

**BEFORE THE HEARINGS COMMISSIONERS
AT PALMERSTON NORTH**

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by NZ Windfarms Limited for landuse, stormwater discharge and contaminants discharge consents required to establish the proposed Te Rere Hau Eastern Extension

BETWEEN **NZ Windfarms Limited**

Applicant

AND **Horizon Regional Council**

AND **Tararua District Council**

Consent Authorities

And **Submitters on the application**

Submitters

Statement of Evidence of Alison Maria van Polanen

INTRODUCTION

Qualifications and Experience

1. My name is Alison Maria van Polanen. I hold the qualification of a Bachelor of Science (first class Honours) from the University of Canterbury and am an Associate Member of the New Zealand Planning Institute.
2. I have been employed by NZ Windfarms Limited (**NZ Windfarms**) since May 2007 as their Consents Manger. The scope of this role includes site feasibility and planning risk assessment, project plan development and implementation, consultant engagement, facilitation of consultation, the preparation and lodgement of resource consent applications and environmental compliance and monitoring associated with consented sites (including the Te Rere Hau wind farm (**TRH**) and meteorological masts).
3. Prior to my employment at NZ Windfarms, I was employed by Harrison Grierson Consultants as a planner and previous to that I was employed by Christchurch City Council and the Community and Public Health, (a division of the Canterbury District Health Board).
4. I note that this evidence is not technical planning evidence and is given in my capacity as an employee of NZ Windfarms. My role in the development of the Te Rere Hau Eastern Extension (**TRHE**) proposal has been to manage the project from its initial development through the processes set out by the Resource Management Act 1991 (**RMA**), to secure the necessary resource consents on terms that are premised by sound environmental assessment. In accordance with this role, I:
 - (a) Co-ordinated the development of the TRHE proposal from its initial design through to the proposal for which consent is being sought;
 - (b) Led the consultation process associated with TRHE, acting as the central point of contact for stakeholders;
 - (c) Oversaw the preparation of the Assessment of Environmental Effects (**AEE**) report and resource consent applications; and

- (d) Have assisted in the preparation of NZ Windfarms responses to the further (informal) information requests made by the Horizons Regional Council (**HRC**) and the Tararua District Council (**TDC**).
5. Over the duration of the consenting period (approximately 2 years), I have visited the site and its surrounds in excess of 30 times.

Scope of Evidence

6. Specifically, in my evidence, I will:
- (a) Describe the development of the TRHE proposal;
 - (b) Outline the engagement of experts;
 - (c) Discuss the consultation process;
 - (d) Discuss NZ Windfarms compliance record with particular regard to the consented TRH wind farm and NZ Windfarms response to complaints;
 - (e) Respond to submissions which raise matters relating to the scope of this evidence or NZ Windfarms as a company; and
 - (f) Respond to matters in the Planners Report and Technical Evidence relating to the scope of this evidence or NZ Windfarms as a company.

DEVELOPMENT OF THE TE RERE HAU EASTERN EXTENSION PROPOSAL

7. As outlined in Mr Cross's evidence, the wind resource along the Tararua Ranges has long been established as one of the most consistent and valuable wind resources in New Zealand. The area also rates very favourably on a global scale. This wind resource was a key factor in identifying the TRHE site for development.
8. Also as outlined in Mr Cross's evidence, the proposed TRHE site is co-located with the existing TRH. The new site is, in effect, an extension of an already consented operating wind farm. The extension will enable a

potential reduction in the number of turbines to be located on the existing wind farm.

9. Following identification of TRHE as a viable site, the design process has generally followed an initial development phase, a development phase and a refinement phase.

Initial Development Phase

10. The initial selection of turbine sites was influenced by a number of factors. These factors included the outcome of wind modelling, the topography of the site, site limitations known at the time, (for example proximity to dwellings), the location of the existing wind farm and associated infrastructure, and the Airways Radar Dome.
11. A desktop exercise was undertaken to analyse the wind resource and the appropriate turbine separation distances. Appropriate turbine separation distances are important to avoid the wind turbines having wind turbulence effects on one another. For the Windflow 500 turbine, the separation parameters applied were approximately 6 rotor diameters by 3 rotor diameters.
12. Following the initial design process, stakeholders were approached to identify environmental concerns and the appropriate technical / environmental investigations commissioned. This process identified cultural, airways radar dome and potential acoustic effects associated with some of the proposed turbine localities.

Development Phase

13. Following the identification of a number of effects associated with the initial turbine layout, the proposed TRHE turbine site localities were modified and further consultation and technical /environmental reviews undertaken.
14. Concurrent to this, NZ Windfarms engaged the National Institute of Water and Atmospheric Research to study the upper air wind resources at various sites in the consented TRH wind farm and within the proposed TRHE site.

A portable acoustic sonic detection and ranging (**SODAR**) monitor was used on-site to measure the lower atmosphere up to 200 metres above the ground in order to provide horizontal and vertical wind speeds at different levels in the atmosphere. The data from the SODAR monitoring program provided useful data on the wind profile over the TRHE area which assisted in determining turbine sites. This data also showed that the initial turbine sites selected were not fully optimising the wind resource.

15. The turbine positions identified by the SODAR monitoring program were checked to confirm access and turbine platform feasibility. The topography of the site also influenced the placement of the turbines. Steep areas were avoided to reduce the levels of earthworks required and to minimise the physical changes to the landscape.

Refinement Phase

16. This design was again presented to stakeholders for feedback. Following consideration of this feedback the project design was finalised and the environmental / technical investigations completed.
17. During the project refinement phase, the majority of the technical / environmental assessments were amalgamated into a number of resource consent applications and an AEE. These documents were finalised and lodged on 29 May 2009.
18. Following lodgement, a number of technical / environmental experts have been involved in addressing issues raised by HRC and TDC and their experts. While issues identified were not presented as formal section 92 RMA requests for further information, NZ Windfarms and their experts have attempted to address all matters raised. Furthermore, in all instances, experts retained by NZ Windfarms worked with the experts appointed by Council, the objective being to ensure that the information provided addressed the issues identified.
19. During the refinement phase, a small number of fill sites were amended and minor road realignments made, (refer to **Appendix A** for amended plans). These amendments were made in order to minimise the encroachment of the proposed works on seepage areas. The details of

these amendments are discussed in the evidence of Mr Colin Fink and Mr Gerry Kessels.

20. It is noted that an archaeological assessment, (refer to **Appendix B**), was commissioned following the lodging of the resource consent applications and AEE. This investigation found no archaeological evidence of Maori or early European occupation and recommended the development of an Accidental Discovery Protocol with Rangitāne o Manawatu.

ENGAGEMENT OF TECHNICAL EXPERTS

21. My reference in paragraphs 13, 14 and 21 above to the engagement of technical / environmental experts at the development and finalisation stages of the proposed TRHE project development, refers to a comprehensive program of work which built on the initial development phase and extended over a two year period, (September 2007 to September 2009).
22. Technical experts were selected according to a range of factors, including, their qualifications, skills and experience (particularly on similar projects), and the methodology proposed.
23. The following technical assessments were conducted as part of the full environmental assessment:
 - (a) Visual Modelling / Photo Simulation Production – Ms Emma Pollard;
 - (b) Landscape Assessment – Mr Peter Rough;
 - (c) Noise Assessment – Mr Malcolm Hunt;
 - (d) Noise Assessment Review and Supplementary Information– Mr Miklin Halstead;
 - (e) Construction Effects Assessment – Mr Colin Fink;
 - (f) Traffic Impact Assessment – Mr Philip Peet;
 - (g) Ecology Assessment – Mr Gerry Kessels;
 - (h) Economic Impact Assessment – Mr Michael Copeland;

- (i) Planning Assessment – Mr Dean Chrystal;
- (j) Cultural Impact Assessment – Tanenuiarangi Manawatu Incorporated;
and
- (k) Archaeological Assessment – Ms Caroline Phillips.

24. In addition to the above assessments, geotechnical engineers from Aurecon visited the site. The purpose of their site inspection was to assess the suitability of the foundation design used for the turbines on the existing TRHE windfarm for the proposed TRHE extension.

25. As a result of this visit Aurecon noted that:

- (a) The upper eastern and southern slopes of the TRHE site are less steep than the TRH wind farm site;
- (b) The eastern and southern slopes of the TRHE site steepen relatively quickly to about 35 to 40 degrees;
- (c) Deeply incised gullies and narrow valleys dominate the terrain;
- (d) That while some of the southern and eastern slopes are hummocky, only minor slope instability in the form of surficial slumping or rilling existed; and
- (e) There did not appear to be any geotechnical hazards which would preclude the development of this site.

26. Overall, Aurecon have been advised that based on work to date the TRHE site is likely to be geologically and geotechnically very similar to the existing TRH wind farm. Consequently the likely geological ground model of the TRHE site is a thin cover of surficial deposits with weathered greywacke rock to depth. Weathering is expected to decrease with depth and the majority of turbines are expected to be embedded in less weathered material. Aurecon recommended that further investigations into turbine wind foundation design be undertaken once access roads and crane pads have been established. This is because once this stage has been reached there will be level ground for geotechnical and geophysical investigations, such as test pitting and multichannel analysis of surface waves.

CONSULTATION

Approach

27. NZ Windfarms implemented a programme of consultation as an important component of developing TRHE. The consultation process assisted in the establishment of parameters for TRHE, the refinement of layout and design, the identification of some potential effects on the environment, the avoidance of some potential effects on the environment, and the development of mitigation measures.

28. The consultation objectives for TRHE were to:

- Inform the surrounding landowners and all interested parties of the proposal;
- Create opportunities for discussion, allowing NZ Windfarms to better understand interested parties views of TRHE;
- Enable the community to develop informed views, decisions and responses to TRHE;
- Assist the refinement of the final TRHE proposal submitted as part of the resource consent application; and
- Ensure ongoing opportunities for open communication with surrounding land owners and interested parties.

29. NZ Windfarms recognise that consultation is an ongoing process. Therefore, it is envisaged that consultation with stakeholder groups will continue throughout the resource consent process, as well as throughout the construction and operational phases.

30. In the following sections of my evidence I outline the consultation undertaken, the comments received and the response from NZ Windfarms.

First Phase of Consultation – Preliminary Consultation

31. The objectives of this phase of consultation were:

- (a) To brief stakeholders on the nature, scale and location of the project;
- (b) To identify concerns that may be associated with the project; and
- (c) To identify potentially affected parties and the community of interest.

Initial Letter

32. On 25 October 2007 a letter outlining the TRHE project and the investigations being carried out in relation to the project (**Initial Letter**) was sent to landowners within a 3km radius of the site as well as the consultation parties identified in **Appendix C**. The letter invited the recipients to meetings between 19 and 23 November 2007, where the proposal was to be discussed. The letter also provided email, mobile and free phone number details for the NZ Windfarms project team.

Phone Call to Stakeholders

33. Following the Initial Letter, NZ Windfarms personnel contacted a number of identified stakeholders, neighbours, and other potentially interested parties. The purpose of this phone call was to confirm that the letter had been received; advise parties further about the project; and if desired, to arrange a one-on-one meeting to discuss the project with NZ Windfarms personnel.

Meetings

34. Meetings were held between 13 – 23 November 2007 with the parties identified in **Appendix C**. Responses received during these meetings are discussed later in the 'Responses Received' section of my evidence.

Second Phase of Consultation – Project Refinement

35. The objectives of this phase of consultation were:
- (a) To brief the community of the nature, scale and location of the project;
 - (b) To explain to the community the timeframe and suggested process for consultation;
 - (c) To discuss the beneficial and adverse effects of the project and options to avoid, remedy, or mitigate the adverse effects; and
 - (d) To identify the community's concerns and provide the community with an opportunity to ask questions.

Second Letter

36. On 16 September 2008, a further letter was sent to the parties who received the Initial Letter as well as those who subsequently requested to be added to the mailing list (**Second Letter**). The Second Letter indicated that following consultation in late 2007 / early 2008 and the identification of

potential cultural, airways radar dome and acoustic effects associated with some of the proposed turbine localities, NZ Windfarms revised the TRHE layout. The letter invited the recipients to meetings between 29 September – 3 October 2008 where the revised proposal would be discussed and again provided email, mobile and free phone number details for the NZ Windfarms project team.

Meetings

37. Meetings were held between 25 September and 3 October 2008, and involved the parties referred to in **Appendix C**.

Third Phase of Consultation – Further Refinement and Pre-lodgement

38. The objective of this phase of consultation was:
- (a) To inform the community of the nature, scale and effects of the project;
 - (b) To discuss the potential effects of the project and the proposed methods to avoid, remedy, or mitigate any adverse effects;
 - (c) Identify any outstanding concerns of those consulted; and
 - (d) To provide a further opportunity to ask questions.

Third Letter

39. On 9 April 2009 a further letter was sent to a number of parties (**Third Letter**), including the additional parties as detailed in **Appendix C**. The Third Letter indicated that the willingness of people to discuss TRHE during the previous 18 months had allowed NZ Windfarms to identify potential adverse effects (predominantly associated with turbines positioned at higher elevations at the southern extent of TRHE) and consequently to revise the TRHE layout to avoid this area. The letter invited the recipients to contact NZ Windfarms should they wish to discuss the revised proposal and provided email, mobile and free phone number details for the NZ Windfarms project team.

Meetings

40. Meetings were held between 23 April and 4 May 2009. Refer to **Appendix C** for a list of parties consulted with.

Lodgement of the application

41. The placement of the turbines was finalised (refer **Appendix D**) and was lodged on 29 May 2009. The application was accompanied by the AEE and a number of appendices.

Fourth Phase of Consultation – Post Lodgment

42. Post lodgement of the TRHE application, NZ Windfarms sent a CD copy of the TRHE AEE and associated appendices to all parties who NZ Windfarms were aware had an interest in the project. NZ Windfarms has also continued to make itself available to discuss the application with interested parties and remains committed to providing ongoing opportunities for open communication.

Comments Received and NZ Windfarms Responses

Regulatory Authorities

43. NZ Windfarms have had preliminary discussions and periodic updates with TDC, HRC and Palmerston North City Council (**PNCC**) since mid 2007 in relation to the TRHE wind farm. A range of matters were discussed at these meetings, including the scope of technical reports, visual simulations, potential bird strike effects, earthworks and the operation of the consented TRH wind farm.

44. Following lodgement of the TRHE application, NZ Windfarms have accommodated the requests of TDC, HRC, and their experts for further information and site visits.

Tangata Whenua

45. NZ Windfarms has consulted with various tangata whenua groups on the recommendations of the PNCC iwi liaison officer and other locals. It is understood that both Rangitāne o Manawatu, who are represented by Tanenuiarangi Manawatu Incorporated (**TMI**)¹ and Rangitāne a Tamaki nui

¹ TMI have represented Rangitāne o Manawatu since it was established in 1989. The TMI beneficiaries are the natural descendents of all the hapu of Rangitāne o Manawatu.

a Rua (**Rangitāne**) have strong cultural and spiritual connections to the area, and NZ Windfarms has consulted with both TMI and Rangitāne regarding the TRHE project.

46. NZ Windfarms initiated consultation with TMI in 2007. There has since been meetings, ongoing discussions and communications, including the provision of available information when requested.
47. A Cultural Impact Assessment was completed in 2005 by TMI assessing the effects of the TRH wind farm. An update to this report was prepared by TMI in 2008 and attached to the TRHE application. This report expressed concerns regarding potential impacts on waahi tapu (in particular significant peaks and trails) and waahi taonga which may be uncovered from earth disturbance and construction activities. The report also provided recommendations in relation to the proposal which focused on consultation, monitoring, the involvement of TMI in the RMA decision process, as well as an accidental discovery protocol.
48. As a result of this report, TMI and NZ Windfarms are currently preparing a Memorandum of Understanding (**MOU**). This mechanism will allow TMI to express their concerns in a formal way while being involved in and aware of all aspects of this project; including any monitoring. NZ Windfarms expect their relationship with TMI will be ongoing, extending beyond the resource consent process and into the wind farm construction and operation if consent is granted.
49. Consultation with Rangitāne begun in 2007 and is ongoing. NZ Windfarms intend to engage further with Rangitāne to ensure that they are kept informed of the progress of TRHE and to ensure any concerns they may have are understood and appropriately addressed,
50. In addition, it is noted that Nga Hapu o Himatangi (Ngati Rakau, Ngati Turanga and Ngati Te Au) also appear to have an interest in the area. NZ Windfarms was not aware that this group had an active interest in the area prior to receipt of their submission on 31 July 2009. NZ Windfarms intends to make contact with Nga Hapu o Himatangi to discuss their concerns.

Airways New Zealand and Palmerston North International Airport

51. NZ Windfarms engaged in further consultation with Airways New Zealand in relation to TRHE. This followed extensive and ongoing consultation in relation to the consented TRH wind farm. An outcome of this consultation has been the revision of the initially proposed turbine layout to avoid any effects on the operation of the nearby Airways Radar Dome. The revised turbines are now beyond the parameters where there was likely to be an effect on the operation of the radar.

Civil Aviation Authority

52. The Civil Aviation Authority (**CAA**) was advised of the proposed TRHE project. Part 77 of the Civil Aviation Rules provides the rules for 'Objects and Activities Affecting Navigable Airspace.' Provision 77.5(1) of the Civil Aviation Rules states that where a person proposes to construct or alter a structure they must notify the Director if the proposed structure extends more than 60 metres in height above the ground level at its site. NZ Windfarms advised the CAA that the maximum turbine height is 47 metres and because this height is less than the 60 metre threshold, the CAA has not requested any further information about the project.

Telecom

53. NZ Windfarms has consulted with Telecom in relation to radio paths, Earth Potential Rise and induced voltage (including contractors who perform various components of Telecoms functions). These matters have been addressed and/or clarified by NZ Windfarms. Notwithstanding this, Telecom and NZ Windfarms are currently engaging in preparing an MOU.

Department of Conservation

54. NZ Windfarms initially met with the Department of Conservation (**DOC**) Palmerston North Area Office in 2007. Subsequent consultation has been with the Wellington Conservancy Office following the initial amendment to TRHE. The initial amendment to the TRHE layout meant that the proposal is now positioned entirely within the Wellington Conservancy. Key effects which the Department of Conservation wished to be addressed in the Ecological Assessment were the effects on native birds (particularly the

New Zealand falcon), the effects of sedimentation on streams, the effects on freshwater fish and the clearance of native vegetation.

55. These matters have been addressed by Mr Kessels in his ecological assessment reports and in his evidence to this hearing.

56. A copy of the assessment reports were sent to DOC and NZ Windfarms offered to discuss any outstanding issues they may have. At the time of the writing this evidence a response had not been received from DOC.

Neighbouring Properties

57. NZ Windfarms has engaged with property owners in the surrounding environment since late 2007. A number of meetings, phone conversations and email exchanges have occurred since this time. The property owners in the surrounding environment whom NZ Windfarms have engaged with have developed opinions on TRHE ranging from supportive to opposition. The matters raised have included:

- The potential amenity effects, particularly noise and visual;
- Proximity of turbines to dwellings;
- Concerns associated with property values;
- The potential effects on water quality; and
- Effects arising from construction traffic.

Tararua Aokautere Guardians

58. Tararua Aokautere Guardians (**TAG**) represents people living or owning properties near the Tararua Ranges that consider themselves affected by the development of wind farms in the area. A meeting was held with approximately 25 members of TAG on Wednesday 21 November 2007. NZ Windfarms took this opportunity to present key project information, listen to the concerns of parties present and respond where appropriate. The key matters discussed included:

- The potential amenity effects, particularly noise and visual;
- The proximity of turbines to peoples dwellings; and

- The potential effects of a perceived phenomenon similar to vibroacoustic disease².

Recreational Users of North Range Road

59. NZ Windfarms has contacted a number of groups who use North Range Road recreationally e.g. walkers/hikers, mountain bikers and four-wheel drivers to advise them of the proposed TRHE project. Concerns expressed by these groups were generally associated with whether there would be improvements to North Range Road beyond the existing upgrade to the consented TRH wind farm entrance. Some groups sought further information about the wind farm in general for educational purposes during their next scheduled activity utilising the area.
60. It is not proposed to upgrade North Range Road beyond the three crossing points from the existing TRH wind farm. At these crossings, the road will be upgraded to comply with Council requirements, as discussed by Mr Peet in his evidence. Existing maintenance of North Range Road to the TRH wind farm site access will be continued for the duration of construction works on TRHE.

Summary of Issues Arising

61. The issues raised during the consultation can be summarised as follows:
- (a) Ecological effects;
 - (b) Visual effects;
 - (c) Noise effects;
 - (d) Adverse effects on property values; and
 - (e) Aviation effects; and effects on potential tourism.

² A chronic, progressive and systemic disease associated with exposure to high levels of infrasound, for example, infrasound from jet engines or from using a pneumatic drill.

Summary of NZ Windfarms Responses

62. NZ Windfarms considered all the issues concerns and information they received from consultation and used this information together with advice from its technical / expert advisers to revise the TRHE proposal so that it addressed these matters more appropriately. In particular, it amended its proposal to:

- (a) Avoidance of fill in seepage areas;
- (b) Removal of proposed turbines which may affect the functioning of the Airways Radar Dome;
- (c) Removal of turbines which may have cultural effects; and
- (d) Removal of turbines which may have adverse acoustic effects.

ENVIRONMENTAL COMPLIANCE RECORD

63. Independent testing to be outlined in expert evidence demonstrates that NZ Windfarms has consistently complied with the conditions of consent relating to the consented TRH wind farm (and various meteorological masts).

64. Notwithstanding this, TRH has been the subject of a number of noise complaints. NZ Windfarms is able to demonstrate compliance with conditions relating to the consented TRH wind farm (Consent Order (ENV W 0039/05)) and with the recommendations of NZS6808:1998. The report demonstrating compliance (Wind Farm Sound Level Monitoring 2009) will be discussed further by Mr Malcolm Hunt and was reviewed by Mr Miklin Halstead.

65. In addition to demonstrating compliance with consent conditions, NZ Windfarms has demonstrated a commitment to better understanding acoustic emissions from the existing TRH wind farm through the commissioning of Marshall Day Acoustics in May 2009 to undertake further measurements and assessments of TRH wind farm sound experienced at receiver localities. This report, which will be discussed further by Mr Miklin Halstead, did not detect any significant tonality component of the TRH noise emissions.

66. Further to this monitoring, and in an effort to further improve the depth of acoustic information and observations, noise logs were distributed to parties in close proximity to the Te Rere Hau wind farm with envelopes for their return direct to Marshall Day Acoustics. Marshall Day used these logs to add detail to their own observations and monitoring. These logs are discussed further by Mr Miklin Halstead.
67. NZ Windfarms has been proactive in the investigation of noise complaints. NZ Windfarms has:
- (a) Demonstrated compliance in accordance with their consent conditions.
 - (b) Undertaken additional monitoring (as identified in paragraphs 65 and 66 above).
 - (c) Liaised with PNCC to ensure when complaints are received the time of complaint and locality are recorded to allow cross referencing with the known operational parameters at the TRH site, e.g. wind speed, direction and the number of operational turbines; so that any patterns can be detected.
68. Mr Miklin Halstead addresses the issue of complaints further in his evidence.

SUBMISSIONS

69. A total of 79 submissions were received, of which 6 were late but accepted by NZ Windfarms. To assist in the identification of the locality of submitters a map was prepared (refer to **Appendix E**). The basis for locating submitters was the postal address provided on each submitters submission form. The exception to this approach is two submitters who own property on Makomako Road. At the request of TDC planning consultants, the properties owned by submitters 11 (MA and TR McBride) and 44 (C and B Percy) in Makamako Road have also been identified on this map.
70. I address the issues of relevance to NZ Windfarms as a company below.

Alternative Renewable Electricity Generation Options

71. A number of submitters suggest that utilising the wind resource at the proposed TRHE site is neither appropriate nor the best form of renewable generation available. As discussed by Mr Cross, NZ Windfarms supports renewable electricity generation and is seeking to improve the efficiency in the operation of the existing TRH wind farm through the co-location of TRHE.
72. I note that some submitters offer suggestions regarding what would constitute a more appropriate form of electricity generation by citing solar, tidal, offshore wind farms and geothermal options. NZ Windfarms has identified TRHE as being the most economic and environmentally viable development option for their shareholders at this time.
73. Ms P Robbie expresses in her submission (Submission 28) that she does not believe clustering of energy production is appropriate, as in her view high numbers of turbines in close proximity to each other would be competing to utilise the same wind resource (i.e. same 'gusts and lulls'). The submitter suggests that a more even production of energy could be achieved through not clustering turbines in the same location. I note it is necessary for energy generation infrastructure to be located near the resource utilised in its production. In the case of TRHE, the resource NZ Windfarms seeks to utilise is the wind. As discussed in the evidence of Mr Cross, the wind resource in this area has long been established as one the most consistent and valuable wind resources in New Zealand and was a key factor in identifying the TRHE site for development.
74. The Energy Efficiency Energy Efficiency and Conservation Authority note in their submission (Submission 50) that the use of wind as a renewable generation resource assists with New Zealand's long term electricity supply security by adding to, and diversifying, New Zealand's electricity generating base. Furthermore it is highlighted that wind is a relatively reliable and economic resource.

Need for Further Archaeological investigation

75. New Zealand Historic Places Trust recommended in their submission (Submission 8) that an archaeological assessment of the project area be undertaken. After receiving this submission NZ Windfarms commissioned an archaeological assessment (refer to **Appendix B**). A summary of the findings of this assessment is discussed earlier in my evidence.
76. I note a copy of the Archaeological Assessment has been forwarded to the New Zealand Historic Places Trust.

Use of a Predominantly New Zealand Manufactured Turbine

77. Two submissions identify the use of New Zealand manufactured turbines as being a positive aspect of TRHE. TN and AM Barry (Submission 7) cite the proposed TRHE turbines are a smaller size comparative to imported turbines and the resultant reduction in environmental effects this smaller size has during the construction phase as being a positive aspect.
78. The Energy Efficiency and Conservation Authority (Submission 50) outline that the proposal will assist in the development of the wind energy industry by using New Zealand designed and manufactured turbines.
79. Conversely, a number of submitters query the appropriateness of the turbine proposed at TRHE on the basis that it is unproven and in their opinion excessively audible. As demonstrated through our compliance record and as discussed further in the evidence of Mr Hunt and Mr Halstead, the TRH wind farm has demonstrated its ability to comply with all consent conditions.

Seismic Risk

80. In the submission of C and N Wallace (submission 72), the issue of seismic risk was raised.
81. The geology of the area has been described in paragraphs 25 and 26 of this evidence. In addition, I note that the turbines will be constructed in accordance with the New Zealand Building Code, as has occurred on the

existing TRH wind farm. Automated emergency systems are in place on the TRH wind farm, and proposed at TRHE, to shut turbines down immediately should a seismic event occur. In addition to this, automated systems discontinue electricity flow immediately in the event of any damage to any part of the network or reticulation.

Benefit of Mixed Land Use

82. Two submissions have identified that TRHE will co-exist with agricultural activities, creating a more sustainable and mixed farm use. Once construction is complete, pasture can continue to be utilised for grazing of sheep and cattle. The ongoing utilisation of the land will not be diminished by the presence of TRHE.

PLANNERS REPORTS AND TECHNICAL EVIDENCE

83. I have read the “Tararua Planning and Technical Evidence” and “Horizons Planning and Technical Evidence” and address the issues arising from these documents which are within the scope of my evidence.

Shadow Flicker Effects

84. Paragraph 135 of the s42A report prepared by the Consultant District Planner suggests that it would be helpful for the applicant to address the potential for adverse effects resulting from shadow flicker at this hearing.

85. At present there are no standards for shadow flicker which apply within New Zealand that I am aware of. The closest guideline (Guidelines for local authorities: Wind Power)³ is published by The Energy Efficiency and Conservation Authority. This guideline explains that the potential effect of shadow flicker occurs only when a turbine is in close proximity to a dwelling and at very low sun angles. The guideline then notes that shadow flicker is not likely to be an issue in New Zealand because the separation distance

³ Energy Efficiency and Conservation Authority. *Guidelines for local authorities: Wind Power*. August 2004.

required for noise mitigation is usually more than enough to prevent occurrence of shadow flicker.

Civil Aviation Authority and Airways New Zealand

86. Paragraphs 137 and 138 of the s42A report prepared by the Consultant District Planner suggested the applicant provide an update on any further discussion or consultation which occurred with the Civil Aviation Authority and Airways New Zealand following lodgement of the TRHE application.
87. NZ Windfarms sent both organisations electronic copies of the AEE and Appendices. Airways New Zealand sought clarification that the turbine localities for which consent has been sought did not differ from those proposed in April 2009. NZ Windfarms confirmed this to be correct. Civil Aviation Authority did not raise any concerns.

Expert Witness Attendance during Consultation Meetings and Visual Simulations from Individual Submitter Properties

88. Paragraph 7.3 of the Landscape and Visual Effects Peer Review observes that there is no discussion in the assessment about public consultation or the involvement by the author in any public meetings. For clarification, NZ Windfarms arranged these meetings to report back amended proposals which had been developed by NZ Windfarms in consultation with its experts to address concerns.
89. Paragraph 7.3 also notes that there are no simulations from landowner properties and no indication that any landowners were approached to discuss producing such simulations.
90. NZ Windfarms engaged experts to provide advice on appropriate simulation sites and agreed to simulations from all sites recommended by its experts.

CONCLUSIONS

91. NZ Windfarms has undertaken comprehensive investigations, sought advice from relevant experts, and adopted an iterative design process to address environmental concerns.
92. NZ Windfarms has also consulted extensively with all relevant stakeholders and directly affected parties known to them by way of 'one-on-one' meetings and other correspondence.
93. NZ Windfarms remains committed to continuing consultation with interested parties and will listen to and consider any concerns that these parties may have going forward
94. NZ Windfarms is confident that the granting of the consents sought in relation to TRHE is appropriate, and will promote the sustainable management of natural and physical resources.

Alison van Polanen

1 October 2009

APPENDIX A
AMENDED PLANS

APPENDIX B
ARCHAEOLOGICAL ASSESSMENT

APPENDIX C
CONSULTATION PARTIES

APPENDIX D
TURBINE LOCATIONS

APPENDIX E
SUBMITTER LOCATIONS