

4 November 2008

Project No. 087813441/04

Mr Matt Russell  
NZ Windfarms Ltd  
PO Box 13-321  
Christchurch

**PEER REVIEW OF ASSESSMENT OF CONSTRUCTION EFFECTS  
PROPOSED WINDFARM, MT STUART, SOUTH OTAGO**

Dear Mr Russell

**1.0 Introduction**

NZ Windfarms Ltd proposes to construct and operate a windfarm on the ridgeline of Mount Stuart, Manuka Creek, South Otago. Golder Associates (NZ) Ltd (Golder) has been commissioned by NZ Windfarms Ltd to carry out a review of construction effects from the perspective of engineering best practise. This report is issued subject to the limitations set out in Attachment 1.

In particular we have been asked to consider and comment on the suitability of the report for submission to the Clutha District Council (CDC) and the Otago Regional Council (ORC). You have also asked us to suggest additional information that should be included in your submission to these Councils.

**2.0 Understanding of the Project**

**2.1 The Wind Farm and Site Layout**

The proposed project includes the construction of a windfarm on a 15 ha site located approximately 16 km due west of the township of Milton. The proposed windfarm will consist of 9 turbines located along the ridgeline of Mount Stuart, giving a combined site generation capacity of up to 6.0 MW. Each of the turbines proposed for the Mount Stuart Windfarm will typically consist of the following:

- a foundation, piled preferred, potential for a gravity pad;
- a tapered tubular steel tower;
- a nacelle – sits atop the tower and houses the equipment that is used to convert the wind energy into electricity; and
- a 3 bladed turbine rotor.

The maximum height of each turbine to the tip of the blade will be 75 m.

**2.2 Construction Activity**

The construction of an internal ridge road (approximately 1.2 km in total length) will be required in order to erect and service the turbines. This internal road will generally be 4 m wide.



NZ Windfarms preferred approach to turbine assembly is a progressive process beginning with turbine tower section erection followed by the nacelle units being lifted onto the towers. A 240 t mobile crane will be used to assemble the turbines on-site. The hub and blades are assembled on the ground, and subsequently lifted as a complete unit onto the nacelle unit.

Given this process, at each turbine location, a temporary working platform approximately 15 m by 18 m (270 m<sup>2</sup>) is required in order to provide working space for the crane, turbine component lay down and to contain the turbine foundation. We understand that the excess excavated material from earthworks may be up to 4800 m<sup>3</sup>.

Some of the other facilities required as part of the windfarm include, an internal underground transmission network, an overhead transmission line from the subject site to the local lines network, temporary stormwater treatment facilities and temporary construction site office, stores and ablutions facilities.

The proposed transmission lines consist of both on-site underground and overhead to the local distribution network which will be rated at 33 kV, thereby eliminating the need for a substation. Instead switching and metering equipment will be installed on the pole where the external transmission lines links up with OtagoNet's network.

Concrete for the foundations can be sourced from Readymix Plants in Dunedin and Balclutha. As a result, an on-site concrete batching plant and associated aggregate storage areas may not be necessary.

### **3.0 Findings of Peer Review**

#### **3.1 Documents Reviewed**

We have carried out a peer review of the following draft document: NZ Windfarms Ltd: *Construction Effects Report Mount Stuart Windfarm Proposal*, dated October 2008. The report did not include the contents of Appendices A through C in the copy provided to Golder on 17 October 2008. The following sections summarise the findings of our review, in relation to engineering best practice, of the Construction Effects report prepared by NZ Windfarms.

#### **3.2 Crane Pad and Lay-down Areas**

At each turbine location, a temporary working platform is required in order to provide working space for the crane and turbine component lay down. No drawings were included in Appendix B of the draft report showing the dimensions of the lay down areas. We would expect that the design of these areas has taken into consideration, a balance between the area required for construction and a minimum of land disturbance.

#### **3.3 Disposal Sites**

The excess excavated material (i.e., up to 4,800 m<sup>3</sup>) is to be disposed into engineered disposal sites within the site. Although the nature of the disposal sites have not yet been the subject of design, from an engineering perspective they will need to be structurally sound and have appropriate erosion and sediment controls in place until the vegetative cover stabilises the site. It is understood that at present, the location of these sites are unknown. We suggest that it would be advisable to seek input from a geotechnical engineer, prior to confirming the disposal site locations.

#### **3.4 Wind Turbine Delivery and Concrete Foundations**

NZ Windfarms should provide an estimate of the number of heavy vehicles with two-way movements that will be associated with the delivery of the turbines to the site and this information should also be included in the traffic effects assessment report.

According to NZ Windfarms the turbines will be erected on either pile foundations or on gravity pad foundations and up to 145 m<sup>3</sup> of concrete, or 33 two-way truck movements, will be required to deliver the concrete for each of the 9 turbine foundations.

A traffic management plan will be required to be submitted to the CDC which contains procedures for all of the traffic accessing the site during the construction phase.

According to NZ Windfarms it is envisaged, that measures required controlling dust and spillage from the concrete trucks will be required to be outlined in the contractor's management plan.

### 3.5 Overhead Transmission Link to Local Network

An overhead transmission line will be necessary to feed the power generated by the windfarm into the local OtagoNet network. We understand that a 10 m wide development envelope will be required along the length of the selected transmission line route. We recommend providing a short description on this development envelope (e.g., ground cover type and maintenance requirements etc).

### 3.6 Management Plans

In collaboration with the Main Contractor, NZ Windfarms proposes develop a Contract Management Plan that is likely to include:

- A Post Construction Site Rehabilitation Plan,
- An Environmental Management Plan,
- An approach to the control of hazardous substances,
- A Traffic Management Plan,
- A Dust Management Plan,
- An Accidental Discovery Policy for regarding artifacts and archaeological or cultural remains, and
- An Erosion and Sediment Control Plan (ESCP).

### 3.7 Erosion and Sediment Control Plan

As the ESCP will form an important part of the construction process, we recommend that NZ Windfarms provide the principal contractor with an outline of the form the ESCP should take and even include proposed locations of sediment ponds that may be required. Furthermore, details on how the implementation of the Contractors erosion and sediment control measures are confirmed and what frequency of regular monitoring and observations may be likely should be included in the final version of the Construction Effects Report.

### 4.0 Conclusions and Closure

NZ Windfarms Ltd proposes to construct and operate a windfarm with up to nine turbines on a 15 ha site, located on the ridgeline of Mount Stuart, Manuka Creek, South Otago. A draft Construction Effects report relating to the application has been prepared by NZ Windfarms Ltd (issued 17 October 2008). Golder Associates (NZ) Ltd agree, as identified by the report, that the majority of the construction effects associated with the proposed construction will be short term as opposed to long term, and potentially adverse effects resulting from such construction activities can be mitigated principally through the adoption of best practise construction management approaches.

We trust that this advice is sufficient for your current requirements. Should you have any questions, or if Golder can be of further assistance please do not hesitate to contact the undersigned.

Yours sincerely

**GOLDER ASSOCIATES (NZ) LTD**



Philip Robins  
Senior Geotechnical Engineer

PNR/SB-C/CT/pnr

Attachments: Report Limitations

\\chc-s-ts01\chc-files\projects-numbered\08781x\3xxx\087813441\_nzwindfarms\_proposedwindfarm\_mtstuart\_ota\1\_coms\correspondence\construction effects\construction\_review\_final.doc

### Attachment 1 - Report Limitations

This Document has been provided by Golder Associates (NZ) Ltd ("Golder") subject to the following limitations:

- (i) This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.
- (ii) The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.
- (iii) Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.
- (iv) In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.
- (v) Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.
- (vi) Where data supplied by the Client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.
- (vii) The Client acknowledges that Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. Golder will be fully responsible to the Client for the Services and work done by all of its subconsultants and subcontractors. The Client agrees that it will only assert claims against and seek to recover losses, damages or other liabilities from Golder and not Golder's affiliated companies. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any legal recourse, and waives any expense, loss, claim, demand, or cause of action, against Golder's affiliated companies, and their employees, officers and directors.
- (viii) This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Document.