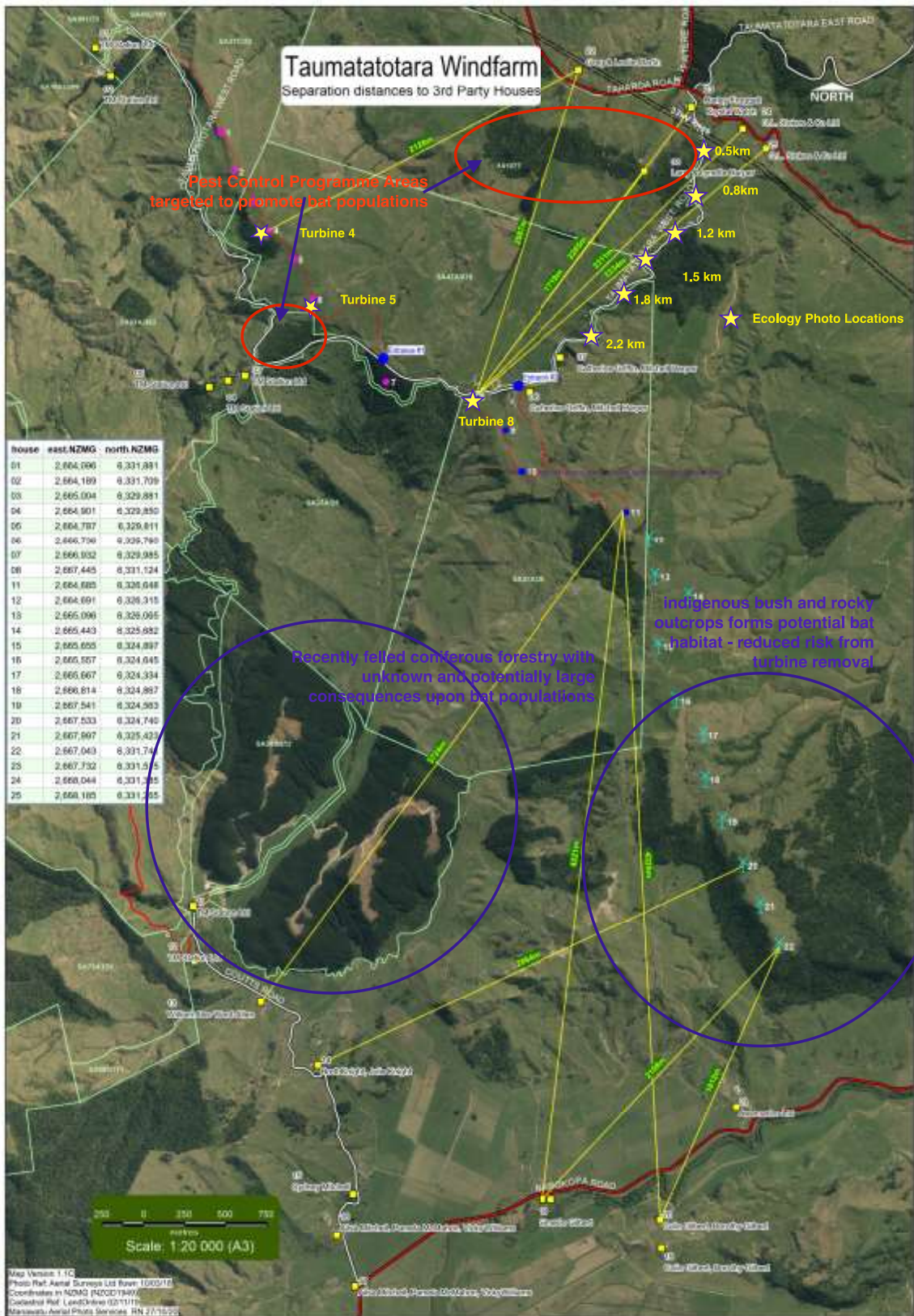
There are various upsides to the proposed variation, and I can see no downsides for bat population at the site or the wider area therefore I recommend approving the application to vary the consent.

Should you require any further information please do not hesitate to contact me on 021436841 or at simon.chapman@ecologynz.nz.

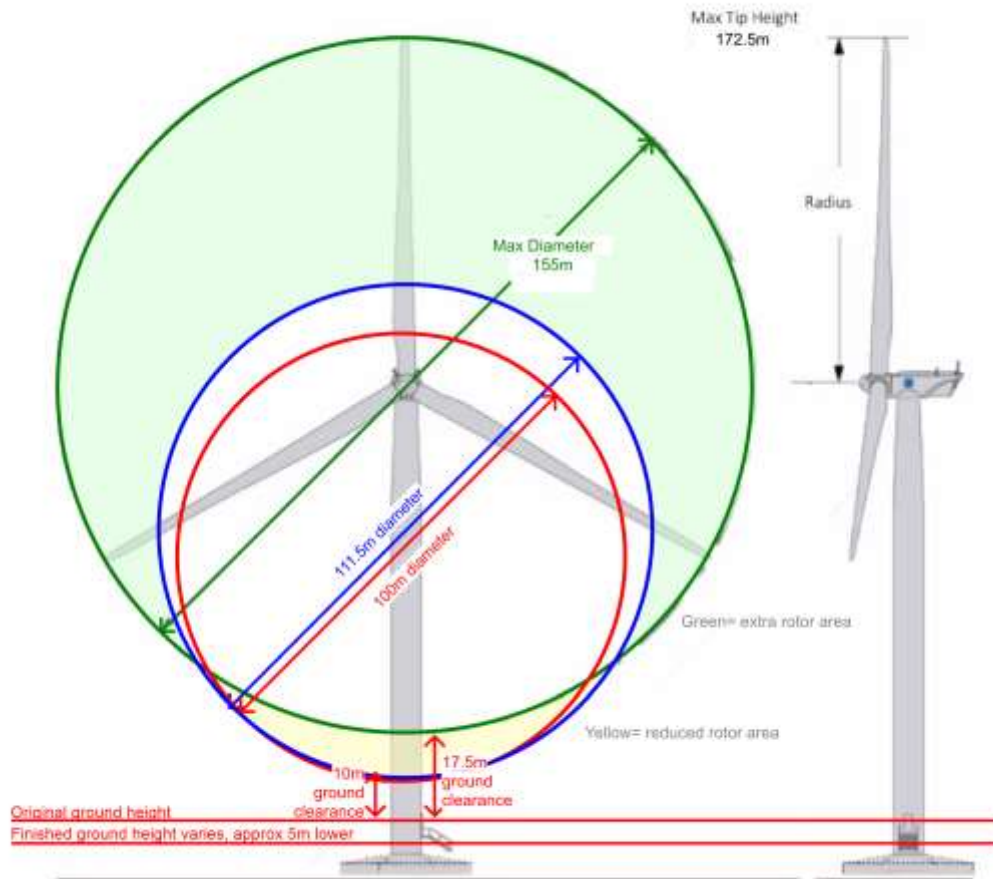


Simon Chapman
Principal Ecologist

Appendix 1: Map showing suggested pest control programme areas (red circles), and relevant landscape context (purple circles: recently felled forestry area (left) and large native area to be avoided by the revised proposal (right))



Appendix 2: Diagram showing the proposed larger turbine (with increased RSA and ground clearance) in comparison to the consented turbine dimensions.



Wind Turbine Diameter Changes

Original - 2008	100m diameter
2011 Consent modification	111.5m
APPLIED FOR 2020	155m

(Scale approx 1:1300 at A4)

Appendix 3: Comparison of turbine RSAs as originally consented, as modified in 2011, and as applied for in the current application

T4 Turbine Rotor Area

	TURBINES 1 TO 11				TURBINES 12 TO 22				Total Area (M ²)	% change
	Diameter	Area	no.	Area	Diameter	No.				
Original - 2008	100	7850	11	86350	100	7850	11	86350	172700	
2011 Consent modification	111.5	9759	11	107352	100	7850	11	86350	193702	12%
APPLIED FOR 2020	155	18860	11	207456	0	0	0	0	207456	20%
POSSIBLY REDUCED 2020*	150	17663	10	176625	0	0	0	0	176625	2%

*Reduce diameter to 150m and delete turbine 9

Ground clearance	m
Original - 2008	10
2011 Consent modification	10
APPLIED FOR 2020	17.5
POSSIBLY REDUCED 2020	20

Appendix 4: Large area of high-quality native forest and bat habitat adjacent to turbines 17 to 22 which have been removed from the proposal.

