IN THE MATTER **of the Conservation Act 1987 and the National Parks Act 1980**

AND

IN THE MATTER **of an application by Riverstone Holdings Limited to construct, operate, and maintain a monorail and associated facilities**

EVIDENCE OF DR GARY BRAMLEY

Date: 18 May 2012

---

1. PROJECT INVOLVEMENT

1.1 Mitchell Partnerships Ltd was retained by Riverstone Holdings Ltd (RHL) to provide ecological information to support a revised concession application to the Department of Conservation for the construction, operation and maintenance of a monorail and associated construction track in and near Snowdon Forest in early 2009. A summary of my qualifications and experience is provided in Appendix 1.

1.2 As part of the field work for this project I have spent a total 20 days in the field walking along the proposed monorail and cycle track routes and flown over the entire route on several occasions.

1.3 In the field I was accompanied at various times by my former colleague, Dr Ruth Bartlett, a botanist, and Mr Rhys Buckingham, a vertebrate ecologist. Both Dr Bartlett and Mr Buckingham are very experienced field ecologists. Whilst in the field Dr Bartlett, Mr Buckingham and I undertook botanical surveys, five minute bird counts and bat surveys and recorded incidental observations about the ecology of the area. In May 2009 Dr Bartlett and I were accompanied by the other consultants employed by RHL for varying lengths of time and were able to discuss our approach with them.

1.4 Prior to undertaking the field work we had access to the earlier ecological surveys of Lee & Elliott (1995) and Boffa Miskell (2006) and the Wildland Consultants Ltd (2006) review of the Boffa Miskell report. We also prepared a review of published literature about the area and the species and habitats we were likely to encounter prior to commencing the field work.

1.5 The results of these investigations are reported in three reports by Mitchell Partnerships Ltd (October 2009, January 2010a, 2010b). I prepared these ecological reports on behalf of Mitchell Partnerships Ltd with the assistance of Dr Bartlett, Mr Buckingham and Dr Sibilla Girardet, another ecologist at Mitchell Partnerships Ltd at the time.

2. SCOPE OF EVIDENCE

2.1 My evidence will primarily focus on matters which have been raised by submitters to the monorail proposal, including:

- The route selection process;
- The vegetation clearance proposed and potential effects;
- The potential effect on bats;
- The rehabilitation proposed and in particular the vegetation direct transfer (VDT) method; and
- The effectiveness of weed and pest control.

I will discuss each of these matters in turn below.

2.2 In addition, I will specifically address the submission by the Wellington Botanical Society.

3. MATTERS RAISED

Route Selection

3.1 The ecological assessments (including the earlier assessments by Landcare Research and Boffa Miskell) have informed the proposal thus far and have identified a 200m corridor, or envelope, within which the final route is expected to lie. While efforts have been made to avoid some areas of high ecological value, it is accepted that the current route includes areas with regional, national, and in some cases, international ecological importance. I note that the submissions have not identified any additional matters of ecological importance and most of the discussion is around the expected magnitude of any effects.

3.2 I have proposed nine ecological criteria relating to the monorail route and a further eight criteria to be applied to the construction track[1], which are intended to encompass the most important ecological values to be found along the route and allow for their protection, where possible, in the final route design. The

[1] pp 96-97 in Mitchell Partnerships 2009

final route selection will be undertaken by a suitably qualified ecologist, the Project Liaison Officer (representing the Department of Conservation) and a suitably qualified engineer working together.

3.3 I expect that in devising the final route, a number of options will be considered, each with differing ecological outcomes. Applying the ecological criteria will allow selection of a final route which minimises the adverse effects where this is achievable to reduce the overall effects of the proposal. By way of example, a number of submissions identified the clearance of a number of large trees as a matter of concern. Our estimate of the number and volume of trees to be removed is based on plots of abundance, with no effort made to avoid large trees. If the criteria are implemented effectively, the number of trees removed will be reduced from the estimate. The Management Plans would be applied to the final route chosen, and these are intended to avoid and reduce any effects further. I consider that the proposed concession conditions in the First Determination report reflect these intentions and also provide an ecological "bottom line" which must not be breached, giving the Minister a degree of certainty about the level of effects.

Proposed Clearance Areas

3.4 There is concern amongst submitters about the extent of vegetation clearance proposed. Our estimates of the extent and volume of the proposed vegetation clearance were an attempt to quantify the scale of the proposal and the volume of wood that would be created, which is an essential step in determining how to manage it. The initial estimates were based on 36 10x10 m plots located at 300 m distances along the route which were measured in May 2009. The final estimates were based on nine 20x20m plots spread along the route, chosen at random and stratified to include at least one red beech plot.

3.5 The basis of randomisation is that every location has an equal chance of being chosen. Under a strictly random protocol, it is very likely that all the plots would have been located in mountain beech forest, which is the most common vegetation type along the route. A random sampling approach was not adopted during our first field visit because it was unknown where each forest type was located along the route until we mapped it in 2009, and it is highly likely the

plots would have been unrepresentative as a result. The nine final plots included four mountain beech plots, one red beech plot and four mixed beech plots (which included red beech and silver beech, with smaller amounts of mountain beech). Whilst I agree that more plots would be desirable, I do not consider that a truly randomised plot selection as suggested by some submitters would have produced more reliable results.

3.6 Overall, I consider the estimates of the extent and volume of vegetation clearance to be conservative and the effect of the proposed clearance to be minor in the wider context of Snowdon Forest. The actual extent of clearance will be known once the final route design is confirmed and is expected to be less than the estimated amount. Ecological survey prior to construction (under condition 5 of the Department's First Determination) will also confirm the estimates. This, coupled with the maximum clearance amount defined in condition 6, will provide certainty on the level of effects expected. Any significant adverse effects on vegetation and fauna will be mitigated or offset where clearance is unavoidable. I am confident that the effect of vegetation clearance on most species can be offset by pest control; I will return to this later in my evidence.

3.7 Several submitters have raised concerns about edge effects and the likely need to remove trees progressively along the route in future. At present some edges are very dense vegetation, others are very open. Effects will vary with where the edges are located, but additional clearance is not expected to be significant. At the panel hearing I presented photos which show examples of how I believe the vegetation along the route might develop with time. One of the key requirements in protecting edge habitat is that herbivores be controlled. Since most of the monorail is located near the forest edge; the edge effects will be reduced to some degree with the monorail structure contributing to that by blocking wind currents and light from outside the forest. Edge effects will also be reduced by the need to maintain canopy cover in order to fulfil the ecological criteria.

Potential Effects on Bats

3.8 The monorail route is a significant site for long tailed bats and it is possible that short tailed bats also occur there. The ecological criteria are intended to protect bats and bat roosts. Once the final route is selected, any remaining affected trees would be subject to survey prior to felling of trees to determine whether bats are present or not. Predator control may also be required to protect bat populations, and if necessary a suitable complement of pest control will be implemented to compensate for roost loss.

Rehabilitation Proposed

3.9 Several submitters have questioned the use of VDT as a rehabilitation method. I note that planting is a challenge at this site because of herbivores, whereas direct transfer has the advantage of establishing immediate vegetation cover, and thus reducing the incidence of surface erosion and allowing the re-introduction of plants that are otherwise slow to grow from seed. This method also transfers the soil fauna and flora, including lichen and fungi which may be present in or on each sod and allows natural processes such as decomposition and nutrient cycling to continue.

3.10 I have been involved in monitoring the direct transfer trials and operational direct transfer carried out at Stockton Mine, where tussock vegetation was the most successfully transferred vegetation, as the root system holds the sods together well and allows sods to be cut and closely butted up when re-laid. At the panel hearing I presented photos of VDT at Stockton Mine. Other sites which I understand have used direct transfer include the Christchurch gondola project (Port Hills) where 20,000 tussock sods were replaced successfully.

3.11 For direct transfer to be successful, the transplanted sods need to be placed on or within an appropriate soil matrix and to be kept moist while they are being stored. Along the monorail route, the sods will be transferred back onto soils sourced from the site and respread over the area; and there is sufficient rainfall for most of the year to ensure that the sods do not dry out. If there are periods of dry weather, I have recommended that the stored sods be watered. In my opinion, direct transfer is eminently suited to tussock vegetation such as that

within the tussock grasslands along the monorail route. The use of VDT and the respreading of soil/vegetation mixtures during rehabilitation of the spur tracks and other areas will also provide for good recovery of the vegetation.

Weed and Pest Control

3.12 There was concern expressed that the construction and operation of the monorail would exacerbate the presence of weeds and pests in the area. While there is no evidence that the monorail route will become a corridor for weeds and pests, I am alert to the possibility. I note that the forest is very open and the monorail route is already a walking track.

3.13 Weed infestations in natural areas generally arise as the result of disturbance or degradation of existing vegetation cover. RHL proposes to implement standard best practice to minimise weed invasion, which I expect to include biosecurity, systematic visual assessment (walkover) of all disturbed areas on a regular basis until a full vegetation cover is obtained and removal or spraying of any infestations.

3.14 There is no evidence that the monorail route will become a corridor for pests, and I note that the local environment is already compromised by pests such as possums and rats. Monitoring is proposed before, during and after construction to detect pest numbers along the monorail route, and an increase in pest abundance will trigger control. In my opinion, there is potential for pest control to have an overall positive effect by achieving broader scale protection for native species and habitats within the Snowdon Forest.

Wellington Botanical Society Submission

3.15 In their submission on the concession application the Wellington Botanical Society (**'The Society'**) made a number of recommendations which they considered should be taken up by the applicant in the event the concession was approved in principle. Taken in the context of wider consultation these opinions were constructive and I address them below.

3.16 The Society has requested detailed planning of the monorail route to begin at the non-forested sections, with the main goal of minimising damage to those

areas and a secondary goal of providing opportunities for those ecosystems to be seen from the monorail and mountain bike route. I support the intention of this submission and believe it is achievable for the applicant to do this.

3.17 The Society also considers that mitigation and offset measures should focus on low altitude, non-forest, valley-floor habitats. I note that any offset measures that might be required for bats would likely be ineffectual if located entirely in non-forested valley floors. The intention of offsets is to replace like with like, so to the extent that low altitude, non-forested valley floors are affected, any proposed offset would need to be located in an area which included these habitats, but I do not consider that a focus on such areas (to the exclusion of other habitats that might require offset) is appropriate. Implementation of the proposed ecological criteria will protect these habitats to the degree that protection is practicable.

3.17 In regards to the Society's concerns about the potential for weed species and pests to establish along the monorail corridor, I consider that the proposed monitoring and pest control measures which I have previously described will be sufficient to prevent the establishment of weeds and pests. With respect to identifying "more ways" to prevent weeds and pests establishing, the parties involved will maintain an active interest in this field and adopt new technology as and when it becomes available.

3.18 The Society considers that more than six months should be allowed for some rehabilitation activities so plants can be planted at the optimum time of year and at a more advanced stage of growth. I accept this suggestion. Rehabilitation will be carried out in accordance with the Vegetation and Habitat Management Plan (**'VHMP'**), and utilising the most effective techniques available. Explicit consideration of this matter in the VHMP will ensure this is acted upon where necessary.

3.19 In relation to the Society's concerns about the potential impact of paint and metallic particles from monorail infrastructure on vegetation, I consider that identifying the particular cause of any small scale effect near the monorail might be particularly difficult. However, the proposed monitoring of vegetation at regular intervals along the monorail route combined with monitoring at regular

distances from the monorail structure would identify the nature of any effects, which could then allow more fine scale interrogation of the cause. The VHMP, allows for contingency measures on a case by case basis and this matter could be included in that consideration.

3.20 The Society requested that the Department ensure the proposed monitoring will be sufficient to deliver valid results. The proposed method of monitoring uses a BACI (Before – After – Control – Impact) approach which will require at least one control site, but likely more than one. Prior to commencement of the monitoring a statistician will be consulted to confirm that the proposed monitorning is sufficient to detect any effects. Any residual effects in relation to habitat modification and loss will be appropriately compensated for by way of implementing the VHMP.

3.21 I consider that the VHMP adequately addresses the matters raised by the Society relating to the requirement to monitor the immediate and long-term effects of the monorail on habitats along the route.

3.22 With respect to formalising enduring arrangements for monitoring and research and ensuring compensation I consider that this matter is implicitly addressed by the concession process and the associated conditions. I am of the opinion that the proposed consent conditions are sufficient in this regard.

4. CONCLUSION

4.1 In my opinion, the ecological assessments undertaken to date have been rigorous and sufficient to identify the potential adverse effects of the monorail on the flora and fauna in the area. The matters identified by the submitters have been adequately considered and addressed. The proposed envelope approach will allow further refinement of the route so as to reduce effects where possible.

4.2 Overall, I consider the robust conditions proposed by the Department's First Determination will sufficiently address submitter concerns in relation to vegetation clearance, pest control and rehabilitation methods and ensure the

adverse effects of the monorail are adequately avoided, remedied or mitigated to the extent where the effects on flora and fauna in Snowdon Forest are minor.

4.3 In the event that adverse effects (for example on bats) cannot be avoided once the final route is selected, Riverstone Holdings Ltd proposes to carry out management to address those effects (e.g. pest control). The scale and method of any management activities would be decided in consultation with the Department of Conservation and have the potential to produce a positive outcome for the currently unmanaged flora and fauna which is most likely to be currently undergoing a gradual and chronic decline.

APPENDIX 1

Qualifications and Experience

Qualifications and Experience

1.1 My full name is Gary Neil Bramley. I hold the degrees of Bachelor of Science (1992) and Master of Science (First Class Honours in Ecology, 1995), both from Massey University, and a Doctorate of Philosophy in Biology from the University of Waikato (1999). Since September 2008 I have been employed with Mitchell Partnerships Ltd which is an environmental consulting firm with offices in Auckland, Tauranga and Dunedin.

1.2 My previous work experience includes working as a tutor in Biology at Waikato Polytechnic, a lecturer in Biology at the University of Waikato and working as an independent consulting ecologist.

1.3 Since 2000 the majority of my relevant work experience has been to undertake or contribute to a large number of ecological investigations, significance assessments and assessments of the ecological effects of developments on coastal, forest, wetland, gumland, farmland and subalpine areas throughout New Zealand. I have been involved in a variety of development projects in New Zealand, including more recently some large scale infrastructure projects and mining projects. I have carried out assessments of the effects of such schemes on terrestrial ecology and have developed and managed the implementation of mitigation works including riparian and terrestrial restoration projects and pest management projects. A list of relevant projects follows. I have published or contributed to eight peer reviewed papers and more than 70 unpublished reports prepared for a variety of clients. I have been responsible for the preparation of Assessment of Environmental Effects documentation, management plans and Department of Conservation Concession applications among other matters. In 2004 I was awarded an “Old Blue” Conservation Award by the Royal Forest and Bird Protection Society followed in 2006 by a Northland Biodiversity Enhancement Group award for contribution to the conservation of Northland’s natural heritage.

1.4 Some relevant current and previous projects that I have undertaken or contributed to include:

- Management plans for Cypress Mine;

- Terrestrial ecology survey and rehabilitation advice at Echo Mine;
- Ecological survey of proposed Strongman Mine offset area and development of the proposed Strongman Mine offset;
- Puketi Forest Trust Restoration Plan and Strategic Plan.
- Birchfield Wetland Restoration Plan;
- Ecological survey at the former Island Block mine;
- Ecological survey of Maramarua mining area;
- Ecological survey of proposed Stockton hydroelectricity area;
- Ecological survey of Liverpool Mining Area;
- Offset proposal for Solid Energy Stockton hydroelectricity proposal;
- Ecological survey for Westco Lagan Ltd, Hokitika;
- Ecological survey in the vicinity of the former Tatu State Mine;
- Ecological survey for the Shotover River Gravel extraction;
- Ecological survey for Ngatamariki geothermal development;
- Ecological survey of the Mt William North Mining Area and development of a biodiversity offset for same;
- Te Reke Olive Grove wetland and hill face restoration;
- Otiria River Catchment Restoration Plan;
- Ngawha Geothermal Power Station flora and fauna monitoring;
- Moturoa Island Wetland Restoration Plan;
- Maitahi Farms wetland assessment;
- Shotover River bird survey;
- Transfer of North Island weka to Russell peninsula;
- Transfer of North Island robin and kokako to Puketi Forest;
- Northland College Farm Environmental Management Plan;
- Ecological survey for Mahoe Farms;
- Tubbs Farm subdivision (ecology survey and restoration planting plan);
- Far North District Council (ecological survey and advice);
- Cable Bay Properties subdivision (ecology survey and restoration advice);
- Ecological survey of Moturua Island;
- Moturua Island monitoring and management plan.