BEFORE A BOARD OF INQUIRY
MACKAYS TO PEKA PEKA EXPRESSWAY PROPOSAL

UNDER	the Resource Management Act 1991
IN THE MATTER OF	applications for resource consents and a notice of requirement in relation to the MacKays to Peka Peka Expressway Proposal
BY	New Zealand Transport Agency

STATEMENT OF EVIDENCE OF SHONA CLAIRE MYERS ON BEHALF OF THE KAPITI COAST DISTRICT COUNCIL

Terrestrial ecology

DATE: 5 October 2012

Simpson Grierson
Barristers & Solicitors

D J S Laing / M G Conway
Telephone: +64-4-499 4599
Facsimile: +64-4-472 6986
E-mail: matt.conway@simpsongrierson.com
DX SX11174
PO Box 2402
Wellington

1. INTRODUCTION

1.1 My full name is Shona Claire Myers.

1.2 I appear as an expert witness for the Kāpiti Coast District Council (**Council**) in relation to its submission on the notice of requirement and resource consent applications lodged by the NZ Transport Agency for the MacKays to Peka Peka Expressway Proposal. I am authorised to give this evidence on behalf of the District Council.

1.3 I hold the degrees of Bachelor of Science and Master of Science (First Class Honours) in ecology and botany. I have 27 years' experience as an ecologist and have been employed by regional and central government agencies, and more recently in private consultancy. I have presented ecological evidence at a number of Council, Environment Court and Board of Inquiry hearings.

1.4 I am a Senior Ecologist and Manager of the Auckland Office of Wildland Consultants Ltd. Wildland Consultants Ltd is an ecological consultancy company specialising in ecological evaluations, ecological restoration, survey and monitoring, and ecological research. In this role I oversee the work of the Auckland office and manage projects providing technical ecological advice and services to a range of clients.

1.5 I was previously employed by the Auckland Regional Council, most recently as Group Manager Heritage. I managed natural and cultural heritage teams undertaking biodiversity and heritage conservation work throughout the Auckland Region. I have also previously been employed as a Scientist with the Department of Scientific and Industrial Research, a Conservation Officer (Protected Ecosystems) with the Department of Conservation, and as a Natural Heritage Scientist and Natural Heritage Team Leader with the Auckland Regional Council.

1.6 My particular areas of expertise include lowland forest, riparian and wetland ecology, ecological survey methods, assessments of ecological significance, assessments of effects, and the management of mainland ecological islands and species conservation projects. I was involved in establishing the Protected Natural Areas Programme, and the national Wetlands of Ecological and Representative Importance (WERI) inventory. I have undertaken ecological surveys and assessments in many parts of New Zealand, including the Wellington Region. I was involved in the development of the Auckland Regional Council's Riparian Management Guidelines in 2001 (Technical Publication 148), and I was involved in leading and implementing riparian management workshops for professionals and landowners.

1.7 I have provided ecological advice on a number of resource management projects, including motorway projects in the Auckland Region, such as the North Shore Busway, State Highways 16 and 18, and the Manukau Harbour Crossing. I presented expert ecological evidence at the Waterview Connection Board of Inquiry in March 2011 and at the Transmission Gully Board of Inquiry in February 2012.

1.8 I have advised national research agencies, such as FRST (Foundation for Research, Science and Technology) on biodiversity research funding priorities, assisted with the development of national guidelines on biodiversity management for the Ministry for the Environment, and was involved in the development of the national Threatened Environments Classification. In 2000, I was a member of the Ministerial Advisory Committee on Biodiversity on Private Land.

1.9 I am currently the secretary of the New Zealand Ecological Society, a past-President of that Society, and a current board member of the International Association for Ecology (INTECOL).

1.10 I have read and am familiar with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2011, and agree to comply with it. My qualifications as an expert are set out above. Other than where I state that I am relying on the advice of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2. SCOPE OF EVIDENCE

2.1 My evidence addresses the following matters:

(a) issues raised in the Council submission regarding the ecological effects of the MacKays to Peka Peka Expressway Project;
(b) ecological values of ecosystems and species within the project area;
(c) effects of the proposed works on these ecological values;
(d) measures to avoid or mitigate potential adverse ecological effects, including offsets for ecological effects,
(e) mitigation of effects on freshwater ecology;
(f) comments on the extent to which I support the applicant's evidence, and proposed conditions, and

(g) recommendations for proposed conditions to address any issues and the outcomes sought by the Council.

2.2 My evidence concentrates on the terrestrial ecological effects of the proposed works, including wetlands and riparian management. In preparing my evidence I have read the relevant Evidence in Chief and the technical reports provided in the Assessment of Environmental Effects (AEE). I have focused on technical evidence and reports related to terrestrial and freshwater ecology. Associate Professor Russell Death will be presenting freshwater ecological evidence for the Council. My evidence will address riparian planting and mechanisms required to avoid and mitigate effects on stream and wetland ecology. I have also reviewed technical reports on stormwater, groundwater and landscape where they are relevant to terrestrial ecological issues or the mitigation of effects on ecological issues.

2.3 I undertook a site visit of the project area on 13 September 2012, including visiting wetland, stream and terrestrial habitats to be affected by the proposal.

3. EXECUTIVE SUMMARY

3.1 Remaining indigenous vegetation and wetlands within Foxton Ecological District have been severely reduced from their former extent and the remnants which remain are important to protect. The MacKays to Peka Peka proposal avoids potential adverse effects on several wetlands in the vicinity of the project area. The project however will have significant adverse effects on a number of wetlands and areas of indigenous forest and shrubland within the proposed footprint. The effects of the project will also include hydrological effects and effects on habitat values of wetlands within and adjacent to the footprint.

3.2 The scale of mitigation for effects needs to be increased significantly to mitigate for the effects on these wetlands and remnants of indigenous vegetation. Mitigation for effects needs to include an increased ratio of restoration planting and protection, and avoidance of effects on the population of North island fernbird. Long-term monitoring of the effects on the hydrology of wetlands needs to be undertaken, and potential effects on hydrology need to be addressed at an early stage within the mitigation package for the project.

3.3 I make specific recommendations in the following paragraphs in my evidence: 6.18, 6.20, 6.22, 6.26, 6.27, 6.28, 6.29, 6.30, 6.31, 6.32, 6.35, 6.36, 6.37, 6.38, 6.39, 6.40, 6.41, 6.42, 6.43, 6.44, 6.45, 6.52, 6.53, 6.54, and Section 7.

4. ECOLOGICAL VALUES AND SIGNIFICANCE OF ECOSYSTEMS WITHIN PROJECT AREA

Ecological Context

4.1 The project area is located within Foxton Ecological District, where indigenous vegetation has been reduced to less than 5% of the land area (Ravine 1992; Department of Conservation 1987). Information from the New Zealand Land Cover Database (2008) shows that only 1.4% of the land cover of the ecological district remains in indigenous forest and shrubland, and only 1.5% remains in freshwater wetlands. Sand dune systems are a major feature of the ecological district and they are the most extensive in New Zealand (McEwen 1987). The sand dunes are the result of sand movement, both past and continuing, under the influence of prevailing westerly winds from the coast. Sand dune landforms and indigenous vegetation associated with them have been modified significantly by land development, and only remnants of wetlands and indigenous forest remain. Indigenous forest would have once been the dominant vegetation cover of the district, and swamp forests and wetlands would have been extensive in the low-lying areas. The few areas that now remain are important and warrant protection.

4.2 All land within the designation for the Expressway lies within Acutely Threatened Land Environments (Leathwick et al 2002; Walker et al 2007) where less than 10 percent of indigenous vegetation cover remains. These are the most threatened environments in New Zealand and the protection of indigenous vegetation associated with wetlands, dunelands in these Land Environments is identified as a national priority (Ministry for the Environment and Department of Conservation 2007). Protection of ecosystems and habitats that have been reduced significantly from their former extent, and in highly modified and threatened environments, is a high priority for the maintenance of indigenous biodiversity in New Zealand (Walker *et al* 2008; Ministry for the Environment and Department of Conservation 2007).

4.3 Wetlands are a nationally threatened ecosystem type (Ministry for the Environment and Department of Conservation 2007) and Wellington is one of the regions in New Zealand where loss of wetlands has been greatest. Only 2.3% remains of the historic extent of wetlands in the Wellington region (Ausseil *et al* 2008). Any impacts or loss of wetland habitat within the designation should be minimised and mitigated so that there is no net loss of wetland habitat, and preferably a net gain.

5. ECOLOGICAL EFFECTS OF PROJECT

5.1 Terrestrial and freshwater ecological values to be affected by the MacKays to Peka Peka Expressway Project, including effects on indigenous vegetation, habitats, flora and fauna, are described in the Evidence in Chief of Mr Stephen Fuller, Mr Matiu Park, Dr Vaughan Keesing, and Dr Leigh Bull, and in the technical reports prepared for the AEE. I have read the ecological descriptions provided in these statements of evidence and in the technical reports.

5.2 The MacKays to Peka Peka Expressway Project has been designed to avoid a number of significant wetlands and areas of regenerating forest and shrubland. The approach used has included route selection to avoid ten significant wetlands and six areas of regenerating forest. I strongly support the approach used to avoid destruction of these wetlands and habitats.

5.3 The Project will, however, adversely affect the significant ecological values of a number of wetlands, streams and indigenous forest ecosystems during both the construction and the operational phases of the Project.

5.4 Potential effects are described in the Assessment of Environmental Effects (**AEE**) technical reports. Construction effects include vegetation clearance, habitat loss, sediment, stormwater and contaminant discharges, and impacts on the hydrological functioning of wetlands. Permanent operational effects will include permanent loss of indigenous vegetation, wetlands, riparian vegetation and fauna habitats (including North Island fernbird), stormwater discharges, and potential ongoing impacts on the hydrology and functioning of wetland ecosystems. These are major adverse effects, which I discuss further below.

5.5 I have relied on the AEE technical reports for detailed descriptions of the overall environmental effects of the project. I am commenting on the effects of the proposed design as presented in the AEE technical reports.

5.6 The Project will destroy and have significant effects on a number of wetlands, and areas of riparian vegetation and regenerating forest. The AEE estimates that the Project will result in the destruction of 5.6ha of indigenous vegetation, including 1.8ha of wetlands and 3.8ha of indigenous forest. In addition, Technical Report 26 (Section 1.7) identifies that there is the potential for destruction of a further 7.4ha of indigenous vegetation due to earthworks and construction activities within the proposed designation.

Effects on Wetlands

5.7 Wetlands directly affected within the project footprint and identified in the AEE include:

(a) Raumati Manuka wetland (estimated 0.03ha loss of 2ha site[1]);
(b) Southern Otaihanga wetlands (estimated 0.55ha loss of 1.39ha site);
(c) Northern Otaihanga wetland (estimated 0.53ha loss of 1ha site); and
(d) El Rancho wetland (K170) (estimated 0.38 ha loss of 3.9ha site).

5.8 The Otaihanga North and Otaihanga South wetlands will be the most affected of these four wetlands. Both wetlands will be severely fragmented and cut in two by the proposed Expressway, and over 50 percent of the extent of the Otaihanga North Wetland will be destroyed. As well as significant habitat loss, there will also be significant hydrological impacts on any remaining parts of these two wetlands.

5.9 Clearance of wetland vegetation within and on the edges of all of these wetlands will also have adverse impacts on the hydrology and functioning of these wetlands. Stormwater treatment and flood storage wetlands are proposed adjacent to the Raumati Manuka Wetland and the El Rancho wetlands, and this has the potential to have significant adverse impacts on the hydrology of these wetlands.

5.10 The AEE ranks these wetlands as being of medium ecological significance. I disagree with this assessment, and with the statement in paragraph 190 of Mr Park's evidence. In my opinion these wetlands are of regional ecological significance, and would meet criteria for assessing regional ecological significance in Policy 22 of the Proposed Wellington Regional Policy Statement (**RPS**)[2]. While three of these wetlands are not identified in the Kapiti Coast District Plan schedule of significant sites, it is likely they were not included because of their location within the proposed designation. This does not affect their level of significance. These wetlands have high values for representativeness and rarity under Policy 22 of the RPS as ecosystem types where less than 30% remains within the ecological district and the region.

5.11 Table 10 in Technical Report 26 assesses the significance of each site located in proximity to the proposed Expressway, and ranks their overall score based on a combined score for a range of significance criteria, including the criteria in the RPS. In my opinion this approach is not appropriate. The criteria in Policy 22 should have been

[1] Figures for loss and total area of site from evidence of Mr Park and Technical Reports 26 and 27
[2] Policy 22 of the Proposed Wellington Regional Policy Statement May 2010 Incorporating Changes from Decision

used to assess ecological significance within the context of the Wellington region. A site only needs to meet one criterion (e.g. representativeness) to be significant under Policy 22, rather than a combination of criteria.

5.12 Due to the way the ecological significance of sites has been assessed in the AEE, wetlands and areas of indigenous vegetation which may meet criteria for regional ecological significance have been assessed as being of low value. The AEE concludes that 1.8ha of wetlands will be destroyed by the proposed Expressway. This figure is not consistent with the total area of wetlands (7.67ha) identified as lying within the footprint in Table 11 in Technical Report 27. Given the depleted state of wetlands in the Foxton Ecological District, most areas of indigenous vegetation and wetland remaining in the ecological district will be significant. Mitigation for the loss of wetlands should address the total area of significant wetlands lying within the footprint, as well as avoidance and mitigation for effects on wetlands in close proximity.

5.13 It is estimated in the AEE that over 13 hectares of mixed indigenous and exotic rush dominated wetlands lie within the proposed footprint. These areas have not been ranked as significant in the AEE and have not been included within the calculation of the area of wetlands to be destroyed. These areas of wetland provide buffers and connections to other wetlands, as well as important hydrological values within the dune systems. Remaining areas could be used to restore wetland systems as mitigation for loss of wetlands within the Project area.

5.14 The construction of the Expressway is likely to have adverse effects on water levels and the hydrology of wetlands along the route. Over 16ha of wetlands have been identified as lying within 200m of the footprint (Table 40, Technical Report 26). Wetlands that have been identified in the AEE as lying within close proximity to the route of the Expressway include:

(a) Te Harakeke/ Kawakahia Wetland (KCDC Ecosite K066);
(b) Kawakahia swamp forest (K066);
(c) Ti Kouka wetland (K066);
(d) Ngarara wetland (K066); and
(e) Osborne's Swamp (K068).

5.15 Avoidance and mitigation for effects on the hydrology of these wetlands should be addressed within the mitigation package. This is addressed further in section 6 of my evidence. There is potential for habitat loss and there will also be indirect effects on

these wetlands through hydrological changes and sediment and stormwater runoff. Hydrological and groundwater impacts on these wetlands are also discussed in the evidence of Mr Hughes and Mr van Bentum on behalf of the Council.

5.16 As discussed in section 5.8 of my evidence, the hydrology of wetlands lying within the footprint of the Project (Raumati Manuka Wetland, Otaihanga North and South Wetlands and El Rancho wetland) will also be adversely affected.

5.17 There will be downstream impacts of sediment and stormwater discharge on the Te Harakeke/Kawakahia wetland and the Waikanae estuary. Te Harakeke/Kawakahia wetland is the second largest area of raupo flaxland wetland remaining in the Kapiti District (Wildland Consultants Ltd 2003), and provides habitat for the nationally threatened North Island fernbird (*Bowdleria punctata vealeae*). These discharges have the potential to have significant adverse effects. These effects are also discussed in the evidence of Mr van Bentum.

Effects on Indigenous Forest and Shrublands

5.18 The proposal will also adversely affect the following fragments of regenerating indigenous forest:

(a) Raumati Road kanuka forest (0.35ha loss of 0.4ha site[3])
(b) Otaihanga Kanuka forest (0.17ha loss of 0.5ha site)
(c) Broadleaved forest at Tuku Rakau (0.25ha loss of 0.9ha site)
(d) Ngarara mahoe forest (0.86ha loss of 4.2ha site)
(e) Riparian forest on the Waikanae River and Kakariki stream (0.13ha loss).

5.19 The Raumati Road kanuka forest and the Otaihanga kanuka forest have been ranked as being of high ecological significance in the AEE, and I agree with this. I disagree with the ranking of the Waikanae riparian forest as being of low ecological value. This forest has very important ecological values and provides riparian protection for the Waikanae River, and I assess it as being of at least moderate ecological significance.

5.20 Waikanae Estuary Scientific Reserve, downstream of the project, is identified as an Area of Significant Conservation Value in the Regional Coastal Plan for the Wellington Region (2008). I also rank all of the remaining areas of indigenous forest and shrubland in this landscape as being of regional significance, due to the extent of loss of

[3] Figures for loss and total area of site from evidence of Mr Park and Technical Report 26

indigenous vegetation in the Foxton Ecological District and the extent of national loss of duneland ecosystems. These areas have high representativeness value under Policy 22 of the RPS.

North Island fernbird

5.21 Habitat for the threatened North Island fernbird (classified as 'At Risk – Declining') (Miskelly *et al* 2008) between Ngarara wetland and Kakariki stream will be destroyed by the footprint of the Project. Two locations in which this species was recorded will be directly affected. This is a highly significant population, being only one of two known populations in the southern North Island. Fernbird are susceptible to habitat destruction and the impacts of animal predators (Parker 2002). I note that Dr Leigh Bull also recorded bittern and dabchick in wetlands adjacent to the Project, and I therefore have concerns regarding potential effects on other wetland bird species which are likely to be present.

5.22 Any effect on North Island fernbird will be very significant, given the significance of the sightings within the southern North Island. Major emphasis should be placed on avoidance and minimising of effects on wetland bird species and habitat.

Summary

5.23 In my opinion, the ecological significance of wetlands and indigenous vegetation on dunelands to be adversely affected by the proposed Expressway has not been adequately assessed and ranked. Due to the loss of wetlands and dune systems nationally and within the Foxton Ecological District, these ecosystems require more substantial recognition and mitigation than that proposed to address adverse effects.

6. AVOIDANCE AND MITIGATION OF EFFECTS

Compensation Ratio for Mitigation Planting and Restoration

6.1 Mitigation proposed in the AEE to address destruction of wetlands and regenerating forest within the footprint of the Project includes mixed indigenous revegetation planting of 7.6ha, and 5.4 ha of wetland restoration. A ratio of 3x is proposed in the AEE for loss of wetlands and 2x for loss of regenerating indigenous forest and riparian forest. These rations have been used to calculate the area of revegetation and restoration that will be provided to offset the loss of indigenous vegetation and habitat.

6.2 Given the extent of loss of indigenous vegetation within Foxton Ecological District, the threatened nature of remaining indigenous vegetation within the landscape, and the national importance of wetlands, my view is that these are not adequate compensation ratios for the destruction of these ecosystems. The area of proposed mitigation also does not take into account the potential extent of all wetlands within the footprint, and the potential for a further 7.4ha of loss of indigenous vegetation within the proposed designation. It also does not reflect any potential hydrological effects on wetlands (over 16ha) adjacent to the proposed Expressway.

6.3 Mr Park and Mr Fuller in their evidence both state that similar compensation ratios proposed for the MacKays to Peka Peka project were used in the Transmission Gully project. I do not agree, as Condition NZTA.53 in the Final Report and Decision of the Board of Inquiry for the Transmission Gully Proposal requires revegetation of 109 hectares of coastal lowland podocarp broadleaved forest as compensation for the loss of 17 hectares of kohekohe broadleaved forest. This ratio was specifically to address the loss of kohekohe forest within the Te Puke Catchment. This is a ratio of over 6x, and is significantly more than what is proposed for this project.

6.4 In his evidence, Mr Fuller explains that for regenerating kanuka or mahoe forest a ratio of 2x has been used, as it will require 20-40 years for a canopy to form, whereas if remnant mature forest were to be affected, a higher ratio would have been used. I do not agree with this assessment as it does not take into account the significance of the remnants of indigenous forest and shrubland that are to be affected.

6.5 I agree with Mr Fuller that wetland restoration can take many years. I do not agree that a 3x ratio is adequate to counter the loss, given the ecological context and value of ecosystems that will be lost and affected. No account has been taken in the compensation ratio for the potential hydrological effects on existing wetlands that will not be destroyed directly.

6.6 The compensation ratio proposed does not fully acknowledge the extent of loss of indigenous vegetation within the Foxton Ecological District, the threatened nature of remaining indigenous vegetation within the landscape, and the national importance of wetlands and dunelands. The ratios proposed in the application are insufficient to compensate adequately for those ecosystems that will be destroyed.

6.7 The ratio proposed also does not address international and national standards for calculating and assessing biodiversity offsets. The key Business and Biodiversity Offsets Programme (**BBOP**) principles which should be used are:

(a) No Net Loss;
(b) Additional conservation outcomes;
(c) Compensation for residual adverse impacts on biodiversity after avoidance, minimisation and on-site rehabilitation;
(d) Limits to what can be offset;
(e) Like-for-like;
(f) Landscape context;
(g) Stakeholder participation;
(h) Equity;
(i) Long-term outcomes;
(j) Transparency; and
(k) Science and traditional knowledge.

6.8 For a major project such as this Expressway, I consider that an overly-simplistic approach has been taken in the AEE, which does not address key offset principles such as no net loss, like-for-like mitigation, and offsetting the residual impacts of the proposal after avoidance and on-site rehabilitation. The mitigation proposed concentrates primarily on restoration planting for the loss of indigenous vegetation and habitat, and it is not clear how it addresses "like-for-like" and "No Net Loss" of ecological features and ecosystem processes to be affected. Whatever the method(s) used to calculate the types and amount of mitigation to be provided, it must take account of the scale of adverse effects and the time required to achieve No Net Loss of indigenous biodiversity.

6.9 The proposed National Policy Statement on Indigenous Biodiversity, in relation to biodiversity offsets, describes the principle of No Net Loss:

> A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes which can reasonably be expected to result in no net loss and preferably **a net gain of biodiversity** (my emphasis).

6.10 No Net Loss is defined in the proposed National Policy Statement as meaning "*no overall reduction in:*

> a. the diversity of (or within) species
> b. species' population sizes (taking into account natural fluctuation), and long-term viability
> c. area occupied and natural range inhabited by species

d. range and ecological health and functioning of assemblages of species, community types and ecosystems.

6.11 Biodiversity is defined in the Resource Management Act as follows:

> Biological diversity means the variability amoung living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems.

6.12 In the New Zealand Biodiversity Strategy (2000) biodiversity is defined as:

> The variability amoung living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity).

6.13 The definition of biodiversity includes genetic diversity, species diversity, as well as ecosystem and ecological diversity. Mitigation for the loss of and impacts on indigenous biodiversity needs to address all of these aspects.

6.14 The concept of biodiversity offsets includes compensation for residual effects on biodiversity after avoidance, minimisation and on site rehabilitation. Residual effects of the proposal which, in my opinion, have not been adequately addressed in the compensation ratio include:

(a) potential hydrological impacts on wetlands;
(b) like for like replacement of habitat types, and no net loss for destruction of the species and ecosystem diversity, and hydrological character of wetland and vegetation types; and
(c) effects on North Island fernbird and other wetland bird species.

6.15 In Tables 1 and 2 below I set out my analysis of the ecological significance of a selected number of the ecological features and processes which will be potentially affected by the Expressway. I also assess the adequacy of the mitigation currently proposed by NZTA. Table 2, in particular, illustrates the uncertainty and, in my view, the inadequacy of the mitigation that is to be provided. I note that NZTA, in Technical Report 26, assesses the potential adverse effects on the loss and hydrological impacts on wetlands as between 'high' and 'moderate', and of indigenous vegetation as being between 'very high' and 'moderate', and the loss of fernbird as being 'very high'. Due to the ecological significance of the features, and using a similar scoring system, I have assessed the effects on wetlands and indigenous vegetation as being 'very high' to 'high'. I agree with the assessment of the effects on fernbird as being 'very high'.

Table 1. Selected ecological processes and features, relative ecological significance and degree of potential adverse effects associated with the MacKays to Peka Peka Expressway.

Ecological feature/process	Relative Ecological Significance[4]	NZTA Assessment[5]	Degree of Adverse Effect[6]	NZTA Assessment[7]
Loss of wetland habitat	National -Regional	Medium	Very high -high	High -low
Loss of indigenous forest and shrubland on dunes	National - Regional	Medium - low -	Very high - high	Very high - low
Loss of fernbird habitat	National	High	Very high	Very high
Changes in water levels and hydrology of wetlands	Regional	N/A	Potentially very high	Potential for significant adverse effects
Fragmentation of ecosystems and severing of connections	Regional	N/A	High	Potential Adverse Effect

Table 2. Selected ecological features and processes to be affected by the MacKays to Peka Peka Expressway proposal, degree of potential adverse effect, whether mitigation is to be provided, and an assessment of whether no net loss or gain will be achieved.

Ecological Feature/Process	Degree of Adverse Effect[8]	NZTA Assessment[9]	Mitigation provided[10]	Net gain or loss[11]
Manuka wetland with Sphagnum (Raumati Manuka Wetland)	High-moderate	Low	Buffer planting and planting of flood storage areas	Unknown
Purei sedgeland and Baumea rushland (Southern Otaihanga Wetland)	Very High	Moderate	Transplanting of wetland plants to low-lying depression and restoration of central wetland	Unknown
Manuka and Carex sedgeland (Northern Otaihanga Wetland)	Very High	High	Transplanting of wetland plants to low-lying depression and restoration of central wetland	Unknown

[4] My assessment based on Proposed Wellington Regional Policy Statement criteria and National Indigenous Biodiversity Priorities
[5] Tables 25 and 35 of Technical Report 26
[6] My assessment based on Section 3.7 of Technical Report 26.
[7] Table 24 and assessment of impact significance in Table 26 of Technical Report 26; Evidence of Mr Park; Evidence of Dr Bull
[8] My assessment based on Table 6 of Technical Report 26
[9] Assessment of Impact Significance in Table 26 Technical Report 26; Evidence of Mr Park; Evidence of Dr Bull
[10] Based on information provided in NZTA Environmental Management Plan
[11] My assessment

Ecological Feature/Process	Degree of Adverse Effect[8]	NZTA Assessment[9]	Mitigation provided[10]	Net gain or loss[11]
Manuka dominated wetland (El Rancho)	High	Low	Restoration of Oxidation Ponds	Unknown
Hydrological impacts on wetlands	Potentially very high	Some measurable adverse effects	Monitoring and adaptive management	Potential loss
Sediment and runoff effects on wetlands	Potentially very high	Not possible to predict	Treatment of runoff, adaptive management	Loss
Adverse impacts on North Island fernbird population	Very high	Potentially very high	Survey and monitoring	Potential loss
Adverse impacts on other wetland fauna (e.g. bittern)	Potentially high	Low	none	Potential loss
Kanuka forest	Very high	Very high	Mixed indigenous planting	Unknown
Riparian forest	High	Very low	Planting	Unknown
Mahoe forest	High	Moderate	Mixed indigenous planting	Unknown
Impacts on native lizards	High	Low	Planting of habitat	Loss
Impacts on other indigenous fauna	High	Low	none	Potential loss

6.16 Mitigation for the Project includes indigenous revegetation planting and restoration of both wetlands and indigenous forest within the Project area. There is little detail provided in the AEE and in the landscape plans as to the exact details of wetland restoration and planting to be undertaken, and whether it will address "like for like" restoration of wetland types that will be affected, and whether No Net Loss will be achieved. For example, the restoration of the Waikanae Oxidation Ponds proposed as mitigation for impacts on the El Rancho wetland, and other wetlands, is unlikely to restore a wetland of a similar type and hydrology. The proposed buffer planting of Raumati Manuka Wetland, and creation of flood storage areas, will not replace the type and hydrology of this wetland. It is also unclear how the mixed indigenous planting proposed will replace the kanuka and mahoe forest types to be lost.

6.17 In summary, in my opinion the proposed compensation ratio does not address the significance of the features and ecological processes that will be lost in the context of the seriously depleted state of indigenous biodiversity on the Kapiti Coast. It also does not address the range of factors that should be addressed through the application of international best practice biodiversity offsets principles. In the absence of a biodiversity

offsets model, it is my opinion that a ratio of at least double that proposed within the AEE should be used. This ratio would be more consistent with the ratio for mitigation proposed for significant areas of indigenous vegetation in the final conditions for the Transmission Gully Project (Condition NZTA.53). As discussed in section 5.13 of my evidence, the mitigation proposed should also address the full extent of significant indigenous vegetation and wetlands within the footprint of the proposed Expressway, and potential hydrological effects on wetlands.

Mitigation for Loss of Wetlands

6.18 Mitigation for the destruction of wetland habitat as described in the AEE is proposed to include 5.4ha of wetland restoration and planting, including translocation of wetland plants into restoration areas. Technical report 26 and the Environmental Management Plan provide some details of the proposed restoration, which will include:

(a) restoration of Otaihanga central wetland and transplanting of wetland plants to a low-lying depression;
(b) restoration of the Waikanae Oxidation Ponds;
(c) wetland buffer planting and planting of wetland species in flood storage area at Raumati Manuka Wetland; and
(d) buffer planting of Ngarara Wetland.

6.19 I support the type of restoration proposed. However, as discussed in sections above, I recommend that mitigation for wetland loss should include increased levels of wetland restoration in other parts of the Project area, including expansion, where possible, of wetland areas and buffers to be affected by the proposal. This could also involve restoration of currently grazed rushland habitats that have the potential to be restored. Mitigation for wetland loss should include improvement of the habitat values through control of pest animals and weeds, and improvement of ecological linkages and corridors.

6.20 Mr Park comments in his evidence (at paragraph 193.2) that a small number of planted flood storage areas will also be used as part of the wetland mitigation. Mr Fuller in paragraph 158 of his evidence comments that he is confident about the design of the proposed flood storage areas and stormwater treatment wetlands. I do not share his confidence. The use of flood mitigation areas is unlikely to provide mitigation for the wetland types and hydrology and natural character of wetlands which will be destroyed.

Research on constructed ponds shows that they can have poor water quality compared with the stream catchments they are located within (Maxted *et al.* 2005).

6.21 Mr Park comments in paragraph 160 of his evidence that loss of wetland habitat in the Raumati Manuka Wetland could be reduced through detailed design of the cycleway in this area. I support this suggestion and suggest that further efforts should be made to minimise loss in this wetland as well as others in the Project footprint through design changes.

Impacts on the hydrology of wetlands

6.22 Mitigation proposed in the AEE and EMP to address potential adverse effects on the hydrology of wetlands includes monitoring of water levels and wetland condition, and an adaptive management approach.

6.23 Hydrology is a critical element in the functioning of a wetland (Peters and Clarkson 2010). Natural hydrological processes are more likely to support indigenous wetland plant communities and species. Hydrology is vital to the functioning of wetlands and the types of plants and animals which are adapted to living in a wetland. Changes in hydrology can have long-term implications.

6.24 Monitoring of groundwater levels are proposed for a number of wetlands, including Raumati Manuka wetland, Otaihanga wetlands, El Rancho wetland and Te Harakeke Wetland (Evidence of Matiu Park, paragraph 133). I support the proposed monitoring; however, I recommend that a baseline of the natural hydrological and ecological character of the wetlands be required so that any changes can be assessed against this baseline. Monitoring will be important to assess any long term changes. The modelling and baseline requirements for monitoring of wetlands are also addressed in the evidence of Mr Hughes.

6.25 Condition G.40 proposes an adaptive management approach which includes monitoring during construction and observing whether trigger levels have been exceeded, and implementing measures to alter the effect. I strongly recommend that any assessment and review of whether the hydrology of wetlands is adversely affected, and whether or not it can be attributed to the effects of the project, should be peer reviewed by representatives from independent authorities with expertise in wetland hydrology. This could involve an expert review panel.

6.26 The AEE includes measures to mitigate any adverse effects on the hydrology of a wetland following a trigger event. These include installation of weirs to control water levels, and restoration planting. I recommend that as well as these measures in the AEE, the potential effects on the hydrology of wetlands should be incorporated up at a very early stage as part of the overall ratio of wetland restoration required as part of the Project because of the potential significance and uncertainty of these effects. Mitigation for effects on the hydrology of wetlands can include alteration of hydrology through artificial structures and restoration of wetland habitats in adjacent areas to offset loss.

6.27 I support the proposed review in Condition G5 of groundwater level monitoring data by both a hydrogeologist and an ecologist. However, there is a need for a strong link between groundwater conditions and conditions regarding ecological monitoring of wetlands (G 34) and the approach to the management of trigger levels and events (G.40) and of groundwater monitoring (e.g. GD 5).

6.28 I recommend a longer period of monitoring of groundwater levels, and I support Mr Park's recommendation (Paragraph 175) for a five-year monitoring period. The proposed ecological monitoring of wetlands (Condition G 38) also needs to be for a similar period to groundwater monitoring.

6.29 I recommend that any results of wetland monitoring should be provided to the Council as well as Greater Wellington Regional Council, to reflect the responsibility of the Council for maintenance of indigenous biodiversity under Section 31 of the RMA.

6.30 There will be downstream effects of sediment and stormwater discharge on the Te Harakeke/Kawakahia wetland, and on the Waikanae estuary. An adaptive management approach is recommended in the evidence of Mr Park (paragraph 135) to ensure that sedimentation is minimised. Conditions need to specify a higher level of sediment control in this area, and monitoring should be undertaken of downstream effects on the wetland. Further information is needed to provide certainty about the effectiveness of sediment control measures for the Te Harakeke/Kawakahia wetland, and for other significant waterways such as the Waikanae River.

6.31 In summary, the potential adverse impacts on the hydrology of wetlands within and adjacent to the proposed route should be included within any calculation of mitigation. Additional protection and restoration of wetlands and buffers both within and outside of the designation should be required. Appropriate conditions are needed to:

(a) ensure that potential adverse impacts on the hydrology of wetlands within and adjacent to the proposed route are avoided or minimised, and included within any calculation of mitigation and restoration;
(b) provide additional protection and restoration of wetlands and buffers both within and outside of the designation;
(c) ensure that adaptive management provides for long-term monitoring of restored wetland areas;
(d) require independent, best practice monitoring of the long-term hydrological effects on wetlands located in close proximity to the proposed Expressway over a 5 year time period; and
(e) require remedial action to address any issues identified by the monitoring.

North Island Fernbird Population and Habitat

6.32 I agree with the evidence of Dr Leigh Bull that potential adverse effects associated with the construction and operation of the Project on the fernbird population are likely to be 'very high'. I agree that further investigations and research are required to determine the distribution and utilisation of fernbird habitat within the proposed alignment. This should include assessing the extent of this population within the adjacent Te Harakeke wetlands.

6.33 Dr Bull in her evidence also recommends research at an existing motorway within a known fernbird habitat to determine the operational effects on the population. I presume that her reference is to the shrubland vegetation known as RAP 21, adjacent to the Albany to Puhoi section of the motorway north of Auckland. While these results could be useful, I note that this situation could potentially be quite different, with a different habitat type, and a different pest animal control regime in that area. Fernbird from RAP 21 affected by the project were also transferred to Tiritiri Matangi Island, a pest-free island sanctuary in the Hauraki Gulf, as mitigation for that motorway project.

6.34 I recommend that as mitigation for any adverse effects on this species, pest animal control is undertaken in local wetland habitats to ensure that the remaining population can sustain itself and expand. Other wetlands in the area will be providing potential

habitats for this species, and habitat restoration and pest control of wetlands in the area would mitigate for the overall impact of the project on the species and its habitat. Fernbird are highly susceptible to animal pests and an ecosystem approach (rather than just species based) is recommended to address the management of this species (c.f. Parker 2002).

Revegetation and mitigation planting

6.35 Revegetation planting is the main mechanism for mitigation of destruction of wetland and forest ecosystems within the proposed alignment. Successful implementation and long-term success of this planting is therefore critical. Proposed Condition DC 54 requires ecological planting to be integrated with landscape planting. I support this approach, although it is difficult to differentiate the exact details of the ecological mitigation planting and the landscape planting. Integration of ecological and landscape planting should include development of ecological corridors and networks to mitigate for the fragmentation of habitats from the construction of the proposed Expressway.

6.36 Condition G 42 identifies that a total of 161ha will be available for active or passive restoration. It is unclear how the proposed revegetation of terrestrial habitat undertaken as part of landscape planting will contribute to restoration and replanting of indigenous forest, wetland and shrubland communities representative of the diversity of forest and wetland types being lost. I support the formation and revegetation of stormwater wetlands; however, these are not a replacement for the loss and destruction of natural wetland systems and impacts on the hydrology of natural wetlands.

Maintenance of Plantings

6.37 A review of the success of revegetation plantings after 10 years should be required, and maintenance of all plantings (including terrestrial, riparian, wetland restoration) should be undertaken for at least 4- 5 years, to ensure that they survive and achieve canopy closure, and provide adequate mitigation for effects. A requirement for review of the success of plantings is consistent with Condition G.36 in the Final Report and Decision for the Transmission Gully Project. As much of the mitigation involves wetland restoration and the uncertainty of the impacts on hydrology, there is a need for a longer time period to monitor success. Mechanisms are also needed to ensure long-term maintenance of plantings, and the agency with responsibility into the long-term for these plantings should be clear, as should be a requirement for follow up action if required.

Permanent legal protection of mitigation and restoration areas should also be required to ensure protection in perpetuity.

6.38 Best practice maintenance of revegetation plantings include requiring canopy closure, and a required success rate for plantings, for example, maintenance and planting requirements such as those in the Auckland Council Rodney District Plan[12]. These types of specifications are recommended, including 80% canopy closure and a survival rate of 90% of the original density and species. Detailed species lists and grades of plants, and a detailed planting plan which identifies ecotones and ecological sequences and habitats to be restored, should also be required. Requirements for enrichment planting and planting of canopy species following establishment of early successional species should also be included, to facilitate natural successional processes. Maintenance and specifications for landscape planting are also addressed in the evidence of Ms Williams on behalf of the Council.

Control of Animal and Plant Pests

6.39 Control of pest animals and weeds will be vital to ensuring that revegetation planting and ecological mitigation is successful. Pest animals which will need control to protect revegetation plantings include possums, rabbits and hares, as these species are significant browsers of the types of vegetation being planted. For protection of wildlife habitats, including fernbird habitat, control of mustelids, feral cats, and rodents will be required. Weed species such as blackberry and convolvulus will need ongoing control.

6.40 Pest animal control should be provided as part of any mitigation package to address adverse effects on indigenous fauna and wetland habitats, and as part of wetland restoration and enhancement. Wetland bird species such as fernbird are highly susceptible to predation by pest animals.

6.41 I support Condition DC.57 which requires pest animal management and weed control within the LMP. The LMP should also provide details of the types and level of control which will be undertaken. This condition currently also appears to be inconsistent with Condition G 43, which only requires control of deer, goats, pigs, and weeds. As I have discussed in Section 4.42, control is required of a wider range of pest animal species.

[12] Appendix 7E Guidelines for Revegetation Plantings. Auckland Council District Plan Operative Rodney Section 2011

Impacts on Indigenous fauna and flora

6.42 Common skink (*Oligosoma n. polychrome*) have been recorded in the Project area (AEE), and the adverse effects on indigenous lizards has been assessed in the AEE as being low. As these species are protected under the Wildlife Act 1953, I recommend that a lizard management plan should be developed for the project, to capture and move lizards within likely habitats, and that this should be specified in conditions.

6.43 A specific condition should also be included to specify avoidance of adverse effects on the *Korthalsella salicornioides* (dwarf mistletoe) populations within the alignment.

Queen Elizabeth Park

6.44 I support the Council's submission that the designation should continue to avoid substantially intruding into Queen Elizabeth Park. The Park contains significant wetland ecosystems (e.g. KCDC Ecosite 184) that I recommend should be avoided.

Mitigation of Effects on Freshwater Ecology

6.45 Associate Professor Death in his evidence on behalf of Council has addressed the ecological values of the streams affected by the proposed works, and the inadequacy of the information provided in the AEE on the aquatic biodiversity of streams and wetlands affected by the proposed Expressway. He has also addressed the effects of proposed stream diversions on stream ecology and the impacts of sedimentation on stream biota and fish, including the effects on the Waikanae River. I concur with his conclusion that the AEE has not adequately assessed the biodiversity values of any of the waterbodies, and that the ecological significance of streams has been downplayed. I agree that the Waikanae River has high ecological condition and value. I do not agree with Dr Keesing that the other streams have low biodiversity value. In this section of my evidence I will address the mitigation which is needed to offset adverse effects on freshwater ecology.

6.46 A number of the streams provide habitat for threatened indigenous fish species. Dr Keesing identifies in his evidence (para 58) that longfin eel (*Anguilla dieffenbachia*) ('Declining') (Allibone *et al* 2007) were present in most streams. Other indigenous fish species present include inanga (*Galaxias maculatus*) ('Declining'), banded kokopu (*Galaxias fasciatus*), Giant kokopu (*Galaxias argenteus*) ('Declining') and red fin bully (*Gobiomorphus huttoni*) ('Declining'). I concur with Associate Professor Death that the

invertebrate, macrophyte, algal and bryophyte communities of waterbodies and wetlands have not been fully assessed or reported in the AEE.

6.47 Dr Keesing in his evidence identifies that there will be loss of 3.12 kilometres of stream habitat, including loss of stream length through extensive culverting and extensive works in the Waikanae River. Riparian planting will be an important part of the proposed mitigation for the loss of stream habitat and effects on aquatic ecology. The riparian zone performs multiple functions, including the retention and filtering of contaminants, the moderation and lowering of temperature, and the provision of aquatic and terrestrial habitat. The shade provided by trees and shrubs along streams is effective in preventing or reducing elevated water temperatures, which can be lethal to native fish and other aquatic fauna (Auckland Regional Council, 2001).

6.48 A planted riparian buffer width of at least 10-20 metres on each side of a stream is needed to provide a sustainable ecosystem (Parkyn *et al* 2000, ARC 2001). Wider forest and riparian buffers on the edge of forest reserves and streams are also recommended to reduce edge effects and to provide a sustainable forest ecosystem (Davies-Colley *et al.* 2000; Young and Mitchell 1994). Increasing the width of the buffer zone along a stream will reduce edge effects.

6.49 A total of 5.277 kilometres of stream restoration is proposed (Dr Keesing's evidence paragraph 119) as mitigation for the loss of 3.12 kilometres of stream habitat. The Stream Ecological Valuation (**SEV**) tool has been used to calculate the ratio of mitigation. The tool was developed in the Auckland region to provide a method for evaluating streams for resource management decisions (Storey *et al* 2011). I support the use of the SEV method for calculating the level of mitigation. However, as the ecological value of the streams has been undervalued in the AEE, the amount of mitigation does not currently reflect the ecological value of the streams affected by the proposed works.

6.50 In paragraph 112 of his evidence, Dr Keesing discusses the different ratios for the different type of works proposed. For example, the ratio for a stream diversion assumes that a new diversion reach will be restored close to an unmodified reference condition. This ratio is completely reliant on the proposed stream restoration and riparian planting being successful and achieving significant benefits to stream ecology. There is no detail provided in the AEE to provide sufficient confidence that this outcome will be achieved.

6.51 The riparian planting proposed (Annexure C of Dr Keesing's evidence) only addresses the sections of streams and diverted streams which lie within the Expressway designation. It does not address the provision of wider ecological benefits and linking stream restoration to the high value condition of upstream reaches.

6.52 There is little detail provided in the AEE regarding how the restoration and creation of diverted streams will be undertaken. In paragraph 204 of his evidence, Dr Keesing states that detailed design of the stream diversions and riparian planting has not been completed. Detailed stream restoration guidelines need to be developed which provide details of how natural stream profiles will be restored, constructed with natural materials and incorporate natural stream channel characteristics, and achieve the restoration of riparian habitats. These could be similar to guidelines developed for the rehabilitation and restoration of Oakley Creek for the Waterview Connection Project.

6.53 In my opinion, the lack of proposed riparian planting associated with the Waikanae River, the most significant stream and river system within the project area, is a significant gap in the proposed mitigation package for effects on streams. Riparian restoration here should be undertaken and have regard to the Waikanae River Environmental Strategy, and be in addition and complementary to proposed flood control works and existing community restoration projects.

6.54 In summary, I recommend the following actions to adequately mitigate the ecological effects of the Project on stream ecology:

(a) The amount of mitigation (including riparian restoration) required needs to be significantly increased to reflect the ecological value of the streams affected by the works. This could include the provision of more substantial riparian linkages outside the designation to provide better connections with the high value upper catchments, and should include additional riparian planting for the Waikanae River as described earlier in my evidence.

(b) Diversions and realignments required for Expressway construction should be rehabilitated separately to the SEV offset mitigation requirements for the Project. This needs to be specified in conditions and would be consistent with Streamworks Condition SW.21 of the Final Report and Decision of the Board of Inquiry into the NZTA Waterview Connection Proposal. Flood storage areas, stormwater treatment areas and connections to stormwater treatment wetlands should also be rehabilitated separately to the SEV mitigation requirements.

(c) The buffer widths for riparian planting should be at least 10-20 metres wide to ensure plantings are sustainable in the long term. I therefore support the comment in paragraph 119 of Dr Keesing's evidence regarding buffer widths. I also support the focus on larger areas of restoration.

(d) Condition WS.5 (attached to Dr Keesing's evidence) should require the development of Stream Rehabilitation Guidelines which provide details of how the natural characteristics of streams will be restored, and the restoration of riparian habitats.

7. PROPOSED CONSENT CONDITIONS

7.1 In this section of my evidence I comment on the proposed conditions, including changes recommended in NZTA evidence. I provide recommendations for changes to a number of the proposed conditions.

Integration of Management Plans

7.2 Condition G19: The CEMP needs to identify how other management plans including sediment and control groundwater level management plans will be integrated with the EMP to avoid and minimise ecological effects. Suitably-qualified and experienced ecologists should be involved in the implementation and integration of all management plans. The EMP should specify how it will avoid and manage adverse impacts on terrestrial ecology, wetlands, and freshwater ecology.

7.3 Condition G29: There needs to be a strong link developed between the Groundwater (level) management plan and the EMP, to ensure that adverse hydrological effects on wetlands are avoided or adequately mitigated and that wetland hydrology is monitored.

Revegetation and Landscape Planting

7.4 I support the intent of Condition DC 54, which requires ecological planting to be integrated with landscape planting, however it is not clear how the proposed ecological planting and the landscape planting will be differentiated and managed. There should be a clear delineation between the landscape and ecological planting, so that ecological restoration and mitigation is implemented and managed to achieve ecological goals.

7.5 Condition DC 57 should require planting of indigenous eco-sourced plants which reflect former natural vegetation and which will ensure natural processes of succession, and not just "where practicable". Given the depleted nature of indigenous vegetation within the Foxton Ecological District, restoration planting undertaken as part of the project should be undertaken using indigenous plants characteristic of the local area. It is also best practice to use locally-sourced indigenous plants. Design details and planting standards should be provided for landscape and ecological mitigation planting to ensure that planting utilises species which are appropriate to the ecology of the site, and so that planting is sustainable and follows natural successional processes.

7.6 Specifications for ecological planting programmes in Condition DC.57, including ecological planting plans, species mixes, and plant densities, should be developed in consultation with and be approved by ecologists at the Council prior to works commencing and prior to ordering of plants. This is to ensure that the proposed ecological restoration planting is appropriate to achieving mitigation for the effects of the Project on indigenous biodiversity. It would also be important to ensure early consultation on species mixes.

7.7 In relation to Condition DC 57 (f), the proposed maintenance regime for wetland and riparian areas is generally supported, although a longer time period (e.g. five years) would be preferable. In my opinion, the maintenance period proposed for terrestrial ecosystems is inadequate and should be for at least 4-5 years. Restoration plantings need at least 3-5 years to establish and to develop canopy closure. The condition should also require monitoring of the success of planting and a review period for at least 10 years to ensure that the plantings are successful and sustainable into the future.

Riparian Management

7.8 Condition WS.8 (formerly WS.5) (attached to Dr Keesing's evidence) should require:

(a) the development of Stream Rehabilitation Guidelines which provide details of how the natural characteristics of streams will be restored and details of the restoration of riparian habitats;

(b) a specification that diversions and realignments required for Expressway construction, and flood storage areas, stormwater treatment wetlands and connections to stormwater treatment areas will be rehabilitated separately to the SEV offset mitigation requirements;

(c) riparian restoration alongside Waikanae River; and

(d) riparian buffer widths of at least 10-20 metres wide.

Pest Management

7.9 Condition DC.57, regarding specifications for pest animal management and weed control within the LMP, is supported but it needs to specify the frequency of control and densities of control. For example, pest animals and plants should be controlled to low densities to achieve ecological outcomes and successful regeneration of revegetation plantings. Condition G43 (e) only addresses control of deer, goats, pigs, and weeds within restoration mitigation areas. I recommend that, to protect sensitive wetland ecosystems and habitats for threatened bird species, other pest animal species need to be controlled, including mustelids, rats, and feral cats. Possums should also be controlled in revegetation areas, to allow successful regeneration and succession.

7.10 In relation to Condition G34 (Ecological Management Plan), instead of providing information on how it will achieve outcomes, the condition needs to be much stronger and specify how it will avoid and minimise adverse effects on all areas of terrestrial ecology and wetlands and indigenous plants and fauna. For example, adverse effects on the wetland hydrology should be avoided, and disturbance of threatened bird species such as North Island fernbird should be avoided, and not only during the breeding season. An indigenous lizard management plan should be developed for the Project.

North Island Fernbird

7.11 I support Condition G34 (d)(x), which requires that the North Island fernbird population must not be adversely affected by construction and operation of the motorway. I recommend that this is extended to protection and restoration of the habitat for this species, including pest control to protect habitat.

7.12 Regarding Condition G38 (Ecological Monitoring), I recommend that the frequency of monitoring of wetlands, vegetation and fernbird populations during construction should be specified (e.g. seasonal), and compared to a baseline, to ensure that any adverse impacts are detected and addressed.

7.13 Regarding Condition G40, I recommend that there be independent peer review of the results of the monitoring of wetlands and the fernbird population, and of any effects.

7.14 Regarding Condition GD.7, I support the monitoring proposed for wetland hydrology. This should be designed to monitor changes and effects on wetlands from a baseline, coordinated with ecological monitoring. There should be a link between conditions requiring groundwater and ecological monitoring of wetlands. I recommend that hydrological and ecological monitoring should be increased to 5 years following construction of the proposed Expressway.

Legal Protection of Mitigation Areas

7.15 Regarding Condition G41, I consider that this condition needs to specify how these areas will be legally protected and covenanted in perpetuity. This is consistent with requirements for legal protection of mitigation areas in the conditions for the Transmission Gully Proposal (Condition NZTA.54). Minimising loss of other habitats not identified as being of 'high' value, such as the extensive areas of wetland rushland which lie within the footprint, should also be identified. These areas are providing important hydrological and habitat functions.

7.16 Regarding Condition G42 (Mitigation Area), I consider that the amount of indigenous revegetation proposed is inadequate in relation to the extent of the adverse effects on wetland and indigenous forest and shrubland ecosystem types, and needs to be at least double what is proposed. The mitigation proposed also needs to address potential further loss of other areas of indigenous vegetation due to earthworks and construction activities within the designation.

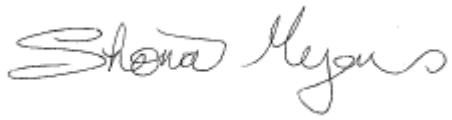
7.17 Condition G7 addresses mitigation for potential further loss of vegetation outside the Project area. I recommend that this should instead be addressed through taking a precautionary approach from the outset and, in identifying appropriate mitigation, address in conditions all areas which could potentially be affected.

8. CONCLUSION

8.1 The Project will have significant adverse effects on a number of wetlands and areas of indigenous vegetation on the Kapiti Coast. There is also the potential for significant hydrological impacts on wetlands within and adjacent to the Project footprint.

8.2 Mitigation for adverse effects on wetlands, streams and indigenous vegetation needs to reflect the ecological significance of these areas and the threatened nature of any remaining areas within the Foxton Ecological District, and needs to be increased significantly.

8.3 Mitigation planting and ecological restoration needs to be maintained and monitored to ensure the success of ecological outcomes. Long term monitoring of the hydrological impacts on wetlands is required as well as mitigation for any potential effects.



Shona Claire Myers
5 October 2012

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