

**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**

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**Statement of Evidence of Colin John Fink**

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## Introduction

### Qualifications and experience

1. My name is Colin John Fink. I am an Associate of Kevin O'Connor and Associates Ltd (**KOA**) who employ over 30 staff. Our company offers consulting services with respect to Civil and Structural Engineering, Surveying, Project Management and Resource Consent Planning. My position within the Company is that of Survey Manager.
2. I hold a Diploma in Surveying from Otago University (1973). I am a full member of the New Zealand Institute of Surveyors and am also a Registered Professional Surveyor.
3. I have a mixture of surveying, project management and civil engineering experience in both the public and private sector. I have lived in the Manawatu since 1991. During this time I have been employed by the Palmerston North City Council for 14 years where I worked in the Consultancy Section and in the later years was Head of Consultancy. This section undertook the design and supervision of most of the Council's development works. Staff included registered engineers, architects, surveyors, design staff and contract engineers. During this time I also project managed most of Council's multi-million dollar building developments. For the last four years I have been employed by KOA and during this time, have been involved in both urban and rural developments.
4. KOA has been involved with NZ Windfarms Ltd (**NZWF**) on the Te Rere Hau site, providing Contract Supervision of the Stage 2 roading and redesign of turbine platforms within Stage 2. KOA has also undertaken other works on-site as and when requested by NZWF.
5. My role with respect to the proposed Te Rere Hau Eastern Extension (**TRHE**) project has been:
  - Preliminary concept design of roading layout;
  - Confirmation of external legal boundaries;
  - On-site review of proposed turbine sites;
  - Final concept design of road layout and turbine platform sites; and

- Construction effects report.

### **Scope of evidence**

6. The evidence I provide today relates generally to the construction work required on-site, site suitability, construction methods, effects arising from construction and mitigation measures proposed.
7. I confirm I have read the Code of Conduct for Expert Witnesses issued as part of the Environment Court Practice Notes and agree to comply with it. This evidence is within my area of expertise, except where I state I am relying on what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

### **Summary of conclusions**

8. While the proposed works will result in disturbances of the land in the form of (access roads, underground electrical cabling, turbine platforms and soil disposal sites), any adverse effects are able to be mitigated, so that the overall construction effects, will be less than minor.

### **Site overview**

9. The construction site subject to this application is approximately 2 kilometres in length (measured along the ranges) and is up to 1.5 kilometres wide; with a total site area of approximately 3 square kilometres.
10. The site topography consists of a main ridge, which runs northeast to southwest. From this ridge, the land slopes to the east with strongly defined ridges and gullies. The terrain at the rear of the site is generally undulating to gently rolling. There are however, some pockets of very steep terrain within the construction site and the balance of the land beyond the construction site also contains steep terrain.
11. Access to the site is from North Range Road; which connects onto the Pahiatua Aokautere Road (**Pahiatua Track**). All proposed new roads within the site are accessed either from existing access roads or off North Range

Road at a point immediately adjacent to the main access road into the existing Te Rere Hau Windfarm.

## Construction

12. The development of the site will involve the construction of approximately 7.3km of internal access roads (**tracks**), the construction of platforms and foundations for 56 wind turbines, the installation of approximately 10km of underground 33kV electrical cabling, implementation of stormwater control measures, disposal on-site of excess excavation material and site reinstatement.
13. The design volume of earthworks for the tracks and turbine platform sites has been assessed at around 320,000 m<sup>3</sup> with approximately 35,000 m<sup>3</sup> of fill material required. The surplus material will be disposed of on-site by controlled filling in the areas identified on the plan of proposed road and turbine locations (attached as **Appendix A** to Ms van Polanen's evidence). The fill sites have been identified to ensure minimal effect of erosion and stormwater runoff.
14. Prior to commencement of the major earthworks on-site, sediment control measures will be installed by the earthworks contractor to undertake this work. The maintenance of these control measures will be the responsibility of the contractor. The NZWF Contracts Engineer will inspect the sites regularly to ensure compliance.
15. The position of each turbine site was initially evaluated at a preferred location derived from a wind generation model. Each position was then identified on-site and its location was evaluated as to its suitability for construction of a platform and access. Where sites were relocated, a further assessment was made against the wind model. Any amendment to that relocated site was again identified on-site and its position reassessed. This iteration process was undertaken until a match was achieved that satisfied construction feasibility and wind generation capacity.
16. The road layout then evolved from these preferred locations. The challenge has been to design an access road to each turbine site at suitable gradients

which would enable materials and construction traffic to access these sites. Each turbine platform is required to be level and large enough to enable the wind turbines to be assembled and erected on-site.

17. Taking into account the above constraints, the position of the roads has been designed to follow existing contours (where possible) to minimise the amount of earthworks required and to avoid seepage areas. Where possible, turbine platforms have also been incorporated into the road area to limit the ground disturbance and minimise the risk of any site erosion.
18. It is anticipated that the construction methodology will be similar to that used on the existing windfarm where the roads were constructed using track excavators and dump trucks to move the excavated material to the required locations.
19. Fill sites for the disposal of excess material have been identified on-site and are within the locations as shown on the plan of proposed road and turbine locations (attached as **Appendix A**). These sites have been selected as they minimise haulage distances of excavated material, provide sufficient areas of stable ground and as discussed in the evidence of Mr Kessel's are free of seepage zones. All fill from the earthworks will be disposed of on-site.
20. On fill/disposal sites, the topsoil will be stripped back using track excavators and the topsoil stored along the edge of stripped areas. This topsoil acts as a bund and helps to control stormwater on-site by channelling it to predetermined discharge areas with silt fences constructed for sediment control.
21. Once the fill/disposal areas are no longer required, the topsoil will be respread over the fill site and the areas re-grassed.
22. Cuts along roads and for turbine platforms will not be re-grassed except where batters are less than 1.5m high. Such batters will (where it is possible to do so) be flattened so that they can be re-grassed to enable cattle to graze these areas more easily.

23. Earthworks will only be carried out in weather that will allow suitable compaction of the proposed fill sites.
24. The underground electrical reticulation will be installed as soon as the road and turbine platforms are cut to their finished levels.
25. The construction of the wind turbines will commence as soon as road access to turbine platforms are available. This involves the drilling of the foundation to a depth of either 7 or 10 metres. During the initial drilling, the geological structure will be assessed and the foundation depth will be confirmed after that inspection.
26. Once the concrete foundation has been completed, the tower itself is erected and the nacelle, with blades attached, then being lifted on to the top of the tower.
27. It is anticipated that the construction and commissioning of the turbines will be completed after a period of approximately two years from when the road construction commences. This is subject to climatic conditions over this period of time.

## **Construction Effects**

### Dust

28. During earthworks, in dry conditions, dust may be generated due to construction traffic movements and/or wind. This generally is for short periods of time and in extreme conditions can be mitigated by dampening down the exposed areas. Due to the location of the site, the effect of dust on adjoining properties is negligible. There will be no long term effects due to dust. Construction traffic will generate some dust while using North Range Road. This road however is a public road and is entitled to be used.

### Traffic

29. During the construction phase, the traffic generated will be similar to that experienced during the construction of Stage 2 on the existing Te Rere Hau site; this is discussed in further detail in the evidence of Mr Peet.
30. Construction traffic on North Range Road is bound by NZWF Site Induction Safety requirements, which states: “*The maximum operating speed on site is 30km/h. This includes North Range Road.*”
31. The Te Rere Hau Windfarm Large Vehicle Operator’s Procedure under Coordination / Communications also requires drivers to contact site security for clearance before entering North Range Road either from the site or from the Pahiatua Track end of North Range Road. This enables security to control the movement of large vehicles along this section of North Range Road.

#### Noise

32. The main construction noise will occur on-site during the road construction, foundation drilling and construction and erection of the turbines.
33. During the periods of road construction, the noise will be more or less continuous as the track excavator digs, turns and disposes of the material into dump trucks which travel to the fill/disposal sites where the fill is compacted by machinery. This is generally a continuous process throughout the day. It is considered however that due to the distance of any dwellings from the site, this noise will generally dissipate before reaching dwellings apart from during periods of calm weather. As the earthworks will be done during daylight hours, any noise impact will be less than minor.
34. Noise from other activities will tend to be of shorter duration and will be isolated around the turbine sites during the construction of the towers.
35. Overall, it is considered that any noise generated will be during daylight hours and as noted in the evidence of Mr Hunt and the Malcolm Hunt and Associates report, is often found to be more acceptable owing to the limited duration of the construction works.

## Vibration

36. It is not expected that there will be any vibration effects during construction as the development work on-site is deemed to be a low level activity.

## **Submissions**

### Day

37. The Day submission (submission 20) refers to sediment loss and better utilisation of top soil. As identified earlier in my evidence, the construction process used on-site is to strip back the topsoil from the cut/fill areas so that it creates a bund along the edge of the stripped area. This bund then acts as part of the stormwater control in directing run off to where silt fences have been established. Once the cut/fill areas have been completed, the topsoil is then respread over the areas required to be re-grassed.
38. As mentioned, earlier in my evidence, here batters are less than 1.5m high, NZWF have agreed (where it is possible to do so) to flatten out cut batters so they can be grassed to enable cattle to graze these areas more easily.
39. I agree with the comments in the Day submission about ensuring that culvert outfalls are kept away from areas of fill. Unfortunately this is not always achievable and where these do occur, the use of stormwater socks may be required until grass is well established.
40. In essence what Mr Day is suggesting is that proposed grit traps be used. The grit traps which are identified in the typical culvert details included in the KOA AEE report are easily maintained with the use of a digger bucket to remove silt build up. The use of such traps will be part of the ongoing maintenance programme undertaken by the contractor while on-site and NZ Windfarms Ltd after that.

### Hindmarsh/Summers

41. The Hindmarsh (Submission 16) and Summers (Submission 45) submissions identify erosion as an issue, but do not state what their specific concerns are.

My evidence has already outlined the methods which will be used to control sediment (and consequently erosion issues). However, I add that, from the experience gained from Stage 2 of the existing Te Rere Hau development, provided adequate stormwater and sediment controls are in place, there are unlikely to be any erosion effects resulting from TRHE.

### Olsson

42. The Olsson submission (Submission 15) opposes the number of sites where filling is occurring (from road formations and turbine platforms earthworks) and expresses concerns about the monitoring of these in rain conditions. As identified earlier in my evidence, fill/disposal sites have been selected to minimise haulage distances of excavated material to provide sufficient stable ground and to avoid seepage zones. To reduce the number of disposal sites will increase the haulage distance which uses more fuel and the remaining sites would then have to have a higher level of fill placed to accommodate the amount of material to be disposed of.
43. With respect to monitoring during rainy conditions, the stripped topsoil is used as a bund to assist in the control of stormwater runoff to areas where silt fences have been constructed. As part of the construction contract, it will be the responsibility of the contractor to ensure that the bund and silt fences are maintained and are working at all times and in particular during rain events.

## **Planners report**

### Tararua Planning and Technical Evidence

44. In paragraph 87 of the Consultant District Planners report (**TDC Report**), it is stated that cut and fill sites will be hydroseeded with pasture grasses. This is generally the case, however my Construction Effects Report goes on to clarify that certain areas will not be re-grassed. These areas are cut batters along the roads and at the turbine platform sites.
45. In paragraph 88 of the TDC Report, reference is made to the comment in the Boffa Miskell Landscape peer review relating to “*re-contouring the terrain around the turbine platform so the new landform is integrated with the*”

*surrounding topography.*” The Boffa Miskell peer review indicates that such re-contouring has occurred at the other windfarms. KOA staff were involved at the construction stage of these other windfarms, and I understand that no conscious attempt has been made to re-contour the surrounding topography at the turbine platforms of those windfarms. My drive-through of these windfarm sites also supports this conclusion.

46. In my view, the size of the other windfarm turbines and the larger platform size may have given the impression of re-contouring. The photographs shown in Attachment 4 of the landscape Peer Review Report are a different situation to those in Attachment 5 and in fact the sites identified within Attachment 5 are sites where the ground level has been reduced considerably and may also have had waste fill disposed of adjacent to the turbine pad. At the TRHE site, due to the smaller turbines being used, the size of the platforms is considerably less. To re-contour some of the sites would involve considerably more disturbance of natural ground. As advised earlier in my evidence, where batters are less than 1.5m high, NZWF have agreed to flatten out cut batters so that they can be re-grassed to enable stock to graze these areas more readily.
47. The size of the platform around the turbine once constructed is required to be retained for on-going maintenance of the towers.

#### Horizons Planning and Technical Evidence

48. In paragraph 46 of the Horizons Regional Council Consents (**HRC**) Planners report, concern is expressed over the sedimentation control of fine silts and a recommendation is made that a Stormwater, Erosion and Sediment Management Plan be prepared prior to commencement of construction.
49. In discussion with NZWF representatives, I am advised that the migration of fine silts has not occurred with the stormwater practices employed on the existing TRH site to date. On steep road side drains, rip rap has been used to reduce stormwater velocity prior to it entering grit traps, From there stormwater is then channelled to silt fences before the stormwater is allowed to overflow onto existing pasture.

50. On fill sites, the topsoil has been stripped back to form a bund of approximately 0.5 – 1.0m high which contains the stormwater within the stripped. It is then directed to specific stormwater control areas prior to it discharging over grassed areas to watercourses.
51. This has proven to be an effective method of controlling sediment on the Te Rere Hau site and it is proposed to use the same systems on the TRHE site.
52. While I agree in principle to the use of grassed strips, as the site is a working farm, it is recommended that the requirement to provide fenced grass strips be limited to locations where stormwater controlled areas are proposed or that other acceptable methods be used. Such an alternative could be the use of grass socks which are available from RST Environmental Solutions.
53. It is also worth noting that while weather patterns in this locality are severe, due to the windy conditions at the site, the ground surfaces generally dry out very quickly. This allows more ground absorption before runoff starts to occur which helps to limit the amount of stormwater required to be controlled.
54. With regard to the Contaminant Management Plan mentioned in paragraph 49 of the HRC Planner's Report, I see no issue in complying with such a condition as this already forms part of the Te Rere Hau on-site Health and Safety Plan.
55. While final construction plans are still to be completed, I agree that the first four culverts identified within paragraph 55 of the HRC Planner's Report (and paragraph 31 of Mr Blackwood's evidence) require resource consent even though NZWF has already obtained consent from Horizons to the construction of road number 2. However, the last three culverts, which are identified as being on roads 27, 30 and 32, are actually sites on top of ridges that are being filled, and accordingly culverts are not required.
56. I agree with the comments in paragraphs 59 – 61 of the HRC Planner's report relating to erosion and sediment control provided alternative solutions are able to be assessed and approved if they are able meet the relevant requirements of HRC. These alternative solutions could be addressed within the detailed design report produced prior to construction commencing.

57. With regard to the water source used on site (paragraph 66 of the HRC Planner's Report), I confirm that all water is obtained from permitted locations off-site. No consents are therefore required from HRC.
58. In response to the potential issue of dust generation (paragraph 101 of the HRC Planner's Report); I refer to section 3.1 of the Construction Effects Report. In that report, I noted that during dry conditions, dust may be generated due to construction traffic movements and/or wind. My report also states that due to the location of the site, the effect of dust on adjoining properties is negligible. In my view, as there will be no objectionable odour, no objectionable deposition of dust and there will be no discharge of noxious or dangerous level of airborne contaminants, the requirements of Regional Air Plan Rule 16 can be satisfied. Accordingly, specific dust conditions are not necessary.
59. In paragraph 33 of Ms Maseyk's report, she identifies that there should be a 20 m buffer around all seepage areas. No reasons are given for the selection of this figure and no consideration appears to have been given to the effect of such a buffer. A 20 buffer will reduce the area available for fill sites and it will change the shape of the fill so that once completed the fill site will not necessarily integrate with the surrounding topography. In my view, provided appropriate sediment controls are in place, there is no need for any buffer zone. However, if the hearing panel determines that a buffer should apply it is recommended that this distance be reduced to be no more than 10 metres.

#### Proposed Conditions of Consent

60. I agree with Conditions 15 – 17 which require a Construction and Environmental Management Plan (**CEMP**) to be prepared.
61. I consider however that the HRC requirement for 60 workings days to approve the CEMP is unreasonable. In my opinion, 30 working days should provide adequate time to review the information provided. Therefore, Condition 15 should be amended accordingly.
62. With respect to Condition 18, I comment as follows:

- (a) The wording is very rigid and provides no flexibility for the use of alternative methods of managing sediment on site;
  - (b) Some of the requirements may not be able to be achieved or may be impracticable. For example the requirement to maintain grass at a height of 25 cm throughout the construction period;
  - (c) The rigid requirement to use flocculation systems within 50 metres of a watercourse means that alternative methods, especially those relating to the removal of better methods fine silts are unable to be used;
  - (d) The experience obtained from the existing Te Rere Hau site indicate that flocculation systems may not in fact be required as the silt controls used to date have proven to be effective.
  - (e) It is recommended that Condition 18 be reworded to allow for the use of alternative methods which may be more appropriate to meet the site conditions. Such alternative methods should be subject to the approval of the HRC Environmental Protection Manager.
63. With respect to conditions 19 – 40 which require the preparation of a Supplementary Environmental Management Plan (**SEMP**), I do not think such a plan is necessary as most of the requirements can be dealt with in the site CEMP.
64. The requirement in Condition 23(a)(ix) for a 20 m buffer has been discussed above. Should the hearings panel decide to impose a buffer, it is recommended that this be dealt with as part of the CEMP.
65. In relation to the advice note which follows condition 24 and which sets out that a peer reviewed may be required cut and fill heights on slopes greater than 20 degrees, I am advised that NZWF will obtain such peer reviews as part of its design processes.
66. With respect to conditions 41 and 42, Mr Kessels states in his evidence that fish passage is not required; therefore these conditions are not necessary.

67. The only other condition I wish to comment on is Condition 52, which relates to culvert gradients. In my view, this condition should be reworded as it is currently inflexible in relation to the slope requirement. I recommend that it be reworded as follows: “*All culverts to have a minimum gradient of 1 in 100 where they cross a road carriageway*”.

## Conclusions

68. The effects during the construction phase of this project are able to be mitigated to the point where they are less than minor as:
- The road alignments have been designed to minimise the effects of earthworks yet still enable materials and construction traffic to access each turbine site.
  - Fill/disposal sites have been identified to minimise haulage distance of excavated material and are in locations that provide stable ground and avoid seepage zones.
  - Fill/disposal sites will be covered in topsoil and re-grassed as soon as the sites are no longer required.
  - Stormwater and sediment controls which comply with the relevant standards will be implemented and maintained on-site for the entire construction period.
  - The effects of dust can be mitigated and due to the location of the site, has negligible effects on adjoining properties.
  - The movement of construction traffic on North Range Road is able to be controlled using existing site safety requirements and procedures.
  - Due to the location of the site, apart from calm conditions, construction noise will generally dissipate before reaching adjoining dwellings.
  - As the development work on-site is deemed to be a low level activity, there will be no vibration effects during construction.
69. The concerns raised by the submitters are able to be accommodated or procedures are in place to mitigate the areas of concern.

70. NZWF on the Te Rere Hau site have shown that they have complied with all of the construction requirements and have implemented effective stormwater and sediment control. It is for this reason that it is requested that the wording in some of the conditions allow some flexibility to allow for alternative solutions. There is the safeguard in that all alternative solutions proposed still have to obtain the approval from the HRC Environmental Protection Manager.
71. In my opinion, the construction works can be carried out on the site where the effects on the environment will be no less than minor.

**Colin Fink**

3 October 2009