Minutes of Meeting: Design Optimisation Minutes Final

Held 3 August 2009 at Wellington at Portland Hotel

Present:	Greg Pollock, Stu McDonnell, Willie Shaw, Gavin Alexander, Paul Blaschke, Jeff Baker, Peter Blackwood[1], Graham Levy, Chris James, Brian Coffey, Nigel Mark-Brown.
Apologies:	John Male, Chris Taylor
Distribution:	As above, plus Ecological and Engineering Caucus Groups.
Note	*These minutes are a record of discussion between the attendees as above, plus input from Isobel Gabites. There have also been some refinement of specific comments on sediment and erosion control, including flocculation, where there remain some areas of agreement and disagreement. It is expected these will be resolved as a result of further soil testing to be completed and drafting of resource consent conditions.*

Workshop Objectives

The agreed workshop objectives were:

- To refine the location, number and design of the spoil disposal sites around the Turitea Wind Farm to address issues raised in the Board of Inquiry; and
- To prepare a refined design and management approach for sediment and erosion control to address issues raised in the Board of Inquiry.

1 Spoil Disposal Sites

In order to agree on a reduced number of appropriate spoil sites around the site, criteria were developed in relation to three specific themes: the practicality of establishing the spoil sites, their ecological effects and operational issues. It is anticipated that there will be detailed resource consent conditions to control spoil sites, and that these criteria are likely to form either a basis for consent conditions, or within the CEMP or SEMP as appropriate. Decisions on resource consent conditions were not made at the workshop.

1.1 Practicality of Establishment

Spoil sites should be located so that:

- They are as close to ridgeline as possible to reduce upstream catchment size, with suitable locations for clean-water cut-off drains;
- Visual effects are minimal post-construction and rehabilitation;
- They are distributed across the site to minimise haul distances as much as possible;
- The topography is efficient to store spoil safely;

[1] Mr Blackwood is from Horizons Regional Council. His participation was to inform the wider group of the approach likely to be accepted by the regional council. It does not imply an assessment of the application has been undertaken.

- Avoiding unnecessary restrictions on fill depth. The preferred approach is to minimise exposed surface area, and maximise volume (i.e. a large fill volume to surface area ratio); and
- No additional indigenous vegetation clearance required.

Each spoil disposal site will be engineered, so that:

- The toe bund will be structural and using weathered rock;
- A sediment pond is designed to collect and treat run-off from the site;
- There is truck and 4x4 access to the sediment pond for access maintenance;
- The site selected does not carry significant cost implications that are disproportionate for any one site;
- A precautionary approach to sediment and erosion control at each site has been adopted; and
- There will be no further adverse effects of constructing roads/crane pads.

It was noted that a concept drawing of spoil site "footprints"; plan, cross and long sections would be presented to the Board as soon as possible.

1.2 Ecological Effects

Spoil sites should be located and designed so that ecological effects are not greater than those assessed to date on the project, and ultimately reduced (as far as practicable) from the current level of adverse effect. This will be achieved by locating spoil sites:

- In farmland surrounding the Turitea reserve wherever possible;
- Avoid clearance of significant amounts of indigenous vegetation, and require an evaluation of each site from an ecologist;
- Avoiding wetland locations;
- Avoiding significant habitats for indigenous fauna;
- Focussing spoil sites in the following catchments:
  - Matarua (North-East)
  - Manawatu Tributaries (North);
- Recognising that for practicality reasons, the Kahuterawa catchment will be required to accept some spoil sites. Given the greater sensitivity of the downstream receiving environment, the following additional criteria will apply to spoil sites in that catchment:
  - Focus in tributaries that are pastoral as first preference;
  - Maximise the distance of flow post pond discharge through farmland before reaching the permanently flowing stream bed;
  - Focus on topography which allows for lower gradient streams immediately below the spoil site;
  - Determine whether any additional sediment treatment can be provided.
- The loss of ephemeral streams is considered a relatively minor effect, but mitigation is considered appropriate for the level of loss of ecological values.
- In all cases, identify reference sites (streams) in adjoining tributaries that can be used for monitoring purposes to prove performance of sediment and erosion control measures;
- Opportunities for restoration works should be considered below each of the disposal sites, taking into account stream gradients, value of downstream habitat, and feasibility of ongoing protection.

It was noted that samples of clay were being sourced from 9 sites around the Turitea Wind Farm, and that the mineralogy would provide guidance on any further flocculation issues. This will be presented to the Board as soon as results are available.

1.3 Operational Issues

It is agreed that the management, maintenance and a range of other operational issues (including engineering design) are critical to the performance of spoil sites. These operational issues should be included in resource consent conditions (or relevant CEMP/SEMP):

- Daily inspection of sediment ponds will be required (provided health and safety issues regarding access in extreme weather are considered);
- Embankment and spillway construction must be designed to survive a 1%AEP storm with 300mm freeboard (if this calculation is based on HIRDS version 2, an additional 20% needs to be added to rainfall);
- Maintenance requirements will be related to storm events;
- Larger spoil sites shall be managed using a "cell" approach, with daily or weekly cover provided to minimise the exposed surface area, and cover provided in advance of a "big storm;"
- A limit on surface area draining to each treatment pond – 3ha per pond;
- Use of automated reporting for sediment ponds, with online access for HRC and PNCC;
- Horizons Regional Council to have independent check on design and site operational activities;
- Design ponds to avoid re-suspension of trapped sediment during large storm events;
- Spoil Site confirmation shall be subject to:
  - Geotech investigations;
  - Ecological investigations; and
  - The ability to provide additional capacity within identified acceptable sites in the event that another spoil site is considered unsuitable after detailed investigations;
- Monitoring of vegetation clearance (perhaps by independent auditor) – this relates more to the construction of roads & pads within the reserve.

1.4 Selected Spoil sites

Following application of these criteria, 11 potential spoil sites have been identified. These are shown on the attached drawing. Further engineering work is being completed to refine the extent and potential capacity of these spoil sites. Two of the sites include the structural fills required for the sub-stations.

2 Sediment and Erosion Control

2.1 General Agreements

- It is agreed that the single biggest risk arising on the site is from a design that seeks to concentrate flow of sediment laden stormwater. The preferred approach, which is the one that has been adopted, is for dispersed treatment and discharge. Avoiding overly concentrated discharges is important for this project in order to reduce effects.
- Defining standards for sediment and erosion control should be methodology based; not based on monitoring after the event (which is not Mighty River Powers proposal in any case).
- Mighty River Power wants to ensure sediment and erosion design criteria for all catchments are based what needs to be achieved in the most sensitive catchments.

- The Greater Wellington guidelines are considered to be generally appropriate. There will be some site-specific approaches and/or constraints, which will be identified in conditions of consent, and particular remedial measures that will be in conditions and in the CEMP and/or SEMPs. It is noted that a review of those guidelines is occurring at present. Horizons are equally comfortable using TP90. For avoidance of doubt, where the guidelines provide for various options, the approach outlined in these minutes will be applied.
- Mighty River Power agree to a weekly review of winter works.

It was noted that the Bulk earthworks is estimated to take between 12-15 months (not the three years quoted by some experts in the hearing, the last 20-24 months being turbine erection). This substantially reduces the risks.

2.2 Proposed Approach - Roads

- Grit traps to occur at typical or indicative 50m intervals (noting that culverts will not be provided every 50m, but will be designed with sediment collection devises such as rock filled side drains and/or grit traps in series.);
- For the finished works, all side drains will have appropriate side-channel drainage and grit trap treatment;
- Super Silt fences on all grit trap outfalls (catchment less than 0.3ha);
- 1000m^2 catchment area typical maximum for grit traps;
- Silt fences along the toe of all fills;
- Vegetation to be mounded at the toe of fills;
- Criteria are needed to minimise the length of fill/tailing fill along roads. Where this fill will be excessively long, other engineered structures such as a wall is to be used. These criteria need to be included as a resource consent condition;
- A cut batter (where road is in cut) or constructed bund (where road is in fill) on the outside of the road is to be provided;
- South Range Road and Water Catchment Access Road will be designed to drain to adjoining catchments outside the water supply catchment wherever possible. Criteria for when discharge to the adjoining catchment is **not** possible are:
  - Where a significant amount of indigenous vegetation clearance is required to provide for the drainage to the adjoining catchment; and
  - Where the volume of earthworks required to divert drainage to the adjoining catchment (i.e. using a pipe or swale) is significant.

  Generally, these two tests will be met where the drainage requirements would be required to extend more than 5m beyond the defined road corridor to reach the adjoining catchment. It is also noted that the 5m distance refers to these occasional and localised structures (primarily a pipe or swale) for discharge, not a 5m strip extending a significant distance along the roads. Vegetation loss will be minor and localised; and
- In order to ensure that the downstream effects of discharges from roads will be minor, during the construction phase, there will be regular and appropriate maintenance of all the structures to manage downstream effects.

2.3 Proposed Approach - Platforms

- As for roads, except that:

- Two grit traps with super silt fences will be provided because of the larger area (i.e. potentially greater than 0.3ha);
- The platform is to be bunded, with side drains; and
- Compaction standards as for structural fills and roads to be applied to crane pads. (crane pads are designed to the same standard as the roads – entire area is metalled).

2.4 Proposed Approach - Stockpiles

- All topsoil stockpiles will be located on pasture or spoil sites. No topsoil stockpiles will be located in an area draining into the Water Supply Catchment. Processed inert materials (eg crushed rock) may be stockpiled on platforms;
- Topsoil stockpiles will have silt fences and be grassed where stockpile is intended to be located for more than 4 weeks;
- Stockpiles of crushed metal may be stored at crane pads provided they drain away from the water supply catchment;
- All stockpiles will be bunded; and
- Stockpiles will be subject to dust suppression control.

2.5 Proposed Approach - Spoil

- Maximum catchment per pond should be 3ha;
- 3% ponds with limits on open area using a "cell" based approach, in particular on the largest spoil sites;
- Ponds designed to structurally survive a 1%AEP event;
- All ponds will be constructed to provide for retrofitting of flocculation if needed;
- Flocculation may be needed where discharge is into sensitive streams if lab tests of soil do not settle naturally and flocculation would provide a benefit. There was not agreement as to how this would be expressed or defined in consent conditions;
- There will need to be a process for 'tracking' the final disposal location of material in the event that different material requires different treatment in terms of flocculation (including if different flocculants are required for different materials);
- More than 1 pond or other device may be required for larger sites (i.e. more than 3ha) or in more sensitive locations (i.e. in the Kahuterawa Catchment); and
- Clean water diversion around all spoil sites capable of conveying the 1% AEP storm event without erosion.

2.6 Proposed Approach - Laydown/Substation

- All substation fills to be engineered structural fill;
- Sediment ponds as per spoil sites to be provided during construction phase;
- Stormwater treatment ponds to be provided long term, in addition to bunding site and other measures described in AEE; and
- Discharge outside water supply catchment for permanent discharge.

2.7 Proposed Approach - Sediment/Erosion Control on Western Ridge

- As for roads and platforms, plus use of large soak holes to provide for ground infiltration of water from grit traps to be investigated;
- Vegetation removed from the area entirely, except at toe of fills.

2.8 Proposed Approach - Road Narrowing

- It is agreed that the only reason to narrow roads is to reduce the wind effects on vegetation;

- As a general rule, road narrowing will not occur on the main road through the site. A specific "toolbox" will be developed for the main road to reduce the impacts of wind effects on vegetation;
- Where bunding is proposed as a tool for reducing wind effects, the material used for bunding shall be weathered rock, with an outer layer of soil;
- At the Western/Game Ridge and the spur roads along the eastern side of the site:
  - Rehabilitate (i.e. narrow) roads to the maximum extent possible; and
  - Within the crane pad area, clear access to the turbine and any ground level equipment will need to be maintained. It is estimated that up to 40% of the area could be planted, and this area will be rehabilitated / revegetated to the maximum extent possible, commensurate with retaining safe maintenance access and working areas. Plant species to be used would include grass and/or toetoe, with follow-up planting of woody species on the margins of the platforms once an initial cover has been established; and
- No narrowing on "farm roads."

Note: Cross sections for South Range Road and Water Catchmetn Access Road where wind protection measures will be proposed or considered is being developed by Mr Shaw.

2.9 Control Mechanisms

The conditions of consent need sufficient detail to set the performance requirements for the works, identify any non-standard approaches or design criteria, and the process for developing and approving the CEMP and the SEMP;

The CEMP is agreed as a necessary document, which provides:

- Principles for Sediment and Erosion Control for the site (amongst other matters);
- Analysis of site risks and consequences;
- Performance Standards to be achieved (these will likely be reflected from resource consent conditions); and
- The "Toolbox" of sediment and erosion control measures that will be used on the site.

The SEMP is agreed as a necessary document, which provides:

- Location specific guidance on sediment and erosion control; and
- A decision framework guided by resource consent conditions on which tools to use from the toolbox in the CEMP.

3 Programme

It is noted that the Board will wish to understand the results of the design optimisation process as early as possible. Prior to being presented to the Board, an opportunity for other members of the engineer and ecological caucus groups is to be provided to determine whether additional experts/parties agree with the design optimised approach adopted. On this basis, an agreed and realistic program is:

- Minutes of Design Optimisation Workshop circulated to attendees;
- Caucus Report Back to Board by Tuesday 11th August (incorporating comments or additions to the Design Optimisation minutes from other experts);
- Report back on further field testing as soon as results are available; and
- Latest Resource Consent Conditions to be circulated as soon as possible by Mighty River so that expert caucus can agree conditions.

Risks to the agreement reached during the workshop were acknowledged as:

- If tests show soils are not well treated by flocculation or if results are variable, a modified approach will be required.
- Nigel Mark-Brown recorded that he is uneasy about winter works **without** flocculation. He noted that resource consent conditions can resolve this;[2].
- Having clear resource consent conditions;
- Clarity around roles and responsibilities of various parties (i.e. Mighty River Power as the consent holder, contractor, and Councils as monitoring and enforcement). Some further consideration is needed on how these relationships are to be structured in resource consent conditions.

4 Summary

Subject to the agreements reached being appropriately reflected in resource consent conditions, and subject to the soil testing results confirming the approach, experts for PNCC and Mighty River Power plus the section 42A report author are in general agreement that the optimised approach expressed in these minutes resolves concerns raised.

Minuted by: Greg Pollock

[2] Isobel Gabites provided comment by email dated 7 August 2009 as follows *"Comments relating to weekly review of winter works, and flocculation options, appear to overlook the equally high rainfall traditionally expected for October and December".* Mr Levy has responded noting that *"Winter works relate not just to rainfall, but also (in fact more so) to ground conditions. October is into a period where there is increased evapo-transpiration relative to winter, and hence the ground dries out and earthworks are again practicable. This is even more the case in December. The sediment control works will be designed for the larger rainfall events, which can occur at any time of year. Therefore high rainfalls in October and December are not a reason for including them in the winter works category."*