

Before the Hearings Commissioners
at Palmerston North

in the matter of: Notices of Requirement by the New Zealand Transport Agency under section 168 of the RMA for the construction, operation, maintenance and improvement of approximately 11.5km of new State Highway between Ashhurst and Woodville to replace the closed section of State Highway 3 through the Manawatu Gorge and associated works, known as the Te Ahu a Turanga Manawatu Tararua Highway Project ('the Project')

to: **Palmerston North City Council**

Manawatu District Council

Tararua District Council

applicant: **New Zealand Transport Agency**

submitter: **Meridian Energy Limited**

Summary of Evidence by **Paul Cedric Botha** on behalf of

Meridian Energy Limited

Date: 28 March 2019

Summary of Evidence

1. This summary should be heard in conjunction with that of Tony Keyte, Chris Jones and Lindsay Daysh and is in support of Meridian Energy's submission.
2. My full name is **Paul Cedric Botha**. I am a chartered mechanical engineer (CEng) and have worked in the wind energy industry for a continuous period of over 29 years.
3. I am currently a director of Roaring40s Wind Power Limited, however I previously held the role at Meridian Energy Limited (Meridian) as a Wind Technical Strategy Manager from 2003 to August 2018. I was responsible for the Te Apiti wind farm layout and have been involved with discussions with NZTA and its representatives since September 2017, in relation to the impacts of a possible highway route through the Te Apiti wind farm.
4. The proposed highway construction, through the Te Apiti wind farm, is going to impact the day to day operation of 31 of the 55 Te Apiti turbines located to the south of the Saddle Road. These impacts will largely be due to the proposed NZTA construction access routes off Saddle Road and through the wind farm.
5. Twenty-five of the turbines are connected to underground electrical feeders which are proposed to be modified in some way, having part of the electrical feeder relocated under the proposed highway. The re-configuration of these feeders is going to result in the direct loss of energy production and wind farm revenue.
6. Sixteen turbines and one of the two wind farm meteorological masts will be impacted long-term as their locations place them on the south side of the proposed highway, resulting in modified long-term access for day to day service and possibly separate over-dimensional load access. The increased wind farm access track lengths will have an impact on the on-going operational budget of the wind farm.
7. At least one turbine is proposed to be removed which will have a direct impact on the amount of renewable electricity generated from the Te Apiti wind farm. This impact will be long-term and beyond the life of the current operational turbine's lifetime as the re-powering opportunity will be lost too. Since the proposal by NZTA is an outline, and includes an indicative alignment only, it is unsure whether further turbines may need to be removed. Such certainty will only be obtained once detailed engineering is completed along with the final alignment and design.

8. NZTA have yet to provide Meridian with over-dimensional wind farm access track routes, with sufficient design detail, that shows suitable access to turbines TAP01, TAP02 and TAP08.
9. The highway alignment has not been finalized however the indicative alignment shows cut batters of up to 34 m deep being located very close to existing wind turbine locations. The presence of those deep cuts through the wind farm are going to result in changes to the wind flow conditions (wind speed, turbulence intensity, inflow angle, wind shear and wind veer) with a reduction in the turbine lifetime and a reduction in wind turbine output.
10. Large spoil sites are proposed within the wind farm site and while the filling of valleys can have a beneficial effect, the height of those spoil sites has the ability to reduce the wind turbine wind speed and consequently the generation output of the wind farm.
11. Trees have the ability to both reduce the lifetime of the turbines and decrease the energy production through their impact on the wind flow conditions. The extensive tree planting proposed in the NOR application would have an impact on a significant number of turbines. There remains uncertainty around what planting is still being proposed by NZTA and therefore its impact on the long-term output of the Te Apiti wind farm however I do note NZTA has agreed by Memorandum dated 1 March 2019 not to carry out planting to offset or compensate for terrestrial ecology on the Te Āpiti Wind Farm site.
12. Meridian's current consent for the Te Apiti wind farm allows for the 55 turbines to be located within 100 m of their consented locations. Meridian would like to continue to maintain the flexibility granted in that consent and therefore considers that a 60 m construction buffer be added to the 100 m turbine location allowance to create a turbine contingency zone of 160 m from the original consented locations.
13. In summary, the proposed highway will result in a reduction of renewable electricity generation, compromise wind flow speeds, create ongoing operational inefficiencies and limit future use of the site.