

BEFORE THE BOARD OF INQUIRY

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a Board of Inquiry appointed under s146 of the Resource Management Act 1991 to consider an application by Mighty River Power Limited for resource consents to construct, operate, and maintain a wind farm at Turitea

SUPPLEMENTARY EVIDENCE OF GAVIN JOHN ALEXANDER

Introduction

1. My name is Gavin John Alexander. My qualifications and experience are set out in my rebuttal evidence. I confirm that I have prepared this supplementary evidence in accordance with the Environment Court Code of Conduct for Expert Witnesses (July 2006).
2. I am providing this supplementary evidence to comment on, and respond to, the Environmental Context Ltd (ECL) report entitled "Proposed Turitea Wind Farm", Review of Construction and Decommissioning Effects, commissioned by the Board pursuant to section 42A of the RMA, and dated 25 June 2009.
3. Specifically, I address the following matters:
 - (a) The nature and thickness of the near surface soils across the site; and
 - (b) Options that exist to reduce the extent of filling.

Near surface soils

4. Section 8 of the ECL report identifies apparent discrepancies between the test pit log descriptions and the results of subsequent laboratory classification tests contained in the Preliminary Geotechnical Report. I accept that differences will occur between subjective, and for the most part tactile-based, descriptions made in the field and more rigorous laboratory testing.
5. I have used all of the available data (i.e. both field and laboratory) when assessing the typical soil profile beyond Browns Flat (as outlined in Section 6.1 p. 9 of the Preliminary Geotechnical Report, included as Appendix One to my rebuttal evidence). This identifies surface materials variously comprising gravely silt, gravely clay, silt and clayey silt.
6. The ECL observation is therefore consistent with the preliminary geotechnical assessment - silts and clayey silts can be expected near the surface in some places. However, I note that in other places the near surface soils will contain a significant proportion of gravel.
7. In terms of the investigation locations identified in Section 8 of the ECL report, it is important to differentiate between the soil profile in the alluvial basin of Browns Flat, which

will largely be avoided by the earthworks, and that of the remainder of the site. Test Pits 4, 5 and 6, and Bores 2 and 3 relate to the alluvial soil profile and so are not directly relevant to the bulk of the site.

8. Also important is the nature of all of the materials that will be encountered in the earthworks operation, and those that will form the cut and fill surfaces. In this regard, I note that existing near surface soils will remain at the crest of cuts, and may be selectively used to dress off fills to support vegetation. Some of these soils will also be incorporated in the structural fills and some will end up in spoil disposal sites. These soils can be expected to be dominated by silts or clays. Based on the general soil profile identified in the preliminary investigations, the soils will vary in thickness from 0m (i.e. not present, as at TP8) to 3.0m (BH6).
9. Below these near surface soils, cut materials and the resulting cut face will comprise sandy gravels and fractured greywacke sandstone/siltstone of varying degrees of weathering. A much smaller proportion of fine material (silt/clay) is likely to be generated from earthworks in these coarser and more competent materials. I expect these materials to be used, as much as possible, to construct structural fills and perimeter berms to support spoil disposal sites.
10. Section 10.2.2 of the ECL report relates to soil type, and suggests that the near surface soils (to about 1m depth) will comprise a significant proportion of the earthworks and have a significant silt and clay content. Based on the data contained in the preliminary geotechnical report and on my own observations on site, I consider that the average thickness of silt/clay dominated material can be modelled as follows:
 - (a) Water Catchment Access Road between Turbine zones 22 and 36 (average 0.25m topsoil allowance) only;
 - (b) Western portion of site - 1.3m including topsoil allowance; and
 - (c) Northern portion of site - 2.0m including topsoil allowance.
11. Mr James has prepared plans showing the locations of these areas, and has calculated the resulting volumes of cut in soils and cut below soils, These are described and presented in Section 7 and Appendix E of Mr James' Supplementary Evidence.

Options to reduce the extent of filling

12. Section 10.2.4 of the ECL report suggests providing retaining walls or other construction techniques to minimise fill extent. In my experience, where good quality fill material is available on site, fill slopes can be steepened by constructing them from that material (eg rockfill) and only reinforcing them where necessary. The costs and benefits of the various alternatives would usually be determined in the course of detailed design and tailored to the actual conditions encountered. I consider this is an appropriate and adequate approach to be adopted in the context of this project.

Gavin John Alexander

20 July 2009