

BEFORE THE HEARING PANEL

UNDER the Resource Management Act 1991

IN THE MATTER of submissions and further submissions on Upper Hutt District Council Plan Change 49- Variation 1 to the Operative District Plan Silverstream Spur.

Submitter **GUILDFORD TIMBER COMPANY LTD (Submitter 82, Further Submitter 12).**

**STATEMENT OF EVIDENCE OF Dr VAUGHAN FRANCIS KEESING
(ECOLOGY)**

ON BEHALF OF GUILDFORD TIMBER COMPANY LTD

Dated: 17 November 2023

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1.0 Qualifications and Expertise

- 1.1 My full name is Vaughan Francis Keesing.
- 1.2 I am a Senior Ecologist and Director with the consulting firm of BlueGreen Ecology Limited (BGE).
- 1.3 My qualifications include a B.Sc. (Hons, 1st) in Zoology and a Ph.D. in Ecology, both from Massey University, as well as a Certificate in Research Statistics.
- 1.4 My skills lie in community ecology. I have specialist skills in the areas of plant ecology, entomology and freshwater ecology including wetlands. I have worked extensively in freshwater and terrestrial habitats throughout New Zealand.
- 1.5 Prior to being an ecological consultant, I was employed by Lincoln University as a research fellow where I taught entomology, applied ecology and restoration ecology. My research there was largely in invertebrate-plant ecology.
- 1.6 I have been practising as a consultant ecologist for the last 25 years and have worked in a variety of locations including the Wellington region and elsewhere in the lower North Island, West Coast, Canterbury, central North Island, and the Far North, Auckland region, and the Bay of Plenty.
- 1.7 During that time, I have undertaken a wide range of ecological surveys of natural and semi-natural sites, incorporating both botanical and freshwater values. I have provided assessments of the value and significance of sites for many councils and private clients, as well as assessing ecological effects of a range of activities on those sites.
- 1.8 This work has included significance and effects assessments across a range of projects and habitat types, such as:
- 1.8.1 Determining significant wetlands (as part of exercises in the West Coast Region and Ashburton to identify Significant Natural Areas (SNAs) and in Rangitikei as part of its Protected Natural Areas Programme);

- 1.8.2 Bush significance assessments (e.g. over 150 Franklin District Conservation lots, 50 Western Bay of Plenty lots, and many more across New Zealand);
- 1.8.3 Large-scale roading projects involving wetland assessment and devising proposals to offset wetland effects (e.g. MacKays to Peka Peka Expressway, Albany to Puhoi SH 1, and Transmission Gully); Northern busway extension SH1, Northshore, Western link Road (pre M2PP) designation, Omokoroa to Te Puna;
- 1.8.4 Wind farms (e.g. West Wind (Meridian), Hurunui (Meridian), Tararua 3, White Hill (Meridian), Mill Creek (Meridian), Kaiwra Downs (Trustpower), Central Wind (Meridian) and Hauāuru mā raki (Contact Energy)) and Geothermal power generation: Te Kopa, TaHeke;
- 1.8.5 Water storage, water take and waste water projects: Hurunui-Waitohi water storage (North Canterbury), Wakamoekau community water storage, Conway water take allocation, North Christchurch stream minimum flow assessments (macrophyte), Arnold HEPS (Greytown), Wairau HEPS (Blenheim), Project Aqua - Waitaki scheme, Wahapo HEPS (west coast), Dobson HEPS Greytown, Kaniere Lakes HEPS, Ruataniwha tranche 2 water abstraction. Foxton wastewater up grade, Levin wastewater upgrade, Featherston wastewater upgrade;
- 1.8.6 Mine related work: Rio Tinto Barry town flats restoration post mining, Tiwai smelter adjacent land values and management, Mananui sand mining Hokatika, Gold mining Ross, Roa mining coal impacts of streams, Grey town, Coal flat (Echo mines), Waihi gold mining expansion, and a number of assessments for mine prospecting operations on the West Coast;
- 1.8.7 River diversion and modification projects: Manawatu River at Woodville for railway security, numerous diversions for roading (TG, M2PP), Taranaki Stream (Woodend), Duck Creek south and North (Porirua), Kakanui diversion (Waikanae);

- 1.8.8 Over 20 large-scale subdivisions (e.g., Omaha South (Darby Partners), Long Bay (Landco), Pegasus Bay (Infinity Co), and Ravenswood (at Woodend);
- 1.8.9 Sensitive area developments: Brand Housing, - Titirangi, 1999 – 2002, Piha Coastal Environments Ltd – Piha, 2000, Douglas Subdivision – Tutukaka, 1999, Lake Brunner subdivision, 2004, Lake Mahinapua tree top walkway, Te Ari Golf resort, Ohau Golf course; and
- 1.8.10 Plan changes and statutory processes (e.g., Porters Ski field expansion); and Rakai Water Conservation Order (WCO) amendment, Hurunui WCO, Ngaruroro WCO, Rangitikei Ecological Region Survey Report for the Protected Natural Areas Programme, DoC, 1994; MfE Riparian Assessment Protocol, 2000; Wairoa Catchment Studies, ARC 1999.

2.0 Code of Conduct

- 2.1 I have read the Code of Conduct for expert witnesses in the Environment Court Practice Note 2023. I agree to comply with this Code. The evidence in my statement is within my area of expertise, except where I state that I am relying on the evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

3.0 Scope of Evidence

- 3.1 My statement of evidence at this hearing is in relation to identification of the Silverstream Spur Natural Area (Figure 1) specifically the boundaries proposed on the Silverstream Spur. These have been identified in the Map included in the Officers Report recommended wording.

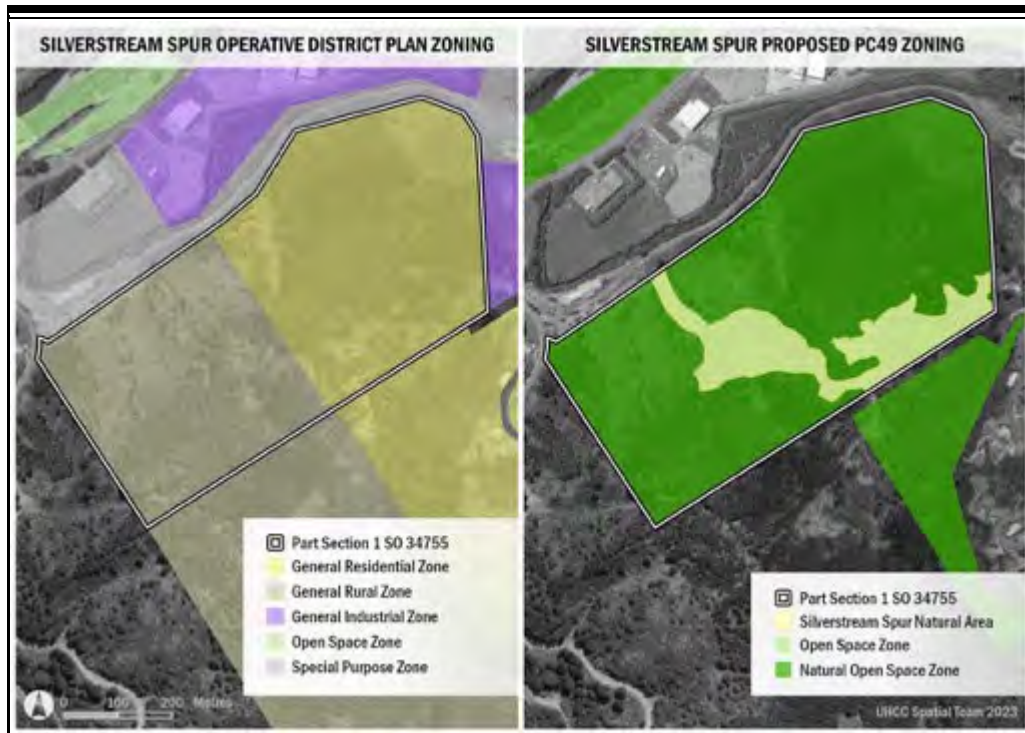


Figure 1. The Spur and Spur natural Area (part of draft SNA UH070 feature).

4.0 Involvement with the site

- 4.1 I have been working with GTC since around 2017 and prior to that with and through my colleagues at Boffa Miskell since 2007. I have crossed the entire site a number of times on foot and undertaken walking and plot data collection in most of the indigenous forest remnants and regenerating features on the long and complex mosaic of a site that it is.
- 4.2 As a result I am familiar with much of the Silverstream Spur and neighbouring GTC owned property and its indigenous components. I have previously undertaken ecological assessments of that area and GTC owned land to inform the land swap proposal.
- 4.3 That work included looking closely in particular at those values associated with “the Spur” and Draft SNA UH070 as proposed Wildlands (2018) of which the spur forms part of a complex of features.
- 4.4 An aerial of this area is set out below in (Figure 2)



Figure 2. The “spur” part of UH070 at the end of Kiln Street

- 4.5 I was asked in August 2023 to undertake an ecological assessment of the values of the Spur on behalf of GTC. Part of that assessment was to consider the extent of those ecological areas mapped by Wildlands (2018) and identified by Wildlands as significant indigenous vegetation as part of Plan Change 49 – Variation 1 as notified was accurate. I was also asked to consider the assessment made to inform Variation 1, and provide my own assessment in addition to reviewing the Wildlands Silverstream Spur Ecological Values Assessment that was included at Appendix 3 of the s32 Report for Variation 1.
- 4.6 The ecological assessment in the Section 32 report is very short and high level without any reference to vegetation plot data or other on-site data collection or survey. The shortcomings of that report have been accepted by the Reporting Officer in the s42A report. That assessment refers to ecological assessment area UH070 (Pinehaven Valley Forest and Scrub) and is a much wider assessment unit, previously used by the draft

Wildlands study conducted in 2018 (and 2020), which the Silverstream Spur site forms a very small part of.

4.7 I note this study remains in draft form. It was advanced in 2018 and changed in 2020 to map Upper Hutt's threatened indigenous flora and fauna based on the DoC classification – it was completed through a desktop study and limited site visits. The Officer's Report discussed the Report at (para 143), but the Officer accepts that the Wildlands Study did not include a detailed assessment.

4.8 In essence the Section 32 Wildlands information is that the Silverstream Spur has /is:

- a. Tree fernland with ponga and mamaku.
- b. Kāmahī-broadleaved species forest with beech, mānuka, kanono, māhoe, and putaputawētā.
- c. Wilding pines and deer present.

And that it therefore is/meets significance criteria:

- d. RPS23a: Representativeness.
- e. RPS23d: Ecological Context.

4.9 I disagree with the findings of that study in relation specifically to the Silverstream Spur Natural Area, included in Variation-1 (but also Wildlands assessment of the wider UHO70 SNA its derived from). Those findings were disputed by GTC (at that time) in respect of their land and have not yet been resolved as UHCC have put that work on hold. The Natural Area on the Silverstream Spur identified in Variation-1 does not reflect my expert opinion as to the values present on the Silverstream Spur, or the values that Boffa Miskell or I had previously mapped as part of our work on the wider GTC site.

4.10 I agree with point (a) and that there is an area of point (b) present and I also agree with point (c), but my issue with this assessment is the significance assessment which is far too coarse in that it clumps "values" attributable only to one feature to the entire area.

4.10.1 The Silverstream Spur is predominantly tree fern and a mamaku gully, (point a.), and I agree with the report in that regard, but not that it is therefore significant.

4.10.2 There is an area of kamahi broad leaf with beech (type b), and while I agree and support the inclusion of that area, it is the only community in the SNA that has the representative and context values stated. This appears to be driving the “significance” outcome in the Section 32 material for all of the areas included as a the Silverstream Natural Area on the Spur and gully. It is incorrect as it is only present in a small area of the spur. I do not agree with this approach or conclusion, and I discuss this in detail below.

4.11 I have had a long history with this site. A summary of that is below:

4.11.1 In 2020 I undertook additional surveys (on top of existing Boffa Miskell Limited site surveys and mapping already completed in 2007-2008) to determine if the Exposure draft NPS-IB significance criteria and the RPS policy 23 criteria changed any of the previously mapped boundaries of this area.

4.11.2 In 2021 Wildlands and I undertook a further site visit and assessment of the Guildford property and the Silverstream Spur. That study (which included other SNA areas) used the GWRC RPS significance criteria of Policy 23.

4.12 The Wildlands Study does not reflect the outcomes of the joint site visit and what was agreed with Wildlands at the time, as being the values attributable to the Spur as I (or Boffa Miskell) had mapped previously.

5.0 October 2023 assessment

5.1 On 19 October 2023 I undertook another data collection site inspection focusing on the proposed SNA boundaries in Variation 1 for the Silverstream Spur. The purpose of this work was to ground truth the SNA boundaries provided in the notified version of Variation 1. A description of my methodology for that exercise is set out below.

- 5.2 I collected a number of representative RECCE vegetation plots to determine the species and cover data and a walked transect so as to be able to provide detail on the type and condition of the regenerating vegetation (and observable fauna) and consider the full set of significance criteria – both those of Policy 23 of the RPS as well as the set in Appendix of the NPS IB (2023).
- 5.3 I also undertook RECCE plot data collection under the pine plantation and in recently harvested pine areas on the GTC property to be able to compare the regenerative character of the Spur and that found under plantation forestry (as opposed to a natural forest).
- 5.4 My walked transect and RECCE plots are shown in the figure below (Figure 3).

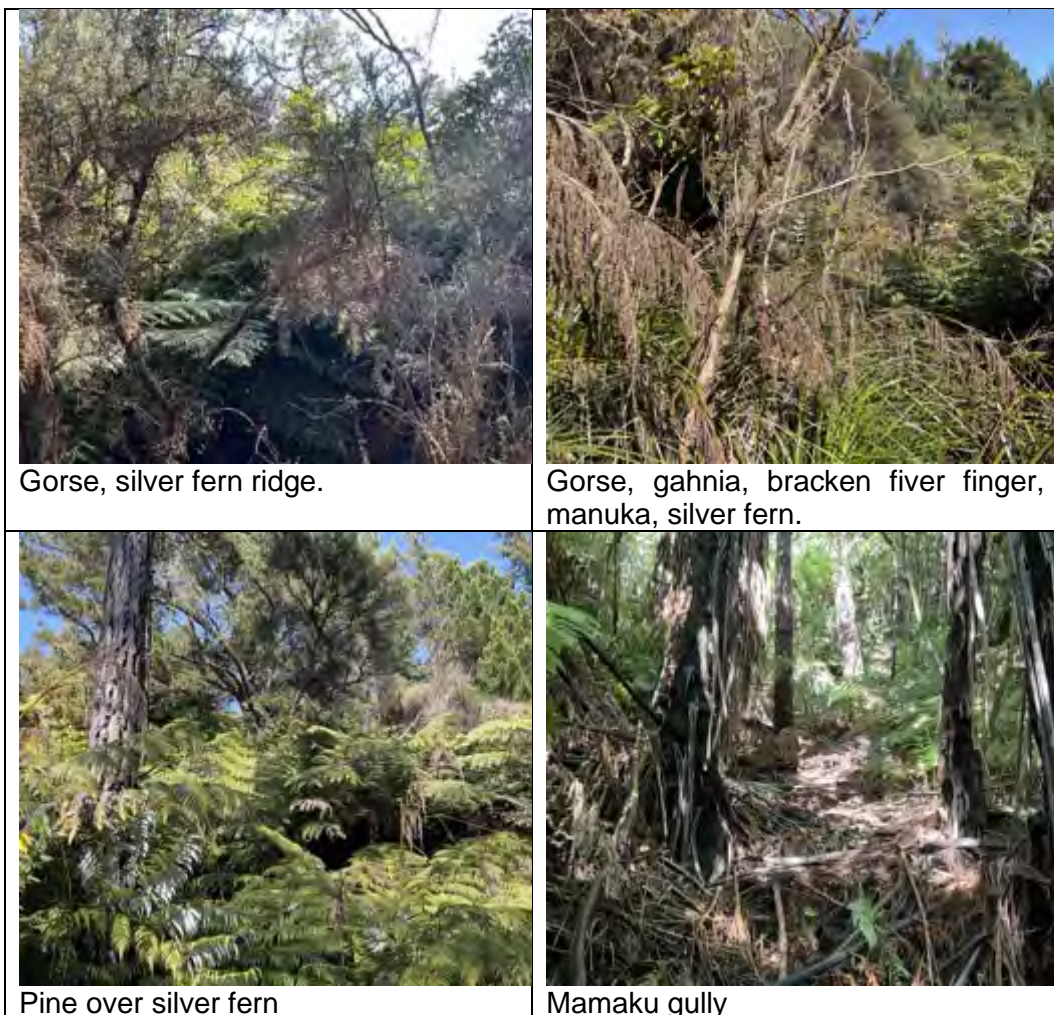


Figure 3. Walked vegetation transect and RECCE plot locations as well as the proposed UH070 boundary (yellow).

- 5.5 These plots were done to clarify the extent of species cover, species richness, the character and type and from so as to assess the representativeness and diversity and rarity of the vegetation. This data, with the historic aerial condition of the area, allows a more thorough understanding of the fit to the significance criteria of both the NPS IB and Policy 23 of the RPS.
- 5.6 I have appended my plot data to this evidence. The species richness was low (3-12 species) and predominantly tree fern (silver fern on the ridge and

mamaku in the gully) with common broadleaf shrub species (these are depicted in the photographs below) these species are commonly present under pine plantation and 5-10 years after harvest.

5.7 In my plots along the ridge there were no emergent native canopy trees, but there were two young totara outside of the plots. The northern gully is largely a monoculture of mamaku (gully fern) with a clear under tier. The ridge is either pine over silver fern, short five finger, hangehange and pigeonwood over NZ blueberry grass (*Dinella*) or open tall grassland with gorse, Gahnia / bracken and silver fern with scattered manuka. It is young simple common early regenerative species often found under tall pines or a single species cover of mamaku. It has a low diversity and poor representativeness (even of an early seral native community). The following 4 photographs illustrate areas of my transect along the spur.



5.8 The only indigenous fauna I noted were fantail and grey warbler, both common and throughout most New Zealand landscapes and are not threatened or at risk species.

6.0 Historic condition

6.1 Notably the spur has been this way (early simple seral vegetation) for over 80 years. Retrolens (1942-1951) aerials suggest the cover was similar to what we see on the site today. In the 1980's the ridge was very young and sparse (Figure 4).

6.2 Had the significance assessment be conducted in the 1980's it is likely that the area now considered maturing beech would have struggled to meet the significance criteria, given its fragmented mature canopy nature.



Figure 4. 1988 aerial photo of the spur (Retrolens).

6.3 As can be seen from the plot data from under pine plantation communities (plots further north but within the wider UH070 on the GTC lands (Appendix 1)), most of the pine plantation has this same under canopy of indigenous broadleaf shrubs and ferns as much of the wider Spur (The plantation has a greater species richness). If the Spur is representative of anything, it is of the native regrowth under pine plantation which while appreciable, cannot be considered to be representative of the natural regenerative state (see below) and is not significant.

7.0 Role of under canopy

- 7.1 It has been recognised across the country that pine forests have this native shrub under canopy (see Brockerhoff et al 2003¹). Research shows 20-100 native species can be present under pine forest. At the upper end of taxa richness plantation forests have sub layers very similar to native forests.
- 7.2 At harvest it is usually all removed and that is accepted (while the NES for Forestry protects SNA and streams etc., it does not protect all of the native under canopy that develops during forest growth). The plots I undertook show that the pine forests and early seral areas of the property are at the low diversity/species richness end of the scale and cannot be considered representative of indigenous natural seral communities, let alone broadleaf indigenous hardwood forest (even an early seral stage).
- 7.3 I reference this seral hardwood indigenous forest because Wildlands called it this type (they called it kamahi-broadleaf with beech etc. in the section 32 material). This error is also in the Landcover Data base, and in part it appears that the evaluation for Council relied heavily on this label and what that means, in reaching its significance finding.
- 7.4 However, it is not, factually correct for the Spur. The vegetation on the Spur is very early mixed regenerating scrub and shrub under tree fern (Wildlands agree). There is simply not enough kamahi and totara and mature broadleaf species along the Spur to form even a partial canopy let alone be labelled indigenous hardwood forest.
- 7.5 As noted earlier, it is this indigenous hardwood (kamahi) broadleaf beech forest that triggers representativeness and ecological context (and LENZ rarity) not the tree fern-ponga vegetation (of which the great majority of the Spur is).
- 7.6 This tree fern-scrub and mamaku community, while not very representative, is nevertheless common – it is not rare or under

¹ Brockerhoff, E.; Ecroyd, C.; Leckie, A.; Kimberley, M. 2003. Diversity and succession of adventive and indigenous vascular understory plants in *Pinus radiata* plantation forests in New Zealand. *Forest Ecology and Management* 185 (2003), 307-326.

represented and there is a considerable amount of this type of early regenerative vegetation in the Ecological District.

- 7.7 The difficulty with the Wildlands analysis for the Spur and the brief ecological report included in the s32 Report, is that their analysis appears to be based on the earlier analysis for UH070 and it has treated the entire SNA unit as if they were of similar condition and value and therefore elements of value in any part of the larger SNA checked significance for the whole.
- 7.8 While it is not useful to break down every SNA into small fragments to test significance, where vegetation types are different, and in different settings, and are sizable themselves it is sensible and indeed good practice to do so. In the case of Variation 1 this should have been done for the Spur; firstly because the tree fern scrub is a very different community to the hardwood – beech community, but also because the plan contains an overlay of a proposed Silverstream Spur Natural Area, restricting activities and placing additional protections on that site which does not require that level of protection. It is important that overlays to protect vegetation have a proper evidential basis for imposing that overlay.
- 7.9 Ecological Area UH070 is very large made up of many pieces with considerable variation in type and condition. It is not accurate to assign all the ecological values present in UH 070 as being present in the Spur, they are not.
- 7.10 Wildlands also raise ecological context criterion stating in their 2020 report that it is “likely” to provide a stepping stone habitat for birds travelling through the Hutt valley. This aspect is not repeated in the Section 32, only the meeting of the criterion. This meeting of the context criterion for bird dispersal is entirely circumspect and with no evidence. That statement is likely true for parts of the much larger draft SNA UH070 which may indeed facilitate bird movement, but the elements important to that function are the mature and maturing forest of large area not at all the seral young edges and tree fern amongst pine trees.

7.11 The Spur habitat I measured does not contain any values or conditions that can meet either the RPS policy 23 or the new NPS IB significance criteria.

7.12 While I have set out my reasoning above, My assessment and the conclusions that I reached as a result of my detailed assessment and on site fieldwork of my work is shown in the following map and table which considers the range of data collected over the site and the various assumptions made and tests the Spur as a feature alone against NPS IB (2020) criteria (Table 1). I note that Policy 23 of the RPS significance criteria are not materially different and cause the same result.

Table 1. NPS IB (2023) Significance (SNA) criteria from Appendix 1 and the Kiln Street spur habitat tested against those criteria.

NPS IB Criteria	Spur
Representativeness	
a) Indigenous vegetation that has ecological integrity that is typical of the character of the ecological district	No, a-typical of natural seral regeneration assemblage, low species richness, low diversity, missing components.
b) Habitat that supports a typical suite of indigenous fauna that is characteristic of the habitat type in the ED and retains at least moderate range of species expected for the habitat type in the ED	No, too reduced in terms of likely invertebrate or bird fauna.
Diversity and Pattern	
a) At least a moderate diversity of indigenous species, vegetation, habitats of indigenous fauna or communities in the context of the ED	Low and very low (gully) levels
b) presence of indigenous ecotones, complete or partial gradients or sequences	The ridge is relatively uniform in environmental factors and the assemblage similar throughout despite small pockets of Gahnia where the fern canopy has not formed, no natural ecotones between assemblages.
Rarity/Distinctiveness	
a) provides habitat for an indigenous species that is listed as Threatened or At Risk (declining) in the New Zealand Threat Classification System list.	No, none known or likely on the spur and while no one has undertaken specific fauna survey I have spent at least 2 days on the Spur and did not record any rare or threatened bird or invertebrate in that time.
b) an indigenous vegetation type or an indigenous species that is uncommon within the region or ecological district.	No, seral early regeneration, and limited richness examples are commonplace
c) an indigenous species or plant community at or near its natural distributional limit.	No
d) Indigenous vegetation that has been reduced to less than 20 per cent of its pre-human extent in the ecological district, region, or land environment.	No
e) indigenous vegetation or habitat of indigenous fauna occurring on naturally uncommon ecosystems.	No

f) the type locality of an indigenous species.	No
g) the presence of a distinctive assemblage or community of indigenous species.	No
h) the presence of a special ecological or scientific feature.	No
Ecological Context	
a) at least moderate size and a compact shape, in the context of the relevant ecological district.	No
b) well-buffered relative to remaining habitats in the relevant ecological district.	No, not as compared to the ED and the buffer is gully tree fern and then pine forest.
c) provides an important full or partial buffer to, or link between, one or more important habitats of indigenous fauna or significant natural area.	While it has a buffer role to the main UH070 feature north, down slope, this buffer function is not "important" and there is no immediate land use threat south but tree fern gully and pine forest.
d) important for the natural functioning of an ecosystem relative to remaining habitats in the ecological district.	No
Significant ?	No

7.13 The boundary of UH070 in the south, i.e., the Natural Areas of the Spur that are significant is shown in Figure 5. I note that I have not surveyed and tested the additional area Council (through Wildlands) have added (area in red in Figure 5), but intend to visit that area to consider the report in advance of the hearing.

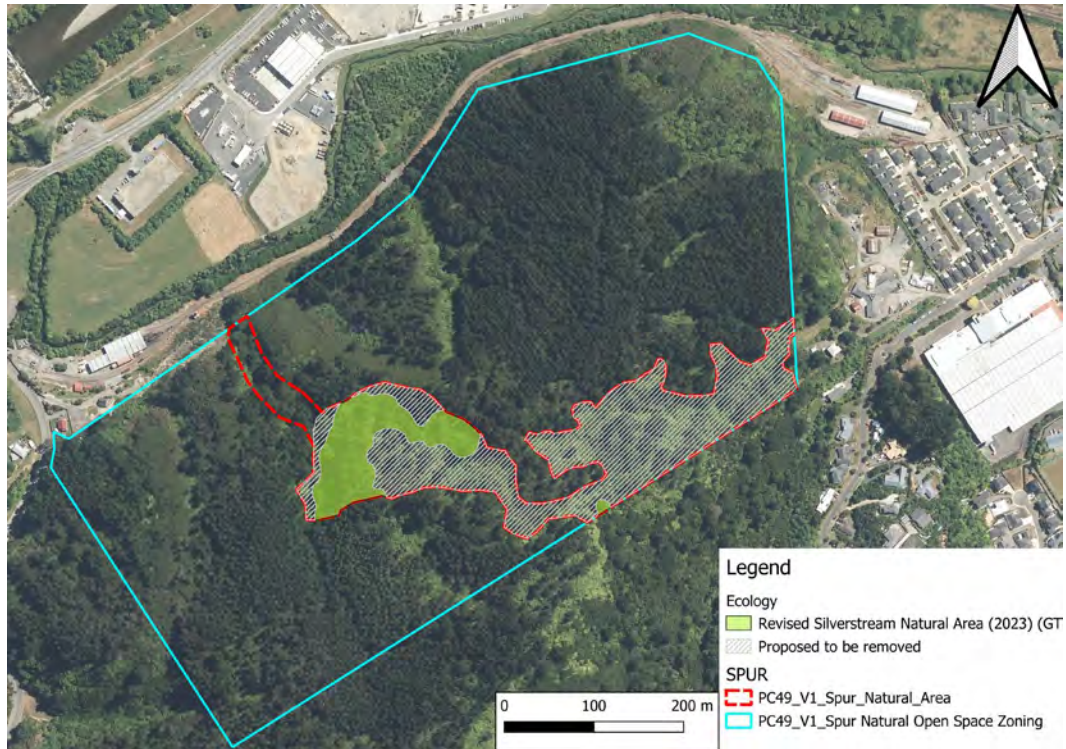


Figure 5. The Natural Area on the spur that is actually significant based on NPS IB criteria and vegetation evidence.

8.0 Summary of Relief sought by Guildford Timber Company

8.1 In my view the SNA boundary on the Spur that I have plotted and described and assessed above, should be accepted by the Panel as the only Silverstream Spur Natural Area on the Spur. For the reasons described above the other areas identified by Wildlands are incorrect.

8.2 My amended version of the extent of the Silver Stream Spur Natural Area has a large deletion to the area proposed by Council and should be preferred over the ecological assessment undertaken as part of the s32 Report. My findings have been reached following a detailed assessment and informed by fieldwork. I have also assessed the areas under both the

RPS Significance Policy 23 and in accordance with the NPS IB (2023) and in my expert opinion these are the reasonable and sensible boundaries.

9.0 Response to Officers Report

9.1 The Officer's Report (Council evidence) states in paragraphs 43-45 that Council will initiate a plan change to give effect to the NPS-IB in due course. This is to include a review of the existing draft and landowner consultation. My assessment has out of an abundance of caution undertaken the SNA analysis for the spur under both the RPS Policy 23 and the now operative NPS IB (2023) and the extent of the natural areas I have recommended are consistent with both those documents including:

- Consideration of habitat for mobile fauna as listed in Appendix 2 of the NPS-IB; and
- Maintaining biological diversity (clause 1.7).

9.1.1 In protecting values outside of SNA, noting that the setting aside of this land for Open Space and any future management plan for the Silverstream Spur area also provides some protection of these values. I also agree with the removal of indigenous vegetation being a restricted discretionary activity.

9.2 I further note that at paragraph [140] the Officer reflects on the Wildlands methodology for identifying the boundaries of the southern bit of UH070 (the Spur) and the extension made in in 2022. In this section they go on to note that there will be a need to undertake further assessments to conclude the draft SNA boundary on the Spur. I have undertaken that assessment (presented here). This removes the guesswork from the zoning, provides certainty for all and future proofs Variation 1. I agree with the Officer that in some cases further ecological assessments would be needed to support a resource consent application for activities within the identified areas or where indigenous vegetation removal was proposed. That is common.

9.3 In my expert view there is no evidential ecological basis for inclusion of the wider areas in the form proposed by Council. In summary those areas are:

- (a) Of low ecological value.
- (b) There is no rarity,
- (c) No distinctiveness or any important patterns or ecotones or gradients.
- (d) The areas I have excluded consist of common early seral species which have not progressed to develop for many decades (i.e., does not show signs of rapid development). Is no different to the assemblages under plantation pine,
- (e) Is not a representative assemblage and does not have important ecological contextual functions (buffering, corridors etc).
- (f) My assessment is consistent with and has taken into account the now operative NPS IB (2023)

10.0 Issues raised by other submitters

- 10.1 At paragraph [143] the Officer notes requests by submitters for mapping of SNA on the Spur, and the Officer relates that this has been undertaken. I have traversed why that mapping undertaken for Council is not accurate and did not address the NPS IB. I have provided a better mapping and assessment process that does account for the criterion in the NPS IB in this evidence.
- 10.2 The Officer summarises a range of submitters' ecological concerns (paragraph 155) over the future of the Spur. In essence much of the submitter concern in relation to ecology revolves around the belief that infrastructure for a road would destroy the habitats, cause edge effects, cause predator access increase, and disrupt a movement corridor for birds (several protected At Risk species).
- 10.3 While the change in the plan to reflect my SNA layer would enable indigenous habitat to be removed, it is fundamentally young tree fern and not habitat which has a formed, comprehensive, important flora and fauna. It is simple early seral low value low taxa richness low stature habitat. The tree fern ridge is already partial edge effected and roading infrastructure would have little added effect to remaining vegetation, while the

representative kamahi and beech forest areas would still be buffered by the remaining tree fern areas.

- 10.4 With regard to mammalian predators there are already tracks and easy passage throughout the spur for mustelids, feral cats, hedge hogs, rats and mice. A road will not increase this access but may introduce a measure of reduction through roadkill, especially hedge hogs and possum. It is far less likely to cause roadkill to the resident or migrating bird fauna. It also enables better management for pest control to occur on the Spur.
- 10.5 It is possible that a road up the Spur could interfere with lizard movement, although that movement is more likely to be along the Spur axis than perpendicular and so may channel movement. It is highly unlikely that there are threatened lizard species present, but the common northern grass skink may be present. Arboreal gecko are most likely associated with the mature and maturing kamahi-broadleaf and beech areas (retained in SNA).
- 10.6 The desire for open space and natural cover aside, no submitters have raised ecological concern that gives me a reason to change the areas I have mapped as SNA and areas that are not.
- 10.7 The Forest and Bird submission at 7b, c, d raises issues related to compromise of SNA, issues of fragmentation of the Spur, and the reported presence of kiwi in Wi Tako Ngata Scenic Reserve. The area of SNA on the Spur is relatively small and does not need to be compromised for development. Indeed, there is plenty of space to achieve a range of development and conservation goals with any development in effect paying for that enhancement. While it is true that larger vegetation areas have larger sized core habitat and greater restoration success because of that, most of the Spur is not a conservation area with values worthy of conservation but a range of exotic forest and amenity areas. Lastly the Wi Tako Ngatata Scenic reserve is separated from the Spur by a forest gap and numerous roads and urban development with the typical array of section cats and dogs. There is no reason to consider, if kiwi are somehow present in the reserve, that they will therefore find and survive in the Spur. It is more probable they would migrate up hill following the forest into the Blue Mountains, not across roads and urbanisation to the spur.

- 10.8 In the Greater Wellington Submission, I note that Greater Wellington raises the need for the plan change to be consistent with Policies 23 and 24 and also policy 47. I have set these policies out in Appendix 2 and confirm that I consider that the revised mapping and provisions of Plan Change 49 - Variation 1 will give effect to the intent of those policies in that it identifies these areas and provides a framework in the plan for additional protection and careful control of activities that may cause effects.
- 10.9 With regard to policy 47 my assessment achieves that requirement for Upper Hutt City which is to identify SNA under the NPS IB and then the issues raised in policy 47 can be managed on the Spur under an assessed regime of indigenous biodiversity values and potential.

11.0 Conclusion

- 11.1 Following analysis of significance criteria in Appendix 1 of the NPS IB (2023) using RECCE vegetation plot data and two days of on-site observations, I have provided a map of the areas I consider can be determined as significant using those criteria (plus the south eastern Wildlands addition).
- 11.2 While the Spur is predominantly native in vegetation cover, that cover is mostly tree fern with common under canopy scrub and there is little evidence that the area is progressing with any speed to more representative kamahi-beech forest.
- 11.3 The Spur is not an area of importance for local fauna, and is not an important buffer or corridor or has any other important ecological function that suggests it needs to be retained to protect indigenous biological diversity of the wider area.
- 11.4 I confirm in my expert opinion that the mapping of proposed areas amended in the manner I have described above, and rule framework proposed by Variation 1 are appropriate.



Dr Vaughan Keesing

Dated 17 November 2023

Appendix 1 – Spur vegetation plots.

In the following E = emergent (above the canopy), c =canopy, subc = sub canopy, s = shrub, g = ground, r = seedling.

Plot 1 was on the north side of the ridge on the steep gully side.

Plot 1	Tier	Cover (%)
Kamahi	E	1
Silver fern	C	80
Supple jack	C	1
mamaku	C	10
Mahoe	C	5
kanuka	c, s,	5
Five finger	sbc	1
putaputaweta	S	1
hangehange	R	1
kanono	R	1
Kiokio	G	1
rangiora	s, r	2

The cover was predominantly silver fern and little else and the species richness low (12 in total). A seral plot should have around 20-25 species and a forest plot upward of 30 taxa.

Plot 2: Ridge top 1/3rd along it

Plot 2	Tier	Cover (%)
Pine	E	80
Silver fern	C	40
Supple jack	C	1
Turepo	S	1
pigeonwood	c, c	15
Kanuka	r, c	1
Five finger	C	1
Dinella	G	5
hangehange	R	1
Tawa	R	1
Mapou	r, c	1
Coprosma rhamnoides	S	1

Three pine were prominent over the plot which was otherwise largely young silver fern. The pigeonwood were clustered in a "hot spot" for richness probably as an area under a bird perch. Again, the species richness is low, even lower than some areas under pine plantation.

Plot 3 further along the ridge was in an open gahnia area.

Plot 3	Tier	Cover (%)
<i>Gahnia xanthocarpa</i>	C	80
Silver fern	S	10
Five finger	C	2
manuka	r,s,c	5
bracken	G	10
Gorse	S	5
Kiokio	G	5
hangehange	S	1
Totara	R	1

A low species richness assemblage with good cover missing a range of herbaceous species, grasses and divaricate shrubs to be representative. Evidence of potential totara development through one sapling.

Plot 4 – ridge into the saddle (the neck)

Plot 4	Tier	Cover (%)
Pine	E	
Silver fern	subc	40
Toitoi	G	
mahoe	C	
pigeonwood	r, s	
Dinella	G	
manuka	C	15
Gorse	C	
hangehange	R	
Five finger	C	10
Ring fern	G	
Kiokio	G	

A narrow point occurs along the ridge and a saddle. Pine forest is close and the saddle narrow. To the east beech forest is not far down slope (and the gully of the saddle) while west pine plantation is prominent. The saddle is a mix of kamahi canopy and silver fern and gahnia with occasional beech tree, it is more developed than the northern ridge area. Beyond is more mamaku - silver fern treeland until an area of taller kamahi and beech.

Plot 5 Western gully head

Plot 5	Tier	Cover (%)
Pine	E	5
<i>mamaku</i>	C	60
Silver fern	C	20
mahoe	C	1

Plot five represents a large area of gully head and middle gully slopes with dominant and almost monocultural mamaku tree fern.

The above plots all represent early serial regeneration stages but ones that are very poor in species richness. They are low diversity, low pattern, simple recovery of early colonisers including pines and other weeds. The 1940-1988 aerial photos show that this has been the way the area has been vegetated for a long time.

I undertook two other plots as comparisons, one in the pine plantation between SNA and one in a 10 year post logging cut over.

Pine plantation plot -natives under tall pine of a spur

Plot 1	Tier	Cover (%)
Pine	E	80
Silver fern	S	10
mahoe	S	5
pigeonwood	S	5
Dinella	G	10
heketara	S	5
Tarata	S	5
hangehange	S	15
Five finger	S	10
kohuhu	S	5
Kiokio	G	10
rangiora	S	5

Hook grass	G	5
kanono	S	10
kamahi	S	5

Post logging cleared area (10-15 years).

Plot 1	Tier	Cover (%)
<i>Gahnia xanthocarpa</i>	C	50
Kiokio	G	5
Pine	r, s	5
Manuka	C	5
Bracken	G	10
Pampas grass	C	20
Gorse	C	20

Appendix 2 – Wording of Policy 23 GWRC RPS (operative).

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

District and regional plans shall identify and evaluate indigenous ecosystems and habitats with significant indigenous biodiversity values; these ecosystems and habitats will be considered significant if they meet one or more of the following criteria:

(a) Representativeness: the ecosystems or habitats that are typical and characteristic examples of the full range of the original or current natural diversity of ecosystem and habitat types in a district or in the region, and:

- (i) are no longer commonplace (less than about 30% remaining); or
- (ii) are poorly represented in existing protected areas (less than about 20% legally protected).

(b) Rarity: the ecosystem or habitat has biological or physical features that are scarce or threatened in a local, regional or national context. This can include individual species, rare and distinctive biological communities and physical features that are unusual or rare.

(c) Diversity: the ecosystem or habitat has a natural diversity of ecological units, ecosystems, species and physical features within an area.

(d) Ecological context of an area: the ecosystem or habitat:

- (i) enhances connectivity or otherwise buffers representative, rare or diverse indigenous ecosystems and habitats; or
- (ii) provides seasonal or core habitat for protected or threatened indigenous species.

(e) Tangata whenua values: the ecosystem or habitat contains characteristics of special spiritual, historical or cultural significance to tangata whenua, identified in accordance with tikanga Māori.

Explanation

Policy 23 sets out criteria as guidance that must be considered in identifying indigenous *ecosystems* and *habitats* with significant *biodiversity* values. Wellington Regional Council, and district and city councils are required to assess indigenous ecosystems and habitats against all the criteria but the relevance of each will depend on the individual cases. To be classed as having significant biodiversity values, an indigenous ecosystem or habitat must fit one or more of the listed criteria. Wellington Regional Council and district and city councils will need to engage directly with land owners and work collaboratively with them to identify areas, undertake field evaluation, and assess significance. Policy 23 will ensure

that significant biodiversity values are identified in district and regional plans in a consistent way.

Indigenous ecosystems and habitats can have additional values of significance to tangata whenua. There are a number of indigenous ecosystems and habitats across the region that are significant to tangata whenua for their ecological characteristics. These ecosystems will be considered for significance under this policy if they still exhibit the ecosystem functions which are considered significant by tangata whenua. Access and use of any identified areas would be subject to landowner agreement. Wellington Regional Council and district and city councils will need to engage directly with tangata whenua and work collaboratively with them and other stakeholders, including landowners, to identify areas under this criterion.

Regional plans will identify indigenous ecosystems and habitats with significant biodiversity values in the coastal marine area, wetlands and the beds of *lakes* and *ivers*. District plans will identify indigenous ecosystems and habitats with significant biodiversity values for all land, except the *coastal marine area* and the beds of lakes and rivers.

Policy 24: Protecting indigenous ecosystems and habitats with significant indigenous biodiversity values – district and regional plans

District and regional plans shall include policies, rules and methods to protect indigenous ecosystems and habitats with significant indigenous biodiversity values from inappropriate subdivision, use and development.

Explanation

Policy 24 applies to provisions in regional and district plans.

Table 16 in Appendix 1 identifies rivers and lakes with significant *indigenous ecosystems* and habitats with significant indigenous biodiversity values by applying criteria taken from policy 23 of rarity (habitat for *threatened* indigenous fish species) and diversity (high macroinvertebrate community health, habitat for six or more migratory indigenous fish species).

Policy 47 will need to be considered alongside policy 24 when changing, varying or reviewing a regional or district plan.

Policy 24 is not intended to prevent change, but rather to ensure that change is carefully considered and is appropriate in relation to the biodiversity values identified in policy 23.

Policy 47: Managing effects on indigenous ecosystems and habitats with significant indigenous biodiversity values – consideration

When considering an application for a resource consent, notice of requirement, or a change, variation or review of a district or regional plan, a determination shall be made as to whether an activity may affect indigenous ecosystems and habitats with significant indigenous biodiversity values, and in determining whether the proposed activity is inappropriate particular regard shall be given to:

- (a) maintaining connections within, or corridors between, habitats of indigenous flora and fauna, and/or enhancing the connectivity between fragmented indigenous habitats;
- (b) providing adequate buffering around areas of significant indigenous ecosystems and habitats from other land uses;
- (c) managing wetlands for the purpose of aquatic ecosystem health;
- (d) avoiding the cumulative adverse effects of the incremental loss of indigenous ecosystems and habitats;
- (e) providing seasonal or core habitat for indigenous species;
- (f) protecting the life supporting capacity of indigenous ecosystems and habitats;
- (g) remedying or mitigating adverse effects on the indigenous biodiversity values where avoiding adverse effects is not practicably achievable; and
- (h) the need for a precautionary approach when assessing the potential for adverse effects on indigenous ecosystems and habitats.

Explanation

Policy 47 provides an interim assessment framework for councils, resource consent applicants and other interested parties, prior to the identification of *ecosystems* and *habitats* with significant *indigenous biodiversity* values in accordance with policy 23, and the adoption of plan provisions for protection in accordance with policy 24. Remedying and mitigating effects can include offsetting, where appropriate.

In determining whether an activity may affect significant indigenous biodiversity values, the criteria in policy 23 should be used.

This policy shall cease to have effect once policies 23 and 24 are in place in an operative district or regional plan.

Appendix 3. – NPS-IB Appendix 2 Criteria

Appendix 1: Criteria for identifying areas that qualify as significant natural areas (SNAs)

This appendix sets out the criteria for identifying significant indigenous vegetation or significant habitats of indigenous fauna in a specific area, so that the area qualifies as an SNA.

What qualifies as an SNA

An area qualifies as an SNA if it meets any one of the attributes of the following four criteria:

- (a) representativeness:
- (b) diversity and pattern:
- (c) rarity and distinctiveness:
- (d) ecological context.

If an area would qualify as an SNA solely on the grounds that it provides habitat for a single indigenous fauna species that is At Risk (declining), and that species is widespread in at least three other regions, the area does not qualify as an SNA unless:

- (a) the species is rare within the region or ecological district where the area is located; or
- (b) the protection of the species at that location is important for the persistence of the species as a whole.

If an area would qualify as an SNA solely on the grounds that it contains one or more indigenous flora species that are Threatened or At Risk (declining), and those species are widespread in at least three other regions, the area does not qualify as an SNA unless:

- (a) the species is rare within the region or ecological district where the area is located; or

- (b) the protection of the species at that location is important for the persistence of the species as a whole.

Context for assessment

The context for an assessment of an area is:

- (a) its ecological district; and
- (b) for the rarity assessment only, its ecological district, its region and the national context.

Manner and form of assessment

- (1) Every assessment must include at least:
 - (a) a map of the area; and
 - (b) a general description of its significant attributes, with reference to relevant criteria (as specified below); and
 - (c) a general description of the indigenous vegetation, indigenous fauna, habitat, and ecosystems present; and
 - (d) additional information, such as the key threats, pressures, and management requirements; and
 - (e) for SNAs in areas of Crown-owned land referred to in clause 3.8(8), the conservation management strategy or plan or national park management plan that applies to the area.

An assessment under this appendix must be conducted by a suitably qualified ecologist (which, in the case of an assessment of a geothermal ecosystem, requires an ecologist with geothermal expertise).

Representativeness criterion

Representativeness is the extent to which the indigenous vegetation or habitat of indigenous fauna in an area is typical or characteristic of the indigenous biodiversity of the relevant ecological district.

Key assessment principles

- (2) Significant indigenous vegetation has ecological integrity typical of the indigenous vegetation of the ecological district in the present-day environment. It includes seral (regenerating) indigenous vegetation that is recovering following natural or induced disturbance, provided species composition is typical of that type of indigenous vegetation.

(3) Significant indigenous fauna habitat is that which supports the typical suite of indigenous animals that would occur in the present-day environment. Habitat of indigenous fauna may be indigenous or exotic.

(4) Representativeness may include commonplace indigenous vegetation and the habitats of indigenous fauna, which is where most indigenous biodiversity is present. It may also include degraded indigenous vegetation, ecosystems and habitats that are typical of what remains in depleted ecological districts. It is not restricted to the best or most representative examples, and it is not a measure of how well that indigenous vegetation or habitat is protected elsewhere in the ecological district.

(5) When considering the typical character of an ecological district, any highly developed land or built-up areas should be excluded.

(6) The application of this criterion should result in identification of indigenous vegetation and habitats that are representative of the full range and extent of ecological diversity across all environmental gradients in an ecological district, such as climate, altitude, landform, and soil sequences. The ecological character and pattern of the indigenous vegetation in the ecological district should be described by reference to the types of indigenous vegetation and the landforms on which it occurs.

Attributes of representativeness

7(1) An area that qualifies as an SNA under this criterion has at least one of the following attributes:

(a) indigenous vegetation that has ecological integrity that is typical of the character of the ecological district:

(b) habitat that supports a typical suite of indigenous fauna that is characteristic of the habitat type in the ecological district and retains at least a moderate range of species expected for that habitat type in the ecological district.

Diversity and pattern criterion

Diversity and pattern is the extent to which the expected range of diversity and pattern of biological and physical components within the relevant ecological district is present in an area.

Key assessment principles

(2) **Diversity of biological components** is expressed in the variation of species, communities, and ecosystems. Biological diversity is associated with variation in physical components, such as geology, soils/substrate, aspect/exposure, altitude/depth, temperature, and salinity.

(3) **Pattern** includes changes along environmental and landform gradients, such as ecotones and sequences.

(4) **Natural areas** that have a wider range of species, habitats or communities or wider environmental variation due to ecotones, gradients, and sequences in the context of the ecological district, rate more highly under this criterion.

Attributes of diversity and pattern

5 (1) An area that qualifies as a significant natural area under this criterion has at least one of the following attributes:

(a) at least a moderate diversity of indigenous species, vegetation, habitats of indigenous fauna or communities in the context of the ecological district:

(b) presence of indigenous ecotones, complete or partial gradients or sequences.

Rarity and distinctiveness criterion

Rarity and distinctiveness is the presence of rare or distinctive indigenous taxa, habitats of indigenous fauna, indigenous vegetation or ecosystems.

Key assessment principles

(2) **Rarity** is the scarcity (natural or induced) of indigenous elements: species, habitats, vegetation, or ecosystems. Rarity includes elements that are uncommon or threatened.

(3) **The list of Threatened and At Risk species** is regularly updated by the Department of Conservation. Rarity at a regional or ecological district scale is defined by regional or district lists or determined by expert ecological advice. The significance of nationally

listed Threatened and At Risk species should not be downgraded just because they are common within a region or ecological district.

(4) **Depletion of indigenous vegetation or ecosystems** is assessed using ecological districts and land environments.

(5) **Distinctiveness** includes distribution limits, type localities, local endemism, relict distributions, and special ecological or scientific features.

Attributes of rarity and distinctiveness

(6) An area that qualifies as an SNA under this criterion has at least one of the following attributes:

(a) provides habitat for an indigenous species that is listed as Threatened or At Risk (declining) in the New Zealand Threat Classification System lists:

(b) an indigenous vegetation type or an indigenous species that is uncommon within the region or ecological district:

- (c) an indigenous species or plant community at or near its natural distributional limit:
- (d) indigenous vegetation that has been reduced to less than 20 per cent of its pre- human extent in the ecological district, region, or land environment:
- (e) indigenous vegetation or habitat of indigenous fauna occurring on naturally uncommon ecosystems:
- (f) the type locality of an indigenous species:
- (g) the presence of a distinctive assemblage or community of indigenous species:
- (h) the presence of a special ecological or scientific feature.

Ecological context criterion

Ecological context is the extent to which the size, shape, and configuration of an area within the wider surrounding landscape contributes to its ability to maintain indigenous biodiversity or affects the ability of the surrounding landscape to maintain its indigenous biodiversity.

(1) Key assessment principles

(2) Ecological context has two main assessment principles:

1. (a) the characteristics that help maintain indigenous biodiversity (such as size, shape, and configuration) in the area; and
2. (b) the contribution the area makes to protecting indigenous biodiversity in the wider landscape (such as by linking, connecting to or buffering other natural areas, providing 'stepping stones' of habitat or maintaining ecological integrity).

Attributes of ecological context

(3) An area that qualifies as an SNA under this criterion has at least one of the following attributes:

1. (a) at least moderate size and a compact shape, in the context of the relevant ecological district:
2. (b) well-buffered relative to remaining habitats in the relevant ecological district:
3. (c) provides an important full or partial buffer to, or link between, one or more important habitats of indigenous fauna or significant natural areas:
4. (d) important for the natural functioning of an ecosystem relative to remaining habitats in the ecological district.