Before the Fast-track Panel

Under:	Fast-track Approvals Act 2024
In the matter of:	FTAA-2603-1178 – Alternative to the Brynderwyn Hills Project (Brynderwyn Hills section)

Statement of advice:	Dr Timothy James Martin
	Terrestrial and wetland vegetation
	Independent consultant
	20 October 2026

Introduction

1. My full name is Timothy James Martin

Instruction

2. I have been requested to provide expert advice to the Director-General of Conservation (DOC/the Department) for the purposes of his comments on the Alternative to the Brynderwyn Hills Project (Brynderwyn Hills section) Fast-track application.

Qualification and Experience

3. I am an independent Environmental Consultant based in Whangarei. I hold the degrees of Bachelor of Science and a Master of Science with First Class Honours, both from the University of Auckland, where my studies were undertaken at the School of Biological Sciences and the School of Geography and Environmental Science. For my Masters research I studied the ecology of hutu, which is a rare native tree.

4. In 2007, I was awarded a PhD in Environmental Science by the University of Auckland. My PhD research focused on the effects of wind disturbance on New Zealand indigenous forests, which involved extensive field research throughout the North Island. I am an author of five scientific papers published on these and other topics in peer-reviewed national and international scientific journals. I have also presented aspects of my research at national and international scientific conferences.

5. I have 20 years of ecological consulting experience, working on projects throughout New Zealand, the Pacific, and South-East Asia. My work has covered a wide range of habitat types including forests, shrublands, grasslands and wetlands. I have worked on major roading projects throughout the North Island, including roles where I have assisted NZTA with ecological consenting, and providing advice to other stakeholders, such as district councils and the Department of Conservation.

6. I am familiar with the legislation and guidance documents relevant to this project, including the EIANZ guidelines for ecological impact assessment, wetland

delineation guidance, the National Policy Statement for Freshwater Management, and the Regional Policy Statement for Northland.

7. I have an excellent understanding of the project site, and the ecology of the wider area. Work that is especially relevant to this application includes:

   i. Co-author of the Natural Areas of the Waipu Ecological District report (2007[1]). For this project I surveyed and mapped ecological values and habitats between the Brynderwyn Hills and the northern end of the proposed road.

   ii. Co-author of the Natural Areas of the Rodney Ecological District (Northland Conservancy report (2012[2]).

   iii. Lead ecological advisor to NZTA for Mangamuka Gorge (SH1) slip rehabilitation (September 2023-Ongoing).

   iv. Lead ecological advisor to NZTA for the preparation of draft ecological impact assessments for the Otaki to North Levin motorway (2021).

   v. Advisor to New Plymouth District Council on ecological matters for the application for a designation to construct a new state highway at Mount Messenger.

   vi. Lead ecological advisor to Pacific Connect, a consortium bidding for the final design and construction of the Puhoi to Warkwork motorway.

   vii. Lead ecological advisor to the Department of Conservation for the consenting of the Manawatu Gorge bypass (SH3) (2019).

   viii. Development and application of a method to rank the ecological values of 304 wetlands across the Northland Region for the Northland Regional

[1] Lux, J, Martin, T, Beadel S. 2007. Natural Areas of the Waipu Ecological District. Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.

[2] Goldwater, N., Graham, P., Holland, W., Beadel, S., Martin, T, Myers, S. 2012. Natural Areas of the Rodney Ecological District (Northland Conservancy). Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.

Council, including identification of the top 10 wetlands in the Waipu Ecological District (2011).

ix. Lead ecologist for Northland Regional Council for monitoring vegetation change in the Kaimaumau-Motutangi Wetlands, Northland, 2021 and 2025.

x. Independent review for Northland Regional Council of wetland extent at a proposed subdivision on the Karikari Peninsula, including rapid, dominance and prevalence tests for wetland habitats (May 2026-Ongoing).

xi. Author of the assessment of ecological effects for air discharges from the Marsden Point Oil Refinery, Waipu Ecological District (2020).

xii. Co-author of a report for Northland Regional Council on wetland guidelines for the Northland Region, including wetland definitions and delineation (2012).

Code of conduct

8. Whilst it is acknowledged this is not an Environment Court Proceeding, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in the preparation of this advice. Unless I state otherwise, this advice is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of advice and expert opinion

9. My expert advice relates to the following:

i. Adequacy of the Applicant's assessment of indigenous vegetation, habitats, and flora within the terrestrial ecology and freshwater ecology (wetlands) assessments, including identification of any habitats and values that have not been assessed or have been poorly characterised.

ii. Adequacy of the Applicant's assessment of effects on terrestrial and wetland vegetation and habitats, with specific reference to any effects that are incomplete, understated, not addressed, or not documented.

iii. Adequacy of the Applicant's proposed mitigation, rehabilitation and management measures.

iv. Alternative mitigation or management approaches, where appropriate.

v. Adequacy of the proposed designation and resource consent conditions.

Material Considered

10. In preparing this advice I have reviewed the following documents as part of the substantive application:

a. Volume B Appendix D06 Assessment of Effects on Terrestrial Ecology 10722-PTA-2B0-PE-RPT-0011, Revison A, 2 April 2026.

b. Volume B Appendix D07 Assessment of Effects on Freshwater Ecology 10722-PTA-2B0-PE-RPT-0010, Revision A, 2 April 2026.

c. Volume B, Appendix D08 Assessment of Effects on Avifauna Ecology 10722-PTA-2B0-PE-RPT-0009, Revision A, 2 April 2026

d. Designation Conditions – 13 July 2026 (Vol B. Appendix E)

e. Resource Consent Conditions – 13 July 2026 (Vol. B. Appendix E)

f. Draft Ecological Management Plan Revision A (13 July 2026)

g. The statement of advice of Mr Goldwater for offsetting matters, and Dr McEwan for freshwater matters.

h. The NZTA ecological impact assessment guidelines[3]

i. The NZTA "State Highway Environmental Plan[4].

j. The National Policy Statement for Freshwater Management 2020, amended December 2025[5].

[3] https://nzta.govt.nz/assets/resources/ecological-impact-assessment-guidelines/Ecological-impact-assessment-guidelines.pdf

[4] https://www.nzta.govt.nz/assets/resources/environmental-plan/docs/environmental-plan.pdf

[5] https://environment.govt.nz/assets/publications/npsfm-2020-amended-december-2025.pdf?v=02a04bb9053b02aadf1c2f2035a658b4d02bd24c

11. My evidence also considers the following material provided by the Applicant, after the application was suspended on 11 August 2026:

    a. A2BH – Ecological effects mitigation table 28 August 2026

    b. Brynderwyn Hills Alternative Project – Indicative Compensation Approach dated 7 October 2026

    a. NZTA's Proposed Amendments to Mitigation Package Since Lodgement, 9 October 2026

12. I visited parts of the proposed project site on 26 June 2026. Survey was by a combination of 4WD and on foot, with a focus on assessing the accuracy of the vegetation types identified and mapped by the Applicant. Due to time and access constraints, the survey included the following areas, from north to south:

    i. Indigenous riparian forest alongside the Waihoihoi Stream visible from Glenmohr Road

    ii. Wetland 2 and a proposed diversion of the Waihoihoi Stream.

    iii. Wetlands 11-15 and 17-19.

    iv. Additional wetland habitat not identified by the Applicant in the vicinity of Wetlands 11-15 and 17-19.

    v. The proposed northern mitigation site.

    vi. An area of plantation forestry on the Brynderwyn Hills.

    vii. Additional wetland areas in pasture immediately to the south of where the alignment would cross the Piroa Stream.

    viii. The southern parts of the proposed wetland mitigation site (known as Q08-066).

    ix. The proposed southern mitigation site.

    x. A wetland in the upper arm of a gully system 300 metres north of Wetland 24.

    xi. Wetland 24.

Summary of key issues

13. The Applicant's assessment of habitats and their values is very difficult to follow due to a lack of documentation, including no provision of a map showing where the vegetation units are located, and no explanation of how ecological values were assigned for each habitat or vegetation unit.

14. Understanding the habitats present and their values is further hindered for wetlands by the highly unorthodox methods used to describe the vegetation types present. The wetland habitat assessment also only includes an assorted subset of the wetland habitats present within the designation corridor, omits from its assessment some indigenous wetlands within the proposed footprint, and classifies some areas of indigenous wetland vegetation as exotic vegetation. Of the wetlands omitted, eight are shown on maps reportedly used by the Applicant for their desktop assessment. Substantial rework of the Applicant's wetland assessment is needed for it to be fit for purpose; namely for the Panel to be able to rely on it to understand what the impacts of the project would be.

15. That said, some key issues with the assessments of ecological values can be identified. The assessment of effects first minimises values, at least for some habitat types, by not considering ecological context, not including rarity, not considering the flora and fauna habitat they provide, and taking a 'siloed approach' whereby values are assigned to vegetation types in isolation, rather than considering the values of a natural area as a whole (e.g. where a site includes several vegetation types occurring as a mosaic). No mention is made of the previously recognised natural areas, and their values, that occur throughout the designation. No assessment is provided for indigenous habitats that are present but not identified as present by the Applicant, and some mapping errors result in areas of indigenous vegetation being assessed as exotic vegetation. There is no assessment of effects for regionally Threatened or At Risk plant species, despite this being included in the methods, and these being recorded as present in the proposed designation.

16. The assessment of effects is also incomplete. The Applicant provides estimates, but does not provide a map, of where the expected habitat losses will occur for the

indicative alignment. This is the core basis for understanding the likely effects of the project on affected habitats (e.g. proportion of loss, edge effects, fragmentation) and understanding the likely quantum of the associated offsets needed. For example, in the NZTA Proposed Amendments to Mitigation Package Since Lodgement, 9 October 2026, a 1:1 loss to gain ratio is now proposed for "any secondary broadleaved, tree fern forest" but where these types will be lost is not mapped, the statement uses vegetation types not consistent with the effects assessment, and the likely quantum of the loss, for the indicative alignment, is not stated.

17. Whilst the Applicant states the ecological value for each ecological unit (e.g. V1_74, kahikatea forest, Very High), there is no corresponding assessment of effects for these units. Instead, all units of the same ecological value are aggregated, and a statement is made about the overall level of effects on habitats of the same ecological value. This is a highly irregular approach for two reasons. Firstly, the actual project impacts on vegetation of the same value range from low to very high (i.e. minor effects through to nearly complete removal) but these are all assessed as the same for each ecological value level (i.e. all effects on Moderate value habitats are assessed as Moderate). Secondly, project impacts will be greater when rare vegetation types are removed. Aggregation of rare vegetation types with more common types artificially reduces some of the most significant impacts of the project (e.g. the removal of rare indigenous forest on alluvium, including sites previously recognised as significant and as habitat for rare species).

18. The fundamental issues with aggregating habitat types based on values is further highlighted by the Applicant's amended mitigation package. The proposed effects assessment groups together disparate habitat types (e.g. kanuka forest on hillslope and tōtara forest on floodplain alluvium), proposes mitigation plantings at four sites, three of which are on hillslopes, and consequently assesses the overall mitigated level of effects being reduced from Moderate to Very High, to a lesser Low to High. The extent of floodplain forests to be protected (e.g. fencing of existing remnants) or restored (e.g. new floodplain forests resulting from plantings) is not stated. Based on its apparent restriction to kahikatea stands at

the northern end near Waipu (Ecological effects mitigation table 28-08-2026), compared to the larger extent of alluvial forests within the indicative alignment, the likely quantum of alluvial forest restoration that will eventuate is likely to be very inadequate. There is no quantification of how the proposal will address adverse effects for floodplain forests. Ecological interventions must be tailored to address the specific impacts to be incurred by the project.

19. The generous width of the proposed designation, and the typically poor state of forests and wetlands where livestock have access, presents ample opportunities to address the impacts of this project through habitat restoration. In many cases, this restoration could be straightforward and low cost, through fencing to exclude livestock from existing forests and wetlands, and some plantings, where needed. More interventionist approaches, such as earthworks to form wetlands, are unnecessary, more expensive, and of higher risk of failure, than restoring existing degraded habitats. Fencing to exclude livestock from a subset of the degraded wetlands present could offset wetland loss, with the quantum of these works being set by an offsetting model or agreed compensation ratios. A key change required for the Applicant's mitigation package is the inclusion of a mitigation site that encompasses floodplain habitats, and is of sufficient size to address the losses that will be incurred for this habitat type. Without this, the loss of rare floodplain habitats within the selected alignment cannot be addressed.

Terrestrial Ecology – Desktop Assessment of Existing Environment

Ecological context

20. The ecological value and significance of a site is informed by a site's context, both within the relevant ecological district (ED), the region, and nationally. Many of the areas of vegetation within the proposed designation form part of larger natural areas, the values of which are detailed in the associated protected natural area programme (PNAP) reports (e.g. for the Waipu ED, Otamatea ED[6], and Rodney ED). Ecological context, representativeness, and rarity of these areas are described in the PNAP reports and are also three of the four criteria for assessment of

[6] Lux, J., Beadel, S. 2006. Natural Areas of the Otamatea Ecological District. Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.

ecological values reportedly used by the author of the report for the Applicant (who I refer to throughout as the Applicant). The PNAP reports also note the presence of species that are locally uncommon, either in the ED, or Northland, and this is one of the required criteria for assessment of values of individual species (e.g. Table 2)

21. The desktop assessment methods state that PNAP data was used by the applicant (Section 2.2), but evidence that this information has been considered is lacking.

22. The assessment by the Applicant does not include an overview of the relevant ecological districts (e.g. ecological district boundaries, key vegetation types, and species and habitats of note, such as the rarity of forest on alluvium).

23. The terrestrial ecology assessment does not provide an account of previously identified natural areas within the proposed designation. Natural areas, including significant vegetation or significant habitat, that are within the proposed designation and identified in the natural area reports, include:

    a) State Highway 1 Forest Remnants (Q08/233) – representative forest type on alluvium, including a vegetation type not found elsewhere in ED. These remnants are typically dominated by kahikatea and or tōtara. The northern end of this series of remnants is located at the proposed Waipu interchange.

    b) Ahuroa River Forest Remnants (Q08/235) indigenous forest on alluvium, presence of manatu (regionally significant), representative for two forest types and the largest examples of these in the ED.

    c) Brynderwyn Hills Forest Complex (Q08/225a). Representative for nine ecological units. Part of this site is within the proposed alignment.

    d) Brynderwyn Hills Forest Complex (Q08/225b). Representative for five ecological units. Part of this site is within the proposed alignment.

    e) Brynderwyn Road Forest Remnants (Q08/067). Crossed by the proposed alignment and representative for totara-kahikatea forest.

    f) The eastern edge of the Wairau River Riparian Forest Remnants (Q08/173). Rare floodplain forest on alluvium, just within the western edge of the proposed designation.

g) Pukeareinga Scenic Reserve and surrounds (ROD001), vegetation on a regionally uncommon soil type, representative for 6 vegetation types, and presence of pied tit.

24. All of these areas are identified as Level 1 sites, as they are significant habitats. The Waipu and Otamatea PNAP report note the severe reduction of forest on alluvium in the relevant ED, and notes protection of these areas is a priority.

25. By not considering the detailed ecological information for each site provided in the natural area reports, the Applicant fails to consider information sources that are critical to this assessment.

Threatened Land Environments

26. The Threatened Land Environment Classification[7] combines three national databases – Land Environments New Zealand, the Land Cover Database, and the protected areas network, to map the landforms on which most indigenous vegetation has been cleared and or identify vegetation for which there is little legal protection. The mapping system includes the categories Acutely Threatened (<10% of indigenous cover left) and Chronically Threatened (10-20% of indigenous cover left).

27. This mapping provides excellent context for understanding the relative rarity of vegetation types within the proposed designation, and the potential impact of the project on these. Flat, warm, and fertile environments have indigenous ecosystems in a state of virtual extinction in eastern lowlands. Where a vegetation type has been severely reduced in extent, relatively poor-quality examples (e.g. grazed, with weeds) may still be the best or largest examples remaining in an ecological district (i.e. Representative), be of Moderate or High ecological value, and comprise significant indigenous habitats.

28. Most of the flat alluvial plains in the Waipu area are mapped as an Acutely Threatened Land Environment, with the ribbons of vegetation along major watercourses mostly classified as a Chronically Threatened Land Environment. All

[7] https://www.landcareresearch.co.nz/tools-and-resources/mapping/threatened-environment-classification

areas of vegetation within the proposed designation on the alluvial flats of Waipu fall into one of these two land environments.

29. The Applicant makes no mention of Threatened Land Environments. Whilst the inclusion of Threatened Land Environment data is not a requirement for an ecological impact assessment, its value for identifying threatened or rare vegetation types is clear. The EIANZ guidelines also point to the usefulness of Threatened Land Environment data for describing sites and considering ecological context (EIANZ p. 50).

30. The alternative approach, which is assessing ecological values based on the vegetation types and the landform on which they occur (e.g. alluvium versus hillslope) is also not pursued. For example, tōtara forest on alluvium and on the northern hillslopes of the Brynderwyn hills are both simply identified as "anthropic tōtara forest" without reference to the associated landform – which for this example is the critical missing factor for assessment of rarity. In this case the tōtara forest on alluvium is on an Acutely Threatened Land Environment (Category 1, <10% indigenous cover left, shown on Appendix E of the Assessment of Effects on Terrestrial Ecology, Sheet 1 of 10), and the tōtara forest on hillslopes is Category 5 (>30% left and 10-20% protected, Appendix E, Sheet 5 of 10).

31. Because of this oversight, the Applicant has undervalued vegetation types where these are associated with landforms with severe levels of historical loss (e.g. all vegetation on alluvial plains and/or on Acutely Threatened Land Environments). Other examples where omission of the associated landform has likely led to an incorrect and lower assessment of ecological values (Appendix F, Assessment of Effects on Terrestrial Ecology) include, but are not limited to:

    a) Remnant riparian podocarp-hardwood-kanuka treeland V1_63 (Ecological Value assessed as Low).

    b) Kahikatea treeland V1-69 (Ecological Value assessed as Moderate).

    c) Crack willow-exotic trees-remnant native trees/mixed exotic and native shrub V1_190, V4_109 (Ecological Value assessed as Low).

    d) Any other vegetation on riparian margins or floodplains that includes mature or remnant indigenous trees and is assessed as "Low" ecological value.

32. As there is no map that shows where each vegetation unit is located, fully understanding the effects of not considering landform for the values assessment is difficult.

Terrestrial Ecology – Methods

Scope of mapping

33. The terrestrial ecology assessment identified 35 vegetation types across the proposed designation. Which vegetation types were selected for mapping is not stated. However, based on Appendix E of the Assessment of Effects on Terrestrial Ecology (Vegetation Types Sheets 1-10) it appears that the Applicant has mapped larger contiguous areas of woody vegetation, and excluded from the mapping exercise:

    a) areas of non-woody vegetation (e.g. pasture, cropping, wetlands dominated by rushes, sedges, grasses and or herbs)

    b) houses and gardens

    c) shelterbelts

    d) some areas of treeland

    e) areas where trees have a low percentage cover and comprise either exotic or indigenous species

    f) smaller areas of crack willow on riparian margin

    g) other land uses (e.g. roads, quarries, ponds).

34. Whilst this approach may seem reasonable, it does come with some inherent issues. These include 1) the Applicant not being able to map the proportion of the project footprint with few or no ecological constraints (e.g. pasture, roads, cropping land), and 2) the questions it poses when aerial photography indicates possible habitats that may have been missed. For example, if a darker patch on low-lying land is scrub or wetland and has been missed by the assessment, or if it has been assessed, and the conclusion was that it was pasture or another vegetation type of little consequence.

Description and classification of vegetation and habitats

35. A key objective of any ecological assessment should be to clearly identify, map, and describe the terrestrial and wetland habitats present in the project area. This should be done and documented in a way that can be understood by people other than those that did the site survey work.

36. Standard methods for the description of habitats in New Zealand typically centre around describing the structure of the vegetation (e.g. forest, treeland, scrub) and then adding to this its composition (i.e. kahikatea forest)[8]. There are set definitions for vegetation structure, which allows for consistency between assessors, and provides a common language (e.g. for when woody vegetation is forest versus when it is treeland or scrub). The use of standard methods for vegetation descriptions greatly aids the review of these assessments by independent parties.

37. Whilst standard methods can vary, the common denominator is describing vegetation, whether it be forest, shrubland or grassland, by its 'canopy' – the uppermost layer of plants exposed to the sky. This approach ensures that, for example, forest with a canopy dominated by kahikatea, over a ground-tier layer of herbaceous plants, is classified as kahikatea forest, and not herbfield. If this same habitat type was classified as herbfield, that would be nonsensical, as the reader would assume that herbs and not trees are the dominant structure of the 'canopy'.

38. Mapping of vegetation types by these standard methods also lends itself well to large-scale mapping exercises using aerial photography and ground-truthing, as it is the upper most canopy layer that is visible using these methods.

39. The methodological approach taken by the Applicant's terrestrial ecology assessment was to classify vegetation using the structural and compositional methods described above, and as per Atkinson (1985). The vegetation was then classed as exotic or indigenous according to species proportions. This is a commendable approach, and in keeping with the expected ways vegetation is described and classified in New Zealand. Detailed habitat descriptions are then

[8]https://www.landcareresearch.co.nz/assets/researchpubs/Wiser_Hurst_Vegetation_Classification_2008.pdf

also provided by the Applicant in Appendix D of the Assessment of Effects on Terrestrial Ecology.

Threatened, At Risk, and locally uncommon flora

40. The project poses potentially significant risks to Threatened and At-Risk plants. The potential for adverse impacts on flora are heightened by the predicted extent of indigenous vegetation clearance (at least 39 ha), predicted loss of old-growth forests and riparian vegetation, and proposed clearance of natural areas known to support plants of conservation concern. Parts of the Brynderwyn Hills Forest Complex – Part A are known habitat for carmine rata (*Metrosideros carminea*, Nationally At Risk-Declining, Regionally At Risk-Naturally Uncommon), northern rata (*Metrosideros robusta*, Nationally and Regionally At Risk-Declining), and gully tree fern (*Alsophila cunninghamii* Regionally At Risk – Naturally Uncommon)[9].

41. The desktop review by the Applicant identified 10 Threatened or At-Risk species within the proposed designation, but this account excluded carmine rata, gully tree fern, and *Veronica macrocarpa* var *macrocarpa* (Regionally At Risk – Regionally Uncommon), which are recorded in the relevant natural area reports for the sites, and were all found by the Applicant during field surveys (Appendix G, Assessment of Effects on Terrestrial Ecology).

42. On this basis, it would be expected that an assessment of effects for indigenous flora for this project would include the methods and results of a targeted flora survey, including a specialist botanist and their level of experience, search locations and methods, and an account of survey effort[10]. NZTA notes the minimum level of experience for a specialist ecologist is five years, and that they are considered an expert by their peers[11]. The personnel for the botanical surveys are not stated so the suitability of the staff and the reliability of their work cannot be assessed. Botanical surveys also need to include appropriate search methods

[9] Lux, J, Martin, T, Beadel S. 2007. Natural Areas of the Waipu Ecological District. Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.

[10] For an example of this approach for an NZTA project refer to Otaki to North Levin Volume IV Appendix J.3 Threatened Plants.

[11] p 10 of https://nzta.govt.nz/assets/resources/ecological-impact-assessment-guidelines/Ecological-impact-assessment-guidelines.pdf

according to the habitats of the site and potential species present. Key issues with the flora assessment, and the robustness of the findings, are outlined below.

43. The only methods stated are that '*incidental observations of regionally or nationally Threatened or At Risk species'* (Section 2.3.1) were recorded, and that "*site walkovers confirmed the presence of ten species within the proposed designation*". "*Incidental observations*" may refer to species seen and recorded while ecologists on site were engaged in other tasks, such as vegetation mapping. Given that the Threatened or At Risk species present in the proposed designation include cryptic species, such as forest vines (carmine rata), and small ground-tier ferns (e.g. *Doodia mollis*), it is unclear to what extent these methods could have reliably located and quantified populations of Threatened or At Risk flora.

44. It is also unknown if any targeted searches were undertaken for Threatened or At Risk species not previously recorded in the proposed designation, but potentially present based on habitat requirements and species distributions. Some of these would require specific survey techniques and are very unlikely to be found without targeted surveys (e.g. scanning emergent canopy trees with binoculars). Potential species in this category include:

    a) Kohurangi (*Brachglottis kirkii* var *angustior,* an epiphyte, Regionally At Risk-Naturally Uncommon, recorded in the Brynderwyn Hills forest complex[12])
    b) Kirk's kōhūhū (*Pittosporum kirkii*, an epiphyte, Nationally At Risk-Declining, Regionally Threatened-Regionally Endangered)
    c) an epiphytic orchid (*Bulbophyllum tuberculatum,*, Nationally and Regionally At Risk – Naturally Uncommon)

45. The risk that flora of concern have been overlooked is accentuated by no reporting of survey locations, methods, or level of effort. These are critical reporting requirements for understanding the robustness of a survey. Survey effort was reported for other components of the project (e.g. densities of frogs per 100 m).

[12] Lux, J, Martin, T, Beadel S. 2007. Natural Areas of the Waipu Ecological District. Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.

Terrestrial Ecology - Assessment of ecological values

Vegetation and habitats

46. An assessment of effects for terrestrial ecology requires an overarching view that considers the full ecological values of a site (i.e. vegetation, habitats, flora, fauna), and the broader context of the site in its ecological district. This is what differentiates an ecological assessment, for example, from a botanical assessment (plant values only), or an assessment of avifauna values (bird values only). This is also the required approach when using the EIANZ framework, which is the method stated as used by the Applicant (e.g. Table 1, which includes habitat for Threatened, At Risk, or locally uncommon species, unusual species assemblages, ecological linkages for species). This would normally be undertaken by combining a vegetation-based assessment, with assessments for other flora and fauna of note (e.g. lizards, frogs, birds, threatened plants).

47. The terrestrial ecology assessment by the Applicant does include desktop and field surveys for lizards (3.2), frogs (3.3), bats (3.4), and invertebrates (3.5), and there is a separate assessment of effects for avifauna (Vol B Appendix D08). How, or even if, these fauna values feed into the assessment of ecological values cannot be determined due to the lack of detail provided.

48. The Applicant states that they used the method for assessment of ecological values provided by the EIANZ guidelines (Section 2 Assessment Methodology). This requires each site being assigned a value between Negligible and Very High for each of the following four criteria: representativeness, rarity/distinctiveness, diversity and pattern, and ecological context, whilst also considering flora and fauna values. An overall score for the ecological value for a site should then be derived from the scores for each of the four criteria (e.g. if an area rates as High for three or four of the criteria the overall score for the site is “Very High”).

49. To understand how the scores have been derived for each site, the Applicant therefore needs to provide the scores for each of the four criteria for each vegetation unit or site, with its corresponding justification, and then the overall ecological value. This is not the case - only the overall ecological value is reported

- and therefore whether the ecological values assigned are appropriate cannot be assessed. This lack of explanation is also at odds with NZTA ecological assessment guidance, that states that reports need to "clearly explain the reasons behind their assessments… so the non-expert can understand the reasons behind their assessment"[13].

50. The Applicant then only includes vegetation types of very High or High Value in the main text of the document in Table 13. Based on the methods provided by the Applicant, even Low value habitats can have a Moderate magnitude of effects (Table 4), so the omission of Moderate and Low value habitats from this table is highly unusual.

51. Additionally, the ecological values appear to have been assessed separately for each polygon of each vegetation type (e.g. kanuka forest), whereas some of the criteria require assessment at a site level (e.g. a forest remnant that includes two or more forest types). It is not clear how or if the Applicant has considered the criteria for diversity and pattern, or ecological context, when these aspects may be lost through a 'siloed approach' that only includes the assessment of single vegetation units.

52. Independent review of the Applicant's assessment of ecological values is also hampered by the lack of a map showing where each polygon of each vegetation type is located (e.g. the location of kanuka forest polygon V4-57 is unknown). Locations are needed to understand if a site comprised one vegetation type, or if it is part of a larger site comprising multiple vegetation types or ecological sequences. Some vegetation types in Table 13 can be located on maps (e.g. where a unit only occurs once, such as kahikatea-kauri-totara treeland, and where this is shown in the vegetation map – at Appendix E of the Assessment of Effects on Terrestrial Ecology). However, for vegetation types with two or more polygons in Appendix E (e.g. kanuka forest) the location of only a few of these can be reconstructed with certainty.

[13] p 13 https://nzta.govt.nz/assets/resources/ecological-impact-assessment-guidelines/Ecological-impact-assessment-guidelines.pdf

53. Due to this lack of detail, and the absence of a corresponding map, significant uncertainties remain for how ecological values have been assessed. Adding the codes to the vegetation maps would also be very helpful for understanding where these are. Examples include:

a) V1_63 (0.40 ha) Remnant Riparian podocarp-hardwood-kanuka treeland on the Ahuroa River was assessed by the Applicant as Low ecological value (Appendix O of the Assessment of Effects on Terrestrial Ecology: Vegetation Values Sheet 1 of 10). The indigenous vegetation is on a Chronically Threatened Land Environment and is part of the Level 1 site Ahuroa River Forest Remnants PNAP site (Q08/035). The site is representative in the ecological district for tōtara forest on alluvium. The vegetation (refer to Appendix 1: Plate 1 of this document) is very similar to the vegetation further south on the same river, that was assessed by the Applicant as Remnant Riparian podocarp-hardwood-kanuka treeland of High ecological value. It is possible that this error is a map typo, but it is also listed as Low ecological value in Appendix F of the Assessment of Effects on Terrestrial Ecology. As this vegetation unit is assessed in error as "Low" ecological value, it is then also excluded from the map of "Existing Indigenous Vegetation" in the Designation Conditions Appendix C.

b) Some areas of broadleaved scrub forest are assessed as Low (V2_24), some as Moderate (e.g. V2_23), and some as High ecological value (V2_27). No explanation for the differing values of these areas is provided.

c) Some areas of secondary kanuka forest are assessed as Very High ecological value (e.g. V1_231), and therefore higher than some areas of remnant riparian podocarp-hardwood-kanuka treeland (e.g. V1_63).

d) Kahikatea-kauri-totara treeland is assessed as Very High (same site as PNAP Q08/227). This same vegetation unit is assessed by the Applicant as only "Low" ecological value where it occurs in wetland habitat included in the wetland assessment.

e) It is not clear if the birds, lizards, land snails and other invertebrate species that are present or likely present, have been considered in the terrestrial

ecology values assessment, particularly for forest patches where no fauna surveys were undertaken.

54. By not considering the detailed ecological information for each site provided in the natural area reports, the Applicant also fails to consider the rarity and or representativeness of sites within their relevant ecological district. As these are key criteria for assessment of ecological values[14], the Applicant has likely underreported the ecological value of habitats throughout the designation.

Errors in the vegetation mapping

55. The Applicant has incorrectly mapped an area of indigenous riparian vegetation alongside the Waihoihoi River at Glenmohr Road as "Crack willow-exotic trees-remnant native trees/mixed exotic and native shrub" (Appendix 1, Figure 1). The Applicant describes this vegetation type as having "a canopy dominated by crack willow" (Appendix D, Assessment of Effects on Terrestrial Ecology).

56. This vegetation is on alluvium on an Acutely Threatened and Chronically Threatened Land Environment. A view of this area via Google Street view (Appendix 1 Plate 2) shows it to be more closely aligned with the Applicant's description of "*remnant riparian podocarp-hardwood-kanuka treeland"* (Appendix D, Assessment of Effects on Terrestrial Ecology) as the vegetation is on riverbanks, is dominated by mature titoki, totara, kanuka and nikau, and crack willow is not dominant. This vegetation type occurs on both sides of the road at this location. This habitat may be the unit coded by the Applicant as V4_118 (0.70 ha), in which case it has been assessed as of "Moderate" ecological value. The Applicant assessed this same vegetation type as being of "High" ecological value at other locations.

57. The detailed vegetation descriptions (Appendix D, Assessment of Effects on Terrestrial Ecology) described "*remnant riparian podocarp-hardwood-kanuka treeland*" as "the dominant riparian vegetation type along the Ahuroa and

[14] Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. 2018. Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

Waihoihoi River". It is mapped alongside the Ahuroa River (Appendix E: Sheet 2 of 10) but none of the map sheets for the Waihoihoi River include this type.

58. This error, and the resulting assessment of the value of this habitat as only Moderate and not High, would then alter the account of vegetation loss provided in Table 16 and Table 17 (Assessment of Effects on Terrestrial Ecology). As there is no map overlaying the labelled vegetation polygons and the proposed alignment, the significance of this error is uncertain.

Threatened, At Risk and locally uncommon flora

59. The Applicant's account of Threatened Flora (Section 3.1.3, Assessment of Effects on Terrestrial Ecology) states that it included species that are Threatened or At Risk, either nationally or regionally. However, the effects assessment then restricts its scope to species that are nationally Threatened or At Risk, omitting any reference to species that are regionally Threatened or At Risk[15], or Regionally Significant. This is at odds with both the EIANZ guidelines (Table 5), and the methods stated as used by the Applicant (Section 2.1), that purports to include species that are locally uncommon as being of Moderate value, and also notes that the presence of locally uncommon species can trigger the "rarity/distinctiveness" criterion for a site's ecological values assessment.

60. The desktop study referred to the Waipu PNAP report as being used as a data source. Where that PNAP report provides records of regionally significant species in the designation, these should be included in the Applicant's assessment. Presence of these species should also then be assessed in Table 17, but they are not.

61. Manatu (lowland ribbonwood, *Plagianthus regius*) is known to occur in the designation (e.g. Waipu ED PNAP site, Ahuroa River Remnants Q08/235) and was recorded as present by the Applicant (Appendix G, Assessment of Effects on Terrestrial Ecology), where it is listed as nationally Not Threatened. This species is Regionally Significant in Northland and based on the recent publication of regional

[15] Ford, M., Cameron, E., Champion, P., de Lange, P., Townsend, A., & Forester, L. (2026). Conservation status of indigenous vascular plants in Taitokerau / Northland 2026. Northland Regional Council.

threat rankings for Northland flora[16], is also Regionally At Risk-Declining; it is locally uncommon, with small, scattered populations occurring on river floodplains on alluvium. This species should be included in an expanded Table 8 that includes regionally threatened, at risk, or significant species, and locally uncommon species. The assessment does not note where manatu was found, or what the impacts of the project will be on it. However, based on iNaturalist records made by the Applicant's survey team, manatu is present:

a) On the southern edge of the kahikatea treeland to the east of SH1 at Waipu 24 September 2025, iNaturalist 319049080, username: naturewu)

b) In forest alongside the Ahuroa River (18 September 2025, iNaturalist 314744720, username: naturewu).

62. *Coprosma rigida* is listed as Regionally Significant in Northland, and Regionally At Risk-Declining. The Waipu ED PNAP report records it within the proposed designation in the southernmost of the Q08/233 forest remnants. This natural area corresponds with the Applicant's "tōtara forest/native broadleaf scrub" of Moderate ecological value at this same location. This species was found by the Applicant (Appendix G, Assessment of Effects on Terrestrial Ecology) but no location was recorded, and it was not recognised as a species of note or assessed further. This species should be included in the impacts assessment for flora provided in Table 8, especially considering that a forest remnant in which it is found will be almost entirely removed. Based on iNaturalist records made by the Applicant's survey team, *Coprosma rigida* was found:

a) In forest alongside the Ahuroa River (20 October 2025, iNaturalist 321997899, username: naturewu).

b) At a second location in the same area (18 September 2025, iNaturalist 314713370, username: naturewu).

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63. Gully tree fern (*Alsophila cunninghamii*) was recorded within the designation by the Applicant (Appendix G, Assessment of Effects on Terrestrial Ecology) but its location is not given. This species is Regionally At Risk – Naturally Uncommon.

64. Other species recorded as present by the Applicant, which are regionally significant or Regionally Threatened or At Risk, but without consideration in the values or impact assessments, include:

    a) *Coprosma propinqua* (Regionally Significant, Regionally At Risk-Declining) in the SH1 Kahikatea remnants (24 September 2025, iNaturalist 319048365, not included in list of flora at Appendix G, Assessment of Effects on Terrestrial Ecology)

    b) *Passiflora tetandra* (Regionally At Risk-Declining) (Appendix G, Assessment of Effects on Terrestrial Ecology)

    c) *Veronica macrocarpa* var. *macrocarpa* (Regionally At Risk – Regionally Uncommon) (Appendix G, Assessment of Effects on Terrestrial Ecology)

    d) *Sophora microphylla* (Regionally At Risk – Declining) (Appendix G, Assessment of Effects on Terrestrial Ecology).

65. Additional areas of indigenous vegetation would likely be assessed as Moderate or High, and not Low, when 1) mapping errors have been addressed by the Applicant, 2) the assessment utilises desktop sources of information relating to ecological values and significance, 3) regionally threatened or at risk flora are considered, and 4) when a detailed account of how assessment criteria were applied to each vegetation type has been provided.

66. Understanding the differential values of indigenous vegetation is an important consideration for the development of a corresponding effects management strategy, where these types will be lost or impacted.

Terrestrial Ecology - Assessment of ecological significance

67. The EIANZ guidelines note that "*criteria for identification of areas of ecological significance or value*" are one of the "*key matters that ecologists should check in undertaking an ECIA*" (p. 21). Where an assessment of significance has not already been done, the applicant "*must determine whether the ecosystem*

components within a project site make all or part of the area significant" (p. 49). This information then provides guidance on the "*appropriate use, protection, or maintenance of these areas*" (p. 49).

68. The EIANZ guidelines note that for sites that have already been identified as significant, that there will likely be information for a site that is useful for assessment of ecological impacts[17]. The NZTA Environmental Plan also seeks to ensure that "adverse effects do not occur or are appropriately managed, Transit aims to protect significant ecological resources"[18]. It would therefore be expected that the Applicant would make use of previous significance assessments, and the data that contributed to these. This has not been the case.

69. The Applicant also does not provide any assessment of the significance of the vegetation and habitats. This is relevant as there are habitats within the designation that have previously been assessed as significant, are proposed for removal, and for which no mitigation is proposed.

70. The Northland Regional Policy Statement (Northland RPS) provides criteria for assessment of ecological significance. The four criteria (provided in the Appendix 5 to the RPS) are similar to the criteria for assessment of ecological values in the EIANZ guidelines, and are as follows:

    1 - Representativeness

    2 - Rarity/Distinctiveness

    3 - Diversity and pattern

    4 - Ecological context.

71. Using these RPS criteria, a natural area is significant if it meets one or more of the four criteria.

72. Criterion 2 (a)(i) of the Northland RPS includes all indigenous vegetation on Acutely or Chronically Threatened Land Environments associated with Land Environments of New Zealand Level 4; 2 (a) (iii) includes all swamps greater than

[17] https://www.eianz.org/document/item/4447 p. 54.

[18] p. 56 https://www.nzta.govt.nz/assets/resources/environmental-plan/docs/environmental-plan.pdf

0.4 hectares; and 2 (b) includes habitats for taxa that are threatened, at risk, or uncommon either nationally or at the relevant ecological scale.

73. These Northland RPS criteria are also similar to the criteria for assessment of ecological significance used in the Department of Conservation ecological district reports, which also include representativeness (Criterion 3), diversity of habitat types (Criterion 4), rarity and special features (Criteria 1 and 2), and ecological context (Criterion 5).

74. In essence, there are strong similarities between ecological value assessments in the EIANZ guidelines, and the relevant criteria sets for assessment of ecological significance in the Northland Region.

75. In the absence of an assessment of significance by the Applicant, an independent assessment could normally be undertaken – using the information provided in the assessments. However, a complete assessment of significance is not possible, primarily due to the absence of a map showing where the vegetation units are located.

76. Where the location of habitats could be reliably reconstructed using information provided in the Application (e.g. where only one polygon of a vegetation type occurred in the proposed designation, or the area of a habitat could be measured and then matched to the Applicant's data), an independent assessment of ecological significance was completed for this review. This is presented in Table 1 below.

Table 1. Assessment of ecological significance where the location and significance of habitats could be reliably assessed based on information in the Application.

Vegetation Type (Assessment of Effects on Terrestrial Ecology)	**Vegetation Type (this review, if different)**	**Ecological value assigned by Applicant**	**NRPS Criteria likely met, source (if relevant)**	**Significance**
Kahikateatreeland/native exotic scrub/ranked grassland (polygons both	n/a	Moderate to High	2 (a) (i)	Significant

Vegetation Type (Assessment of Effects on Terrestrial Ecology)	Vegetation Type (this review, if different)	Ecological value assigned by Applicant	NRPS Criteria likely met, source (if relevant)	Significance
sides of SH1 at Waipu)				
Remnant riparian podocarp-hardwood-kanuka treeland (Ahuroa River)	n/a	High	1 (a), 1 b) 2 (a) (i), 2 (b) 4 (a) (b) (Lux and Martin 2007)	Significant
Kahikatea forest (V1 74, 0.44 ha, V1 84 0.57 ha)	n/a	Very High	1 (a) 2 (a) (i) (Lux and Martin 2007)	Significant
Anthropic tōtara forest	n/a	Low	1 (a), 1 (b) 2 (a) (i), 2 (b) 4 (a) (b) (Lux and Martin 2007)	Significant
Kahikatea-pukatea forest V1 144 (2.54 ha)	n/a	Very High	1 (a), 1 (b) 2 (a) (i), 2 (b) 4 (a) (b) (Lux and Martin 2007)	Significant
Crack willow-exotic trees-remnant native trees/mixed exotic and native shrub (V4-118, 0.70 ha)	Remnant riparian podocarp-hardwood-kanuka treeland	Moderate	2 (a) (i) 4 (a) (b)	Significant
Totara forest/native broadleaved scrub (V1_152, 0.78 ha)	Kahikatea-kanuka forest (Lux and Martin 2007)	Moderate	1 (b) 2 (a) (i) 2 (b)	Significant

Vegetation Type (Assessment of Effects on Terrestrial Ecology)	Vegetation Type (this review, if different)	Ecological value assigned by Applicant	NRPS Criteria likely met, source (if relevant)	Significance
Totara forest/native broadleaved scrub (V1_175, 1.46 ha)	n/a	High	2 (a) (i)	Significant
Kohekohe-taraire-podocarp-broadleaf (V2_35 17.06 ha, V2_39 19.21 ha)	n/a	Very High	1 (a) (b) 2 (b) (c) 3 (a) 4 (a) (b)	Significant
Totara forest-native broadleaved scrub (Chainage 23150)	Wairau River Riparian Forest Remnants Q08/173 (Lux and Beadel 2006)	Low	1 (a) 2 (a) (i)	Significant

Terrestrial Ecology - Assessment of Effects

General approach

77. Effectively, an assessment of ecological effects cannot be arrived at without first identifying and mapping what habitats are present and where, what the values of those habitats are, what proportion of each habitat type is affected (e.g. percentage of a forest stand or vegetation type to be lost), and wha the level of effect is for each vegetation and/or habitat type. A detailed and robust assessment of ecological effects, that is commensurate with the associated risks and impacts, would usually be expected to be provided for a project of the scale and complexity of the Northern Corridor. This has not been achieved by the Applicant.

Mapping as a tool for effects assessments

78. The assessment of effects for terrestrial habitats does not include a map of habitats that is then overlaid with the proposed project footprint. This would be the usual and expected way to document where habitats of note will likely be

impacted, and to assess the magnitude of those impacts (i.e., partial versus complete removal of habitat areas). This mapping exercise must have been done in order to prepare Table 16 (Assessment of Effects on Terrestrial Ecology), which provides the predicted area of loss for each vegetation type within the designation. But this mapping has not been presented.

79. By not providing this map, it is not known:

    a) If the Applicant has correctly assessed the predicted habitat loss (i.e. locations, habitat types, and extents).

    b) How or if the Applicant has considered the proportion of loss for each habitat type in the assessment of effects.

    c) If the predicted losses include losses for the construction envelope, as opposed to only the footprint of the road surface and berms. This could feasibly add an additional 20 m (linear distance) of loss to the width of proposed alignment.

    d) How the project might adapt, or how the impacts might differ, if the constructed alignment differs from the indicative alignment.

80. It is also not known if the estimated habitat loss includes the footprint of stormwater treatment ponds. These are not shown on any of the EcIA maps and could cumulatively cover a large area (i.e. hectares or tens of hectares) for a road of this length. For example, the Assessment of Effects on Freshwater Ecology shows cut and fill extents for the indicative alignment (Appendix A) but none of the associated infrastructure (e.g. stormwater ponds, construction roads). Due to topographical constraints the footprint of stormwater ponds will typically be in gullies where there is steeper land and ecological features such as wetlands and riparian vegetation.

<u>Lack of an assessment of effects for vegetation types</u>

81. The EIANZ guidance notes that matrices are useful for summarising assessments, but "matrices alone are insufficient, and must always be used in conjunction with thorough discussion to show how scores have been allocated" (p. 76). This level of detail has not been presented by the Applicant.

82. In Section 4.3.1of Assessment of Effects on Terrestrial Ecology, the Applicant estimates the overall extent of loss for indigenous dominant vegetation for the

project (39 ha) but this lacks context, as the proportion of the total extent of indigenous vegetation that this loss comprises is not stated. Effects are at least partly based on the proportion of habitat affected.

83. The proportion of loss for individual vegetation types (e.g. as a proportion of these types in the designation) is also not included in Table 16 or 17. Table 16 states the extent of loss (e.g. 10.4 hectares of kanuka forest) but omits the proportion that this loss comprises (e.g. 10.4 ha of kanuka forest is what percentage of kanuka forest locally or in the proposed designation?). Table 17 also states the level of effect of vegetation removal based only on the extent of clearance, without considering the proportion of habitat to be removed.

84. Thus the effects assessment for indigenous vegetation contrasts with the Applicant's approach for effects on flora (Table 17), and lizards (Table 18) where there is some attempt to justify unmitigated levels of effect based on proportion affected (e.g. for copper skinks "a larger portion of suitable habitat will be affected").

85. Essentially, Section 4.3.1 serves only as a summary of the effects assessment for vegetation types (i.e. the key findings), but there is no supporting assessment that shows how these conclusions were reached.

<u>Aggregation of vegetation types by value</u>

86. The EIANZ guidance warns that "combining values should be done in a way that avoids suppressing project impacts on individual features or components" (p. 69). The Application's approach to effects assessment exemplifies this pitfall.

87. The effects assessment first groups all the vegetation types according to their ecological value (e.g. Low, Moderate or High) (Table 17), then states what the unmitigated level of effect is for each 'ecological value level' across the entire designation. For example, the Applicant states there is a Moderate level of unmitigated effect for all the vegetation types assessed as 'Moderate' value, based on 4 ha of direct loss. Similarly, the Applicant states there is a Low level of unmitigated effects for all vegetation types assessed as Low or Negligible ecological value. This is a highly unusual and irregular assessment method.

88. By taking this approach, the loss of a vegetation type or feature, as a proportion of the extent of that ecological habitat type or feature in the proposed designation, is concealed. It is unknown if or how the Applicant has assessed the unmitigated levels of effects for each of the affected vegetation types.

89. This unusual approach also poses questions. Using habitats of Moderate ecological value as the example:

    a. What proportion of loss does this 4 ha of Moderate value vegetation comprise – is it 4 ha of 4 ha, 8 ha, or 10 ha? This is not stated in section 4.31 or Table 17.

    b. How the Applicant has assessed all unmitigated effects on vegetation assessed as Moderate as being at a level of Moderate or lower, regardless of the proportion of the vegetation type affected?

    c. Are any areas of a Moderate value vegetation type uncommon in the local landscape, with consequently the loss of these more appropriately being assessed as a High or Very High level of unmitigated effect (e.g. any areas of alluvial forest assessed as Moderate ecological value)?

90. These questions were further explored using a small subset of vegetation types for which their locations could be reconstructed based on the information provided.

91. The polygon of totara forest/broadleaved scrub labelled V1_152 could be located without a map of habitat loss, as it is the only area of this vegetation type of Moderate Ecological Value with an area of c. 0.78 ha (Appendix 1: Figure 2). The impacts of the project on this forest demonstrate the issues with assessing impacts on an aggregated basis. Almost all of this forest remnant will be removed as the indicative alignment passes through the middle of it (Appendix 1: Figure 3), but the effects of the project on this forest remnant have only been assessed by the Applicant as Moderate. In the EIANZ guidance (p. 83), Moderate corresponds with a partial change in baseline conditions and "*the loss of a moderate proportion… of a feature*". If the impacts of the project were assessed separately for this forest remnant, which I consider they should be, the appropriate magnitude of effect would be Very High, corresponding to a major alteration of baseline conditions, and the loss of a "very high proportion" of the feature. This would make the overall level of effect High in accordance with the EIANZ guidance (Table 10), if the remnant is of only Moderate ecological value. It should be noted

however that this forest remnant is assessed as Significant, as it is habitat for an At Risk plant species (refer to Table 1above) and is indigenous vegetation on alluvium that is an Acutely Threatened Land Environment.

92. A similar scenario occurs for kahikatea treeland (0.12 ha at Chainage 23,100). This kahikatea stand has been assessed by the Applicant as Moderate ecological value (Assessment of Effects on Terrestrial Ecology, Appendix O: Vegetation Values Sheet 9 of 10). This treeland is indigenous floodplain vegetation on a Chronically Threatened Land Environment. It is entirely within the footprint of the indicative alignment so is indicatively proposed to be completely removed, but the level of effects on this feature, due to aggregation, have only been assessed as Moderate.

93. It is highly likely that aggregating sites by values, prior to assessment of impacts, has concealed other impacts throughout the proposed designation that have been assessed as Moderate or lower, that should have been assessed as High or Very High. However, these could not be assessed as the impacts on each feature are not provided in table form by the Applicant, and neither are they provided as a map in the Assessment of Effects on Terrestrial Ecology (i.e. a spatial overlay of the indicative alignment and the affected vegetation types).

94. This grouping together of vegetation types, and the lack of supporting documentation, means the assessment falls well short of what is required, and conceals high levels of impacts for some of the vegetation types present.

95. This approach also then results in key information gaps that hamper the development of meaningful mitigation and compensation approaches. For example, nowhere is it stated what the total predicted loss is for indigenous forest on alluvium. Based on an overlay of the indicative alignment with aerial imagery, which is provided in the Assessment of Effects on Freshwater Ecology (Appendix C), the likely minimum extent of loss for alluvial forests on the Waipu plains, in addition to any losses of kahikatea at the northern end, is at least three hectares (Appendix 1, Figure 4). This is based on my estimates of alluvial forest loss, from north to south, of 0.59 ha for Chainage 10,400 to 10, 600, 0.88 ha at Chainage 11,100 to 11,200, 0.77 ha at Chainage 11,300 to 11,450, and 0.98 ha at Chainage 12,800-12920.

Indirect effects

96. In Section 4.3.1 of the Assessment of Effects on Terrestrial Ecology there is no attempt by the Applicant to quantify indirect effects (e.g. new edge effects, fragmentation) on vegetation, and in particular forest vegetation. For linear infrastructure projects these can often be of a similar extent, though of lesser magnitude, to the areas of direct loss (i.e. vegetation clearance). A table similar to Table 16 should be included to quantify edge effects where these are relevant (e.g. new edge effects and a reduction in core area for areas such as the mature forest by the Piroa Stream). Indirect effects can then be also considered for the mitigation package.

97. For sites that are already small and fragmented (e.g. many small areas of forest or treeland in pasture), partial removal will further decrease the viability of these areas, and their potential for restoration. These fragmentation effects will be greater for habitat patches that become separated due to the alignment. Any such areas where tree cover is currently sufficient to suppress grasses, and have understorey vegetation, are likely to have edge and fragmentation effects of Moderate or higher. Whilst increasing the length of the assessment, a table that assesses these effects for each affected habitat area would make the assessment less generic, and more robust. For example, it may be that the loss of 90% of a small remnant of forest within pasture (e.g. at Chainage 11,300-11,450) should be taken as also triggering the eventual loss of the 10% that remains – as no mitigation actions are proposed for this site.

98. For assessing the level of indirect effects identified by the Applicant, these are first grouped as '*habitat fragmentation and edge effects*" and then once combined, assessed as having a Very High level of unmitigated effect. Whilst this is an appropriate assessment of the significance of this impact, it should be noted that edge effects and fragmentation can operate differently across sites and consequently may differ for what is the best mitigation approach.

Threatened, At Risk, and locally uncommon flora

99. The Applicant notes the permanent loss of nationally Threatened and At Risk plants but, in its effects assessment, omits the loss of all regionally threatened, at

risk, significant, or locally uncommon plant species – all of which are assessment criteria for the EIANZ framework.

100. To provide a meaningful assessment of project impacts on flora, the Applicant would first need to revise its assessment to include Regionally Significant, Regionally Threatened, Regionally At Risk, and locally uncommon species in its desktop and field survey methods, and demonstrate that targeted field surveys were staffed by a suitably experienced botanist. These surveys would include reporting on survey locations and search effort, and present population data to support claims regarding the percentage of the populations affected. The Applicant should also include all species of concern found during the field assessments in the assessment of effects. The omission of species that are regionally significant and or threatened is of particular concern, considering that some of these were recorded by the Applicant in the field.

101. No population data is provided for any of the species of concern. Because of this gap, there is no evidence supporting the Applicant's claim that only a small proportion of the population of each species will be lost. To support their conclusions, the Applicant should also note if any of these species were seen within the proposed designation but beyond the indicative alignment, as these are the ones likely to be retained.

<u>The threshold of effects that require management</u>

102. The EIANZ guidance, and standard practice in New Zealand more generally, states that "Very High" adverse effects are likely to be unacceptable, and best dealt with through avoidance, and effects that are High or Moderate should be "managed through avoidance, design, or offset or compensation actions" (EIANZ p. 84).

103. This may not be the approach taken by the Applicant, as there are conflicting accounts for whether Moderate levels of effects are addressed. Unless the text in Table 17 of the Assessment of Effects on Terrestrial Ecology that is bolded or not bolded has a typo, the Applicant only proposes mitigation for unmitigated levels of effects that are High or Very High. Consequently, no mitigation is proposed in Table 17 for the direct loss of 4 hectares of vegetation assessed by the Applicant

as of “Moderate” Ecological Value with a Moderate level of effect. The Applicant provides no explanation for this departure from the EIANZ guidance.

104. Not including mitigation for Moderate levels of effects in Table 17 also appears to conflict with Section 5 and Table 23 of the Assessment of Effects on Terrestrial Ecology, where mitigation is proposed for the loss of 29 hectares of habitat where effects are assessed as Moderate or higher. In Section 6, post-mitigation effects that are Moderate or higher are then stated as warranting offsetting or compensation.

105. If Table 17 is correct, and the Applicant has dismissed Moderate levels of effects on habitats of Moderate ecological value, the project would include no mitigation or other management interventions for the loss of a wide range of indigenous vegetation types that combined cover 4 hectares. Noting there is no map showing where the losses occur, and the extent of those losses, examples of these unmitigated effects could include some of the following (sourced from Assessment of Effects for Terrestrial Ecology, Appendix F):

    a) Kahikatea treeland (0.08 ha, 0.07 ha, 0.07 ha, 0.26 ha, 0.12 ha, 0.17 ha, all assessed as Moderate in Appendix F), especially any of these are on Acutely or Chronically Threatened Land Environments (e.g. the 0.12 ha to be entirely removed at Chainage 23,100), and or mapped as significant in the natural areas report for the Waipu Ecological District (e.g. Site Q08/233). It should be noted that areas of kahikatea treeland assessed as “Moderate” ecological value are not included in the proposed “avoid areas” (Designation Conditions Appendix A).

    b) Kohekohe-taraire-tawa-podocarp/broadleaf assessed as Moderate (e.g. V2_22, 0.13 ha)

    c) Anthropic tōtara forest assessed as Low (e.g. V3_53, 0.91 ha) or Moderate

    d) Tōtara forest/native broadleaf scrub assessed as Moderate (e.g. V1_176, 0.59 ha)

    e) Broadleaf species scrub forest assessed as Moderate (e.g. V2_12, 5.14 ha, V2_19 2.66 ha)

    f) Crack willow-exotic trees-remnant native trees/mixed exotic and native shrub (V4_118 0.70 ha)

106. Of these, the most concerning examples are where kahikatea treeland on alluvium does not meet the Applicant's threshold in Table 17 for when mitigation is warranted – because all vegetation types assessed by the Applicant as Moderate value, regardless of the scale of loss, are assessed as having a Low level of unmitigated effects. Some of these areas of "Moderate" value kahikatea treeland have been assessed as significant indigenous vegetation, are part of natural areas mapped in the Waipu Ecological District and are a rare vegetation type occurring on an Acutely Threatened Land Environment. Applying the EIANZ thresholds, the loss of this vegetation would trigger the need for mitigation.

107. Additionally, it should be noted that the Applicant's assessment of kahikatea treeland on alluvium as being only of Moderate ecological value, does not recognise the rarity of this habitat type. An assessment of this habitat as High ecological value would be more appropriate and would result in this habitat having an unmitigated level of effect of High or Very High.

108. None of the documents provided post-lodgement address the errors or information gaps for habitat identification, habitat descriptions, or ecological values described above. Neither does the material provide maps that document where the vegetation units are found, or where the predicted losses will occur.

109. Comparing the mitigation proposed in the effects assessment, described above, and the proposed amendments to the mitigation package, is difficult. No maps are provided, in the effects assessment or the amendments to the mitigation package, of where the vegetation units occur in relation to the indicative alignment. The assessment of terrestrial effects refers to vegetation codes (e.g. kahikatea treeland V3_73) whereas the proposed amendments to the mitigation package refer to broader vegetation types that occur across the wider designation (e.g. kahikatea dominant forest). It is unclear for example, whether 'kahikatea dominant forest' also includes 'kahikatea treeland', or if lower density kahikatea treeland is excluded from the proposed mitigation package.

110. The lack of any maps showing vegetation loss also hampers the design of an appropriate effects management strategy (e.g. where indigenous vegetation, that might be in a poor state, will likely be retained and is therefore a possible site for mitigation works or implementation of a restoration offset).

111. Consistent use of terminology across the project documents, with accompanying maps, would be needed to provide meaningful commentary on the threshold of effects proposed to be addressed by the Applicant.

Terrestrial ecology – Mitigation

Adherence to the mitigation hierarchy

112. Given the high magnitude of loss for terrestrial indigenous vegetation (39 ha, Assessment of Effects on Terrestrial Ecology 4.3.1), the Applicant will need to carefully demonstrate the proposal's adherence to the mitigation hierarchy (i.e using the EIANZ guidance[19] that Very High adverse effects are preferably managed through avoidance, and High and Moderate adverse effects through avoidance, design, or if needed, latter steps in the hierarchy p. 84) This indigenous habitat loss includes old-growth forest on the Brynderwyn Hills, which is also significant fauna habitat, and rare alluvial forest remnants near Waipu.

113. Attempts by the Applicant to avoid and or minimise ecological impacts on high value habitats have not been adequately documented. The assessment should include an account of this, including where this was sought, where additional avoidance or minimisation was gained, and where was this not possible due to other constraints.

114. In particular, the Applicant should provide a summary of the design process for where the road crosses the "Very High" value "kohekohe-taraire-podocarp-broadleaf forest" by the Piroa Stream. This should cover the consideration of a viaduct, and the potential use of retaining to reduce forest loss due to toes of embankments. This account should also detail any wildlife crossing measures to reduce fragmentation effects, considering the road crosses perpendicular to a larger forest tract with very high fauna values (e.g. inclusion of oversized box culverts with freshwater and terrestrial zones).

[19] https://www.eianz.org/document/item/4447

115. The Applicant should document any proposed spoil sites that have or could be removed from the project due to impacts on natural inland wetlands and other habitats with High or Very High ecological values.

Aggregation of vegetation types and effects management for alluvial forests

116. The NZTA ecological assessment guidance states that an EcIA must clearly show the linkages between affected values, impacts, and how effects are addressed[20].

117. A core issue with aggregating all vegetation types of the same values together for a mitigation package (eg in Table 23, Table 24), is that some impacts for rare vegetation types may not be adequately addressed by a broader mitigation package, which are aimed at restoring forests more generally. This is the case for this assessment.

118. Three of the proposed mitigation sites are on hill country, with a fourth site, not mapped and of unknown extent, including the existing kahikatea stands at Waipu, and adjacent land where plantings will be undertaken to link these stands (Ecological Effects Mitigation Table 28-08-2026). This fourth site is the only mitigation specifically proposed for the loss of or impacts to rare forest types on alluvium, which can only be restored on alluvial surfaces As both the predicted extent of alluvial forest loss, and the proposed area of alluvial forest restoration, are not stated by the Applicant, the rationale for reducing the level of mitigated effects for any forest on alluvium from 'Very High' to 'High' is poorly documented.

119. The effects assessment needs to update the account of Vegetation Loss provided in Table 16 and 17 (to account for areas now identified as "Avoid Areas"), and quantify the extent of alluvial indigenous vegetation loss, including correction of errors in vegetation types described earlier in this statement, and overlaying all vegetation types on soil maps to identify those on alluvial deposits.

120. The predicted extent of alluvial forest to be lost, including the 3.22 hectares shown in Appendix 1: Figure 4, can then be compared with the proposed extent of alluvial forest restoration. This needs to be separated from mitigation via hillslope

[20] p 47. https://nzta.govt.nz/assets/resources/ecological-impact-assessment-guidelines/Ecological-impact-assessment-guidelines.pdf

plantings, and have the same rigour applied to the calculation of appropriate ratios (i.e. use of a BOAM). This will also be required to ensure offsetting is "like for like with the ecosystems lost of kahikatea forest", as stated in the proposed amendments to the mitigation package.

121. The package also needs to consider the additional species that trigger "like for like" offsetting, which is presently limited to three species: kahikatea, kauri, and pūriri (proposed amendments to mitigation package). Areas of forest to be lost are locally dominated by other species such as rimu and tanekaha and should be included in the "like for like" approach.

122. Care also needs to be taken to ensure that tōtara forest on alluvium is also recognised as an important forest type. Where this forest type is on alluvium, and is to be lost, it also justifies inclusion in mitigation plantings that will be 'like for like' (proposed amendments to mitigation package). These plantings can recognise that tōtara has artificially increased dominance where forests have developed under a grazing regime but still ensure tōtara are a key component of alluvial plantings.

123. Conversely, trading up for the loss of tōtara forest on hillslopes, for example by planting more diverse podocarp-broadleaved mixes, is appropriate for restoration plantings.

124. Despite the relatively small extent of these alluvial forest types, they do justify separate attention by the Applicant, much in the same way frogs are dealt with separately to lizards, rather than being addressed as "fauna". The width of the proposed designation across the alluvial plains where these losses will occur provides many opportunities to undertake forest restoration activities to address these impacts (e.g. alongside the Ahuroa River, and in the Wairau catchment).

<u>"Mitigation plantings" to address forest loss</u>

125. In the proposed amendments to the mitigation package, it includes a requirement to "offset the loss of certain forest and plant species, including at a 1:1 loss to gain ratio – any secondary broadleaved, tree fern forest" and "at a 1:3 loss to gain ratio – kahikatea dominant forest, kauri dominant forest, tōtara dominant forest, mature kanuka forest with secondary totara and other podocarps, and puriri

dominant forest". This contrasts with Designation Condition D27 (b) that restricted mitigation plantings to a ratio of 1:1, and only for habitats of High or Very High value mapped as "Existing Indigenous Vegetation" (Designation Conditions Appendix C).

126. The vegetation to which the 1:1 ratio now applies is not known. No quantum is given, and "secondary broadleaved, tree fern forest" is or are not vegetation types recorded by the Applicant as present in the designation (Assessment of Effects on Terrestrial Ecology Appendix F).

127. Neither is it clear in the amendments to the mitigation package if all indigenous vegetation is allocated a ratio of 1:1 or 1:3, or if these ratios only apply to a subset of the habitats affected.

128. The "ecological effects mitigation table 28 August 2026" proposes the 1:3 ratio for "moderate to high value areas" that comprise six forest types - dominated by kahikatea, puriri, kauri, tōtara, and or kanuka. Thus, the wording is similar to the amended mitigation package, but the terminology excludes very high value areas, and also forest types, sometimes of Moderate to High value, dominated by the species other than those listed (i.e. kohekohe).

129. The concern is that there is no explicit inclusion in the effects mitigation table or the amended mitigation package of mitigation planting ratios to address adverse effects for a series of vegetation units, and neither are these vegetation units then included in the Indicative Compensation Approach. These omissions include, but may not be limited to:

    a) V2_22 Kohekohe-taraire-tawa-podocarp/broadleaf, 0.13 ha, Moderate

    b) V4_121 Kohekohe-taraire-tawa-podocarp/broadleaf, 1.88 ha, High

    c) V2_37 Kohekohe-taraire-tawa-podocarp/broadleaf, 2.83 ha, High

    d) V2_39 Kohekohe-taraire-tawa-podocarp/broadleaf, 18.21 ha, High

130. Whether these omissions are logical, because they are present in the designation but are not within the predicted areas of loss, or if they have simply been overlooked in the mitigation package, cannot be determined as no map of predicted loss for the vegetation units is provided.

131. Using the same terminology for vegetation types throughout the effects assessment, and in the mitigation, offsetting, and compensation proposals, would greatly assist in understanding what the proposal actually is (i.e. what it includes, what it excludes, and the proposed quantum of plantings).

132. Mitigation plantings would then also be better targeted if they directly countered an identified residual effect that is Moderate or greater. At present, which vegetation types trigger mitigation plantings, if they are to be impacted, appears in places to be arbitrary, in that it is not set by habitat value, vegetation age, or level of impact. For example, a 1:3 ratio is proposed for the loss of mature pūriri forest, which has been assessed by the Applicant as both "low" (e.g. V4_47) and "moderate" (e.g. V4_42) ecological value. Similarly, if "secondary broadleaved", to which the 1:1 applies, includes "broadleaved species scrub forest", this 1:1 ratio would be applied to younger vegetation of both low (V4_110) and moderate (V2_33) ecological value.

133. Using an offsetting model (e.g. BOAM) to determine appropriate planting ratios would assist in setting planting ratios that are appropriate for the value, age and structural complexity of the affected habitats. These are likely to be significantly greater than a ratio of 1:3 for mature forest vegetation. This is discussed further in the statement of Mr Nick Goldwater.

<u>Mitigation of indirect effects</u>

134. To effectively reduce the level of indirect effects, any mitigation of edge and fragmentation effects needs to be locationally focused on habitats partially cleared and or dissected by the alignment. Mitigation also needs specific measures to address the risks for weed invasion alongside newly fragmented and disturbed habitats; a review of road edge effects undertaken for NZTA noted increased risk for high value habitats within 500 m of roads[21]. This risk is of particular concern where the proposed alignment crosses high value forest in the Piroa Stream area.

[21] p. 143 https://nzta.govt.nz/assets/resources/research/reports/692/692-road-edge-effects-on-ecosystems.pdf

135. Significant weed growth, of species such as pampas, now characterises sections of the road further south (e.g. between Albany and Puhoi, Appendix 1 of this document: Plate 3). The standard NZTA approaches are therefore not sufficient, either by duration or effort, to address the burden of invasive plants that can develop following major roading projects.

136. In response to this issue, the amended mitigation package now includes weed control to "remediate impacts on high and very high value forest habitat". This sets an inappropriately high bar for where weed control is warranted. For example, this would not require any weed control for the new forest edge created through an alluvial forest patch at Chainage 11,400 (Freshwater Assessment Appendix C, Sheet 4 of 33). The need for weed control, and where, should be informed by an effects assessment that considers the ecological value of the habitat and the likely adverse effects of the proposed road, and then includes weed control where the unmitigated level of effect is Moderate or greater. This approach would likely extend the areas that require weed control to include all indigenous forest vegetation where the construction will result in a new forest edge.

137. Mitigation of edge effects can also be partly addressed by undertaking plantings of fast-growing indigenous species to seal the newly-created forest edges, and reduce the establishment of weed species (e.g. as proposed by NZTA for the SH3 Manawatu Gorge bypass). The Applicant proposes plantings to reduce fragmentation and edge effects, but only at the North and South Mitigation sites (Table 24). To ensure this measure is likely to reduce the level of mitigated effect, the planting plan would need to include locations, species, site preparation, and post planting maintenance until the vegetation is well established. None of these details have been provided.

138. The North and South mitigation sites are existing forest remnants that will be adjacent to the indicative alignment (Section 5.1.1, 5.1.3). The proposed sites lie to the east of the alignment and plantings here will only address edge and fragmentation effects for habitats on the eastern side of the proposed road.

139. No plantings to address edge effects or fragmentation, or other habitat connectivity structures are proposed in Table 24 (Assessment of Effects on Terrestrial Ecology) for any other habitats crossed by the indicative alignment,

including the forest assessed by the Applicant as Very High value on the southern slopes by the Piroa Stream, and the kanuka forest and kauri-podocarp forest of Very High value at the southern end of the route.

140. Despite the mitigation plantings targeting indirect effects within less than one quarter of the affected areas (i.e. one side of two of the four major forest crossings), the mitigated level of indirect effects for the entire proposed designation, is assessed by the Applicant as being reduced from to 'Very High" to "Moderate". The level of mitigated indirect effects for the proposed designation would be more appropriately assessed as High.

141. For the mitigation of fragmentation effects, opportunities should also be sought to retain connectivity between divided habitats (e.g. viaducts, bridges, or over-sized culverts), or to restore connectivity where this has been lost (e.g. through plantings to link existing separated habitat areas).

Mitigation for loss of Threatened or At Risk plant species

142. The project will result in adverse effects for six Nationally Threatened or At Risk plant species (Table 17) and an unknown number of Regionally Threatened or At Risk plant species, as the presence of these in the project footprint were not assessed by the Applicant. The unmitigated level of effect on kauri is assessed by the Applicant as Very High; this is appropriate.

143. The proposal to only mitigate for the loss of kauri and pūriri, and for these species only trees over 50 cm diameter, is arbitrary and concerning. The percentage of kauri and pūriri to be felled that are less than 50 cm diameter and the percentage that are over 50 cm diameter is not included in the Assessment of Effects on Terrestrial Ecology, so the likely shortfall in mitigation cannot be assessed. For example, not mitigating the loss of smaller kauri or pūriri could mean there is no mitigation for 10, 30, 50, or 80% of their populations.

144. Kauri under 50 centimetres diameter are still valuable components of the ecological landscape and still drive the function of kauri forest ecosystems with their unique and threatened suite of associated species. Kauri also attain canopy positions within Northland forests at diameters substantially less than 50 centimetres (i.e. as small as 10-15 cm diameter). For a previous section of this

state highway, the size threshold that triggered mitigation plantings for the loss of kauri and other canopy trees was set at a much lower 15 centimetres diameter (Puhoi to Warkworth Designation Condition 59[22]). The Applicant does not provide any justification for why the losses of only the largest kauri trees will be mitigated for this section of the road. A more appropriate size threshold for mitigation would be any kauri in canopy positions; these are the trees that have survived the seedling and sapling stage, and without disturbance, would be likely to persist, and contribute to the survival of the population, for several hundred more years.

145. Plantings for the largest kauri and pūriri trees at 1:50 ratio is a very minimal and coarse approach and will not in itself address project impacts on these species. However, plantings of these and other associated species, and the subsequent maintenance to replace the basal area[23] of these trees within a specified time, might. For kauri in particular, the proposed approach carries a strong risk that functional kauri forests will be lost and replaced with low-diversity plantings more akin to a kauri plantation.

146. The proposed mitigation approach for kauri, pūriri, and other key canopy trees species, would be much stronger if the basal area of trees lost was calculated, potentially to be done at the time of felling, local growth rates were investigated, and the application included enough seedlings to ensure basal area is replaced within a set timeframe (e.g. within 20 years). This was the approach taken for the Puhoi to Warkworth section (Designation Condition 59[24], 25 April 2014). These tree plantings should then be one component of plantings to restore hillslope forest as close as possible in character to the forest areas to be felled. Post planting maintenance will be needed until these trees have established and attained canopy positions, and if need be, additional plantings undertaken if survival or growth rates are not tracking towards basal area replacement.

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[22] https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000033/Boards-Decision/d471277950/NSP000033-Volume-3-Final-Conditions.pdf

[23] The area per hectare occupied by kauri trunks

[24] https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000033/Boards-Decision/d471277950/NSP000033-Volume-3-Final-Conditions.pdf

147. Similarly, other large, canopy trees that are key components of forest areas to be felled (e.g. miro, kahikatea, tōtara, matai, tanekaha) should be addressed in a similar way. For Puhoi to Warkworth, seven canopy tree species other than kauri were included for this basal area replacement approach (i.e. tanekaha, puriri, tōtara, kahikatea, rimu, rewarewa, taraire, refer to the same designation condition 59 as above). Without including other canopy tree species, there is a high risk that restoration plantings might succeed but not address the losses of trees that are key ecological components of these habitat types.

148. Felling of kauri trees, earthworks in or beside existing stands of kauri, and movement of people and materials through kauri stands, can spread kauri dieback. This could then cause additional losses of kauri, both within the proposed designation and elsewhere (i.e. if contaminated material is removed from the construction sites). Kauri dieback is briefly assessed in the Assessment of Effects for Terrestrial Ecology, where the proposed mitigation is the "correct application of Kauri Hygiene Standard Operating Procedures" prepared in 2021 (Table 23), the implementation of which is predicted to reduce the overall level of effect from High to Low (Table 24).

149. For Puhoi to Warkworth, Designation Condition 63 and 63A required the preparation and implementation of a detailed Kauri Dieback Biosecurity Plan[25]. The Standard Operating Procedures (SOP) referenced by the Applicant are a useful guide, but a site-specific kauri dieback plan will be required for this project to be able to implement them. Examples of where the SOP requires site specific planning include:

    a) The identification of Contaminated Areas, Protection Areas, and Kauri Hygiene Areas

    b) Identification of the approved landfill for contaminated material

    c) How the SOP alters how habitat restoration works will be undertaken.

[25] https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000033/Boards-Decision/d471277950/NSP000033-Volume-3-Final-Conditions.pdf

d) Risk assessments for aggregate sources (i.e. quarries) and machinery to be brought to areas where kauri are present.

150. If kauri dieback is not adequately addressed, there is a risk that the felling of approximately 40 kauri (Assessment of Effects on Terrestrial Ecology, Table 17), may in time comprise only a small proportion of the actual number of kauri lost due to construction of this road. If this came to pass the mitigated impacts to kauri could remain as High.

151. The updated mitigation package includes that plantings incorporate "nationally or regionally threatened or at risk species within planting plans". This has some merit but needs expansion to encompass all of the threatened and at risk plant species that will be affected, including those currently omitted in the assessment of effects by the Applicant. Plantings should not negate the need to maximise avoidance of effects on these species, where this is possible, and should be designed with the view to establishing self-sustaining populations of the affected species in the restoration areas.

<u>Other alternative approaches for addressing adverse effects</u>

152. Aside from this basal area replacement approach, the Applicant should first seek to maximise the protection of existing indigenous habitats as the preferred approach for offsetting residual effects on terrestrial habitats. Plantings of new habitat can be part of this strategy, particularly where it will buffer or link fragmented forest habitats. However, protecting areas that have regenerated naturally, already have compositional and structural complexity, and are at risk of loss from grazing, will have better ecological outcomes than plantings, with these gains realised sooner. This is effectively an "averted loss" approach, as without this management, all grazed forest remnants in the proposed designation will eventually be lost. Mitigation by fencing to exclude livestock, on a per hectare basis, is also of much lower cost than forest plantings. Key opportunities that deserve consideration in the mitigation package include fencing to exclude livestock from:

a) Any of the kahikatea forest and treeland remnants at Chainage 9300-9600 where livestock still have access.

b) The tōtara treeland on alluvium at Chainage 10,400-10,800.

c) The indigenous alluvial forest to be partly retained at Chainage 12,800-13,000.

d) The indigenous forest and raupo reedland (Wetland 8) on the riparian margins of the Waihoihoi Stream, with the control of crack willow, and additional plantings where necessary.

e) The area of kahikatea-kauri-tōtara treeland at Chainage 16,300, as this forest falls partly within the project footprint.

153. An averted loss approach, if it is to be pursued as part of the mitigation package, will require robust quantification of the current trajectory of forest loss in the local landscape. This is a needed step so the extent of averted loss that will be achieved can be quantified.

Monitoring timeframes

154. For the monitoring of vegetation at mitigation sites (Section 5.1.5 of the Assessment of Effects on Terrestrial Ecology), the Applicant proposes to undertake this as per the standard NZTA methods for a period of five years. No further details are given. This may suffice for the establishment of roadside vegetation plantings but is well short of the timeframes required to ensure plantings will address the loss of mature indigenous forest. Monitoring will need to be habitat specific and ensure the longer-term success and viability of forest plantings, including species such as kauri and kahikatea.

Compensation for effects on indigenous vegetation that cannot be mitigated

155. The proposed amendments to the mitigation package, and the Indicative Compensation Approach, includes compensation for any loss within mature kanuka-podocarp-broadleaved forest near Pukekaroro, and mature taraire-kohekohe-podocarp-broadleaved forest on the Brynderwyn hills. These are identified as not being able to be offset as they comprise mature, structurally complex forest habitats. The nine vegetation units that comprise these forest areas are listed in the Indicative Compensation Approach document (e.g. V2_35).

156. The location of these vegetation units is not mapped, and an analysis of the vegetation types and extent did not aid the understanding of what is proposed (Table 2).

Table 2. Vegetation units and types proposed for compensation.

Unit	Area (ha)	Type	Value
V4 64	17.00	Kanuka forest	Very High
V4 66	13.52	Kanuka forest	Very High
V2 35	17.06	Kohekohe-taraire-tawa-podocarp/broadleaf	Very High
V_24	?	?	?
V2_27	1.24	Broadleaved species scrub forest	High
V2_34	19.08	Exotic pine forest/mixed native and exotic scrub/ranked grassland	Low
V2_7	0.97	Kohekohe-taraire-tawa-podocarp/broadleaf	High
V2_3	8.33	Broadleaved species scrub forest	High
V2_4	2.15	Kohekohe-taraire-tawa-podocarp/broadleaf	Very High
Total	**79.35**		

157. With regard to compensation for taraire-kohekohe-podocarp-broadleaved forest on the Brynderwyn Hills:

a) the vegetation unit code “V_24” is not listed anywhere else in the Application, so what it relates to is not known. It may be a typo that is supposed to read “V2_4” but this is a later code on the same list (so would then be a double up).

b) Two of the codes do not relate to this mature forest type, but are broadleaved scrub (V2_3, V2_27, Appendix F of the Assessment of Effects for Terrestrial Ecology). Scrub habitats are usually able to be offset, due to their relatively young age and simple structure. Their inclusion within a compensation package is not explained.

c) One of the codes, V2_34, is “exotic pine forest” with an ecological value of Low (as assessed by the Applicant, Appendix F). This could be a typo that should instead refer to V2_37 or V2_39 (High or Very High value kohekohe forest), but this cannot be determined without a map of where the losses will occur. Inclusion of exotic pine forest in a compensation proposal is highly unusual.

158. The cumulative total of this assortment of vegetation types, using the vegetation codes provided and including scrub and pine forest, is 79.35 ha. The wording of the compensation approach states that compensation is for "any loss within" these areas. The indicative design indicates that 15 ha of the 79.35 hectares will be cleared and will require compensation.

159. Which habitats comprise these 15 hectares, based on the vegetation loss within the indicative alignment, is not stated, nor can it be derived from the information provided. For example, it could comprise 10 hectares of mature forest and 7 hectares of scrub, or it could comprise five hectares of mature indigenous forest, six hectares of scrub, and six hectares of exotic pine forest. If the inclusion of broadleaved scrub and exotic pine forest, alongside mature indigenous forest, is not an error, it is difficult to see how the same ratio proposed (3:1) can apply to these disparate habitat types. It would also be unexpected to propose offsetting or compensation for the loss of an exotic vegetation type of Low ecological value.

160. If the inclusion of broadleaved scrub and or exotic pine forest here is an error, the Applicant will need to revise this proposal, and provide the corrected vegetation units, vegetation types, and extents, as this will likely affect the quantum of compensation.

Wetland Ecology – Methods

Desktop scoping and delineation of wetlands

161. The application states that potential wetlands within the proposed designation were first identified by desktop methods, using the Waipu and Otamatea PNAP

reports, and the Northland Regional Council (NRC) Indicative Wetlands Map[26] (Methods, Section 2.2.6, Assessment of Effects on Freshwater Ecology). This assessment then notes that potential wetlands were selected for field work if they intersected with the alignment or were within the proposed designation (Section 2.2.7). Therefore, the expectation is that all potential wetlands within the proposed designation have been assessed. I do not consider that this is the case, for the reasons explained in detail below.

162. A key additional information source I would have expected to have been included is Google Earth imagery, and Retrolens imagery (i.e. historical aerial photographs). Inclusion of these two additional data sets would add to the list of potential wetlands to be investigated. This is also described below on wetland-by-wetland basis.

163. It is also important to note that this wetland mapping process does need to identify and map all wetlands within the proposed designation corridor, whether they are within the indicative alignment or not. The reason for this is two-fold. Firstly, the alignment is indicative: its route could change, it does not include the associated stormwater treatment ponds, and it is unlikely that any change in alignment would trigger a renewed round of wetland mapping and assessments. The assumed intent is therefore that all wetlands are identified by this assessment. Secondly, understanding where wetlands are present in the proposed designation corridor, but not affected by the indicative alignment, is the starting point for identifying potential sites for wetland mitigation works

164. The Assessment of Effects on Freshwater Ecology does not identify or map the areas of potential wetland areas derived from the desktop sources, that were then investigated in the field. The methods refer to the delineation of wetlands using the MfE rapid test, where vegetation was obviously facultative wet and obligative wet plant species, and the use of vegetation plots and the formation of dominance and prevalence indices where areas were less clearly wetlands (Section 2.2.7). The methods note that the additional tests for hydric soils and hydrology were

[26] https://experience.arcgis.com/experience/588ba304a02b4a22beb1ebb33cafc03e

unnecessary as “rapid testing and some vegetation plot testing were sufficient to determine areas that could be natural inland wetland” (Section 2.2.7).

165. The freshwater assessment does not map or list the areas confirmed as wetlands using the rapid testing alone, or which ones were confirmed using dominance and prevalence indices. The Applicant does not provide any of the vegetation plot data. The assessment simply notes that based on the desktop and field assessments, that 25 wetland areas were confirmed that met the criteria for natural inland wetlands (Section 3.1). The lack of documentation for any part of this process makes an independent assessment of its robustness impossible.

Description of wetland habitats

166. In contrast to the Applicant’s use of a standardised method for terrestrial habitats (i.e. classifying and describing vegetation based on canopy dominance), the Applicant’s methods for wetland habitats are highly unorthodox and leave considerable uncertainty as to what habitats are present and where.

167. Wetlands are primarily described by the Applicant with reference to their ground-tier vegetation, even in forest or treeland habitats where there is an indigenous canopy. This effectively omits higher value wetland vegetation from the assessment, and, where grazing is present, assigns values based on a grazed and often degraded ground-tier. This is a highly unusual approach to habitat assessment. It appears to be systematic, and for some wetlands, it results in assessments of ecological values that do not reflect their actual state.

168. If a wetland contained multiple vegetation types, only one of these types is usually described by the Applicant, and the one selected is the vegetation type of the lowest ecological value. Where photographs are provided, these are limited to a maximum of one per wetland, and the lowest value vegetation type is pictured. The Applicant needs to recognise in its assessment that one wetland can comprise multiple vegetation types, and these can have marked differences in significance and values.

169. These issues are discussed below with regards to specific wetlands identified by the Applicant.

Wetland fauna

170. The Applicant notes that 'the animals that live in a wetland' are one of the six crucial components for differentiating natural inland wetlands from wet pastures (Section 3.1.1, Assessment of Effects on Freshwater Ecology). The Applicant also notes the presence or absence of any Threatened or At Risk species as a criteria for assigning ecological values (Section 2.2.2 and Table 1). However, no fauna survey methods are provided in the methods section for wetlands (Section 2.2.7). If fauna surveys were completed, the methods and results of these should be described. Understanding the locations, methods and survey effort is needed to independently assess the veracity of the Applicant's claim that no Threatened or At Risk species were present in any of the wetlands assessed.

171. Alternatively, if no wetland fauna surveys were undertaken, the Applicant should note that fauna are excluded in their assessment of ecological values, and the statement that "no threatened or at risk taxa were found" (Section 3.1) should be deleted as it infers they were absent rather than not being surveyed.

Wetland Ecology – Errors in wetland extent, descriptions, and values for wetlands identified by the Applicant

Wetland 11

172. Wetland 11 lies within pasture and is described by the Applicant (Appendix A, Assessment of Effects on Freshwater Ecology) as an "*array of wetland exotic and common native plant species*". This description is appropriate for the vegetation present (Appendix 2 of this document, Plate 1); however, the mapping of the site excludes an upper arm of Wetland 11 (Appendix 3 of this document, Figure 1). This excluded area has no discernible differences in hydrology or vegetation to the wider parts of Wetland 11 included by the Applicant.

Wetland 12

173. Wetland 12 is described Appendix A (Assessment of Effects on Freshwater Ecology) as comprising herbaceous species such as soft rush, *Glyceria,* and *Isolepis*, but this assessment also notes that "*further into the bush fragment, kahikatea are evident along the edge of the wet ground*", and "*there is a seepage area … part way into the bush.. which is covered in creeping buttercup, several*

sedges in low abundance, and a lower canopy of a few wheki". The freshwater assessment fails to note that the latter forested portion of the wetland comprises approximately half the extent of Wetland 12, as mapped by the Applicant.

174. The indigenous canopy over the upper half of the wetland is not described in the wetland assessment, the description being limited to the shrub and ground-tier layers, even in forested habitat (e.g. the exotic herb -creeping buttercup with 80% cover). The one photograph of Wetland 12 (Appendix A, Assessment of Effects on Freshwater Ecology) shows the lower wetland area where this cover of woody species is absent or limited. The Applicant states the indigenous biodiversity of the Wetland 12 is "*Negligible*" (Table 4) and that the condition of the wetland is "*poor (exotic)*" with an ecological value of Low (Table 19). The Applicant's Assessment of Effects on Avifauna Ecology notes that Wetland 12 has potential habitat for North Island fernbird (Table 9).

175. This description in the Assessment of Effects on Freshwater Ecology is also at odds with the 'wetland type' provided in Table 4 of the same freshwater assessment, where it acknowledges the presence of indigenous vegetation, and alternatively describes the wetland as "*kahikatea with creeping bent, Glyceria, water pepper and creeping buttercup*".

176. This assessment of Wetland 12 is not correct with regards to its extent, vegetation types, and ecological values. My field visit on 26 June 2026 confirmed that the middle and upper reaches of Wetland 12 is indigenous vegetation.

177. The middle reaches of Wetland 12, below the kahikatea wetland, is indigenous sedgeland dominated by *Isolepis prolifera*, with a fringe of kahikatea, occasional manuka and giant umbrella sedge (*Cyperus ustulatus)* (Appendix 2 of this document: Plates 3 and 4).

178. The upper reach of Wetland 12 is the lower edge of a forested hillslope seepage. Kahikatea dominate the canopy, over a sparse shrub tier, and a ground-tier that is dominated by sedges. Within this kahikatea forest, there is a large canopy gap where the wetland is co-dominated by swamp millet (*Isachne globosa*), an indigenous grass, and an exotic herb – creeping buttercup (Appendix 2 of this document: Plate 5).

179. This kahikatea forest in the upper reaches of Wetland 12 is described in the Assessment of Effects on Terrestrial Ecology as "kahikatea-kauri-totara treeland" (Appendix E, Vegetation Types Sheet 5 of 10), "native" (Table 7) and of "Very High" ecological value.

180. The description of this wetland, based only on its more modified lower reaches, results in the values of this wetland being very understated. The Assessment of Effects on Freshwater Ecology states that Wetland 12 is 'exotic' and of Low value. This is also at odds with the Assessment of Effects on Terrestrial Ecology that maps the upper wetland as having an indigenous canopy, with a value of Very High.

181. The assessment of Wetland 12 needs to separately identify and describe the values of the parts of the wetland with indigenous cover. The middle and upper reaches of Wetland 12, where indigenous wetland species including kahikatea are dominant, should be assessed as Moderate to High ecological value.

182. This reassessment of Wetland 12 also needs to correct wetland extent. There are no noticeable hydrological or vegetative differences between the parts of Wetland 12 included and excluded from the wetland area, as mapped by the Applicant (Appendix 2 of this document, Plates 1 and 2). Wetland 12 occupies the full width of the gully floor, extends 35 metres further down the gully than shown on Appendix C, Sheet 11 of 33 of the Assessment of Effects on Freshwater Ecology, and is contiguous with Wetland 13. The true extent is also well-approximated on the NRC indicative wetland layer. The extent of the Wetland 12 as mapped by the Applicant is not stated, but the additional area of wetland that needs to be included is approximately 450m^2. This lower, additional part of Wetland 12, that is the most degraded, is the area most similar to the description of the wetland provided in the Assessment of Effects on Freshwater Ecology.

<u>Wetland 13</u>

183. Wetland 13 is mapped by the Applicant as three polygons (Freshwater Assessment, Appendix A, Sheet 5 of 13). This is an underestimation of extent as the wetland is contiguous, occupies the full width of the gully floor, and also extends further upstream in the two easternmost arms to meet the areas of

indigenous forest (Appendix 3 of this document, Figure 2); these two excluded areas sum to approximately 1100m^2 (600m^2 + 500m^2).

184. The entirety of Wetland 13 (i.e. all three polygons) is described as being "*generally vegetated*" with exotic and common native species such as water purslane, water pepper, soft rush, start wort, *Isolepis prolifera*, Edgar's rush, and creeping bent, with occasional *Machaerina*. Of the species listed in the freshwater assessment, only two are indigenous – Edgar's rush and *Machaerina*. The one photograph provided is of the lower reaches of Wetland 13 where it is a narrow band of wet ground surrounded by pasture. The freshwater assessment concludes that Wetland 13 has '*Negligible*' indigenous biodiversity (Table 4) and the wetland type is stated as "*poor (exotic)*" (Table 19).

185. Based on my field visit undertaken on 26 June 2026, Wetland 13 is best described as a mix of indigenous and exotic vegetation. Exotic wetland species are generally more abundant on an "area covered" basis, but the wetland retains a significant indigenous component, including an additional eight indigenous species: giant umbrella sedge (*Cyperus ustulatus)*, wheki, kahikatea, rautahi (*Carex lessoniana)*, *Isolepis prolifera*, manuka, swamp kiokio, and purei (*Carex secta)* which is classified as Regionally At Risk- Regionally Declining. In places, these indigenous species are locally dominant (Appendix 2 of this document: Plates 6-8). Some of the better more intact areas of indigenous wetland vegetation in Wetland 13 are not included in the map of this wetland provided by the Applicant (e.g. Appendix 2 of this document: Plate 8).

186. Wetland 13 clearly has indigenous biodiversity higher than "*Negligible*". The diversity of indigenous wetland plants that are present may also explain why the Assessment of Effects on Avifauna (Table 9) noted this wetland is habitat for North Island fernbird. The Applicant needs to revise its assessment of Wetland 13 to acknowledge the diversity of indigenous wetland species that are present, including a Regionally At Risk plant species and a nationally At Risk bird species, to better include these higher quality areas in its representation and assessment of the site, and to include the upper eastern arms which are currently excluded.

187. The indigenous wetland species persisting in this wetland would likely result in Wetland 13, or at least the better parts of it, being assessed as of Moderate ecological value, or higher.

Wetland 14

188. Wetland 14 is described alongside Wetland 12 in Appendix A of the Assessment of Effects on Freshwater Ecology, noting that a typo here describes Wetland 14 as Wetland 16. The wetland is described by the Applicant as more than 50% soft rush, with Edgar's rush, creeping bent, creeping buttercup, and starwort. Except for Edgar's rush, the native species present are not listed by the Applicant, but these include wheki, *Eleocharis acuta*, swamp kiokio, and swamp millet. The wetland extent mapped in the freshwater assessment is a good approximation of this wetland's boundaries.

Wetland 16

189. Wetland 16 is correctly assessed in the Assessment of Effects on Freshwater Ecology as comprising three areas of differing ecological value, with the upper and lower portions being "highly modified and exotic grass dominated" and the middle portion better representing "a natural state of wetland". The Assessment of Effects on Freshwater Ecology states that this central part of Wetland 16 is "*of high value due to the currently low presence of indigenous natural inland wetlands in the Waipu Ecological District*" (Section 3.1.2) and is a "*forest gully wetland*" (Appendix A). The canopy of this wetland is not described in the Assessment of Effects on Freshwater Ecology, but in the Assessment of Effects on Terrestrial Ecology it is mapped as "*kauri-podocarp forest*" with a value of Very High (Appendix O, Ecological Value, Sheet 5 of 10).

190. Due to the Applicant's approach, all of Wetland 16, including the "*forest gully wetland"* where kahikatea is present, is assessed as "Low" for indigenous biodiversity in Table 4; this is incorrect. The wetland is also assessed in Table 4 as having an ecological value of "mostly low, but a central 1/3rd is of High value" (Table 4). This highlights the irregular approach of trying to characterise the indigenous biodiversity of a wetland of differing character with only one overarching statement.

191. The assessment of Wetland 16 needs to identify and describe the vegetation and values for each of the three separate areas of Wetland 16.

Wetlands 15, 17, 18

192. Wetlands 15, 17, and 18 are described in the Assessment of Effects on Freshwater Ecology as headwater mud sponges at the heads of forest fragments, with exotic wetland vegetation dominated by creeping buttercup, soft rush, and *Isolepis*. The indigenous biodiversity was assessed as "*Negligible*' and ecological value assessed as "*Negligible*' (Table 4).

193. This description of wetland vegetation is correct for Wetlands 17 and 18 at the head of the two forest gullies, but Wetland 15 is in pasture, and similar in composition to Wetland 14, with which it is close to but not contiguous with.

194. Wetland 15 is dominated by Yorkshire fog, Edgar's rush, and creeping bent, and has a lower diversity of indigenous species than Wetland 14.

Wetland 23

195. Wetland 23 is a '*gully floodplain wetland'* with a "*light canopy of kahikatea and nikau*". The wetland is grazed and the ground-tier is dominated by creeping buttercup, an exotic herb (Appendix A, Assessment of Effects on Freshwater Ecology). The 'wetland type' does not refer to the indigenous canopy, instead classifying it based on the ground-tier vegetation which is "*Juncus, creeping bent, and buttercup*" (Table 4). The one photograph of this wetland included in Appendix A of the freshwater assessment shows a forest understorey dominated by creeping buttercup and excludes any view of the canopy. The wetland condition is assessed as "*poor (exotic*)" and ecological value as "*Negligible*" (Table 19).

196. Wetland 23 was not visited on 26 June 2026. However, the assessment of Wetland 23 needs to be revised so it uses a standard approach to vegetation classification that considers the indigenous canopy that is present. This would likely result in Wetland 23 being of greater ecological value than "Negligible".

Wetland Q08/066 (proposed mitigation site)

197. Wetland Q08/066 is excluded by the Assessment of Effects on Freshwater Ecology's assessment of natural inland wetlands, on the basis that "*this feature is*

a deliberately dug water body that has caused gully features to retain water and rushes, I consider that the wetland gully arms and the water body are likely exempt from qualification as a natural inland wetland under the exclusions under the NPS-FM"

198. The excavated pond should be excluded by this reasoning, but Retrolens imagery of this site (dated 1985, prior to water body construction, Appendix 2: Figure 1), shows extensive gully floor wetland features pre-dated the pond across most of the site. This confirms the wetlands were not caused by the excavation of the pond. Additionally, the gully floor features extend up to 10-15 m in elevation above pond water level – showing the upper gully arms are not back flooded by the pond itself. Except for the pond area, this wetland is a natural inland wetland.

199. The southern portions of this wetland have been fenced to exclude livestock, and terrestrial buffer plantings of indigenous species are well established (Appendix 2: Plate 9). These parts of Q08/066 are within the proposed restoration site but are also the only wetland areas in the proposed designation already subject to wetland restoration works. The fenced wetland areas have developed into dense and diverse indigenous vegetation including *Machaerina* sedgeland.

200. The Applicant's assessment that the indigenous biodiversity of Q08/066 is "*Negligible*" (Table 19), is incorrect.

201. Examples of this representational bias, with the effect of understating ecological values of wetlands, are summarised in Table 3 below. This table also demonstrates the internal conflicts between the findings of the Applicant's environmental specialists.

Table 3. Summary of Applicant's assessments of Wetlands 12, 13, 15, 16, 17, 18, 23, and Q08/066. All content extracted from the freshwater and terrestrial ecology assessments. Key discrepancies shown in bold.

Wetland	**Wetland type (AEE freshwater ecology)**	**Wetland description (AEE freshwater ecology**	**Wetland values – biodiversity (AEE freshwater ecology)**	**Ecological value (AEE freshwater ecology)**	**Terrestrial ecology – description (AEE terrestrial ecology)**	**Vegetation and values (my site visit 26-06-26)**
12	Poor (**exotic**) (Table 19) "**wet pasture**" (4.3.1)	**Kahikatea** with exotic ground-tier (Table 4)	**Negligible** (Table 4) "**Without any indigenous biodiversity values**" (4.3.1)	**Low** (Table 19)	Upper half of Wetland 12 - Indigenous forest	Middle reaches – Indigenous sedgeland **Moderate**, upper reaches (incl. **kahikatea forest)** – **Moderate to High**
13	Poor (**exotic**) (Table 19)	Juncus, creeping buttercup, creeping bent (Table 4)	**Negligible** (Table 4)	Low (Table 19)	**Indigenous treeland and forest,** scrub, grassland	Lower reaches – **Low**, middle and upper reaches **Mixed indigenous-exotic** - **Moderate**
16	Upper and lower – exotic, mid - **forest gully wetland** (Appendix A)	Lower – exotic rushes and grasses, mid – **raupō, kiekie, sedges**, upper – wet pasture (Table 4)	**Low** (Table 4)	Mostly Low, central 1/3 **High** (Table 19)	Lower – not mapped. Mid and upper – '**kauri-podocarp forest'**	Lower – n/a Mid and upper "**Very High**"
Wetlands 15, 17, 18	Headwater mud sponges	15 – wet pasture, 17-18	**Negligible** (Table 4)	Negligible (Table 19)	15 – not mapped	Needs assessment

Wetland	Wetland type (AEE freshwater ecology)	Wetland description (AEE freshwater ecology	Wetland values – biodiversity (AEE freshwater ecology)	Ecological value (AEE freshwater ecology)	Terrestrial ecology – description (AEE terrestrial ecology)	Vegetation and values (my site visit 26-06-26)
	under **forest canopy** (Appendix A)	"headwater small Isolepis and creeping buttercup" (Table 4)			17, 18 – **Anthropic tōtara forest**	
23	Poor (**exotic**) (Table 19)	Juncus, creeping bent, buttercup (Table 4). **Light canopy of kahikatea and nikau** (Appendix A)	**Negligible** (Table 4)	**Negligible** (Table 19)	Not mapped	Needs assessment
Q08/066	n/a	Open water, poplar, Juncus, creeping bent, creeping buttercup (Table 4)	**Negligible** (Table 4)	**n/a**	n/a	Southern portions fenced and restored with a terrestrial buffer. Indigenous wetland types present.

Wetland Ecology – commentary on Applicant's findings

202. The wetland assessment (Assessment of Effects on Freshwater Ecology, Appendix A, Sheets1-13) maps all wetlands as "potential wetlands" including the 25 confirmed wetlands. This approach leaves uncertainty as to where wetlands have been confirmed (i.e. if they have been confirmed as wetlands they should not be mapped as potential wetlands).

203. As the Assessment of Effects on Freshwater Ecology only presents the locations of potential wetlands that were surveyed and confirmed as wetlands, it is unclear whether other potential wetlands along the route, included in the NRC indicative wetlands layer and/or visible using Google Earth imagery, were either 1) assessed by the Applicant and deemed not to be wetlands, noting no documentation of this process in the report, or 2) not assessed, and potentially a source of the underestimation of wetland extent. Therefore, additional potential wetland areas that I identified using Google Earth, were prioritised as sites to visit on 26 June 2026.

204. The Assessment of Effects on Freshwater Ecology estimates that the indicative alignment will result in the impacts to 3.05 hectares of wetland habitat (Table 18). The following section provides an account of additional wetland areas that confirm that the assessment has significantly underestimated the extent of natural inland wetlands in the proposed designation, and the extent within the currently proposed alignment, inclusive of spoil sites.

Wetland Ecology – Wetland extent, descriptions and values of wetlands omitted by the Assessment of Effects on Freshwater Ecology.

205. Following my desktop review and the site visit, I assigned the 15 additional wetlands or likely wetlands, sequential numbers from 25-39 (Table 3). Eight of these passed the rapid test for natural inland wetlands, and seven require field surveys that were not feasible during a one-day site visit; these latter wetlands have been tentatively assessed as "likely" to be natural inland wetlands.

206. These 15 wetlands are all omitted by the Assessment of Effects on Freshwater Ecology. These wetlands also include eight that are mapped in the NRC indicative wetland layer, despite this being stated as an information source for the Applicant's desktop review of potential wetlands. This raises serious concerns about the wetland assessment, including why only a subset of the affected wetlands have been included. All 15 wetlands are also visible using Google Earth and or Retrolens imagery, and some of these wetlands are indigenous wetlands of Moderate or High ecological value. These 15 wetlands are all within the proposed designation and or the indicative alignment, inclusive of spoil sites.

Wetland 25

207. Wetland 25 is located on a wet gully floor and is crossed by the alignment at Chainage 23,700. It is 250 metres north of Wetland 24, is included in the NRC indicative wetland layer (Appendix 4, Figure 1) and is visible using Google Earth maps (Appendix 4, Figure 2). The wetland includes exotic-dominated vegetation, and an area of indigenous raupō-reedland (Appendix 4, Plate 1). It passed the rapid test for wetland delineation (i.e. all dominant species are either wetland obligate or facultative wetland species)[27]. The wetland likely extends further down the same gully system; this wasn't surveyed but based on aerial imagery the total area in the proposed designation could be up to 1.9 hectares. For consistency with the Assessment of Effects for Freshwater Ecology, the raupo reedland in this wetland would be assessed as High ecological value, as it is indigenous wetland vegetation. No wetlands have been mapped in this area in the Assessment of Effects on Freshwater Ecology.

Wetland 26

208. Wetland 26 is located on a wet gully floor along the southern edge of the proposed southern mitigation site. It is included in the NRC indicative wetland layer (Appendix 4, Figure 3) and is visible using Google Earth maps (Appendix 4, Figure 4). It passed the rapid test for wetland delineation.

209. It is not within the proposed alignment but is a significant opportunity for wetland restoration at a site already identified for this purpose. The wetland is approximately 0.95 hectares in extent and is very degraded (Appendix 4: Plate 2-3). There are smaller, indigenous dominant wetland close to the site, and fencing with some buffer plantings would result in a rapid improvement in ecological values.

Wetlands 27-31

210. Five additional wetlands, named Wetlands 27-31, are located on a gentle north-facing hillslope to the south of the Piroa Stream. These wetlands are within the proposed designation, and within the footprint of the proposed alignment, being

[27] https://environment.govt.nz/assets/publications/Wetland-delineation-protocols.pdf

within either the road footprint or spoil disposal sites. These wetlands are not included in the NRC Indicative wetland layer, but they are visible using Google Earth imagery (Appendix 4: Figure 5). No wetlands are mapped in this area in the Assessment of Effects on Freshwater Ecology.

211. Wetland 27 (2,350m^2) (Appendix 4: Plate 4) and Wetland 28 (1850m^2) (Appendix 4: Plate 5) are dominated by spike sedge (*Eleocharis acuta*), an indigenous obligate wetland species, with frequent to occasional Edgar's rush, Yorkshire fog, creeping bent, creeping buttercup and lotus. Both areas had wetland hydrology, passed the rapid test, and are indigenous wetlands. Wetland 28 had a drain along its western edge.

212. Wetland 29 (0.13 hectares) (Appendix 4: Plate 6) is at the foot of the slope adjacent to a farm race. This wetland is dominated by Edgar's rush, Yorkshire fog, and creeping buttercup, with patches of spike sedge, creeping bent, and soft rush. The area had wetland hydrology and passed the rapid test. This wetland is best described as a mixed exotic-indigenous rushland-sedgeland.

213. Wetland 30 (2.45 hectares) (Appendix 4: Plate 7) is on a very gentle slope, with a central drain, and additional drains on its western, southern, and eastern sides. This wetland is dominated by soft rush and creeping buttercup, with obligate species such as watercress and spike sedge also present. The area passed the rapid test for wetland vegetation. The wetland is an exotic-dominated rushland-herbfield mosaic.

214. Wetland 31 (0.13 hectares) (Appendix 4: Plate 8) is at the foot of the slope adjacent to a farm race. It is separated by an area of higher ground from the larger Wetland 30. The wetland is dominated by creeping bent, soft rush, creeping buttercup, with mercer grass also present. The area had wetland hydrology and passed the rapid test for wetland vegetation.

<u>Areas 32-33</u>

215. Areas 32 and 33 (Appendix 4: Figure 5) are likely to be wetlands, based on the hydrology and the vegetation types present, and a very short site inspection. Area 32 (0.45 hectares) is dominated by creeping buttercup and Yorkshire fog, with frequent Edgar's rush, soft rush, and occasional kikuyu grass. It is upslope of

Wetland 27 and drier than wetlands lower on this slope. Area 33 (0.25 hectares) is on the western edge of the fill and is dominated by soft rush and creeping bent. It had surface water and drainage ditches. These two areas would need dominance and prevalence tests to confirm they are also wetlands.

216. To the west of Wetland 30, and to the east of Wetlands 27-29, are additional potential wetlands, based on analysis of Google Earth imagery (Appendix 4: Figure 5). These areas were not visited on 26 June 2026 and need to be assessed in the field to include or exclude them as wetlands.

Areas 34-37

217. Areas 34-37 (0.68, 0.26, 0.32, 0.35 ha) lie within three proposed spoil sites east of the alignment at Chainage 17,300-17,600. No wetlands have been mapped in this area by the Applicant. A series of wetlands in these gullies is included in the NRC Indicative Wetlands map (Appendix 4: Figure 6), and they are clearly visible when viewing Google Earth imagery (Appendix 4: Figure 7). These areas were not visited on 26 June 2026 but are very likely to be natural inland wetlands based on their landscape position, and their dark green colour on aerials taken in the drier summer months.

Wetland 38

218. Wetland 38 (0.44 hectares) is at the head of a gully to the west of Wetland 15. The wetland is included in the indicative wetland maps by NRC (Appendix 4: Figure 8) and is clearly visible using Google Earth imagery (Appendix 4: Figure 9) No wetland is mapped in this area in the Assessment of Effects on Freshwater Ecology.

219. Wetland 38 is a patchy mosaic of vegetation types, with areas dominated by swamp millet and or Edgar's rush (Appendix 4: Plate 9), and smaller dense patches of *Machaerina rubiginosa* (Appendix 4: Plate 10). Within one area of *Machaerina* there is a small stand of wheki with *Gahnia xanthocarpa*. Gorse is common on some of the drier margins. This wetland passed the rapid test for wetland vegetation and is indigenous vegetation.

Wetland 39

220. Parts of Wetland 39 (1.01 ha) are included in the NRC indicative wetland layer (Appendix 4: Figure 10), and it is in an old stream channel that is visible using Google Earth imagery (Appendix 4: Figure 11). Access was not granted to view this site during the field visit. This area is very likely a natural inland wetland and has also been omitted by the Assessment of Effects on Freshwater Ecology.

Summary of wetlands omitted by the Applicant

221. Over the course of the one-day site visit, walkovers of parts of the proposed designation identified an additional eight wetlands and seven 'likely' wetlands that have been excluded from the wetland assessment in error (Table 4). The wetland habitats omitted, and identified by this review, include an additional 4.88 hectares of wetland habitat and 3.32 hectares of likely wetland habitat. The subset of these additional wetlands that are also indigenous wetland sums to 0.91 hectares.

222. My site visit also identified wetlands that were included in the Assessment of Effects on Freshwater Ecology but had areas of these wetlands excluded from the assessment (e.g. parts of Wetland 11, 12, and 13). For Wetland 13, these exclusions included some of the highest quality wetland vegetation in the upper arms. It is not clear how these areas could be missed by the Applicant as they are contiguous with wetlands included in the freshwater assessment.

Table 4. Summary of the 15 wetlands or likely wetlands within the proposed designation not included in the Applicant's assessment of wetlands.

Wetland #	NRC wetland layer	Extent (ha)	Confidence	Vegetation	Within Designation?	Within indicative alignment?	Likely value
25	Yes	0.35 ha (extending up to 1.90)	Confirmed	Exotic with some areas of indigenous wetland (0.04 ha)	Yes	Yes	Low (exotic) High (indigenous)
26	Yes	0.95	Confirmed	Exotic	Yes	No	Low
27	No	0.24	Confirmed	Indigenous	Yes	Yes	Moderate
28	No	0.19	Confirmed	Indigenous	Yes	Yes	Moderate
29	No	0.13	Confirmed	Exotic	Yes	Yes	Low

Wetland #	NRC wetland layer	Extent (ha)	Confidence	Vegetation	Within Designation?	Within indicative alignment?	Likely value
30	No	2.45	Confirmed	Exotic	Yes	Yes	Low
31	No	0.13	Confirmed	Exotic	Yes	Yes	Low
32	No	0.45	Likely	Exotic	Yes	Yes	Low
33	No	0.25	Likely	Exotic	Yes	Yes	Low
34	Yes	0.68	Likely	?	Yes	Yes	Not assessed
35	Yes	0.26	Likely	?	Yes	Yes	Not assessed
36	Yes	0.32	Likely	?	Yes	Yes	Not assessed
37	Yes	0.35	Likely	?	Yes	Yes	Not assessed
38	Yes	0.44	Confirmed	Indigenous	Yes	No	Moderate to High
39	Yes	1.01 ha	Likely	Not assessed	Yes	No	Not assessed
Confirmed wetlands (ha)			4.88				
Likely Wetlands (ha)			3.32				
Indigenous wetlands (ha)			0.91 (of those assessed)				

223. Whilst this review only covered parts of the route, it still substantially increases the extent of wetlands, and indigenous wetlands, known to be present within the proposed designation.

224. The ecological value of all these additional wetlands needs to be assessed, and include consideration of their fauna values, supported by data from fauna surveys. However, based on the three indigenous wetlands identified and assessed in the Assessment of Effects on Freshwater Ecology (i.e. Wetland 8, the central portions of Wetland 16, and Wetland 24), which were all assessed as having an ecological value of High (Table 4), the indigenous wetlands present but overlooked are also likely to be of Moderate to High ecological value. The assessment notes that although Wetlands 8 and 24 were assessed as High ecological value, they are "simple and highly modified" (Section 3.1.2). This description is also appropriate

for the newly identified Wetland 27 and 28, that have had their composition and structure substantially altered by their long history of grazing.

225. At the very least, the additional indigenous wetlands are of higher value than other exotic-dominated wetlands assessed by the Applicant as Low ecological value (e.g. Wetlands 2 and 7 in Table 4 of the Assessment of Effects on Freshwater Ecology). None of the documents provided post-lodgement address any of the errors in wetland identification, mapping, habitat descriptions, or ecological values described above.

226. As an example, the "aquatic survey information" maps provided to the Department of Conservation on 7 October 2026 only shows a subset of the wetlands present, which are labelled as "potential wetlands". This map series excludes a series of confirmed wetlands present in the proposed spoil sites.

227. The Applicant, in the updated mitigation package, has stated a "requirement for a pre-construction survey to confirm the extent and value of wetlands". I agree that additional wetland survey work is required, but leaving this work until the pre-construction period is highly problematic.

228. The wetland surveys undertaken to date are of very poor quality. Wetlands have been overlooked throughout the designation, and for confirmed wetlands have extremely mischaracterised some of the habitats and values present. This provides little confidence that any future wetland surveys will be undertaken to the expected standard for a high-risk infrastructure project.

229. Additionally, leaving further survey work until pre-construction precludes any of the habitats identified informing the current design process. Knowledge of the wetlands present in the designation should be used to inform the design and location of project components such as spoil sites, and the indicative alignment itself. No avoidance of high value wetland habitats is likely if these are not identified until the pre-construction project phase.

Wetland Ecology – Assessment of effects

Overview

230. The Applicant's Assessment of Effects on Freshwater Ecology states that in the areas affected by the alignment, only Wetland 24 has mostly indigenous vegetation cover (Section 4.3.1) and that all other wetlands, including Wetlands 12, 13, and 23, reassessed above, "*are essentially wet pasture areas, without any distinctive wetland functions or indigenous habitat values*" (Section 4.3.1). This is not correct.

231. The Applicant's Assessment of Effects, for both Freshwater Ecology and Terrestrial Ecology, and my site visit undertaken on 26 June 2026 (Appendix 2 and 4), clearly show that, within the project footprint, indigenous vegetation is present in wetlands other than Wetland 24. This indigenous vegetation may have been overlooked as it was either not in the ground-tier (e.g. the kahikatea forest in Wetland 12) or not present over all of a wetland's area (e.g. Wetland 13, which has both exotic and indigenous wetland vegetation types).

232. It is expected in a modified landscape that some parts of some wetlands will be of higher value than other areas, and these areas should not be excluded because the higher value vegetation does not cover all a wetland's area.

233. This assessment is also questionable due to the presence of other indigenous wetlands that were not surveyed and assessed (e.g. Wetlands 27, and 28). These two wetlands are within indicative spoil locations and sum to 0.43 hectares.

234. Wetlands other than Wetland 24, that are within the project footprint and have been incorrectly assessed by the Applicant as "wet pasture… without indigenous habitat values" (Section 4.3.1) therefore include at least the following:

    a) The middle and upper reaches of Wetland 12 (indigenous sedgeland and kahikatea forest)
    b) Parts of Wetland 13 (mixed exotic indigenous wetlands)
    c) Wetland 27 and 28 (spike sedge sedgeland on hillslope seepages)

d) The upper edge of the raupo reedland in Wetland 25, depending on where this is with regards to the outer edge of the indicative alignment.

235. The Applicant's assessment of wetland habitats should be corrected so that it also considers:

a) the woody vegetation present in the wetlands
b) areas where parts of an identified wetland have been excluded
c) the eight additional wetlands and seven 'likely' wetlands identified during this review
d) any other wetlands omitted from the assessment.

236. The Applicant should also document how all indicative wetland areas as mapped by NRC have been assessed in the field.

237. It should also be noted that for indigenous wetlands incorrectly characterised as exotic, and the 15 additional wetlands or potential wetlands, no attempt has yet been made to avoid or minimise the loss of these areas (i.e. because they were either assessed in error as Low or Negligible ecological value (Table 4 of the Assessment of Effects on Freshwater Ecology), or not identified by the assessment).

238. The errors and omissions in the Assessment of Effects on Freshwater Ecology, as documented above, need to be addressed before a complete and robust assessment of effects for wetlands can be prepared. Otherwise, the effects assessment will only cover a portion of the wetland habitats within the proposed designation and project footprint, and significantly underreport their ecological values.

239. That said, a few key issues for the effects assessment can be identified now, based on the assessment as it stands, and information derived from my June 2026 site survey.

<u>Wetland 12</u>

240. For Wetland 12, the level of effect was assessed by the Applicant as Very Low (Table 19, based on Low ecological values), despite nearly the entire wetland, including the portion now documented as indigenous wetland vegetation, being included in the footprint of the road (Assessment of Effects on Freshwater

Ecology, Appendix A: Sheet 5 of 13). This places the quantum of loss at 0.36 ha, but this excludes the losses for the lower part of Wetland 12 (0.05 ha) that are excluded, as described above.

241. Using the EIANZ guidance, the loss of all of the indigenous sedgeland, of Moderate ecological value, and most of the kahikatea forest on hillslope seepage, of Moderate to High ecological value, would correspond with a High or Very High magnitude of effect (i.e. total loss or major loss of the feature). This would result in a level of effect of High for the indigenous sedgeland, and Moderate to Very High for the kahikatea on the hillslope seepage.

242. It should be noted that these levels of effect for Wetland 12 are conservative and not inflated compared to the effects assessment provided in the application for Wetland 24, where loss of only one-third of this wetland was assessed as having a level of effect of "High" (Section 4.3.1).

243. The Assessment of Effects for Freshwater Ecology provides no additional justification for assessing the total or major loss of these indigenous wetland types as having a Very Low level of effect. This flawed assessment of effects is primarily attributable to the mischaracterisation of the indigenous wetland vegetation present as exotic wetland vegetation of Low value (Table 19).

244. There is no assessment of the indirect effects of the proposed embankment on the portion of Wetland 12 to be retained. A NZTA review of road-edge effects recognised that fill adjacent to wetlands can affect groundwater, and that small hydrological changes can cause alterations to wetland habitat[28]

<u>Wetland 13</u>

245. If the ecological values of Wetland 13 were revised to consider the indigenous vegetation and range of values present in the wetland (i.e. Low to Moderate), and the part of Wetland 13 within the road footprint conservatively assessed as only of Moderate magnitude (i.e. a partial change), the overall level of effect on Wetland 13 would be assessed as Low to Moderate.

[28] p.147 https://nzta.govt.nz/assets/resources/research/reports/692/692-road-edge-effects-on-ecosystems.pdf

246. The level of effect has been assessed as Very Low (based on Low ecological values) (Table 19, Assessment of Effects on Freshwater Ecology).

247. The Applicant provides no assessment of indirect effects for Wetland 13 downstream of the proposed embankment. These could include groundwater changes due to the embankment.

Wetland 25

248. The project effects on Wetland 25 have not been assessed as this wetland was omitted from their assessment. The level of effect will be primarily determined by the portion of the indigenous wetland within the proposed fill, and an assessment of indirect hydrological impacts, as the wetland will lose most or all of its contributing catchment. An assessment of hydrological impacts is provided for Wetland 24 by the Applicant, and an additional assessment needs to include the potential effects on the raupo reedland, directly downstream of the proposed road embankment, in Wetland 25.

Wetlands 27 and 28

249. Wetlands 27 and 28 would be completely removed as they lie within a proposed spoil site at Chainage 21,200-20,900. If, based on these being indigenous wetlands, they are reassessed to be conservatively of Moderate value, the corresponding magnitude of effect would be Very High (i.e. total loss), and the level of effect would be High.

250. The effects of the proposed road on these wetlands have not been assessed as they did not identify these areas as wetlands.

Other natural inland wetlands

251. All natural inland wetlands within or adjacent to the proposed footprint, whether identified in the Assessment of Effects on Freshwater Ecology as one of their 25 wetlands (Section 3.1), or by this independent review, should be reassessed for the ecological effects the project will have upon them. This should consider their full set of values, including use by mobile wetland fauna, and the predicted magnitude of project impacts. Where no wetland bird surveys have been done, the assessment should assume presence of rare wetland birds where the habitat is

suitable. These assessments should also include an assessment of potential indirect hydrological impacts, as per Wetland 24. If hydrological impacts are uncertain, a precautionary approach should be undertaken including baseline and post construction monitoring of groundwater levels and vegetation.

Wetland Ecology – effects management

252. Based on a questionable and irregular assessment of wetland habitats, including wetland areas excluded from the assessment, and understating their ecological values, the Assessment of Effects on Freshwater Ecology only proposed to implement effects management for the partial loss of one of the 24 wetland (Wetland 24, Table 19 – level of effect High, and Section 5.4.3). This is inconsistent with the actual extent, vegetation types, and values of the wetland habitats across the designation, the level of effects the project will have on those wetlands, and the EIANZ guidance for when effects management is warranted (e.g. being triggered by unmitigated levels of effect of Moderate or above). Subsequently, the proposed amendments to the Applicant's "mitigation package" include "mitigation for both moderate and high value wetlands" with the caveat that this is "excluding all exotic dominant wetlands" (Ecological Effects Mitigation table 28-08-2026). It is assumed that this clause should also include any wetlands identified of Very High value.

253. The exclusion here of all 'exotic dominant wetlands' is not justified. It is expected that most if not all wetlands of Moderate value or higher will likely be indigenous wetlands. However, this is not always the case, and the package should allow for effects management for exotic dominant wetlands of Moderate or higher value, if these occur. There are examples of exotic dominant wetlands in the Waipu Ecological District nearby that are critical habitat for threatened wetland fauna. Doctors Hill Wetland is a local hotspot for Australasian Bittern (Threatened – Nationally Critical).

254. Only addressing impacts on Moderate and High value wetlands remains at odds with the requirements of the National Policy Statement for Freshwater Management 2025, that specifies effects management for all natural inland

wetlands[29], and with NZTA's environmental plan, that has as an objective 'no net loss of wetlands"[30]. The current approach will result in adverse effects that are more than minor for a suite of natural inland wetlands, without any management of these effects.

255. After the deficiencies of the Assessment of Effects for Freshwater Ecology have been fully addressed, including the identification, mapping and evaluation of all natural inland wetlands in the proposed designation, the quantum of wetland loss, and subsequently the effects management required, will have been substantially increased. Additional areas of wetland loss will be all or a subset of the additional 4.88 hectares of wetlands and the 3.22 hectares of 'likely wetlands' identified by this review, and any new wetlands identified by desktop and field surveys yet to be undertaken.

256. This greater quantum of wetland loss is not a barrier to effectively managing the effects of the project on natural inland wetlands, as there are extensive areas of degraded natural inland wetlands within the designation, that are outside the footprint of the indicative alignment inclusive of indicative spoil sites (e.g. Wetland 25, Wetland 26 within the southern mitigation site. Wetland 38, Wetland 39).

257. The selection criteria for a wetland mitigation site or sites, should prioritise:

    a) Degraded natural inland wetlands within the proposed designation (i.e. grazed and or with pest plants).
    b) Wetlands where ecological values can be substantially increased with greater certainty by straight-forward and relatively low-cost methods (e.g. fencing and planting of terrestrial buffers), without the need for higher cost, more interventionist approaches (e.g. earthworks to first create wetland hydrology, then plantings of wetland vegetation).
    c) Sites not directly adjacent and parallel to the proposed or existing roads, in places where fauna potentially impacted by vehicle movements may be present (e.g. Australasian bittern).
    d) Sites close to or contiguous with other wetlands or indigenous forest areas.

[29] 3.22 (1) (c) (vi) in https://environment.govt.nz/assets/publications/npsfm-2020-amended-december-2025.pdf?v=02a04bb9053b02aadf1c2f2035a658b4d02bd24c

[30] p. 56 https://www.nzta.govt.nz/assets/resources/environmental-plan/docs/environmental-plan.pdf

e) Wetlands with a high likelihood that the proposed mitigation works will result in natural wetland habitats similar to, or better than, the wetland habitats to be lost.

258. The Applicant proposes two potential wetland mitigation sites, one on the southwest corner of the intersection of SH1 and SH12, and the wetland Q08/066, described in 138-141 above.

259. The first wetland mitigation site (SH1-SH12 corner) has little or no existing wetland habitat. No wetlands have been mapped here in the Assessment of Effects on Freshwater Ecology, and no wetlands are shown here on the indicative NRC wetland maps. The Applicant acknowledges that the site will require excavation. This is not a preferred site for wetland restoration as it meets none of the five criteria proposed above.

260. The second wetland mitigation site (Q08/066) includes existing natural inland wetlands, and a constructed pond (refer above). As the Applicant, in error, did not note that the southern parts of this wetland have already been fenced and restored, it is unclear how the project can achieve an additional 2.44 hectares of restored wetland at this location. For this wetland area to be considered a candidate, the Applicant should provide a detailed plan showing where raupo reedland can feasibly be established. As this is critical for the management of effects on wetlands for this project, this process should not be left until the detailed design stage. It would be critical that this wetland restoration excludes all areas of natural inland wetland at this site that have already been restored. The assessment also notes that road construction could cause groundwater drawdown at this site and recommends post-earthworks monitoring of this wetland using piezometers (Section 5.5). This raises additional concerns regarding the suitability of the site for wetland restoration.

261. Based on my 26 June 2026 field survey, extensive areas of existing but degraded natural inland wetlands within the proposed designation, that are good candidate sites for wetland restoration, include Wetland 13, Wetland 25 (up to 1.9 ha), Wetland 26 (0.95 ha), Wetland 38 (0.44 ha), and Wetland 39 (1.01 ha). All of these wetlands could be restored by fencing to exclude livestock, without the need for earthworks to alter the existing hydrology. Most could also be restored by only

planting a terrestrial buffer, leaving the wetland areas themselves to recover through natural regeneration. Thus, these candidate sites would have superior ecological outcomes, with lower cost, than the two wetland restoration sites proposed by the Applicant.

262. It should also be noted that Wetland 26 is located within the proposed southern mitigation site, and the upper reaches of Wetland 13 are within the northern mitigation site, so no additional landowner agreements would be needed for these two areas.

263. A well designed and implemented wetland restoration project, with its quantum suitably determined based on a robust assessment of wetland loss and impacts, has a very high likelihood of achieving a net gain for the quality of wetland habitats within the designation. This is assessed in more detail in the statement of advice of Mr Goldwater.

Comments on consent conditions

Overview

264. The proposed designation and resource consent conditions address the habitats, ecological values, impacts, and restoration potential as identified and assessed by the Applicant. Therefore, they also fall well short of what is appropriate, due to the errors or omissions described above. Additionally, the proposed timeframes for active management (i.e. post planting maintenance and pest plant and animal control), are inadequate to ensure that the long-term ecological gains predicted by the Applicant will eventuate.

265. As the habitat maps form the basis for where protections or specific mitigation measures in the text of the conditions apply, these are addressed first.

Designation conditions Appendix A – Mapping of Avoid Areas

266. At the northern end of the route, polygons of forest or treeland on alluvium are mapped as Avoid Areas. These encompass the vegetation dominated by kahikatea in this vicinity that has been assessed as High or Very High ecological value. This condition will substantially reduce the potential impacts of the project on the rare floodplain forests at this location. As the ‘avoid’ maps do not note the vegetation

types, extent in hectares, or their vegetation codes (e.g. V1_74), the Assessment of Effects on Terrestrial Ecology will need to update its assessment where it noted the loss of these areas.

267. These “avoid areas” do not include one area of kahikatea treeland that lies to the west of SH1. (i.e. the stand shown in Appendix 5: Plate 2). If this area of habitat is not included as an “avoid area” because it is within the likely footprint of the road, it conflicts with the statement that, apart from the kahikatea stand on the eastern side of SH1, there are restoration works in the remaining kahikatea stands.

268. It is unclear why other areas of High value alluvial forest alongside the Ahuroa River are not also shown as “Avoid” in Appendix A, given these are along the northwestern border of the designation, and well clear of the indicative alignment.

<u>Designation conditions Appendix D – Avoid Areas except for ecological works</u>

269. Appendix D, Page 1 of 4, should be revised to include the “kahikatea-kauri-totara treeland” of ‘Very High’ value as an Avoid Area, where it lies beyond the proposed footprint of works.

270. Appendix D should be revised to include areas of indigenous wetland that are safely beyond the boundary of the indicative alignment, whilst still considering the need to retain some flexibility. This would likely result in Wetland 38 being mapped as avoided.

271. Appendix D, Page 1 of 4, includes the entirety of Wetland 16. This is to be commended. Inclusion of Wetland 16 here negates the need for the Applicant to discuss compensation ratios for the potential loss of Wetland 16, as it does in RC39.

272. Wetland 26, that was omitted by the Applicant, is located immediately to the south of the Avoid Area in Appendix D, Page 3 of 4. Extension of the ‘avoid’ area southwards to include this wetland would negate the need for the Applicant to reassess this area and would also include a wetland that is a good candidate for restoration.

273. The designation conditions define Project Works to exclude Establishment Works which includes access tracks and vegetation clearance. The Avoid Areas only

prevent Project Works from occurring, not Establishment Works. The two conditions regarding Avoid Areas (D1 and D2) should not allow Establishment Works to occur within these areas. Otherwise the Avoid Areas may not be protected from all construction works, including vegetation clearance and earthworks.

Designation conditions Appendix C – Existing Indigenous Vegetation

274. Appendix C does not present a map of existing indigenous vegetation, as it excludes all indigenous vegetation in wetlands, and all indigenous vegetation of Low ecological value, as identified and assessed by the Applicant.

275. As such, Appendix C should be revised so that it is titled Appendix C – Existing terrestrial vegetation assessed as ecological value of Moderate or higher.

276. Appendix C will then need to be revised to include as Moderate, High or Very High ecological value:

    a) V1_63, tōtara forest, incorrectly assessed as Low ecological value (Appendix 1 of this document: Plate 1).

    b) Any other areas of woody indigenous vegetation that are on alluvium, on Acutely or Chronically Threatened Land Environments, or within recognised natural areas, and are currently assessed as Low ecological value (e.g. anthropic totara forest contiguous with Waipu ED PNAP site Q08/035).

Resource Consent Conditions – Appendix A - Existing Wetlands

277. Appendix A is titled Existing Wetlands; this is not correct. Due to the errors and omissions described above it only includes a subset of the wetlands within the proposed designation and within the indicative alignment. At least eight additional confirmed wetlands, and seven more “likely” wetlands, need to be added to this map series (i.e. to Sheet 2, a new map showing the missing section of the proposed designation to the south of Sheet 2, and Sheet 4). The map series also needs to be revised to include the reaches of existing wetlands excluded by the Applicant (e.g. parts of Wetland 11, 12, 13).

Designation conditions – Ecology

278. On undisturbed, original soils in the Northland Region (i.e. not cut or fill sites), canopy closure post planting of indigenous species often occurs in year three, four, and five. However, this is highly dependent on suitable soils, appropriate plant selection, good site preparation, and regular post planting maintenance, especially during the first two to three years. For this project, none of these details have been determined at this stage.

279. Plantings can also have high failure rates, and on difficult sites, or sites with inadequate maintenance, canopy cover can fail to occur, and or pest plants can become dominant.

280. To address these risks, all consent conditions relating to planting need to be outcomes based. This places the emphasis on adequate resourcing, and what the objectives are for a site. The NZTA ecological assessment guidelines state that for mitigation measures, an EcIA should, in addition to the actions, also specify "timings, techniques, resources, and intended ecological outcomes"[31]. As these are not included in the Assessment of Effects for Terrestrial Ecology, these should be embodied in the relevant consent conditions.

281. Condition D27 states that plantings will be undertaken to replace the loss of kauri over 50 cm diameter at a ratio of 50:1, with the subsequent amendment to also include pūriri. There is a high risk that this consent condition could be met but not address the loss of kauri or puriri trees (e.g. if by Year 5 most of the planted kauri or pūriri have died or are suppressed by competing tree species).

282. Condition D27 should be revised so that replacement plantings are undertaken for the loss of all canopy kauri and pūriri trees, and with the forecast that the basal area lost will be replaced by Year 20. The kauri and pūriri should be a component of forest restoration plantings of a similar assemblage to the forest to be lost. The number and growth rates of surviving trees at Year 5 could then be used to forecast the year by which the basal area of planted trees equals the basal area of trees that were felled. If at Year 5, the prediction is that basal area will not be

[31] p47 https://nzta.govt.nz/assets/resources/ecological-impact-assessment-guidelines/Ecological-impact-assessment-guidelines.pdf

replaced by Year 20, additional plantings to compensate for this can then be undertaken.

283. A similar consent condition can then be drafted to address the loss of other key forest species that will be felled (e.g. kahikatea, tōtara, rimu, tanekaha, taraire), to ensure that the outcome of the plantings is that they develop into vegetation similar to the composition of forests to be lost. This approach would be far more robust and can likely be achieved within the same forest mitigation areas that have been proposed.

284. Revising D27 so that it essentially includes a performance target would not be out of kilter with approaches for other major roading projects, including the Puhoi to Warkworth section of this road as discussed above. If basal area replacement is not pursued and plantings remain at a ratio of trees felled to trees planted, it should be noted that for the Mt Messenger Bypass (SH3) that not 50 but 200 replacement trees were required for each significant tree felled (Consent Condition 29(a)(ii)(3)), and a consent condition for that project (29(a)(ii)(9)) required 90% survival of these trees at Year 6, and if this was not achieved by Year 6, replacement planting and maintenance beyond Year 6 was required until 90% survival was achieved.[32]

285. In Condition D23, the landscape plantings require plantings of kahikatea and tōtara if the alignment impacts kahikatea/tōtara stands. This adverse effect is highly likely. The mapped "Avoid areas" will reduce but not prevent these losses, and there are kahikatea and or tōtara dominated forests proposed to be removed or partly removed within the indicative alignment totalling at least three hectares (as shown in Appendix 1: Figure 4). Plantings of kahikatea and tōtara are appropriate, but the outcomes of these plantings must be ecologically oriented. The objective needs to be the restoration of indigenous alluvial vegetation of similar structure and composition to the areas to be felled, and of an appropriate quantum, considering these plantings will take many decades to reach an equivalent state. If this cannot be fully catered for within the landscape planting, these plantings should be part of a tailored ecological management plan.

[32] ECM_8509661_v1_Final Mt Messenger Decision and Conditions - received by NPDC 6 April 2021

286. The “ecological effects mitigation table 28-08-2026” states that for mitigation plantings threats will be “managed to achieve 80% tree survival and 80% canopy cover by Year 10. Condition D30 will need to be updated to reflect this change. The condition should also allow for intermittent maintenance as needed, on an ongoing basis, to address the potential invasion of the sites by shade tolerant pest plants (e.g. tree privet), or issues caused by unforeseen events (e.g. fire, landslides).

287. A new designation condition needs to be drafted requiring the preparation and implementation of a site-specific kauri dieback biosecurity plan.

Resource Consent Conditions

288. The intent of Condition RC35 is to ensure riparian plantings are appropriate and will successfully establish. The wording of this condition will not ensure this.

289. RC35 (a) (ii) states that plants will be eco-sourced from the ecological district, except where it is not practicable to do so. Eco-sourcing is important, particularly for sensitive high value sites such as the Piroa Stream, and the condition should be revised to state “from the ecological district, or if not practicable to do so, from the Northland Region”. This will place little practical restriction on plant sourcing and ensure genetic stock is at least appropriate for Northland.

290. The same eco-sourcing conditions, revised as above, should also apply to the Wetland Management Plan (RC42-RC49).

291. RC35 (a) (iv) states plantings will “be maintained for 5 (sic) or until 80% indigenous canopy cover is achieved (whichever is earlier).” As frequency and methods for maintenance are not defined, this condition would allow for infrequent maintenance, planting failure, and then maintenance to end at Year 5, even if the plantings failed. Well planned and maintained plantings can easily reach canopy closure in three to five years, and the condition should be revised so that it reads “maintained until 80% indigenous canopy cover is achieved”.

292. This revision would bring the conditions for the riparian plantings into line with the wetland restoration conditions, that specify that maintenance will continue until 80% vegetation cover is established (RC49 (a)). This would also bring the condition more into line with other NZTA projects; the corresponding consent condition for

Mt Messenger (Condition 29(a)(ii)(7))[33] required that plantings achieved 80% cover at Year 6, and if this was not achieved, planting and maintenance beyond Year 6 until this is achieved.

293. RC39 specifies the loss to gain ratios for Wetlands 8, 16, and 24 (RC39 a) regarded by the Applicant as indigenous wetlands, and the lower loss to gain ratios for Wetlands 11-14 (RC39 b), regarded by the Assessment of Effects on Freshwater Ecology as lower value and exotic. The ratios are partly dependant on whether the "replacement wetlands" are "created as contiguous habitat".

294. No explanation is given for the inclusion of Wetlands 11-14 in RC39, given they are only a subset of the natural inland wetlands assessed by the Applicant. as having Low or Negligible ecological value. The term 'replacement wetland' is also not defined, so it is unknown if this exclusively refers to new constructed wetlands or also encompasses existing degraded wetlands that could be restored. The term 'contiguous habitat' is not defined so it is unknown if this refers to wetland contiguous with the wetlands that will be partially lost (e.g. Wetland 12), or simply to a restored area of wetland that is contiguous. These ambiguities need to be resolved for this condition to be workable.

295. If RC39 (a) does relate to higher value wetlands, Wetlands 12 and 13, which are indigenous dominant or have a significant indigenous component, should be included with Wetlands 8, 16, and 24 in RC39 (a), to which higher loss to replacement ratios apply.

296. RC39 (a) and (b) will then need to be updated accordingly to include the other indigenous and exotic dominated wetlands that are impacted by the project, but currently omitted by the Applicant (i.e. the subset of Wetlands 25-39 that are affected as they are within or adjacent to the footprint, including any indirect effects).

297. Successful implementation of RC40 (i.e. to manage the effects on extent and values of existing wetlands that are lost) is entirely dependent on the wetland assessment accurately first documenting these values. This condition is therefore

[33] https://www.npdc.govt.nz/media/wwelte5z/final-decision-and-conditions-mt-messenger-april-2021_1.pdf

reliant on revisions to improve the wetland assessment, as discussed in this evidence.

298. I also note that the loss to gain ratios proposed are very low, especially considering the age of some of the vegetation present (e.g. kahikatea forest in Wetland 12). This is covered in the statement of advice of Mr Goldwater.

299. RC40 notes that the project needs to manage any effects on cryptic bird species. As no fish surveys have been undertaken in any of the wetlands, this condition should also extend to indigenous fish such as black mudfish and banded kokopu, if they are present.

300. RC42 (a) restricts the scope of the wetland management plan so that it only addresses the loss or partial loss of Wetlands 8, 16, and 24. Given that it is clear that natural inland wetlands and indigenous wetland vegetation are more widespread than they have been mapped, this consent condition needs to be revised to include all natural inland wetlands in the proposed designation that will be impacted.

301. RC42 (b) and (c) specifies how the wetland management plan will include the amount of wetland to be created, and the methods to achieve this. Given the generous extent of existing but degraded wetlands in the proposed designation, this condition should explicitly allow for existing degraded natural inland wetlands to be included in the restoration package. Restoring areas with natural hydrology will be cheaper, lower risk, and with more certain outcomes, than attempting to create new wetland habitat. This essentially balances losses of wetland extent against gains in habitat quality. It will also result in wetland offsets that are more "like for like" as the hydrology of gully floor and hillslope seepage wetlands are difficult if not impossible to construct via earthworks.

302. If the creation of new wetland habitat is to be pursued, RC42 should specify that wetland creation replicates the hydrology and soils of the wetlands to be lost (i.e. primarily wet gully-floor wetlands, with organic soils and pathways of shallow, slow-flowing water). This will be a difficult task as many gully-floors already support these wetland features.

303. If wetlands are to be created, transfer of wetland soils and indigenous vegetation from wetlands to be lost would speed the potential return of cryptic marsh bird habitat as required by RC 42 and RC43. Opportunities for wetland soil and vegetation transfer would be particularly worthwhile for the raupo in Wetland 24, and the indigenous wetland plants throughout Wetland 13.

304. RC44 outlines a method for the calculation of compensation, if it is not practicable to comply with RC42 or RC43. Given the numerous opportunities to restore wetlands provided by the designation corridor, including within sites already identified for restoration (e.g. Wetland 26 at the southern mitigation site), there is no need to consider compensation as a possible outcome. The project retaining control of wetland restoration works, and where and when it will occur, substantially reduces uncertainty. It should also be noted that the ratios proposed by the Applicant are dependent on implementation timeframes; if this cannot be confirmed with the third party, the ratios and compensation costs could also increase accordingly.

305. Under a compensation approach, the locations of wetland creation should be based as far as practicable, on the catchments and habitats where wetland losses will occur. RC44 proposes that any compensation would be for wetland creation works in the Wairau catchment. This approach would not address the loss of wetlands in the Waihoihoi catchment, including indigenous wetland habitat in Wetlands 12, 13 and 38, and Wetlands 34-37 and 39, if these last five wetlands are surveyed and confirmed. Wetlands have site-specific values, including the presence of North Island fernbird at Wetland 13 (Applicant's Assessment of Effects on Avifauna, Section 3.1.3). Wetland creation only in the Wairau catchment would not benefit the At Risk wetland species in the Waihoihoi catchment.

306. RC45 states where groundwater monitoring needs to occur in relation to major cuts. This condition should be revised to 1) include wetland habitats within or adjacent to the footprint of works that have been omitted by the Applicant, 2) include the potential groundwater effects of embankments, as these can also result in adverse effects for wetland vegetation (e.g. potential increase or lowering of groundwater levels on the uphill side, or a lowering of water tables on the

downhill side) and 3) detect changes in groundwater levels whether this is an increase or a decrease. Groundwater monitoring on both sides of an embankment, to detect change, has been implemented by NZTA for other projects adjacent to wetlands (e.g. the Eastern Corridor Project[34]). The consent conditions for MacKays to Pekapeka required baseline monitoring of wetlands (G.38 a), monitoring of wetland hydrology (G.38 c) and wetland condition (G.38B c) for five years following completion of construction, and the minimisation of effects on wetlands resulting from hydrological changes to groundwater (G34 (E) (b) (iii)[35]. As currently worded, this condition only covers the scenario of groundwater drawdown that could result from cuts.

307. RC45 (a) (ii) (A) and (B) should refer to a change in groundwater level (increase or decrease) that results in a change in indigenous vegetation composition. Vegetation change so that "such that the existing wetland no longer meets the definition of natural inland wetland" should be deleted, as significant adverse effects on a wetland could occur, while the area remains as wetland (e.g. if an area of indigenous sedgeland or forest became permanently inundated, and died, with a change to a new wetland vegetation type). The potential for adverse effects on wetlands, without actual wetland loss, has been previously recognised in a review published by NZTA[36].

308. Consequently, RC45 (b) also needs to be revised to include all indigenous wetlands, and include any adverse effects due to groundwater changes.

309. RC50 states that wetlands constructed for stormwater treatment shall be constructed offline from watercourses. This condition should also require that the location of these avoids any impacts on natural inland wetlands.

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[34] https://www.nzta.govt.nz/assets/projects/tel/docs/newsletter-11-sept-2008.pdf

[35] https://www.kapiticoast.govt.nz/media/kjlbjfmj/nzta-005-mackays-to-peka-peka-m2pp-designation-conditions.pdf

[36] p. 147 https://nzta.govt.nz/assets/resources/research/reports/692/692-road-edge-effects-on-ecosystems.pdf

Conclusions / Recommendation

310. The terrestrial and wetland assessments undertaken by the Applicant to date identify significant adverse impacts for habitats within the proposed designation, including the partial or complete loss of previously recognised natural areas, rare forest types, natural inland wetlands, and indigenous wetlands.

311. Additional work is needed to address the deficiencies and errors in these assessments, and these revisions fall into three broad areas; first, to accurately identify, map, quantify, describe, and value the affected habitats and flora, using standardised methods, secondly to present this information in a logical and transparent way that can be understood by a third party, and thirdly to present a robust effects assessment, where effects management is targeted at the impacts specific to this project, and seeks improved outcomes for the affected habitats and species. The ecological effects of the project, and how to address these, must be assessed for each vegetation type separately (i.e. not aggregated as they currently are), and in a step-wise manner.

312. To rectify the errors, omissions, and deficiencies in the terrestrial and wetland assessments, the Applicant needs to:

    a) Be consistent in its use of the EIANZ methods, and where methods have diverged from this system, revise the report to bring it into line with the methodology the Applicant intended to use.

    b) Revise the ecological values assessments to consider the ecological context of the sites, including the previously documented values of natural areas, local rarity, and Threatened Land Environments.

    c) Expand its assessment of flora to include Regionally Threatened, At Risk, or Significant species, and the impacts of the project on these species.

    d) Correct mapping errors that omit important indigenous habitats within the proposed designation and revise ecological values assessments where these are inconsistent with its assessment of similar sites (e.g. V1_63 with riparian forest assessed as Low ecological value).

e) Provide an account of how ecological values were assigned for each vegetation type and polygon, at the level of what is required by the EIANZ guidelines (i.e. each vegetation unit, its scores for the four criteria with justification, and overall score).

f) Provide a map of where affected terrestrial habitats are located with regards to the designation and the indicative alignment, and to the detail level of the vegetation codes. Without this it is unknown where the losses will occur, the magnitude of those losses, and potential opportunities for avoidance, mitigation or offsetting. This mapping of habitat loss needs to include the likely locations of stormwater treatment devices and other construction components (e.g. temporary access roads). This map could then be used to compare and update the effects management required once the constructed alignment, and its associated effects, is confirmed.

g) Provide a complete assessment of terrestrial effects, that moves beyond presenting only the summary information and provides the detailed justification of level of impacts for each affected habitat type.

h) Develop a terrestrial ecology restoration package, that addresses all unmitigated effects of Moderate or greater, includes specific measures to address potential indirect effects (e.g. edge effects, spreading of kauri dieback, groundwater level changes), and includes offsets for the loss of rare floodplain vegetation on alluvium, and the loss of mature indigenous trees other than kauri and pūriri.

i) Provide the methods and results for wetland fauna surveys, and the dominance and prevalence data for wetland delineation. Without this information, conclusions regarding absence of Threatened or At Risk species, or wetland extents, cannot be relied upon, and the presence of rare species should be assumed if the habitat is suitable.

j) Revise the wetland habitat assessments to ensure they accurately portray the wetlands present. Where a wetland comprises two or more vegetation types, each of these should be assessed separately (i.e. documentation of habitats including photographs, values and project impacts).

k) Revise the wetland habitat assessments for Wetlands 1-24 to include the full extent of these wetlands within the designation, and a robust assessment of the ecological values that have been overlooked or undervalued.

l) Undertake a second mapping exercise for natural inland wetlands in the proposed designation, that includes field surveys of:

- the eight additional confirmed wetlands (4.88 ha)
- the seven additional likely wetlands (3.22 ha)
- all wetland or potential wetland areas that are included in the NRC Indicative wetland layer
- all other potential wetlands visible using aerial photographs.

m) Post their survey and delineation, complete an assessment of ecological values and impacts for all wetlands present, that also includes indirect hydrological effects.

n) Develop an offsetting and compensation approach to address the residual impacts on terrestrial ecology (including alluvial vegetation, and mature, structurally complex forests), that is logical, robust, and transparent.

o) Develop a wetland restoration package that fully addresses the predicted losses and impacts for all natural inland wetlands.

p) Ensure that the benefits of all restoration works are protected and maintained for at least as long as the duration of the impacts (i.e. the lifespan of the road).

313. Impacts on habitats, based on the indicative alignment, are predicted to be high, including the loss of at least 39 hectares of terrestrial indigenous vegetation, inclusive of 29 hectares of indigenous vegetation assessed as Moderate to Very High ecological value, and a quantum of wetland loss that is yet to be determined. The project will also result in significant losses of mature indigenous forest on alluvium; this has not been quantified by the Applicant. However, the generous width of the proposed designation provides no shortage of opportunities to address residual adverse effects on terrestrial and wetland vegetation and flora. There are many degraded forest and wetlands within the designation, with their

ecological values reduced and at further risk, due to the long-term effects of grazing and invasive species.

314. A robust and complete assessment of ecological effects is much needed and is yet to be provided. This needs to be the basis for determining the appropriate mitigation and offset measures, and their quantum, to ensure the adverse impacts of the proposed road on terrestrial and wetland vegetation will be adequately addressed.

APPENDIX 1: TERRESTRIAL ECOLOGY



Plate 1. V1_63 Remnant riparian podocarp-hardwood-kanuka treeland assessed by the Applicant as Low ecological value. Image from Google Street view from Millbrook Road close to its intersection with Ahuroa Road.

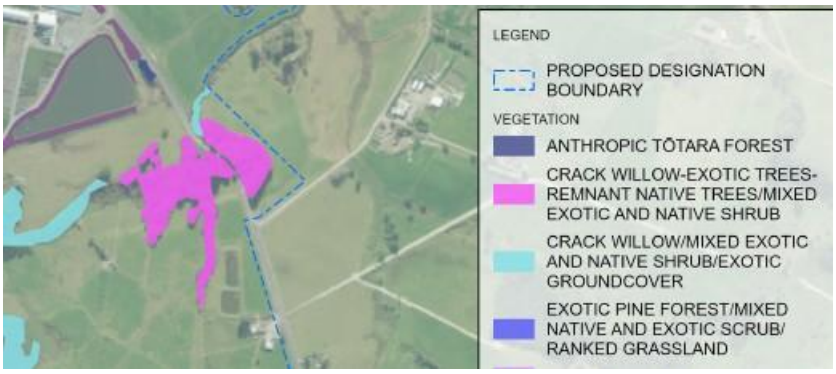

Figure 1. Screenshot of the Applicant's vegetation map for Glenmohr Road (Assessment of Effects on Terrestrial Ecology, Appendix E: Sheet 4 of 10)



Plate 2. Mature indigenous treeland on alluvium beside Glenmohr Road with titoki, nikau and totara (image from Google Street view). Mapped by the applicant as “Crack willow-exotic trees-remnant native trees/mixed exotic and native shrub” and assessed as ‘Moderate’ ecological value.



Figure 2. Area of totara forest/broadleaved scrub on alluvium assessed as Moderate ecological value by the Applicant (Assessment of Effects on Terrestrial Ecology, Appendix O, Sheet 2 of 10, yellow polygon). This site lies within a PNAP site and is habitat for an At Risk plant species.



Figure 3. Project effects on this alluvial forest remnant assessed as a Moderate level of effects by the Applicant. Only a small portion of its western and eastern edges might be retained (Assessment of Effects on Freshwater Ecology, Appendix C, Sheet 4 of 33).



Figure 4. The four remnants of alluvial forest that lie to the south of the kahikatea stands near the Waipu interchange. The likely areas of loss (shown with red polygons), based on the indicative alignment, have been estimated using Google Earth as 0.59 ha, 0.88 ha, 0.77 ha, and 0.98 ha, totalling 3.22 hectares. The Applicant does not present any maps showing terrestrial vegetation loss, hence the estimate presented here.



Plate 3. Roadside cut dominated by the invasive plant pampas (Cortaderia selloana), Wainui, Albany to Puhoi motorway. 6 April 2026.

APPENDIX 2. WETLAND HABITATS ASSESSED ON 26 JUNE 2026



Plate 1. Upper arm of Wetland 11 excluded from the map of Wetland 11. Photographed by Timothy Martin, 26 June 2026.



Plate 1. Wetland 12 immediately uphill of its lower boundary as mapped in the Assessment of Effects on Freshwater Ecology (Appendix A, Sheet 5 of 13). Photographed by Timothy Martin, 26 June 2026.



Plate 2. Wetland 12 extending well beyond its lower boundary, as mapped by the Applicant in the Assessment of Effects on Freshwater Ecology (Appendix A, Sheet 5 of 13). Wetland 12 extends to meet Wetland 13 (centre background). Photographed by Timothy Martin, 26 June 2026.



Plate 3. The middle reaches of Wetland 12, downhill of the kahikatea forest, is indigenous sedgeland dominated by Isolepis prolifera. Other species present include occasional giant umbrella sedge, soft rush, manuka, wheki, and kahikatea. This was assessed as 'wet pasture' in the Assessment of Effects on Freshwater Ecology (Section 4.3.1). Photographed by Timothy Martin, 26 June 2026.



Plate 4. Second view of the middle reaches of Wetland 12, downhill of the kahikatea forest. The wetland here is also indigenous sedgeland dominated by Isolepis prolifera (the bright yellow green colour). This was assessed as 'wet pasture' (Section 4.3.1), with the indigenous Isolepis prolifera recorded as only 5% cover (Appendix A, Assessment of Effects on Freshwater Ecology). Photographed by Timothy Martin, 26 June 2026.



Plate 5. Upper reaches of Wetland 12 with kahikatea forest on a hillslope seepage (photograph distance), and a seepage dominated by swamp millet and creeping buttercup, with swamp kiokio (Parablechnum minus) and Isolepis prolifera (foreground). This wetland area, including the kahikatea, was assessed as ‘wet pasture’ in the Assessment of Effects on Freshwater Ecology (Section 4.3.1). Photographed by Timothy Martin, 26 June 2026.



Plate 6. Wetland 13 viewed looking downstream from its confluence with Wetland 12. Yorkshire fog is dominant but there are areas with wheki, Cyperus ustulatus, and Carex lessoniana. This

wetland is descibed by the Applicant as ‘exotic’ with ‘Negligible’ indigenous biodiversity. Photographed by Timothy Martin, 26 June 2026.



Plate 7. Area of Wetland 13 locally dominated by indigenous sedges including Cyperus ustulatus and Carex secta. This area was also described as wet pasture without indigenous habitat values (Assessment of Effects on Freshwater Ecology, Section 4.3.1). Photographed by Timothy Martin, 26 June 2026.



Plate 8. Upper eastern arm of Wetland 13 with patches of wheki, Cyperus ustulatus, and occasional manuka. This area is upstream of the boundary of Wetland 13 as mapped by the Applicant (i.e it was not mapped as wetland). Photographed by Timothy Martin, 26 June 2026.



Figure 1: Retrolens imagery of Wetland Q06/066 (photo right) prior to construction of the pond.



Plate 9: Fenced and restored upper reaches of Q08/066 showing indigenous sedgeland with buffer plantings of indigenous forest species. This is assessed by the Applicant as having Negligible indigenous biodiversity. Photographed by Timothy Martin, 26 June 2026.

APPENDIX 3. MAPS OF WETLAND EXTENT



Figure 1. Upper arm of Wetland 11 excluded by the Applicant (shown in red).

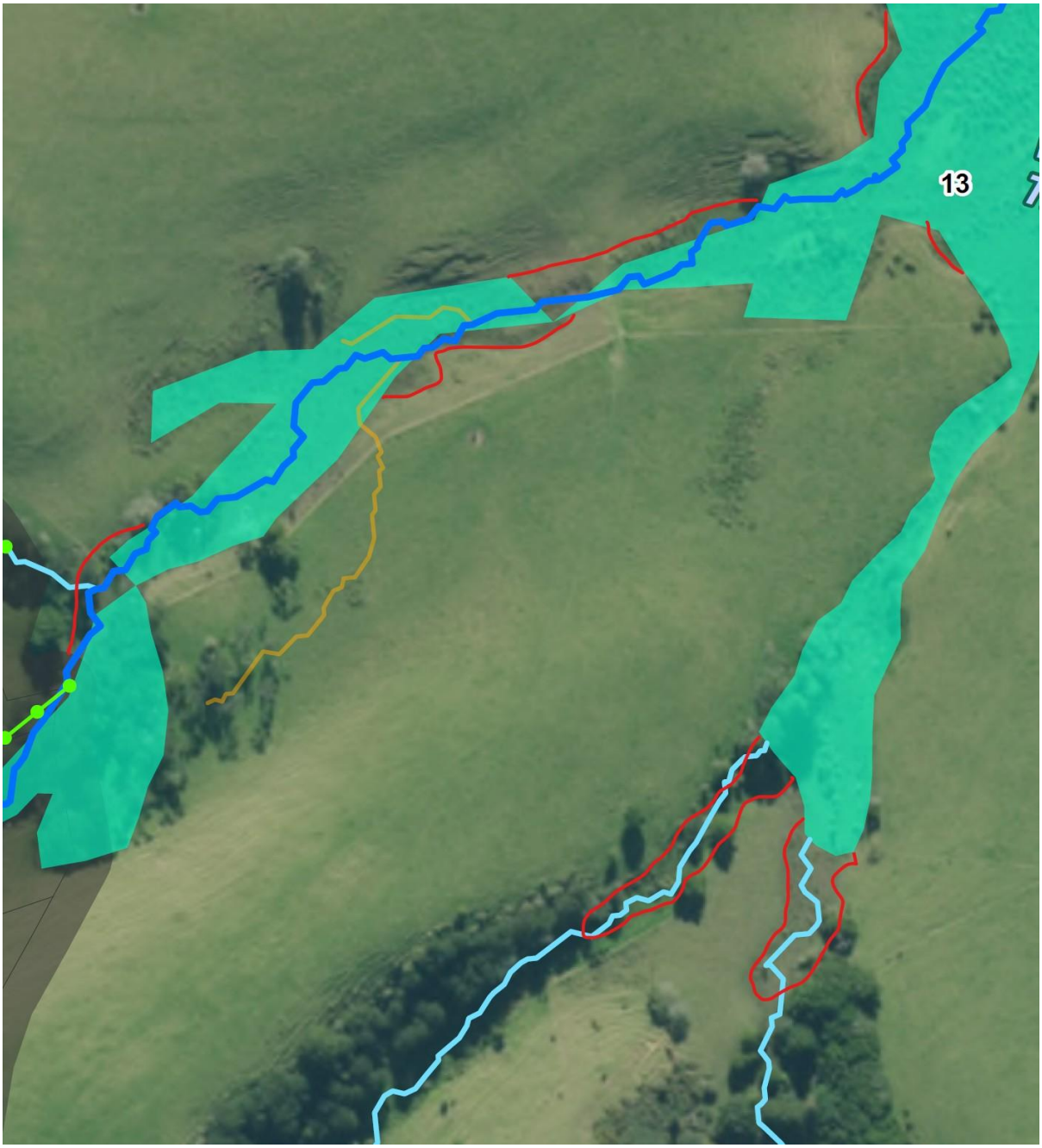

Figure 2. Extent of wetland 13 as mapped by Applicant (green polygons), with additional wetland areas omitted by the Applicant marked in red.

APPENDIX 4: WETLAND HABITATS OMITTED IN THE APPLICANT'S ASSESSMENT



Figure 1. Extract from NRC Indicative wetland layer with location of Wetland 25 marked in red.



Figure 2. Wetland 25 with area of raupo reedland (tawny colour, right of centre).



Plate 1. Raupo reedland (background left) with exotic-dominated wetland with scattered Cyperus ustulatus (centre and bottom right). 26 June 2026.



Figure 3. Wetland 26 (light green polygon) on NRC Indicative Wetland Layer



Figure 4. Wetland 26 visible on Google Earth



Plate 2. View up grazed gully floor of Wetland 26 along the southern edge of proposed mitigation site. 26 June 2026.



Plate 3. View across grazed gully floor of Wetland 26 along south edge of proposed mitigation site. 26 June 2026.



Figure 5. Wetlands 27-31, and likely wetlands 32-33, to the south of the Piroa Stream at Chainage 20600-21100. Imagery from Google Earth.



Plate 4. Wetland 27 with indigenous sedgeland dominated by spike sedge (Eleocharis acuta, Obligate). 26 June 2026.



Plate 5. Wetland 28 with indigenous sedgeland dominated by spike sedge (Eleocharis acuta, Obligate). 26 June 2026.



Plate 6. Wetland 29 is a mixed exotic-indigenous wetland dominated by Edgar's rush, Yorkshire fog, and creeping buttercup, but with patches locally dominated by spike sedge or creeping bent. 26 June 2026.



Plate 7. View northeast across Wetland 30 dominated by soft rush and creeping buttercup, with patches of Edgar's rush. 26 June 2026.



Plate 8: Wetland 31 is dominated by soft rush, creeping buttercup and creeping bent. 26 June 2026.



Figure 6. Wetlands 34-37 as shown on NRC indicative wetland maps.



Figure 7. Areas 34-37 as shown on Google Earth imagery.



Figure 8. Wetland 38 (red polygon) as shown on NRC indicative wetland maps.

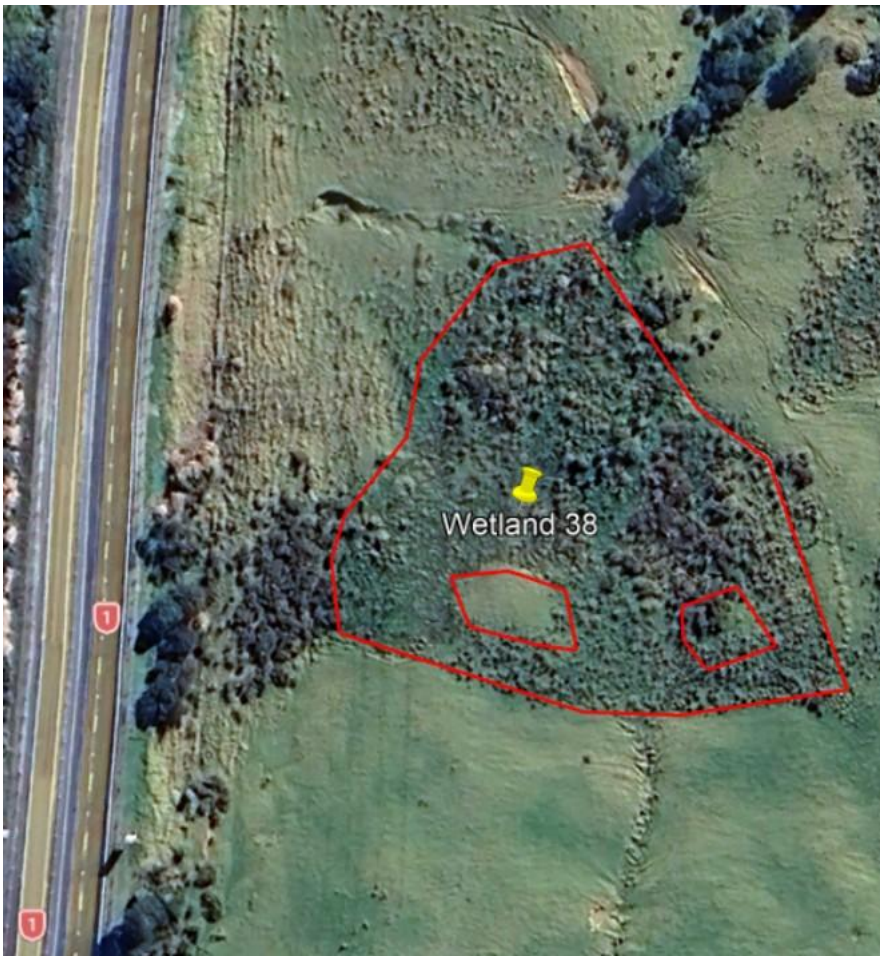

Figure 9. Wetland 38 to the west of Wetland 15. Google Earth imagery.



Plate 9. View north across Wetland 38 from its southern edge. Indigenous swamp millet grassland with Juncus on the drier margins. 26 June 2026.



Plate 10. Central part of Wetland 38 with Machaerina rubiginosa sedgeland and wheki. 26 June 2026.

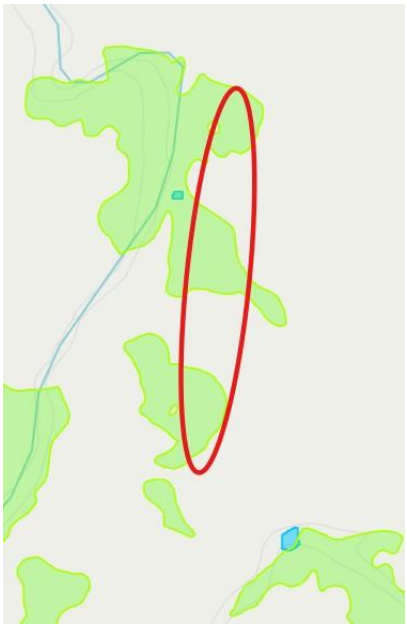

Figure 10. Wetland 39 (likely) shown in red on the NRC Indicative Wetlands Layer.



Figure 11. Wetland 39 (likely) as viewed using Google Earth imagery.

APPENDIX 5. KAHIKATEA TREELAND AT WAIPU



Plate 1. Kahikatea treeland on the western side of SH1 at Waipu mapped as “avoid”. This treeland remnant is grazed with no regeneration. Image from Google Earth Street View 20 July 2026.



Plate 2. Kahikatea treeland on the western side of SH1 at Waipu not mapped as “avoid”. This treeland remnant is also grazed with no regeneration. Image from Google Earth Street View 20 July 2026.