

Before Independent Hearings Commissioners At Wellington

Under the Resource Management Act 1991

In the matter of Applications for resource consents, and a Notice of Requirement for a Designation by Wellington Water Limited on behalf of Upper Hutt City Council, for the construction, operation and maintenance of the structural flood mitigation works identified as the Pinehaven Stream Improvements Project.

Statement of evidence of Adam Sean Forbes for Wellington Water Limited (Terrestrial Ecology)

Dated 20 July 2020

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Table of contents

1	Qualifications and experience	2
2	Code of conduct	3
3	Scope of evidence	3
4	Executive summary	4
5	Existing terrestrial ecology environment	5
6	Terrestrial ecology effects	6
7	Recommended mitigation	9
8	Responses to issues in submissions	12
9	Response to section 42A report	12
10	Conclusions	14
Appendix A	Aerial photograph comparison of Pinehaven residential area	15
Appendix B	Supplementary assessment of terrestrial ecology effects – 50 Blue Mountains Road.....	16

Statement of evidence of Adam Forbes

1 Qualifications and experience

- 1.1 My full name is Adam Sean Forbes.
- 1.2 I am the founder and Principal Ecologist at Forbes Ecology Limited. In this role I provide consulting advice on ecological matters to local and central Government and to private landowners and applicants under the Resource Management Act 1991 ('**RMA**'). Prior to establishing Forbes Ecology Limited, I was employed as a Project Ecologist with Stantec.
- 1.3 I have fifteen years' experience working as an ecological consultant. The last seven years have been as an independent self-employed consultant.
- 1.4 I hold a PhD in Forestry from the University of Canterbury School of Forestry, and I am an Invited Research Associate with the School. I am a current member of the New Zealand Ecological Society.
- 1.5 During my time as an ecological consultant I have undertaken a number of ecological assessments for RMA applications. These projects have included surveys and descriptions of ecological values, assessments of statutory ecological significance (including in terms of section 6(c) of the RMA) for both applicants and regional and territorial authorities, assessments of effects, and development of effects management and monitoring strategies.
- 1.6 The following work experiences are particularly relevant to this application:
 - a Between 2013 and 2019 I held the position of Ecology Reviewer advising Greater Wellington Regional Council ('**GWRC**'), Porirua City Council, Hutt City Council, Upper Hutt City Council ('**UHCC**'), Kapiti Coast District Council on technical ecology matters relating to new resource consent applications, designation changes and compliance during the implementation phase of the Roads of National Significance projects in the Wellington Region, namely the Transmission Gully, Mackays to Peka Peka, and Peka Peka to Otaki roading projects.
 - b During 2016 and 2017 I assisted Porirua City Council with a review of the ecologically significant sites in the Rural Zone of the Porirua District. This required ecological assessments of a large number of natural sites against

the ecological significance criteria contained in Policy 23 of the GWRC Regional Policy Statement ('RPS').¹

- c During 2013 to 2015 I undertook an ecological impact assessment of the Winstone Aggregates Belmont Quarry extension located in the western Hutt Valley hills.

- 1.7 My evidence relates to a Notice of Requirement ('NOR') for Designation and associated resource consent applications for the construction, operation and maintenance of the structural flood mitigation works identified as the Pinehaven Stream Improvements Project ('the Project'). Wellington Water Limited ('WWL') has lodged the resource consent applications and NOR on behalf of UHCC.
- 1.8 I am familiar with the area that the Project covers, and have been involved with the Project as the terrestrial ecology lead since June 2019. On 14 July 2020 I took part in expert witness conferencing in relation to terrestrial ecology.

2 Code of conduct

- 2.1 While these applications are not before the Environment Court, I have read and am familiar with the Code of Conduct for Expert Witnesses in the current Environment Court Practice Note (2014). I have complied with the Code in the preparation of this evidence, and will follow it when presenting evidence at the hearing.
- 2.2 The data, information, facts and assumptions I have considered in forming my opinions are set out in my evidence to follow. The reasons for the opinions expressed are also set out in my evidence to follow.
- 2.3 Unless I state otherwise, my evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

3 Scope of evidence

- 3.1 This evidence addresses the following matters:
 - a Existing terrestrial ecology environment;
 - b Terrestrial ecology effects;

¹ Policy 23: Identifying indigenous ecosystems and habitats with significant indigenous biodiversity values – district and regional plans.

- c Recommended mitigation;
 - d Responses to issues in submissions;
 - e Response to section 42A report.
- 3.2 I have relied on the assessments and written advice of Ms Alison Davis of Aristos Consultants Limited in relation to fauna values, effects and effects management.² I refer to a number of her conclusions in my evidence to help present a complete picture of terrestrial ecology matters.

4 Executive summary

- 4.1 The key effects of the project in terms of terrestrial ecology will be:
- a Removal of black beech ('low' level of effect), kowhai and kahikatea ('very low' level of effects) trees;
 - b Effects on significant trees at 50 Blue Mountains Road can and will be avoided; and
 - c Loss of bird habitat ('minor' level of effect).
- 4.2 Overall, I consider that these effects will be potentially low or very low (as stated above)
- 4.3 With the mitigation measures that I have recommended (and proposed in the draft conditions), the overall effects will be very low or negligible. These mitigation measures are:
- a Replacement planting of black beech, kowhai and kahikatea trees;
 - b Clearly demarcating ecologically significant trees that are to be avoided;
 - c Avoiding the specified significant trees – both the above-ground components and the respective root zones;
 - d Restricting vegetation clearance that occurs within 4m of any protected indigenous bird species nest; and
 - e Surveys to determine the presence/ absence of lizards and bats with follow up protocols if they are detected.

² Avifauna – for the Pinehaven Stream, included as part of Appendix S to the Assessment of Environmental Effects ('AEE').

4.4 Overall my view of the severity/acceptability of the terrestrial ecology effects of the Project is that with the conditions proposed the adverse effects can be appropriately managed and that the terrestrial ecology effects of the proposal are acceptable.

5 Existing terrestrial ecology environment

5.1 The existing environment comprises a well-vegetated residential area on the valley floor with forested hills surrounding the valley. Most of the existing vegetation located amongst residential properties are exotic trees, shrubs and herbaceous species that have been planted or have established over the last six decades (approximately) since residential development expanded in this area (see the aerial photograph comparison in **Appendix 1**). In addition, a number of native species have also been planted over this time, such as the tree species kowhai, which is relatively common on private land in the Pinehaven residential area.

5.2 Within the Pinehaven residential area, most pre-European forest was historically cleared with the land converted to grazing or housing and roading (see **Appendix 1**). A number of individual trees survived forest clearance and, in addition, in a few instances, clusters or stands of native forest still remain today (see **Appendix 1**).

5.3 A good example of a native forest remnant is the forest located at 50 Blue Mountains Road (refer the Supplementary Assessment at **Appendix 2**), which represents the nature of forest canopy composition occurring in pre-clearance times. In some cases, these remnants also have a composition representing forest types that have been widely cleared and are poorly protected in the Wellington region.

5.4 The riparian zone of the Pinehaven stream provides a mosaic of bird habitats that is predominantly tree or shrub covered, forming a continuously-linked wooded habitat from the top of the catchment to the Hutt River on the valley floor. In total, there are 39 bird species that have been reported, or are likely to be present, in the Pinehaven catchment. This avian diversity is a reflection of the well-forested and good-quality habitat available for birds in the catchment.

5.5 A small number of lizard species are known from the Pinehaven catchment and the forested, shady riparian habitat is not generally favourable habitat for lizards.

- 5.6 There are no records of bat species present within the Pinehaven catchment, and their presence is considered to be unlikely due to favourable bat habitat being very restricted in extent

6 Terrestrial ecology effects

Effects on forests and flora

- 6.1 Effects of the Project on forests and flora are predicted to be as follows:
- a Removal of 13 individual native canopy and sub-canopy trees, of three species, of the following composition: nine kowhai, three black beech, and one kahikatea.
 - b Stream works, including temporary access, within the ecologically significant forest stand at 50 Blue Mountains Road for which effects can be largely avoided with residual effects addressed through remediation.
 - c Removal of miscellaneous vegetation of domestic origins in residential gardens and other green spaces. While this vegetation makes up the bulk of the affected vegetation, it is of negligible ecological value, and for this reason is not considered further in the Project's regime for managing terrestrial ecology effects.
- 6.2 Black beech forest is ranked as Regionally Vulnerable³ due to past forest clearance at a regional scale. Following the best practice approach to determining ecological value of species (i.e., Table 5 of EIANZ (2018) Guidelines for Ecological Impact Assessment ('**EIANZ Guidelines**')⁴), I consider the three black beech trees to be of a "moderate" ecological value, and the ecological effect arising from their loss would be of "low" magnitude (**Table 1** below). Applying the ecological value-magnitude of effect matrix from the EIANZ Guidelines, this equates to a low level of adverse effect from the removal of three black beech trees. If during later project stages the design changes meaning that any of these black beech can be retained, then the black beech should be retained as a matter of priority (and the number of replacement plantings could be scaled back accordingly using the 10:1 ratio).

³ Nick Singers, Philippa Crisp and Owen Spearpoint "Forest ecosystems of the Wellington Region" (December 2018) Greater Wellington Regional Council <https://www.gw.govt.nz/assets/Our-Environment/Environmental-monitoring/Environmental-Reporting/Forest-ecosystems-of-the-Wellington-region-reduced.pdf>.

⁴ Judith Roper-Lindsay, Stephen Fuller, Scott Hooson, Mark Sanders and Graham Ussher *Ecological Impact Assessment (EiA) EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems* (2nd ed, Environmental Institute of Australia and New Zealand Inc, Melbourne, 2018). Available at: <https://www.eianz.org/document/item/4447>

- 6.3 The nine kowhai trees⁵ are each of low ecological value and their loss would result in a low magnitude of ecological effect (**Table 1**). This would equate to a very low level of effect.
- 6.4 The kahikatea tree is of low ecological value and its loss would result in only a very slight change from the existing baseline condition in terms of forest composition and structure and the change would be barely distinguishable, approximating a no-change situation (**Table 1**). The magnitude of effect would be negligible which equates to a very low level of effect.

Table 1. Assessment of effects for native trees affected by the Project.

	Native tree species		
	Black beech	Kowhai	Kahikatea
Ecological value	Moderate	Low	Low
Effect magnitude	Low	Low	Negligible
Level of effect	Low	Very low	Very low

- 6.5 During March 2020, the project team discussed with me plans to undertake stream works along three stream reaches at 50 Blue Mountains Road. In response to this I undertook a site visit on 12 March 2020 and have assessed the effects of these proposed stream works. This assessment is included as an appendix to my evidence (**Appendix 2**).
- 6.6 In summary, my recommendations for the proposed works at 50 Blue Mountains Road (set out in **Appendix 2**) were heavily focused on avoidance of effects to significant trees and forest values, and with input on site from the arborist, my recommendations have been to avoid adverse effects on all significant trees located in proximity of the works.
- 6.7 Some other common forest flora would also be affected, however as described in my report, this is limited to non-significant trees and is coupled with a plan for remediation and other mitigation measures as provided in my report (**Appendix 2**). My recommendations for works in 50 Blue Mountains Road need to be implemented fully. In addition, proposed conditions must specify management of fauna related effects which would be relevant to and applied at 50 Blue Mountains Road. I am comfortable that terrestrial ecology effects can be managed in association with the works proposed for 50 Blue Mountains Road and that the conditions proposed in the evidence of **Ms Helen Anderson** are adequate to achieve this.⁶

⁵ Some of which are clearly planted as they occur in rows, but all have been assumed to be naturally occurring for the purposes of this assessment.

⁶ Anderson EIC, para 13.14 and Appendix 2, pg 43-44.

Effects on terrestrial fauna

- 6.8 With respect to birds, the loss of 13 individual native canopy and sub-canopy trees would result in a loss of feeding and roosting resources. However, the resources lost would still remain common in the surrounding landscape and therefore birds would switch to use those other resources. The fauna assessment provided by Ms Alison Davies provided in response to the Council's section 92 request concludes that loss of breeding pairs of indigenous birds from the catchment is unlikely given the scale of vegetation clearance proposed relative to the vegetation to be retained.⁷ Therefore, the loss of bird habitat will be a minor adverse ecological effect. Further, Condition 36⁸ is proposed to manage effects on avifauna during the breeding season. Overall I am comfortable that the conditions adequately manage adverse effects to terrestrial avifauna.
- 6.9 Although conditions along the affected riparian areas are not particularly suitable for lizards, it cannot be concluded that lizards are absent entirely. For this reason, potential effects on lizards (if they are present) are proposed to be managed through a Lizard Management Plan which will set out a method for survey, salvage, transfer and release of lizards associated with habitats affected by the project.⁹
- 6.10 Similarly for bats, an absence of bats from the Project area cannot be demonstrated, and for this reason a condition is proposed for a bioacoustics survey prior to works commencing.¹⁰ If this survey detects bats, then a suitably qualified ecologist will survey the affected area for the presence of bats and bat roosts. If roosting is detected then a pre-tree felling protocol will be prepared in consultation with the Department of Conservation for the purpose of avoiding the injury or mortality of roosting bats. Any tree works would then be undertaken in accordance with the pre-tree felling protocol.

Effects on significant indigenous vegetation or habitats: s6(c) of the RMA

- 6.11 Some elements of the affected terrestrial ecology are significant in terms of RPS Policy 23, meaning they are relevant to s6(c) RMA considerations. These elements are:

⁷ Section 92 response to UHCC dated 21 February, 2020, Appendix A, Table 1, page 11.

⁸ UHCC Section 42A Report, Appendix 5, Condition 36.

⁹ UHCC Section 42A Report, Appendix 5, Condition 38.

¹⁰ UHCC Section 42A Report, Appendix 5, Condition 37.

- a The three mature black beech trees, which meet the 'Rarity' criterion of RPS Policy 23 as black beech forest is classified as Regionally Vulnerable.¹¹ Adverse effects from removal of the black beech trees have been assessed and will be managed through replacement planting at the ratio stated in my assessment and discussed below at 7.2 below.
- b The native forest remnant located at 50 Blue Mountains Road is an old-growth forest remnant that meets the 'Representativeness' criterion of RPS Policy 23 (due it no longer being 'commonplace') and is therefore significant in terms of RMA s6(c). Works are proposed at three locations within this forest remnant. I have assessed the effects of these works, and have concluded that effects to all significant trees can and will be avoided. Other effects can be managed through remediation efforts timed around construction works (see **Appendix 2**).
- c If lizards or bats were detected, then the bats and probably the lizards (depending on which lizard species) would also trigger the 'Rarity' criterion under RPS Policy 23. This matter has been pre-empted and conditions are proposed to manage effects to each of these fauna groups.

7 Recommended mitigation

- 7.1 With respect to effects management, best practice ecological impact assessment guidance (see p. 84 of the EIANZ Guidelines¹²) states that levels of adverse effect of low or very low are not normally of concern, meaning they do not warrant replacement planting or similar effects management measures. Although these levels of effect apply to black beech, kowhai and kahikatea, I have recommended a proposed condition relating to replacement planting with ecosourced seedlings as these species require deliberate replacement to ensure their recruitment back into the project area and my recommended replacement planting therefore helps ensure the replacement of these lost individual trees.¹³
- 7.2 For each tree species, replacement planting at the following ratios has been proposed to ensure the levels of effect arising from tree loss are adequately

¹¹ Nick Singers, Philippa Crisp and Owen Spearpoint "Forest ecosystems of the Wellington Region" (December 2018) Greater Wellington Regional Council <<https://www.gw.govt.nz/assets/Our-Environment/Environmental-monitoring/Environmental-Reporting/Forest-ecosystems-of-the-Wellington-region-reduced.pdf>>.

¹² Judith Roper-Lindsay, Stephen Fuller, Scott Hooson, Mark Sanders and Graham Ussher *Ecological Impact Assessment (EiA) EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems* (2nd ed, Environmental Institute of Australia and New Zealand Inc, Melbourne, 2018). Available at: <https://www.eianz.org/document/item/4447>

¹³ UHCC Section 42A Report, Appendix 5, Conditions 32 and 33.

addressed. The ratios represent the number of ecosourced seedlings planted for each of the identified tree species lost:¹⁴

a Black beech 10:1;

b Kowhai 3:1;

c Kahikatea 5:1.

7.3 The following further conditions have been proposed in relation to planting of these trees:

a Seedlings used for replacement plantings must be sourced from the same Ecological District;¹⁵

b All seedlings for replacement planting should be of an advanced grade (>60cm height at planting) and planted into appropriate soil and microclimate conditions;¹⁶ and

c Planting locations should be as close to the point of loss as practicable..¹⁷

7.4 These conditions in relation to planting will ensure that the level of adverse effect from the Project is low for Black Beech and very low for both Kowhai and Kahikatea.

7.5 The proposed planting conditions above are shown in the updated landscape plans attached to the evidence of **Mr David Compton-Moen**.

7.6 Regarding the proposed works at three stream reaches at 50 Blue Mountains Road, **Ms Helen Anderson's** evidence proposes a new condition which would require the consent holder to engage a suitably qualified ecologist to clearly demarcate setbacks from the ecologically significant trees identified in Sites B and C as described in **Appendix 2** of my evidence.¹⁸

7.7 All construction works at 50 Blue Mountains Road would adopt the following effects management measures:¹⁹

a Clearly demarcate ecologically significant trees that are to be avoided;

¹⁴ UHCC Section 42A Report, Appendix 5, Condition 33.

¹⁵ UHCC Section 42A Report, Appendix 5, Condition 33.

¹⁶ UHCC Section 42A Report, Appendix 5, Condition 34.

¹⁷ UHCC Section 42A Report, Appendix 5, Condition 35.

¹⁸ Anderson EIC, para 13.14 and Appendix 2, pg 43-44.

¹⁹ Anderson EIC, para 13.14 and Appendix 2, pg 43-44.

- b Avoid the specified significant trees – both the above-ground components and the respective root zones;
 - c Clean all machinery of plant pest propagules prior to entry to 50 Blue Mountains Road, to prevent the importation of plant pests to the present ecosystem; and
 - d Following the completion of works at Site C, reinstate the disturbed area with rough tree fern seedlings and stem segments salvaged from the work area pre-works, as outlined in my supplementary report (see **Appendix 2**).
- 7.8 The vegetated nature of the existing environment means that there is a degree of resilience to the bird community from vegetation clearance at the relatively limited scale proposed. Adverse effects to bird nesting will be addressed through restrictions of vegetation clearance within 4 m of any protected indigenous bird species nest and through the proposed replacement plantings.²⁰ I also recommend that a procedure shall also be provided prior to construction commencing for the management or relocation of any native birds found nesting within the construction areas during the construction period, this is proposed in the evidence of **Ms Helen Anderson**.²¹
- 7.9 Adverse effects to lizards will be addressed through surveys and salvage of lizards from affected habitats and relocation of those individuals to suitable release sites.²²
- 7.10 Adverse effects to bats will be managed through surveys to determine the presence/absence of bats with follow up protocols to manage bats in relation to tree felling if they are detected. These measures will be developed in consultation with the Department of Conservation.²³

Overall assessment of effects – with mitigation

- 7.11 Overall, after mitigation actions are applied, it is my view that the effects of the project on terrestrial ecology are acceptable. The conditions require important measures to manage adverse effects and in some instances management plans are required to provide the appropriate level of effects management detail and planning.

²⁰ UHCC Section 42A Report, Appendix 5, Condition 36.

²¹ Anderson EIC, Appendix 2, pg 42.

²² UHCC Section 42A Report, Appendix 5, Condition 38.

²³ UHCC Section 42A Report, Appendix 5, Condition 37.

8 Responses to issues in submissions

- 8.1 I have reviewed the submissions lodged in relation to the resource consent applications for the Project. Where I am able to respond to the matters raised, I do this below.

Adverse effects on resident goose

- 8.2 Submitter 1 (Karyn Mills) raises concerns about adverse effects on a resident goose. While I respect this concern it is my opinion that geese are highly mobile and adaptable species, and while there might be some disruption during the period of works, this bird is likely to adjust well to the restored stream corridor following works. I have not seen this bird myself.

Tree removal

- 8.3 Submitter 4 (Deborah Griffiths) raises concerns about the removal of trees from her property (14 Blue Mountains Road). Submitter 4 accepts tree removal is required but would like the black beech on her property to be retained where possible. I have assessed this black beech which is 59.5 cm diameter at 1.35 m above ground level. This is a mature and valuable tree and as set out in my evidence above, I recommend that all black beech should be retained if the opportunity is presented during later project stages. However, if avoidance is not possible then I am comfortable that the loss will be adequately addressed through the 10:1 replacement ratio that I have proposed for black beech.

9 Response to section 42A report

Upper Hutt City Council

- 9.1 Paragraph 10.16 states that resource consents²⁴ have already been granted to remove trees numbered 22 (oak) and 23 (black beech) and also removal of several kowhai trees. I have reviewed those consent documents and can confirm that the replacement ratios for canopy trees are identical to those proposed in this application. Therefore, whether the trees are lost through the existing consents or the current application is not a concern to me, the effects management in terms of replacement planting will be the same.
- 9.2 Paragraphs 10.39 to 10.48 provide comment on ecological effects. The points made largely relate to the replacement ratio that Council is seeking for 0.25 ha of

²⁴ These resource consents are: 1) Undertake Improvements to the Culvert for Flood Management Improvements at Road Reserve on Sunbrae Drive and 4 Sunbrae Drive, Pinehaven (ref 1910164), and 2) Undertake Improvements to the Culvert for Flood Management Improvement at the Corner of Pinehaven and Blue Mountains Roads (ref 1910165).

native riparian vegetation in addition to the canopy tree replacements I have recommended, and also covers issues around setbacks of tall trees from residential dwellings. Both of these issues were covered in caucusing between Ms Paler and myself on 14 July 2020, at which time Ms Paler reduced her recommended replacement ratio from 3:1 to 2:1.

- 9.3 In summary, my advice regarding this 2:1 replacement ratio is based on the premise that the affected vegetation is of a low ecological value and the magnitude of effect would be moderate. Following EIANZ Guidelines (2018), this combination of value and effect magnitude would result in a low level of effect and this does not normally need to be addressed through provision of positive effects. According to best practice guidance (EIANZ 2018), effects management in this combination of value and effect magnitude is more appropriately focused on minimisation of effects through design and implementation of works.
- 9.4 During caucusing, Ms Paler and I established that the area of native vegetation under consideration for this replacement is 0.25 ha. The affected vegetation is readily replaceable (both in terms of timeframes and risk of recruitment failure) and in this instance I maintain that the replacement of the affected vegetation is not necessary. One should note that I took a different approach to management of low levels of effect to long-lived canopy trees (i.e., my recommended replacement ratios for black beech, kowhai and kahikatea), as those features need to be deliberately replaced, and to re-attain the existing values their replacement through planting seedlings is a longer-term process. Hence this illustrates how low levels of effect can sometimes require positive effects to address depending on the nature of the affected feature.
- 9.5 All of this said, I note that the project actually already proposes to establish 0.6 ha of native restoration plantings in response to vegetation clearance so this would accommodate Ms Paler's recommended replacement of 0.25 ha at a ratio of 2:1 (i.e., resulting in a requirement for 0.5 ha of native restoration planting). From my perspective this makes this issue of disagreement over whether replacement plantings are necessary for the 0.25 ha of native vegetation a moot point.
- 9.6 Regarding the suggested need to set back tall trees 10 m from residential properties,²⁵ I think this should be dealt with by a condition that protects the plantings on an ongoing basis. My view is riparian forests are critical for stream health and living near a healthy stream will mean having trees in close proximity.

²⁵ UHCC Section 42A Report, paras 10.44 – 10.46.

As such I suggest there are grounds to view tree planting near residential buildings as a positive rather than a negative.

- 9.7 Regarding the recommended conditions, I am happy with the amendments recommended by Ms Paler in her updated report²⁶ (Appendix 7 of the UHCC s42A report), other than my points of disagreement outlined above and in the 14 July Terrestrial Ecology JWS regarding the replacement of the 0.25 ha of low value native vegetation and the set back of tall trees from residential buildings.

10 Conclusions

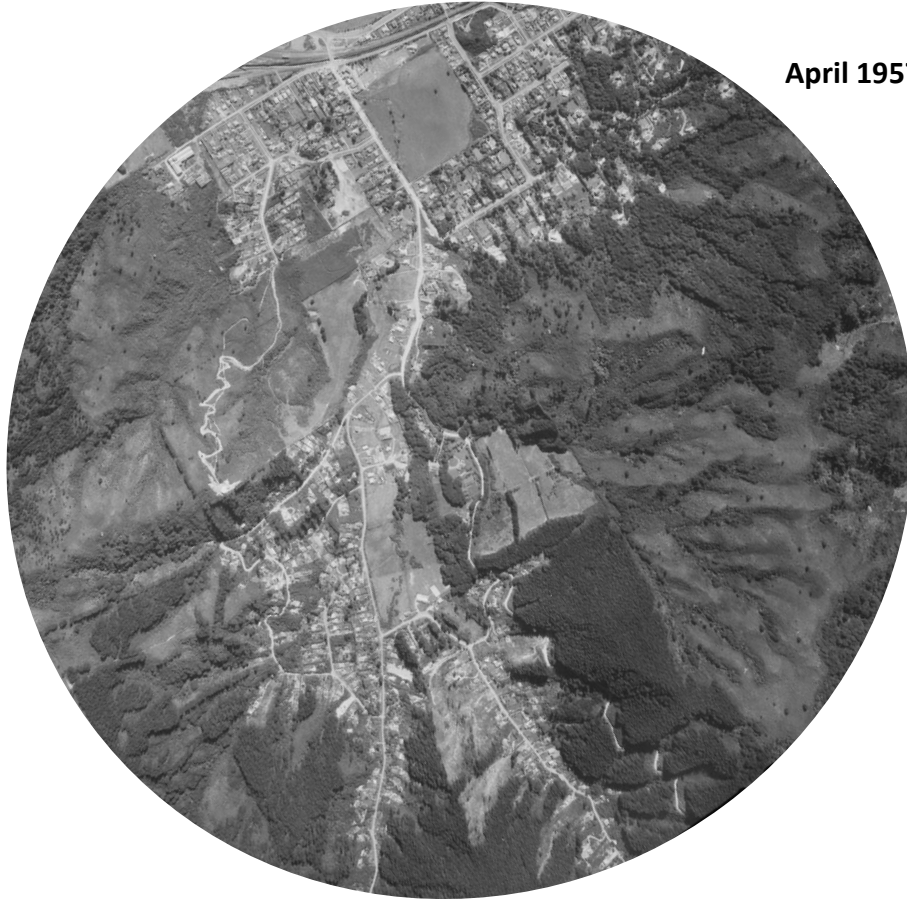
- 10.1 My terrestrial ecology assessment is based on best practice ecological impact assessment principles EIANZ (2018).
- 10.2 I am comfortable that the proposed conditions address my recommendations for effects management.
- 10.3 Based on the effects and recommended mitigation outline above, I do not consider that the effects of the Project are significant or sufficiently adverse to the ecology to suggest that the Project cannot proceed.

Adam Sean Forbes

20 July 2020

²⁶ UHCC Section 42A Report, Appendix 7.

**Appendix A Aerial photograph comparison of Pinehaven
residential area**



April 1957



October 2016

**Appendix B Supplementary assessment of terrestrial ecology
effects – 50 Blue Mountains Road**

Supplementary Assessment of Terrestrial Ecology Effects – 50 Blue Mountains Road

Overview

This assessment addresses three stream reaches where stream works have more recently been proposed. The forest at 50 Blue Mountains Road is a sizable (approximately 1 ha) old-growth remnant, with a composition spanning several forest classifications. This diversity is probably explained by the diversity of landforms present. On alluvial flats, old-growth conifer-broadleaved forest exists, and on steeper well-drained slopes and ridge-top positions both hard beech¹ and black beech² are prominent.

Site Visit

I undertook a site visit to 50 Blue Mountains Road on 12 March 2020. The site visit was in the company of project design engineers, engineering contractors and an arborist. The site visit focused on visiting potentially affected stream reaches to assess options for management of effects to terrestrial ecosystems, being primarily riparian forests. Three stream reaches were visited (termed Sites A, B and C in my assessment; see Figure 1 below), and terrestrial ecology effects management for each of these areas is addressed below.

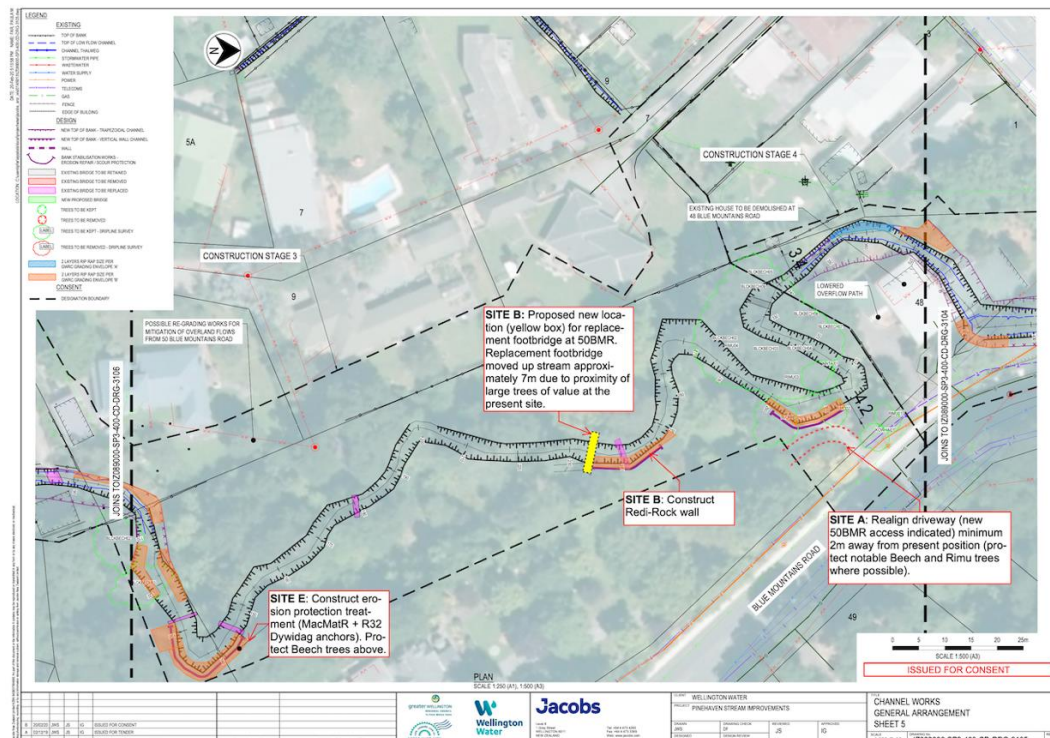


Figure 1. Stream reaches assessed at 50 Blue Mountains Road. The site labelled E on the above plan is Site C in my assessment.

¹ *Fuscospora truncata*

² *Fuscospora solandri*

Site A

Site A is located where the stream passes to the north of the existing driveway of 50 Blue Mountains Road³. The proposed works would involve relocating the existing driveway to the south east in a direction away from the stream alignment. This option was adopted to avoid the need to disturb the sensitive riparian zone along this stream reach.

Key constraints for terrestrial ecology are an old-growth black beech tree (90.5 cm DBH⁴) and a mature rimu⁵ tree (30 cm DBH), which are located adjacent to the existing driveway at 50 Blue Mountains Road. In particular, the black beech tree is an old and ecologically valuable tree. Both trees represent pre-human forest compositions and are therefore ecologically significant under the representativeness criterion of Greater Wellington Regional Council's Regional Policy Statement (GWRC RPS) Policy 23. For this reason, I have recommended avoidance of these two native trees. I understand avoidance can be achieved by relocating the driveway a few metres to the south east, rather than undertaking works on the stream bank.⁶ On this basis, no vegetation of significance would be affected by a driveway relocation of this nature.



Figure 2. Black beech and rimu trees, recommended to be avoided, located adjacent to the existing driveway at 50 Blue Mountains Road.

³ At approximately: 41° 9'20.77"S 175° 0'52.41"E

⁴ DBH means tree trunk diameter at breast height, which is 1.35 m above ground level

⁵ *Dacrydium cupressinum*

⁶ Clarification letter to GWRC dated 25 March 2020, pages 31-32

Site B

Site B is located in proximity of a small foot bridge across the stream⁷.

Key ecological constraints are limited to the left bank where three kahikatea⁸ trees are located in close proximity to the existing foot bridge (Figure 3). This foot bridge is proposed to be removed and replaced a short distance upstream in a location well clear of any significant trees. Sensitive removal of the bridge is proposed, and this is expected to avoid adverse effects to the three adjacent kahikatea trees. Adverse effects to significant trees would be avoided at Site B.



Figure 3. View looking along the existing foot bridge with the trunks of two kahikatea trees, one located to each side of the bridge.

In addition, opportunities were noted for salvage and relocation of kahikatea and tree fern seedlings from affected areas and in the immediate surrounds to form part of the replacement planting seedling stocks.

Site C

Site C is the upstream-most of the three 50 Blue Mountains Road proposed works sites covered in this report⁹. The site is located on a bend in the stream and access to the site for stream works would be required along a temporary access alignment parallel to the stream channel, upstream of the site.

There are several significant large-diameter native trees on the true left bank for which adverse effects must be avoided. These native trees are:

- One tanekaha¹⁰,
- One rimu,
- One kahikatea,
- One kamahi¹¹.

I have recommended that adverse effects to each of these trees be avoided and it is understood that avoidance is possible and will be achieved. This would involve avoidance of

⁷ At approximately: 41° 9'21.95"S 175° 0'52.63"E

⁸ *Dacrycarpus dacrydioides*

⁹ At approximately: 41° 9'24.62"S 175° 0'54.53"E

¹⁰ *Phyllocladus trichomanoides*

¹¹ *Weinmannia racemosa*

effects both to the above-ground portion of the trees and also their respective root zones. A new condition should require a suitability qualified ecologist to clearly demarcate setbacks from the above trees so that avoidance is achieved.

In two locations, individual mahoe¹² trees, which are not ecologically significant with respect to GWRC RPS Policy 23, will be cut back (but not removed entirely) to facilitate temporary construction access and these trees will naturally re-sprout and re-grow over time. This approach has the benefit of retaining the live mahoe root mass on the stream banks to maintain bank stability through the works period and beyond. The finer details of the extent of pruning of each individual will be determined by the suitably qualified ecologist prior to works commencing, as required by a new proposed condition.

A number of mature rough tree fern¹³ occur on the true left bank and these would need to be removed for temporary access and to provide a space to carry out stream works from. These rough tree fern will be felled and cut into 2 m sections, will then be stockpiled nearby in moist and shaded conditions, and these stem segments will then be scattered across the ground, post-works, to enable the tree fern stem sections to sprout and re-grow in the disturbed area. Similarly, a number of rough tree fern seedlings will be salvaged from this disturbed area (pre-works commencing) and then replanted (post-works), as part of the remediation effort. These remediation measures will be confirmed by the suitably qualified ecologist prior to commencement of works.

On the true right bank are a number of mature beech trees (both hard and black beech), located high on the upper slope, which must be avoided (avoidance relates both to the above ground tree parts and the tree roots – which I note extend downslope to within several meters of the stream). It is understood that the stream works methodology has accommodated these trees and avoidance will be achieved.

One mature mataī tree is located immediately downstream of the existing foot bridge and while the tree is beyond the works area, the roots might extend upstream of the bridge into the proposed stream works area. Therefore, any excavation in this site must be sensitive to and maintain the integrity of the mataī tree's root system. Hand pruning of affected roots was discussed with the arborist as an appropriate method of trimming back tree roots, should this level of intervention be required. An arborist should supervise these excavation works and execute any necessary root pruning, and this should be required by a new condition.

One kauri¹⁴ is present in the true right riparian zone and would likely be removed by the proposed stream works. This is a planted specimen – as the Wellington Region is well south

¹² *Melicytus ramiflorus*

¹³ *Dicksonia squarrosa*

¹⁴ *Agathis australis*

of kauri's natural range. Given the planted nature of the kauri specimen, the tree is not considered ecologically significant with respect to GWRC RPS Policy 23.

In addition to achieving the above avoidance and remediation measures, I recommend the following additional effects management measures to protect terrestrial ecological values at 50 Blue Mountains Road (required by a new condition).

- Have a suitably qualified ecologist clearly demarcate ecologically significant trees that are to be avoided, and determine the extent of pruning to native trees to provide access to works areas.
- Avoid the specified significant trees – both the above-ground components and the respective root zones,
- Clean all machinery of plant pest propagules prior to entry to 50 Blue Mountains Road, to prevent the importation of plant pests to the present ecosystem,
- An arborist shall supervise any excavation works within the root zone of one mature mataī tree is located immediately downstream of the existing foot bridge at Area C. If pruning of the root system is required, this shall be executed by an arborist in a manner (e.g., hand pruning) that maintains the integrity of the mataī tree's root system.
- Following the completion of works at Site C, reinstate the disturbed area with rough tree fern seedlings and stem segments salvaged from the work area pre-works, as outlined above in my report above.

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31/03/2020