Before the Expert Panel appointed under the Fast-track Approvals Act 2024

Under	the Fast-track Approvals Act 2024
And	
In the Matter of	an application for approvals by NZSki Limited to upgrade existing infrastructure at the Remarkables Ski Area, including a new passenger transport lift, carparking areas, and expanding the ski field into the adjacent Doolans Basin

Statement of Evidence of **Gary Neil Bramley** on behalf of NZSki Limited in response to Section 53 Comments

Terrestrial Ecology

Dated: 3 November 2026

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INTRODUCTION

1. My name is Dr Gary Neil Bramley.

2. I am an owner and Director of EcoLogical Solutions Limited.

3. I hold the degrees of Bachelor of Science (1992) and Master of Science (First Class Honours in Ecology, 1995) both from Massey University, and a Doctorate of Philosophy in Biology from the University of Waikato (1999).

4. I have worked as a consultant ecologist since 2000 and the majority of my relevant work experience has been to undertake or contribute to a large number of ecological investigations, significance assessments and assessments of ecological effects of developments on urban, peri-urban, coastal, forest, wetland, gumland, farmland and subalpine areas throughout New Zealand.

5. I have published or contributed to thirteen peer reviewed papers and more than 300 unpublished reports prepared for variety of clients. In July 2017, I completed the "Making Good Decisions" programme and am a certified resource consent hearings commissioner. In August 2026 I was appointed by the Minister of Conservation to the Te Hiku o te Ika Conservation Board.

6. In 2004 I was awarded an "Old Blue" Conservation Award by the Royal Forest and Bird Protection Society followed in 2006 by a Northland Biodiversity Enhancement Group award for contribution to the conservation of Northland's natural heritage. In 2018, I was awarded life membership of the Puketi Forest Trust, a charitable trust which I helped establish in 2003 to restore Puketi Forest in Northland.

7. I visited the site in April 2023. At that time Wentworth Station, which adjoins the Remarkables Conservation Area (within which the Remarkables Ski Field is located) and is accessed via State Highway 6 in the Gibbston Valley, was undertaking a subdivision to create multiple lots for sale. Proposed Lot 1 comprised approximately 1,444ha between the Doolans Creek Left Branch and Doolans Creek Right Branch upstream of the confluence. NZSki Limited (**NZSki**) had asked me to undertake a high-level assessment of the potential for offsetting and compensation for effects of the Doolans Valley expansion within the proposed Lot 1 as part of their due diligence in relation to considering purchase of the proposed Lot 1. The land use of the proposed Lot 1 was described as "a hunting operation that provides game shooting opportunities for red deer, fallow deer, and goats" with "several sheep and cattle" also present on the property. My conclusion at that time, based on a desktop assessment and a visit to the Doolans Valley was that the use of Lot 1 for the purposes of offsetting the proposed Doolans Valley expansion would comply with

the principles of offsetting as set out in the National Policy Statement for Indigenous Biodiversity (**NPS-IB**), provided that the existing vegetation there was degraded by the existing land use as a hunting operation and it would be practical to undertake weed control and/or planting (noting that I did not visit the proposed Lot 1 to inform my assessment). This proposal did not proceed.

8. Most recently, I was retained in October 2026 to provide a peer review of the work undertaken by e3 Scientific on behalf of NZSki's application on the Remarkables Ski Area Upgrade and Doolans Expansion (**Project**) under the Fast-track Approvals Act 2024 (**FTA**), provide advice with respect to application of the effects management hierarchy, particularly with respect to offsetting and update the Terrestrial Ecology Management Plan F.01 (TEMP).

9. This statement is given as part of NZSki's response to comments on the Project made under Section 53 of the FTA. In preparing this evidence I have reviewed the following documents. The short forms I use to refer to these documents are shown in brackets.

    (a) e3Scientific, Terrestrial Ecological Impact Assessment, B.12, updated version (TEcIA).

    (b) e3Scientific, Lizard Assessment & Management Plan, B.13, revised version (LMP).

    (c) Lemon (2026), Remarkables Skifield Doolans Expansion Project – Terrestrial Ecology Management Plan, F.01 (TEMP).

    (d) Mitchell Daysh, Effects Management and Compensation Overview Addendum, 3 September 2026 (A-21).

    (e) Proposed resource consent conditions, H.02.

    (f) Department of Conservation comments on the substantive application under s53 of the Fast-track Approvals Act 2024, 27 October 2026 (DOC s53):

        (i) Dr S Walker, statement of advice on terrestrial flora and ecosystems, 7 October 2026, s51 Appendix A (Walker SoA).

        (ii) Dr S Walker, addendum to statement of advice, 27 October 2026, s53 Attachment 2 (Walker Addendum).

        (iii) Dr F Maseyk, statement of advice on effects management including compensation, 12 October 2026, s51 Appendix J (Maseyk SoA).

(iv) Dr F Maseyk, addendum to statement of advice, s53 Attachment 4 (Maseyk Addendum).

(v) Dr C Kavazos, statement of advice on freshwater, s51 Appendix B (Kavazos).

(vi) Dr C Watts, statement of advice on invertebrates, s51 Appendix C (Watts).

(vii) Dr K Weston, statement of advice on avifauna, s51 Appendix E (Weston).

(viii) Mr N Harker, statement of advice on lizards, s51 Appendix D (Harker).

(ix) Mr D Barrell, statement of advice on geomorphology, 12 October 2026, s51 Appendix I (Barrell).

(x) Mr J Head, addendum to statement of advice on landscape, 27 October 2026, s53 Attachment 3 (Head Addendum).

(g) Ms J Macleod, statement of advice on planning, s53 Attachment 1 (Macleod). Appendix A to Ms Macleod's statement (her tracked comments on the proposed conditions) was not attached to the copy provided to me, and I have not reviewed it.

(h) Central Otago District Council:

(i) Wildland Consultants, Remarkables Ski Field Expansion Management Plan Review, Contract Report 7955b, July 2026 (Wildlands 7955b).

(ii) Wildland Consultants, NZSki Remarkables Ski Field Expansion Updated Terrestrial Ecology Review, Contract Report 7955c, September 2026 (Wildlands).

(i) Otago Regional Council:

(i) Mr A Rossaak, technical advice on wetlands and Tarn 3 under s53, 12 October 2026 (Rossaak).

(j) Kā Rūnaka:

(i) Statement of evidence of M J Dale (ecology), 27 October 2026 (Dale).

(k) Policy and guidance:

(i) National Policy Statement for Indigenous Biodiversity 2023, including Appendices 3 and 4 (NPS-IB).

(ii) Environment Institute of Australia and New Zealand (**EIANZ**), Explanatory Note: Interpretation of scale in assessment of ecological values and magnitude of ecological effects, August 2026 (EIANZ 2026).

(l) Other material provided by NZSki:

(i) N Simpson, An Ecological Survey of the Rastus Burn Basin and Remarkables Skifield Area, Conservation Consultancy Limited for NZ Ski Limited, October 2020 (Simpson 2020).

(ii) NZSki, 2015 Earthworks Projects – Re-vegetation, presentation (NZSki 2015).

(iii) NZSki, The Remarkables Landscape Developments, presentation to the Otago Regional Council, undated (NZSki ORC presentation).

(iv) e3 Scientific, TEcIA Stakeholder Response memoranda to NZSki on the comments of DOC, CODC and ORC, 26 August 2026 (e3 Scientific DOC response, CODC response and ORC response).

(v) Draft statements of evidence for NZSki in response to s53 comments, 3 November 2026: Ms R Teele (terrestrial ecology) (Teele), Mr L Salemink-Waldren (terrestrial ecology) (Salemink-Waldren), Mr M Hamer (freshwater ecology) (Hamer), and Mr C Knox and Ms T Anderson (lizards) (Knox and Anderson). These are drafts, so I refer to them by section heading rather than paragraph number.

(m) Other references:

(i) Federated Mountain Clubs of New Zealand and Forest & Bird, The Remarkables National Park, 2018 (FMC 2018).

(ii) Department of Conservation, Conservation Resources Report on Tenure Review of Ben Nevis Pastoral Lease (Po 241) and Unalienated Crown Land – Nevis Streambed, June 2004, released under the Official Information Act (Ben Nevis CRR).

(iii) Department of Conservation, Report to the Commissioner of Crown Lands on Tenure Review of Mt Difficulty Pastoral Lease (Po 353), conservation resources report, copied October 2002, released under the Official Information Act (Mt Difficulty CRR).

10. My evidence responds to the following matters raised in the comments, within my area of expertise. For each document I list the matters responded to, with the source paragraphs, and then the paragraphs of this evidence where I respond.

(a) DOC s53:

(i) Further information on alternatives to the Doolans take and Tarn 3 (2.2(c)), NUE mapping (2.2(d)), invertebrate sampling (2.2(f)), a Transit Hub lizard survey (2.2(g)) and climate change (2.2(a)–(b));

(ii) Compensation (2.5–2.11); and

(iii) conditions and management plans (3.1–3.7).

(b) My response: paragraphs 42, 45, 47, 56–57, 68–91, 92–93 and 99–100.

(c) Dr Walker Statement of Advice:

(i) scale of assessment (8–9, 63–66), avoidance without NUE mapping (61), operational avoidance options (Table 3) and sediment limits (140).

(d) My response: paragraphs 25–40, 42–43, 56, 60 and 100.

(e) Dr Walker Addendum:

(i) the water take, Tarn 3 and Lake Alta (5–14); NUE mapping (9); snowmaking effects (10–12); Rastus Burn NUEs (15–22); irreplaceability of NUEs (23–24); and edge-effect monitoring (25–30).

(f) My response: paragraphs 24, 42–44, 56–57, 64–69 and 100.

(g) Dr Maseyk Statement of Advice:

(i) application of the hierarchy (69–70), adequacy of the package (79–80, 116–117), lizards (89–92) and the compensation framework (Part C).

(h) My response: paragraphs 55–63, 72–81 and 94–95.

(i) Dr Maseyk Addendum:

(i) whether offsetting and compensation are appropriate (5–7, 16), the refined package (13–15 and Table 1), and engagement with Kā Rūnaka (17).

(j) My response: paragraphs 63, 65, 69–71 and 77–80.

(k) Dr Kavazos: snowmaking effects on wetlands.

(l) My response: paragraphs 43–44 and 100.

(m) Dr Watts: the invertebrate sampling window (14, 22).

(n) My response: paragraph 47.

(o) Mr Harker:

(i) salvage (18–25), the number of McCann's skink affected (14–17, 32, 35), other species and the incidental discovery protocol (36–39, 51–53), the Car Park and Bus Hub (26–30, 55), and compensation (41–49, 54).

(p) My response: paragraphs 92–98 and 105.

(q) Barrell and Head Addendum:

(i) the significance of the late-glacial moraine sequence (Barrell 17–19, 32, 39–40), the effects of the Project on it (Barrell 33–36; Head Addendum 6–7), and mitigation (Barrell 37–38).

(r) My response: paragraph 68.

(s) Macleod:

(i) whether offsetting is possible (86–88, 198, 210), whether compensation is appropriate (159–163), lizards (190–202), naturally uncommon ecosystems outside SNAs (204–211), the moraine (32–40), and management plans (328–332).

(t) My response: paragraphs 37 and 64–100.

11. Central Otago District Council:

    (a) Wildland Consultants (**Wildlands**):

        (i) resolved matters (s4.1); unmanaged effects and snowmaking (s4.2); water supply (s4.3); sampling (s4.4, s4.8); the vegetation model and scale (s4.5); NUEs (s4.6); wetland crossings (s4.7); residual effects (s4.9 and Table 1); the TEMP (s5); the LMP and lizards (s6); compensation (s7.2); and NPS-IB policies (s8.1).

12. My response: paragraphs 19–52, 73 and 92–98.

13. Kā Rūnaka:

    (a) Mr Dale:

        (i) NUEs and basin values (25–27, 82–87); Tarn 3 (16, 52–62, 102); lizards (68–80); the footprint (81); snowmaking, grooming and climate (86–95, 104); and the compensation package (18, 96–100, 105).

14. My response: paragraphs 22, 24, 43–45, 53–54, 64–68, 74 and 92–98.

15. Otago Regional Council:

    (a) Mr Rossaak:

        (i) the status and value of Tarn 3 (s3.1), wetland loss and the scale of assessment (s3.2), avoidance and effects management for wetlands and Tarn 3 (s3.3–3.4), the compensation package (s3.5, 3.7), management plans (s3.6), and conditions (s4).

16. My response: paragraphs 24, 37, 44, 59, 68, 76, 86 and 100.

17. I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023. The reports I have prepared are within my area of expertise, except where I state that I am relying on material produced by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my reports.

PEER REVIEW OF E3 SCIENTIFIC'S APPROACH

Summary

18. e3 Scientific (led by Mr Salemink-Waldren and Ms Teele) undertook ecological surveys within the upper Rastus Burn and Doolans basins using vegetation plots,

wetland assessments and fauna surveys including for birds and lizards as well as invertebrate sampling. Based on their findings they then assigned ecological values using the EIANZ guidelines. e3 Scientific used their vegetation plots combined with a machine-learning model trained on the surveyed area to create a vegetation map of the "Remarkables Ecological District (ED) alpine zone (above 1,100 m)" (**the ED alpine zone**) to inform their assessment of effects.

19. They conservatively assumed complete loss of the affected vegetation types and quantified the magnitude of effect as the proportion of each vegetation type lost at the scale of the alpine zone [see the TEcIA s6.1.1–6.1.3; Wildlands s4.5]. The residual effects identified (i.e., those remaining after effective implementation of effects management actions) are set out in Table 18 of the TEcIA.

20. e3 Scientific was not engaged by NZSki to address offsetting or compensation. The TEcIA states[1] that it "does not set out offset or compensation measures to address residual effects" and that this matter "is being addressed by NZSki". It nonetheless concludes that offsetting is not possible[2] noting that "credible opportunities for offsetting within a harsh alpine environment are not possible. This is because neighbouring subalpine and alpine areas contain relatively undisturbed vegetation and habitats that are unlikely to benefit from implementation of offsetting measures, such as habitat protection or restoration measures."

21. I disagree with this conclusion and return to this matter in paragraph 70 of my evidence below.

CONCLUSIONS

22. There are several areas where the TEcIA is either internally inconsistent (particularly in relation to Table 18, which is the key table in the document) or inconsistent with other documents such as the TEMP (which was not written by e3 Scientific). These have generally been identified by the commenters and have been addressed by e3 Scientific in their response and in the updated TEMP which was prepared by Steve Gorinski in our team and reviewed by me.

23. Notwithstanding these inconsistencies (which have now been addressed), I agree with Wildlands (Section 9) that the field effort has been substantial and that the values description provided by e3 Scientific is detailed. In my view it forms a sound basis on which to the Panel can make an informed decision.

[1] TEcIA Section 2 page 7.
[2] TEcIA Section 7.1, p 149.

24. With respect to Tarn 3, my view is Tarn 3 does not meet the definition of a wetland as set out in the RMA[3] on the basis that surveying has confirmed that it does not include "a natural ecosystem of plants and animals that are adapted to wet conditions". Wildlands in Section 4.1, agree with e3 Scientific's conclusion in that regard. Dr Walker and Mr Rossaak take the opposing view [Walker Addendum paragraph 6, Rossaak section 3.1]. This determination affects which national instrument applies, but does not affect the value of the tarn. All parties agree that Tarn 3's value is at least "High" (Mr Rossaak considers it "Very High") and its loss would be permanent (for at least the life of the concession). Tarn 3 does support a low-diversity aquatic community (zooplankton, macroinvertebrates and some macrophytes), as e3 Scientific's freshwater assessment records (Rossaak s3.1; Dale 53–54). Ecologically, I agree with e3 Scientific that its value is "High" rather than "Very High": its biodiversity value is low compared with the other tarns, and its inherent value derives mainly from its naturalness, its fluctuating hydrology and its setting within the late-glacial moraine sequence (Barrell 35). Its geomorphology, landscape and natural character values are outside my expertise. e3 Scientific's position is that the margins of Tarn 3 have no hydrophytic vegetation or hydric soils, its bed comprises schist shingle and silt, its level fluctuates widely; and that the nearest seepage wetlands are about 260m away and are not hydrologically connected (e3 Scientific CODC response 2.1.5, citing the Water Take AEE s3.4.1 and 5.6). Mr Salemink-Waldren has since applied the reasoning of the wetland delineation protocols to Tarn 3. No vegetation was present in the area inundated at the time of survey; elsewhere in the periodically inundated area vegetation covered less than 1% and comprised facultative and facultative-upland species; and the substrate is schist shingle without hydric soil (Salemink-Waldren, 'Ephemeral Wetland – Tarn 3'). In my view that evidence supports e3 Scientific's conclusion that the bed of the tarn is not a wetland. Whether the RMA definition, which includes "shallow water", nonetheless captures it is a matter on which the experts differ, but it does not change the tarn's value or the need to address its loss.

25. With respect to the scale of the assessment, the ecological values were derived by e3 Scientific from survey data collected within the Rastus and Doolans basins. The magnitude of effect was considered in relation to the ED alpine zone described above. In my view this approach is appropriate and defensible in principle, but its inputs need testing and I return to that matter in paragraph 31 below.

26. e3 Scientific assumed total loss of the affected features (i.e., no remediation) and assessed the magnitude of effects as the percentage of each vegetation type lost within the alpine zone using the thresholds in Table 12[4] of the TEcIA which were:

[3] wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.
[4] TEcIA s6.1.1 – 6.1.3 pp 103-105).

(a) Negligible up to 0.01%;

(b) Low 0.01–0.5%;

(c) Moderate 0.5–2.5%;

(d) High 2.5–5%; and

(e) Very High above 5%.

27. My reasons for considering this approach appropriate are as follows:

(a) Assessing magnitude at the scale of the zone of influence (ZOI), which e3 Scientific (correctly in my view) defines as the basin of the Upper Doolans Right Branch is inappropriate. The 2018 EIANZ guidelines for Ecological Impact Assessment distinguish the ZOI from the scale of assessment, and state that "assessing magnitude of effect at the spatial scale of the effect (Zone of Influence) is not recommended".

(b) The ED alpine zone is a legitimate context. The thresholds in Table 12 are low, which builds in a degree of conservatism. I return to this matter in paragraph 31.

28. EIANZ recommends that "generally… an assessment [in relation to magnitude of effect] at the scale of the feature (e.g., contiguous dunes, wetland system, forest community) should be done" (Roper-Lindsay et al. 2018). The EIANZ 2026 explanatory note cautions against using wider habitat that has not been surveyed to an equivalent level of detail to dilute the loss of an important feature. Ideally, sufficient additional plots elsewhere in the ED alpine zone would have been collected to address this matter. I consider the impact on the assessment if the maps were unreliable with respect to extent later in my evidence, from paragraph 31.

29. In terms of this Project, some ecological values exist only at the scale of the Doolans Basin. For example, its intactness and its mosaic of connected habitats are features of the basin as a whole. A percentage of vegetation types lost cannot measure those values at any scale, so in my view they need to be considered independently (i.e., have their own assessment of magnitude).

30. I note that the conservatism of e3 Scientific's approach depends on the accuracy of the ED alpine zone extent used as the denominator when calculating the percentage of that vegetation type affected. In this case, each extent is extrapolated from the surveyed basins, without ground-truthing elsewhere in the ED alpine zone, so the estimate of extent could conceivably be wrong. By way of example, using the

estimates of extent provided in the TEcIA, the vegetation class 'High alpine cushionfield' illustrates how much this could affect the outcome:

(i) about 2.1ha of high alpine cushionfield is affected (1.92ha of direct disturbance plus edge effects). This is reported as 0.96% of an estimated 222ha in the ED alpine zone, which results in a 'moderate' magnitude using e3 Scientific's framework[5];

(ii) The estimate of 222ha of high alpine cushionfield in the ED alpine zone assumes that the community makes up 7.2% of the cushion-dominant class across the zone, as it does in the surveyed area[6];

(iii) This estimate of extent has not been verified because the machine learning used in the vegetation mapping relies on plots located only in the Doolans valley. If the true extent were below about 85ha, the magnitude would be 'High'. If the true extent was below about 43ha, the magnitude of effect would be 'Very High'.

(iv) In my opinion, survey plots outside the Doolans could have verified the assumption on which these estimates are based. Without them, the magnitude of effect is more uncertain. This approach leaves open the possibility that the basin's communities are less widely represented than calculated as asserted by Dr Walker and Mr Dale in their SoAs. I explore the reliability of e3 Scientific's estimates below.

(b) The extent of the area affected by the Project (the numerator in the calculation of the percentage affected) is also incomplete because the extents are based on direct disturbance plus an allowance for edge effects due to construction[7]. Operational effects, in particular snowmaking and its downslope drainage and delayed melt effects and any effects of snow grooming are not considered beyond the disturbance footprint of the Project (see paragraphs 43-45 below). Ski field induced change effects on biological composition and habitat condition are generally poorly understood nationally and globally, although I note Mr Salemink-Waldren refers to a study at Treble Cone near Wanaka relating to snow grooming (Wardle and Fahey 2002). I have had input into and support the ongoing monitoring and operational response conditions proposed in relation to this snowmaking and grooming aspect.

[5] TEclA Table 14, p 113.
[6] TEclA Table 13, p 107.
[7] TEclA Table 14, p 112.

(c) Because the thresholds adopted by e3 Scientific in their assessment are conservative, a modest increase in the extent of the area affected can change the magnitude. For high alpine cushionfield, an affected area above about 5.6ha would be 'High' using e3's denominator.

31. In order to confirm whether e3 Scientific's approach to scale is appropriate, and that the matters I have identified above do not materially affect the conclusions reached by Mr Salemink-Waldren and Ms Teele for most communities, I tested the figures provided in Table 14 of the TEcIA. My findings are set out in the following paragraphs.

32. With the exception of the high alpine cushionfield, the extent within the ED alpine zone would have to be overestimated more than fivefold before any magnitude of effect moved from "Low" to "Moderate", and more than 25-fold before it reached "High".

33. If the extent of the area affected has been underestimated, the same factors apply. To use snow tussock as an example, e3 Scientific estimate that 6.3ha of 7,057ha would be affected. The true extent would need to be under approximately 250ha for the magnitude of effect to achieve the "High" category.

34. Wildlands (s4.5.1) state that the mapping broadly matches the regional datasets. On that basis, errors in estimates of vegetation extent that large, particularly for common and widespread vegetation types, are very unlikely.

35. I also considered the possibility that both the extent of a vegetation type affected has been underestimated **and** the extent of that type in the ED alpine zone has been overestimated. In that scenario the two errors multiply: The percentage of a vegetation type affected is calculated by dividing the area affected (the numerator) by the extent within the ED alpine zone (the denominator), so if the area affected is understated by one factor and the extent overstated by another, the true percentage affected is e3's figure multiplied by both. For example, underestimating the area affected by 2× and overestimating the extent by 2.5× gives a combined error of 5×. Under that scenario, e3 Scientific's assessments of the magnitude of effects for most communities are still valid, with high alpine cushionfield still being the most susceptible to misclassification (underestimation of effects). Snow and north-facing tussock vegetation types would need approximately 2.5× more area affected and 2.3× less extent before they even reached a "Moderate" magnitude of effects. To reach a "High" magnitude, both errors would have to be about 5×. Given tussock communities are the most widespread, and presumably the most easily distinguishable to trained machine learning, magnitudes that different are not credible for either vegetation type.

36. Under this scenario of both underestimation of effects and underestimation of extent, High alpine cushionfield is more exposed than in either scenario alone. A c. 1.6× variance for either estimate would elevate it to a “High” magnitude of effects. That could be, for example, operational effects affecting a further c. 1.3ha combined with the true extent being about 140ha rather than 222ha. Both are plausible. This strengthens my recommendation (paragraph 37(a)) to treat it as a “High” magnitude of effect to be conservative.

37. On the basis of this stress-testing, I conclude that e3’s estimates of magnitude can be relied on, with three exceptions:

    (a) High alpine cushionfield would reach a “High” magnitude of effect if its extent were overestimated about 2.6 times, or if the affected area increased to about 5.6ha. In my view either scenario could apply and this uncertainty can be addressed by treating the effect as “High”. Under the offsetting and compensation framework I propose that would increase the amount of compensation required, but not the type of response, because this community is already at the limits of offsetting. A “High” magnitude of effect alone does not place a value beyond compensation. Under the NPS-IB, compensation is not appropriate where the biodiversity affected is irreplaceable or vulnerable (Appendix 4, principle 2). High alpine cushionfield is not a naturally uncommon ecosystem; it is estimated to cover about 222ha in the ED alpine zone and also occurs on the adjacent ranges where DOC itself proposes cushionfield projects (Maseyk Addendum Table 1, Projects F–G). Additionally, NZSki has transplanted cushionfield successfully at a small scale in the upper Sugar Bowl (Simpson 2020, s11 and Figures 72–73). On that basis I consider that compensation would be appropriate, once offsetting has been tested and found not to be feasible beyond what is proposed.

(b) The Naturally Uncommon Ecosystems and the ecological integrity/intactness of the basin cannot be measured by a percentage at any scale. These features are best dealt with on a case-by-case basis and avoided or compensated, regardless of the calculated magnitude. This includes the connected wetland mosaic, which Mr Rossaak considers is diluted by an Ecological District scale assessment (Rossaak s3.2).

    (c) Operational effects on wetlands and vegetation reduce condition rather than area. For that reason, they should not be regarded as “loss”. However, when assessing the effects there are no reliable estimates (e.g., via research or previous monitoring) as to how much the quality of each vegetation type would be reduced. On that basis these effects are best

addressed via monitoring and trigger thresholds that result in additional effects management such as no-snowmaking zones or rotation of grooming areas being applied than by the magnitude assessment. This approach has been captured in the updated conditions (see paragraph 100(f) of this statement).

38. e3 Scientific's draft s53 evidence addresses these matters in part. Mr Salemink-Waldren and Ms Teele maintain the ED alpine zone scale, and Mr Salemink-Waldren addresses operational effects through the grooming measures discussed at paragraph 43. To the extent they are not addressed, I recommend:

    (i) Reporting magnitude both at the ED alpine zone scale and at the scale of the relevant ecological feature. In my view mapped naturally uncommon ecosystems are the appropriate scale for this purpose: for example, the moraine bench, the nested moraine and Tarn 3 system, and the deflation surface at Helicopter Ridge. The feature scale should also include each vegetation community and the basin as a unit.

    (ii) Testing the ED alpine zone extents for high alpine cushionfield and the NUE communities, at least through sensitivity analysis (as I have crudely done), and preferably with plots outside the Doolans.

    (iii) Comparing the assessment at the two scales and where they give different magnitudes, adopting the higher of the two. Carrying the higher overall level of effect (and therefore level of residual effect) into the offset and compensation accounting is also the conservative approach.

39. To conclude, I do not agree that the ED alpine zone scale is inappropriate or that it has resulted in an underestimation of the magnitude (and therefore overall level) of effects. Relatively large changes to the inputs to the calculation are required to materially affect the assessment except for high alpine cushionfield, and that vegetation type is best considered to have a "High" magnitude of effect to address that uncertainty. There are some values that this method cannot capture (such as ecological integrity), which e3 Scientific address through its assessment of fragmentation (TEcIA s6.3) and cumulative effects (TEcIA s6.9) (e3 Scientific DOC response 2.3.4).

40. Overall, I consider that e3 Scientific's approach to the scale of assessment is appropriate, and that the gaps I have identified are not material to its conclusions for most vegetation communities.

41. In relation to the vegetation mapping, I agree that the model extrapolates beyond the training area without ground-truthing, uses imagery alone, aggregates communities, and reports no accuracy statistics. e3 Scientific has described the steps it took to manage bias in the model: running it separately above 1,500m and between 1,100m and 1,500m; correcting units outside the training area by expert interpretation of aerial imagery and re-running the model; and mapping wetlands and tarns from wetness, slope and flow-accumulation layers. It states that the training area is 3.39% of the Ecological District above 1,100m, that the output broadly matches the Otago Current and Potential Ecosystems and Manaaki Whenua potential vegetation datasets, and that the model is a guide rather than an absolute measure of area (e3 Scientific CODC response 2.2.1.3; DOC response 2.3.4; ORC response 2.1). Those steps reduce the uncertainty but do not remove it, because no accuracy statistics or field validation outside the training area have been reported. In my view, despite these limitations, the vegetation mapping is still sufficiently sensitive and specific to be relied upon when assessing the magnitude of effects as I describe above.

42. With respect to naturally uncommon ecosystems (NUEs), these were classified by vegetation community but not mapped by landform. Dr Walker, Mr Dale and Wildlands consider that moraines and deflation surfaces are therefore under-identified, including possibly along the water-take track and at the Rastus Burn screes. This matter would be addressed via a geomorphology-based NUE map overlaid on the footprint. This approach would provide the “feature” scale for assessing the magnitude of effect, and act as the foundation for the split between offsetting and compensation I have set out below (paragraph 76).

43. With regard to operational effects, I agree that these did not form part of the original assessment. e3 Scientific’s response to CODC addresses them only in part. It considers that grooming and snow compaction will occur on trails that are already disturbed, so will cause no additional loss and that any damage from equipment where snow is thin will be confined to isolated convex slopes of cushionfield and tussock grassland. In their view this would result in aa “Negligible” magnitude of effect at the ED alpine zone scale; and that avalanche control will change only the timing of avalanches, with no effect (e3 Scientific CODC response 2.1.2). Mr Salemink-Waldren’s draft evidence addresses snowmaking and grooming more fully. He accepts that wind-drifted artificial snow will reach adjacent vegetation and assesses the remaining effect of snowmaking as having a “Negligible” magnitude. He accepts that grooming of natural-snow trails outside the footprint (TEcIA Figure 2) may damage vegetation and alter the snowpack, and that the nature and magnitude of these effects are a knowledge gap. Mr Salemink-Waldren proposes the following controls on snow grooming:

(a) a minimum snowpack of 40cm within all areas of 'Groomed natural snow' shown in Figure 9 to his evidence before snow grooming can begin, except on rockfield;

(b) grooming must stop when the snowpack reduces below 40cm; and

(c) no grooming of natural snow trails, except on rockfield, can occur once certain snowpack conditions are reached in the in the surrounding Doolans Right Branch Creek upper basin; the thresholds relating to snowpack conditions are to be determined in consultation with an ecologist, hydrologist, and avalanche/snowpack specialist.

44. He also proposes preparation and implementation of a snowmaking and grooming management plan that must be certified by DOC. The objective of the management plan is proposed to identify how the potential adverse effects of snow making and grooming on the terrestrial ecology and biodiversity values are to be monitored and managed for the duration of the activities. To achieve this, the management plan is proposed to include monitoring to monitor the effect of the activities, trigger levels for remedial actions and document remedial actions to be implemented such as rotating snow grooming or ceasing snow grooming if monitoring identifies an adverse effect on vegetation communities where grooming is occurring.

45. Monitoring is proposed to establish baseline ecological conditions before grooming or snowmaking begins, including surveys of affected and control sites. Surveys must be repeated annually for the first five years after snow making and grooming starts and on a five yearly thereafter. The management plan is proposed to document remedial actions and/or compensation to be implemented if the monitoring shows vegetation change of affected plots shifts by more than 10% and is not similarly reflected in control plots.

46. In my view those measures, with his Figure 1, largely define the operational effects area and provide the right type of response to address effects. I would add that the 10% trigger should be defined (for example as change in indigenous cover or in the cover of key species), that retrospective compensation should be pre-quantified in the Offset Plan, and that snowmaking water chemistry should be monitored to address the potential for alkalinisation of wetlands.

47. In my view effects within the operational effects area are uncertain as to magnitude given the lack of relevant published research in New Zealand, other than short-term monitoring at Treble Cone, which found lower live vascular cover on groomed cushionfield but no significant change in species richness or composition over three years (Wardle and Fahey 2002, cited by Mr Salemink-Waldren). There is, however, some local evidence with respect to the nature of ski field operations on vegetation

and wetlands. Mr Simpson's 2020 survey of the Rastus Burn ski area for NZSki records that ski trails and fun areas "produce much bare ground", and that wetlands are very sensitive to silting from runoff from ski trails and roading and "to damage from snow groomers and skiers as the snow cover thins" (Simpson 2020, s12). Mr Rossaak adds the risk of alkalinisation of peat wetlands from snowmaking water (Rossaak s3.2). However, Mr Simpson also records that, after more than 35 years of skifield operation, the plant communities in the Rastus Burn "are mainly intact and appear to be flourishing", that "there is no known loss of rare or threatened plants or animals", and that there was "no noticeable change to bird life" (Simpson 2020, s12). On that evidence, the operational effects of the ski field are more likely to be a decline in quality in parts of the area than a loss of species or alteration of vegetation composition. Given that any adverse effects are likely to be a decline in quality, rather than a complete removal, my view is that at least some of these effects should be offsetable provided that other degraded examples exist that can be improved. Dr Maseyk has provided examples of such communities in her Addendum (Maseyk Addendum Table 1). This approach would rely on robust monitoring and trigger thresholds which could be provided for in conditions and management plans.

48. The effects of climate change are discussed in the evidence of e3 Scientific and I have not considered them here.

49. Wildlands (s4.2) are of the view that unaddressed effects rated "minor" or lower are left unmanaged, which risks cumulative multiple-stressor effects. My residual effects management framework, discussed later in my evidence, accounts for these in the offset rather than ignoring them.

50. With respect to sampling gaps, four or fewer plots were sampled in high alpine cushionfield and Dracophyllum scrub [Wildlands s4.4] and there was no invertebrate sampling between October and December [Wildlands s4.8; DOC s53 2.2(f); Watts 14, 22]. These gaps are relevant, but in my view, they are unlikely to be material: the rarefaction curves calculated by e3 Scientific indicate that most species were captured in most communities (Wildlands s4.4), and Wildlands view (s4.8) is that the invertebrate assessment does not downplay effects and I agree. Of the rarefaction curves calculated, only the rocky outcrop and snowbank curves do not flatten, which e3 Scientific attributes to their limited extent. No snowbanks are to be disturbed (e3 Scientific CODC response 2.2.1.1).

51. In relation to the value of remediation, Wildlands (s4.1) notes that no further management is proposed if revegetation and re-sowing both fail and considers that this approach requires further consideration. Given that that revegetated areas are still treated as habitat loss, I remain unconvinced that this reconsideration would materially affect the outcome. e3 Scientific explains that 60% survival is the

minimum it considers acceptable in the harsh receiving environment, that 60% indigenous cover within seven years is based on its observations of high-quality remediation in the Rastus Burn, and that if revegetation and re-sowing both fail the level of effects before mitigation would apply (e3 Scientific CODC response 2.5.1.2). In my view that supports a backstop in the revegetation condition, so that any failure is addressed rather than simply recorded: replanting first and, if that fails, adding the shortfall to the offset or compensation (condition (j) in paragraph 100).

52. NZSki has a long record of revegetation in the Rastus Burn under a joint DOC–NZSki revegetation protocol, with an independent monitor (Mr Neill Simpson) engaged by DOC (NZSki 2015). Mr Simpson's 2020 survey reports that:

    (a) tussock grassland lifted and replaced by machine in a single movement (which I have called 'vegetation direct transfer' (or VDT), as on the new Sugar Bowl trail in 2020, is "hardly distinguishable from the untouched tussock grassland", whereas tussocks stored in piles for weeks or months fared less well (Simpson 2020, s11);

    (b) cushion plants, previously thought impossible to transplant, have been hand-planted successfully at about 1,800m in the upper Sugar Bowl and have persisted for about five years (Simpson 2020, s11 and Figures 72–73); and

    (c) part of a wetland at the top of the Alta chair was lifted, held in baskets in open water for two months and replaced, and was unrecognisable as disturbed four years later (Simpson 2020, s11 and Figures 81–84; NZSki ORC presentation, slides 4 and 9).

53. Mr Simpson concludes that revegetation of tall and short tussock grassland "has generally proved successful", while cushionfield and fellfield communities "are difficult to recreate but are proving possible in small areas" (Simpson 2020, s12).

54. Mr Simpson's observations accord with my experience monitoring rehabilitation at Stockton Mine, where VDT is common practice as part of mine rehabilitation, although the environment is very different, with the higher and more evenly spread rainfall in particular likely to be a factor in success there. In my view the methods required by ECO.14–15 (single movement and minimal storage) are achievable and provide reasonable confidence that revegetation of tussock grassland will succeed. With dedicated and experienced operators and appropriate ground to receive them I consider that cushionfield, high alpine cushionfield and wetlands at the scale proposed are also achievable. However, in order to be conservative, I have not assumed success for revegetation in the indicative offset calculation I have provided below.

55. In conclusion, my view is that overall, e3 Scientific's ecological impact assessment is reliable, and its approach to the scale of assessment is reasonable. Nonetheless, for the three matters I identified in paragraph 37, the magnitude of effects, and therefore the residual effects, may be understated. This results because operational effects were not considered. The alpine zone extents are untested, but in my view are unlikely to materially affect the outcome. Assessment of values that exist only at basin scale (such as intactness and connectivity) were not separately assessed. e3 Scientific have updated their assessment in response to the comments received and I rely on their Terrestrial ecological memorandum for the revised values and magnitudes of effects, the corrected Table 18 and the other minor corrections. The framework I have recommended to respond to residual effects (and the offsetting I propose) is based on that revised assessment.

Basin history

56. Mr Dale records Dr Walker's view that the Doolans Basin "may be the only alpine basin within the Ecological District that has not historically been subject to pastoral grazing" [Dale 82, citing Walker pers. comm.; see also Walker SoA 49]. Dr Walker's reasons are that the vegetation is "unusually" intact; that no shepherds' huts, fencing or stock tracks have been found in the basin; and that the high, south-facing basin offers little grazing and a high risk of stock loss. She accepts that sheep are likely to have strayed into it (Walker SoA 49). In my opinion that has not been established:

(a) Wentworth lease. The Wentworth Pastoral Lease (Po49) was issued in 1952. It lay between the left and right branches of Doolans Creek and extended upslope of the water intake location and proposed base area (AJ Harford-Brown, pers.comm.). Its high country carried about 2,500 wethers before 1983. A 1984 run plan began destocking, and from 1992 up to 1,800 wethers were allowed for about 10 weeks. The lease was surrendered through tenure review in 1996, and about 4,000 ha passed to the Crown for conservation [Wentworth tenure review documents, PANZ archive]. On that basis at least the lower slopes were grazed and very likely the upper slopes as well.

(b) Farm track. The presence of an old farm track crossing the branches of Doolans Creek to Doolans Saddle indicates that farming took place in the area at some point (FMC 2018, p 17, which describes it as part of the mountain-bike route from Coal Pit Saddle to Doolans Saddle and Nevis Crossing). I note that the applicant's heritage assessment interprets the tracks visible on aerial imagery, which lie south of the intake, as walking tracks rather than sheep tracks (Walker SoA 49, fn 11). The track therefore

confirms access to the area rather than conclusively supporting grazing within the upper basin.

(c) Current use of adjoining land. In 2023 proposed Lot 1 of Wentworth Station, between the two branches of Doolans Creek, was used as a hunting operation for red deer, fallow deer and goats, with some sheep and cattle also present (paragraph 7). Browsing animals were therefore present on land immediately adjoining the basin recently.

(d) Rastus Burn. Mr Simpson records that merino sheep grazed the adjoining Rastus Burn until tenure review of the Cone Burn and Wentworth Pastoral Leases removed all sheep, and that "the many sheep tracks that once criss-crossed the basin are no longer visible and sheep camps have disappeared as the vegetation has recovered" (Simpson 2020, s2 and s12). That contradicts Dr Walker's premise that historic livestock tracks remain visible for generations (Walker SoA 49(c)). In my view the absence of visible tracks in the Doolans Basin is not reliable evidence that it was never grazed.

(e) Wider Context. "Formerly a single large run covered nearly all of The Remarkables", mustering sheep from the Wye Creek and Rastus Burn catchments each autumn, and "nearly all of the proposed park area has been used for summer grazing of merino sheep at some stage in the past 150 years" (FMC 2018, p 19). The Ben Nevis tenure review records that grazing of 6,844 ha of mainly high-altitude country, including the true right of the Doolans Creek Left Branch, ceased in 1980, and that tussock cover and condition are particularly good in the retired block, while the replacement of slim snow tussock by cushionfield on sunny spurs is likely to reflect past grazing (Ben Nevis CRR, pp 3, 7, 14 and 16). The Mt Difficulty lease, which was run in conjunction with Wentworth, had upper slopes grazed to about 10% plant cover, and snow tussock was expected to recover once grazing ceased (Mt Difficulty CRR, pp 2, 13–14).

(f) TEcIA. The TEcIA does not address grazing history.

57. I accept that the basin is in very good condition and that it is generally agreed that its values are "High" to "Very High". If it was grazed, however, its present condition is likely to reflect recovery since destocking. That matters in two ways: Firstly, it weakens the claim that the basin is unique in the Ecological District because it has never been grazed. Ms Teele identifies, from aerial imagery, ten basins elsewhere in the Ecological District above 1,100m with vegetation similar to the Doolans, and nine other high, south-facing basins, and notes that no evidence has been provided that they were grazed differently (Teele, Figures 1–2). Secondly, it indicates that alpine vegetation in this altitudinal range responds when browsing pressure is

removed, which supports the potential for condition-gain offsets elsewhere nearby. The recovery of the Rastus Burn since destocking, described by Mr Simpson is a local example of that response. Mr Salemink-Waldren refers to plant lists from the Wye Valley, Rastus Burn, Loch Linne Station and Staircase Creek that record similar species (Salemink-Waldren, 'Scale of Assessment'). Ms Teele also shows that the basin is one of the more accessible in the district, used by ski tourers, hunters, walkers, mountain bikers and trail bikes reaching it from the Rastus Burn, Wye Creek and Coal Pit Saddle (Teele, Figures 3–6). DOC's reviewer considers that the other basins are smaller or differ in vegetation (quoted in e3 Scientific DOC response 2.3.5). The comparison relies on aerial imagery and plant lists rather than field survey and is not conclusive, but in my view, it shows that the claim that the basin is unique has not been established.

APPLICATION OF THE EFFECTS MANAGEMENT HIERARCHY

Background

58. The hierarchy requires adverse effects to be avoided where practicable, then minimised, then remedied. Only after that can residual effects be offset where possible, and then compensated. I assess each step here in turn. Whether the national instruments are determinative under the FTA is a planning matter discussed in the evidence of Ms O'Sullivan.

Avoidance

59. The matter of avoidance is discussed in more detail in the evidence of Ms McQuillan. It is my understanding from discussions with the Project team that:

    (a) Site selection has steered infrastructure away from high value ecological features (such as wetlands and cushionfields) and towards lower ecological value features such as rockfield and tussock; and

    (b) This assessment has been informed by estimates/quantification of the extent of features affected and/or avoided by alternative layouts; and

    (c) This has resulted in exclusion of options with highest ecological impacts as a result of earthworks.

    (d) This approach has also been applied to Tarn 3 and the potential water sources for snowmaking including available volume, timing, storage needs, pipeline route and power, existing consents, and cost as set out in the evidence of Ms McQuillan. The ecological comparison of reservoir sites is set out in the evidence of Mr Salemink-Waldren ('Alternative Reservoir Location'), and the NZSki Site Selection Memorandum (August 2026;

Attachment A to A-21) documents the wider avoidance decisions. Mr Salemink-Waldren also records that the string mire and surrounding cushion bog on the bench at about 1,600m have been avoided, with a buffer of more than 30m of tussock grassland (Salemink-Waldren, 'String Mire').

(e) Based on the evidence provided, my view is that the 'avoidance' element of the hierarchy has been comprehensively explored and implemented to the extent practicable as part of planning the construction phase of the Project. Whether it has been fully applied to the water source depends on the outcome of NZSki's investigation of a Lake Alta take (paragraph 57). If that is practicable, avoiding Tarn 3 and the water-take track would in my view be a proper application of the hierarchy. If it is not, the reasons should be documented and the loss of Tarn 3 offset or compensated.

(f) Operational avoidance is not yet demonstrated. I understand from NZSki that excluding snowmaking and grooming from all NUEs and wetlands would not be practicable for the operation of the ski field. Mr Salemink-Waldren instead proposes confining snowmaking to the main trail and managing grooming through rotation, a minimum snow depth, a seasonal cut-off and monitoring with triggers (paragraph 43). In my view those measures, together with the avoidance of the string mire and cushion bog, are an acceptable substitute for blanket exclusion, provided the triggers are defined and secured by conditions (paragraph 100(f)). Damage where snow cover thins, which Mr Simpson observed on the Rastus Burn wetlands (Simpson 2020, s12), should be a specific focus of that monitoring.

60. The matters which come to bear on the comparison of water sources are considered further in the evidence of Ms McQuillan.

Minimisation

61. My view is that several measures described as avoidance in the original application (such as narrow formations and crossings at narrow points) are more correctly regarded as minimisation.

62. Other minimisation actions relating to the design and layout of the footprint, vegetation loss and fragmentation, biosecurity, wetlands and fauna are set out in A-21 including:

(a) Building roads out downslope with retaining walls rather than cutting deep slopes, so less rock falls onto the vegetation below, for example on the Sugarbowl–Helicopter Ridge track.

(b) Keeping formations and earthworks as narrow as practicable.

(c) Co-locating roads and services in one shared corridor.

(d) Locating wetland and stream crossings at the narrowest points, and retaining natural flow paths and hydrological connectivity.

(e) Drainage and erosion and sediment control and sequencing construction to limit the amount of exposed ground. The draft Erosion and Sediment Control Plan forms part of the Construction Environmental Management Plan (Rossaak s3.6).

(f) Marking the disturbance footprint with no works permitted outside it unless that reduces the footprint, with any change to be confirmed by an ecologist.

(g) Translocation of all Threatened and At Risk – Declining plants and up to 500 clusters of each Naturally Uncommon or Data Deficient species with a 60% survival target. Any shortfall against that target should be added to the offset or compensation.

(h) Stockpiling only permitted inside the footprint.

(i) Covering unvegetated trail surfaces with large coarse rock, not fine gravel.

(j) Bringing in no outside soil, cleaning machinery at a quarantine area at the Remarkables base, and moving no soil more than 100 vertical metres upslope or between catchments.

(k) Applying the vegetation measures, and maintaining the hydrology of every wetland and stream.

(l) Preparing a design and hydrological assessment for each crossing, approved by an ecologist, and confirming after construction that the wetlands are still functioning hydrologically. In my view a hydrologist, as well as an ecologist, should approve each crossing design and confirm hydrological and ecological function after construction.

(m) Designing external windows to break up sight lines, monitor for bird strike, and adding deterrents if a “Threatened” or “At Risk” bird strikes.

(n) Surveying for nests before works in the breeding season, with exclusion zones, moving nests or chicks, or destroying nests to encourage re-nesting (e.g., pipit).

(o) Using no lead-based materials, securing tools and materials, erecting signage, training staff, and providing kea “playgrounds” if they become a nuisance.

(p) Removing lizard habitat gradually, clearing vegetation only when it is warmer than 14°C, and following an incidental discovery protocol.

(q) Relocation of all known invertebrate host plants (*Cardamine*, *Aciphylla aurea* and *A. latipinna*), in the largest tracts possible and as close to the donor site as possible.

(r) Managing rubbish including requiring all bins to be located inside and undertaking annual rubbish collections.

63. My view is that some of the minimisation measures proposed could be strengthened, including:

(a) sediment discharge limits much lower than the proposed 150 NTU (against a 0–0.35 NTU baseline). I defer to Mr Hamer and Dr Kavazos on the appropriate limit; Mr Hamer proposes no conspicuous change in visual clarity at 10 stream widths downstream of any input (Hamer, response to Dr Kavazos);

(b) a single-entry weed quarantine;

(c) supervision of lizard habitat clearance and a lizard relocation protocol (paragraph 93).

(d) Management of construction noise for birds and invertebrates. Residual effects are “Moderate”, and “High” for seven invertebrate species. Timing noisy works to avoid the bird breeding season and the peak moth flight period is an obvious minimisation measure that does not appear to have been considered.

(e) Operations have no minimisation measures. Lighting is managed only through construction conditions CON.9–11.

64. In my view some actions listed as minimisation are mislabelled. Translocation of vegetation and monitoring are remediation and verification respectively.

Remediation

65. Revegetation of up to 11.88ha including direct transfer of vegetation is appropriate, but should not be credited as reducing residual effects unless fallback actions to ensure success are practicable and achievable. Such actions include contingency planting, seed sowing, irrigation during summer dry periods, weed control and/or an increase in offset quantum. I do not consider that extended monitoring is an appropriate contingency to mitigate the risk of planting failure.

Residual effects

66. After avoidance, minimisation and remediation, residual effects remain for some high-value and very-high-value features. One of the outstanding matters is the extent to which, and how those effects are addressed. Dr Maseyk considers strict adherence to the hierarchy would direct the activities to be avoided [Maseyk Addendum 5]. My view is that there are residual effects that can be offset and that therefore the residual effects should be divided into those that can be offset and those which cannot (i.e. are at the limits), and each addressed accordingly. e3 Scientific accepts that compensation is warranted for wetland loss under the NPS-FM, and that until an offset or compensation package is presented a significant overall net loss of ecological values is expected (e3 Scientific DOC response 2.4; ORC response 2.3). Mr Salemink-Waldren confirms that residual effects on a wide range of invertebrates require compensation, and that *Pyrausta comastis* has a "Moderate" level of residual effect from operational noise and lighting that should be added to TEcIA Table 18 (Salemink-Waldren, 'Invertebrates'). Mr Hamer now accepts that the 55m of intermittent stream diverted into the armoured swale should be treated as lost, although he assesses the effect as "Low" (Hamer, 'Doolans Tributary Streams – Ecological Impact Assessment'). In my view compliance with the NPS-FM would require that loss still be accounted for in the offset and/or compensation.

Whether all naturally uncommon ecosystems are irreplaceable

67. Dr Walker's opinion[8] is that NUEs are irreplaceable, so compensation for their loss is not appropriate for two reasons:

    (a) NUEs are of limited national extent, with few equivalents.

    (b) NUEs cannot be re-created within resource management timeframes.

68. Dr Maseyk reaches a similar conclusion for the package as a whole[9].

69. I agree that some of the affected NUE features are irreplaceable, or close to it. I do not agree that NUE status alone makes a feature irreplaceable, for the following reasons:

(a) The definition Dr Walker relies on is narrower than the conclusion she has drawn from it. Maron et al. (2026) define ecologically irreplaceable assets as those "impossible or extremely difficult to restore or recreate within an ecologically relevant timeframe" [quoted at Walker Addendum fn 17]. That is a test of re-creatability. It

[8] Walker Addendum 23–24; NPS-IB App. 4 principle 2(a)
[9] Maseyk Addendum 5, 16(b)

does not make rarity a reason for irreplaceability. The first limb of Dr Walker's reasoning therefore goes beyond the definition she adopts.

(b) NUE is a classification of rarity, not of threat or re-creatability. The NUE typology (by its definition) identifies ecosystems that were naturally limited in their total extent. The threat status of NUEs has been individually assessed. Their threat status varies by type (Holdaway, Wiser and Williams 2012). Re-creatability also differs widely between naturally uncommon ecosystem types.

(c) Irreplaceability is a matter of degree and depends on place. In conservation planning, irreplaceability measures to what extent a particular site is required to meet a conservation target, given the alternatives[10]. It is a continuum, assessed at a stated scale. The NPS-IB treats irreplaceability and vulnerability as examples of when compensation is "not appropriate". It does not list NUEs as a class despite the NUE framework predating the NPS-IB by more than a decade.

(d) The NUE status does not change the values as assessed, because those communities were already scored "High" or "Very High" for rarity.

70. My view is that each affected NUE should be assessed individually against the criteria when considering it's offset-ability:

(a) national extent and threat status of the NUE type;

(b) representation of that type in the Remarkables Ecological District and perhaps adjacent Ecological Districts;

(c) whether the whole feature or only part of it is lost or otherwise affected;

(d) condition, and whether it is unique in the basin;

(e) re-creatability, and estimated recovery time where the physical processes continue; and

(f) scientific or geomorphic significance.

71. On the information I have, and on the understanding that the footprint has been minimised to the extent it can be, my view of each affected feature is:

(a) Tarn 3 (a tarn; an ephemeral wetland in DOC's view, a wetland in Mr Rossaak's view; not a wetland in Mr Salemink-Waldren's view or mine,

[10] Pressey RL, Johnson IR and Wilson PD (1994) Shades of irreplaceability: towards a measure of the contribution of sites to a reservation goal. Biodiversity and Conservation 3: 242–262.

although the experts differ (paragraph 24)). Experience at Stockton Mine suggests tarns are easily created and relatively quickly develop an aquatic invertebrate community statistically indistinguishable from natural communities. In my view Tarn 3 could be offset, particularly since its biodiversity is low. However, Mr Rossaak considers Tarn 3 unique in the basin and the wider area because of its fluctuating water levels, groundwater connection and unvegetated beaches (Rossaak s3.1). A created tarn would need to replicate those features, ideally in a similar moraine setting, to qualify as an offset. If that cannot be demonstrated, the loss of Tarn 3 should be compensated. The landform in which it sits is part of the moraine sequence, which I address next.

(b) The nested late-glacial moraine at Tarn 3 and the main trail is at the limits, because the landform cannot be recreated. Mr Barrell describes the sequence as an outstanding natural feature of national scientific relevance (Barrell 32, 40). It should be avoided where practicable, or otherwise compensated for.

(c) The moraine bench (base building and learners' slope) is less clearly at the limits. Mr Barrell considers that the gondola, towers and base buildings "are not in locations that compromise any landforms of notable significance" (Barrell 33), although Dr Walker treats the bench as a naturally uncommon ecosystem. I understand that NZSKi have proposed the minimum viable footprint, so on that basis effects on the ecological values of the moraine bench should be compensated for. I note that Mr Salemink-Waldren considers that the bench does not meet the NUE definition of moraine because its soils are too developed (Salemink-Waldren, 'Moraine', citing Brownstein et al. 2025).

(d) The extreme alpine deflation surface at Helicopter Ridge (mid-station) is a naturally uncommon ecosystem (Dale 25, 87), although Mr Barrell does not identify it as a rare geomorphological feature (Barrell 19). Re-siting should be tested, otherwise compensated for; Mr Salemink-Waldren points out that "alpine deflation surface" is not a listed naturally uncommon ecosystem, and that Helicopter Ridge does not meet the definition of screes of acidic rock (Salemink-Waldren, 'Alpine Deflation Surface'). If that is correct, the feature should be assessed on its vegetation and recovery time rather than on its NUE status.

(e) Moraines possibly crossed by the water-take track remain unconfirmed. These should be mapped, and would be avoided entirely if Lake Alta were adopted;

(f) Acid-rock screes at Sugarbowl and Curvey (Rastus Burn). My approach here would be to evaluate the extent of the type in the Ecological District and whether scree processes resume beyond the formation. Ms Macleod notes that no compensation has been proposed for these screes (Macleod 210), and Dr Watts considers they are likely to support distinct and poorly known invertebrate assemblages (as summarised at Macleod 208). In the absence of further information to address those matters I have treated them as Tier 4 (compensation). Mr Salemink-Waldren estimates that the tracks intersect about 550 linear metres of scree, rather than the 1,000m inferred from Dr Walker's figure (Salemink-Waldren, 'Screes of acidic rock').

(g) Rockfield and rocky outcrops: evaluate as above; and

(h) Indirect sediment effects on Swan Lake, seepages and cushion bog: These are avoidable through sediment controls with strict triggers.

72. Where a feature is at the limits to offsetting, I accept that it cannot be offset, and that from an ecological perspective, a compensation case for such a feature must meet a high bar. Whether and how compensation can be weighed in the context of this application and the Panel's decision is a planning and legal matter. I note that DOC itself has suggested a package "to assist the panel" while maintaining its view that some features cannot be offset[11].

Proposed Offset and compensation framework

Is Offsetting feasible?

73. As noted above (paragraph 20), e3 Scientific concluded that offsetting is not possible because the adjoining alpine habitats are relatively undisturbed and unlikely to benefit from protection or restoration[12]. In my view that conclusion is not supported by their own assessment. In addition, to date no offset options have been tested to support or disprove that conclusion. Matters that suggest to me that offsetting is both achievable and effective include:

(a) e3 Scientific rates the long-term viability of the vegetation communities as "High" only "*where weed control is routinely and successfully implemented*". Without any management input, it rates long-term viability as "Moderate"[13]. In my view a difference between "Moderate" and "High" viability that depends on management is a gain that effective and sustained physical protection measures can deliver.

[11] Maseyk Addendum 7; DOC s53 2.5–2.6
[12] TEcIA s7.1, p 149
[13] TEcIA s6.1.4. p 109.

(b) e3 Scientific also states that maintaining the undisturbed vegetation "will include ecological monitoring and active management including mammalian pest, weed control, and rubbish collection"[14]. Again, this suggests that active management will improve both the quality and the viability of the ecological values present.

(c) DOC[15] identifies wilding conifers, priority weeds and ungulates (goats, pigs and deer) as threats to ecosystems within the Remarkables Management Unit, and proposes control projects with outcomes "experienced directly within the Remarkables Management Unit"; and

(d) Wildlands (s4.1) view is that only fully successful weed control supports a "High" viability rating.

74. Relatively undisturbed habitat can therefore still benefit from averted-loss and condition-gain measures. Whether those gains are enough to offset particular residual effects is a question for expert opinion, ideally informed by a quantified model.

The current package and its critics

75. Prior to my peer review NZSki proposed:

(a) a Biodiversity Compensation Project of $75,000 per year (inflation-adjusted) for the concession term, with a project plan due up to 18 months after Doolans construction starts;

(b) $80,000 for lizards;

(c) a concession fee increase from 2.5% to 3%; and

(d) $20,000 for a boardwalk at Lake Alta.

76. In my view all of these except the boardwalk and the concession fee are compensation and none are of a nature that would provide an offset to residual effects of the Project. The commenters agree on the weaknesses of this package, though not on the remedy:

(a) it is set by a funding cap rather than by outcomes;

(b) it is not quantified, so time lag and likelihood of success are not addressed;

[14] TEcIA s6.1.4, p 109
[15] Maseyk Addendum 13(a)–(b) and Table 1, Projects A–C

(c) it has no requirement for similarity or proximity. Wildlands' opinion is that, at least in theory, it could fund lowland predator control in the North Island. I would note that that would not be a unique DOC compensation arrangement in that respect.

(d) it is not linked to the residual effects, and is not fixed before irreversible effects occur; and

(e) it is inadequate in scale, although in my view that is virtually impossible to assess currently.

77. Mr Dale[16] considers the framework "has potential merit" but calls for "a transparent and repeatable method". I agree. The concession fee is not linked to the residual effects of the Project, and in my opinion should not be counted as ecological compensation. The boardwalk is intended to remove or reduce existing effects on a highly traversed wetland area and on that basis, could be considered compensation.

Proposed framework

78. In a non-FTA proceeding, offsets are required to meet the NPS-IB Appendix 3 principles, and compensation the Appendix 4 principles. I consider that this approach should still guide formulation of the residual effects response here. Those principles include additionality (principle 4 in both), leakage (5), long-term outcomes (6), landscape context (7), time lags (8), science and mātauranga Māori (9 for offsetting, 11 for compensation), tangata whenua and stakeholder participation (10, 12) and transparency (11, 13). Compensation also allows trading up (9) and, as a last resort, financial contributions (10) (Maseyk SoA, Table 1). Wildlands also consider that compensation should be quantified for time lag and likelihood of success. In my view this is unnecessary if the range of values being compensated for is reduced via implementation of offsetting for those that can be offset and that commences in advance of works.

79. I propose a tiered framework applying the effects management hierarchy. The residual effects identified after the revised assessment are divided into values that can be offset and values at the limits, and each is addressed with an appropriate method. The values in each tier are provisional, pending the NUE map and a revised Table 18:

(a) **Tier 1 – Avoid :** the water-take track, the string mire and cushion bog. Treatment: redesign (water source), and mapped no-go areas, and the

[16] Dale 18, 99–100

snowmaking and grooming measures described in paragraphs 43 - 45, supported by the options comparison described above;

(b) **Tier 2 – Minimise and remedy:** The whole footprint and zone of influence. Treatment: strengthened sediment, weed and revegetation measures, operational controls. Verify with BACI monitoring with quantified targets and triggers.

(c) **Tier 3 – Offset.** Tarn 3 if it is retained in the design, snow and north-facing tussock grassland, *Dracophyllum* scrub, cushionfield not on NUEs, pipit and falcon habitat, McCann's skink, and the lower-level effects left unmanaged by e3 Scientifics approach. Treatment: like-for-like averted loss and condition gain in the Remarkables Ecological District, started before impact. Method: Use widely accepted/proven techniques to control weeds and ungulates and other site-specific remedies as appropriate to the management site (e.g., planting of bare areas). Ideally a Biodiversity Offset Accounting Model (BOAM) would be deployed using area × condition, with time discounting, confidence in success and sensitivity ranges (Maseyk et al. 2016), but in my view this is not essential where the expected gains have been verified independently at >1 location. I return to this matter in paragraph 81 below. Note that the ecological attributes to be offset would need to be considered separately to avoid loss of smaller or less easily distinguishable attributes. With respect to the 55m of intermittent stream lost to the reservoir inflow diversion should also be offset, using stream-specific methods (Stream Ecological Valuation and Environmental Compensation Ratio) rather than a BOAM. Tarn 3 can only be included in this tier if a created tarn can be shown to replicate its features (paragraph 68(a)).

(d) **Tier 4 – Compensate.** Residual values at the limits: NUEs not avoided or offset, high alpine cushionfield, moraine, range-restricted invertebrates and loss of basin intactness and connectivity. Treatment: trading up to higher-priority values, explicitly not presented as no net loss. Method: compensation focussed on relevant ecological features nearby and cross-checked against Dr Maseyk's evaluation framework[17]. Wetland losses (cushion bog, riparian wetland, seepage and string mire) should be accounted for separately by type and extent, as Mr Rossaak recommends (Rossaak s3.2 and s4 (ECO.6)), and the acid-rock screes are included here pending evaluation. Dr Maseyk notes that compensation does not require the numerical demonstration of no net loss, only that its positive outcomes

[17] Maseyk SoA Part C

outweigh the values lost (Maseyk SoA 42). A compensation model is a tool for making that judgement transparent; it does not imply that no net loss is the objective. When considering the utility of applying a BOAM, I am mindful that constructing a BOAM and collecting the information required to inform it is a significant and generally costly exercise. In general, I would be in favour of adopting a position that directs the maximum amount of funding to ecological enhancement and the minimum amount to monitoring and verification. This would involve adopting proven methods to address known issues for which the outcomes have been independently verified (ideally at more than one location). This approach maximises the ecological outcome for every dollar spent.

Candidate projects

80. DOC's refined package[18] is a useful starting point for discussion and testing. As a starting point for discussion only, and noting that this is DOC's package rather than my own proposal, I categorise its projects as follows:

(a) **A – Wilding conifer control, Remarkables Management Unit:** an offset (averted loss of tussock grassland), subject to a risk-of-loss counterfactual and additionality against existing programmes;

(b) **B – Priority weed control, Remarkables Management Unit:** an offset (condition gain), which also minimises the project's weed risk, subject to a baseline of weed cover and a target species list;

(c) **C – Ungulate control (goats, pigs and deer), Remarkables Management Unit:** an offset (condition gain in tussock, herbfield and cushionfield), subject to exclosure or browse-index baselines at defined alpine sites;

(d) **D – Rubbish removal and black-backed gull management, Doolans:** compensation, measured by rubbish load and gull numbers;

(e) **E – Nevis galaxid, Nevis catchment:** compensation (trading up, freshwater), measured by barrier performance and subject to landowner agreement and third-party approvals. In my view this project is not viable to pursue because of the difficulty in securing third party agreements.

(f) **F – Dunstan Mountains and Leaning Rock; G – Pisa Range; H – Old Man and Old Woman Ranges:** compensation for cushionfield (including *Dracophyllum muscoides* cushionfield), string mire, cushion bog and threatened plants on adjacent alpine ranges, subject to defined sites

[18] Maseyk Addendum Table 1; DOC s53 2.9

and outcomes; In my view this project is not viable because it is too far removed from the impacts; and

(g) **I – Waikaia and Pomahaka headwaters; J – Blue Mountains:** compensation for cushion bog. These are further from the site, and the Blue Mountains is furthest [Maseyk Addendum Table 1], so I also consider this project not viable and would give it the lowest priority.

81. In my experience, offset and compensation actions that are as close to the Project as possible, and within NZSki's ability to deliver, are the most likely to succeed. Projects F to J depend on third-party landowners and approvals, and on management by others. I would therefore give priority to projects within the Remarkables Management Unit and on land NZSki manages or can secure, and treat the more distant projects as a fallback only to be considered if better options fall through.

82. In my view there are five other projects which could be suitable (subject to verification):

(a) Creation of a tarn with similar features to Tarn 3. It would need to replicate the fluctuating water level, groundwater connection and unvegetated beaches of Tarn 3 (Rossaak s3.1).

(b) Rehabilitation of the Rastus Burn legacy ski-area footprint, beyond existing concession obligations. This is an offset for tussock and cushionfield, in the same Ecological District and at the same elevation. This could include the proposed boardwalk or other improvements or re-routing of the track to avoid high value habitats. Mr Simpson records damage to the wetlands at the top of Lake Alta, and to cushion communities along the Lake Alta track and at the lake, from increasing visitor numbers, and notes that upgrading the track would keep walkers on it (Simpson 2020, s12). Because that damage is currently DOC's responsibility rather than NZSki's under the existing concession arrangements, rehabilitating it would be additional.

(c) a McCann's skink relocation site with habitat enhancement (paragraph 97(b));

(d) predator control for pipit and falcon, if a measurable benefit is achievable; and

(e) The purchase and protection of an area of land which can be managed for conservation similar to the proposed Lot 1 of Wentworth Station I discussed in paragraph 7 was tested, but ultimately was not practicable for NZSki. Retiring such an area from grazing and hunting, with ungulate and weed

control and a covenant, would deliver averted loss and condition gain perhaps adjoining the Remarkables Conservation Area.

Design rules

83. For the framework to be credible, I recommend that:

(a) the loss side is developed from the revised, site-scale assessment and any NUE map produced;

(b) each gain site has a baseline and a documented threat (browse, weeds, wildings, predation);

(c) gains are easily verifiable and additional to the pest control NZSki is already required to undertake. The renewed Rastus Burn concession requires a Pest Control Plan for pests present as a result of, or made worse by, the concession activities, and NZSki proposes to extend it into the Doolans (concession special conditions 48–54; e3 Scientific DOC response 2.1; Wildlands s7.1 notes that BIO.16–19 have been removed from the updated resource consent conditions). That control cannot be counted as offset or compensation gain;

(d) gains start before Doolans works, and time lag is discounted explicitly;

(e) results are reported with sensitivity ranges, and the noting my earlier concern about the costs of verifying a BOAM (paragraph 76(c)), assuming one is adopted, the model is first run provisionally, then verified after the summer 2026–27 baseline data is collected;

(f) sites are secured by concession, agreement or covenant for the life of the consent;

(g) funding follows the full cost of the outcome, including monitoring and contingency, and is not capped; and

(h) Kā Rūnaka are involved in project selection, which DOC notes has not yet happened.

84. Once the potential project(s) are agreed and confirmed, development and testing of a BOAM (if adopted) would allow explicit calculation of biodiversity loss and gain and a transparent assessment of what elements are still outstanding and require compensation. In my view the BOAM is a tool to test whether a proposed offset is adequate and to make that test transparent; it is not an end in itself and the process conveys a level of certainty that is simply not warranted in most ecological settings.

Where experts can agree that a clear net ecological gain is achievable, the methods are proven and the outcomes reliable, I would not necessarily deploy a BOAM for the reasons I have outlined above (paragraph 76(c)).

Indicative Offset Quantum and Costs

85. To give the Panel an indication of the likely scale and cost of an offset, I have prepared an indicative calculation for the option I consider most likely to be effective, relevant and achievable: wilding conifer and ungulate (goat, deer, pig and chamois) control on alpine and subalpine tussock and shrubland in the Remarkables Management Unit (DOC Projects A and C, with chamois added to Project C).

86. The calculation follows the structure of a BOAM, measuring biodiversity in condition-weighted hectares (area × condition score out of 100), but it is simplified. Every input is an assumption that must be confirmed with field baselines before a full BOAM is run, and I have deliberately chosen conservative assumptions.

Loss

87. To estimate the loss, I have used the areas of direct disturbance and edge effects provided in TEcIA Table 14 for the vegetation communities that I consider can be offset (Tier 3), with the following assumed current condition scores:

    (a) snow tussock grassland, 6.25ha (condition score 90);

    (b) north-facing tussock grassland, 2.64ha (condition score 85);

    (c) (Dracophyllum scrub, 0.18ha (condition score 85); and

    (d) cushionfield not on NUE landforms, 1.52ha (condition score 90); and (e) disturbed vegetation, 1.40ha (condition score 40). The loss totals approximately 12.0ha.

88. In calculating the loss, I have assumed that:

    (a) all cleared areas are completely lost, so no credit is taken for the revegetation of up to 11.88ha making the starting point conservative when considering rehabilitation;

    (b) operational effects (snowmaking, delayed melt and edge effects) affect an additional area equal to the cleared area and degrade it by 30 condition points; and

(c) the offset should deliver a net gain of 10% over the loss, which is my assumption of the margin needed to achieve the net gain required by NPS-IB Appendix 3.

89. Using those assumptions, the loss is about 13.5 condition-weighted hectares (9.9 from clearance and 3.6 from operational effects), and the offset target is about 14.9 condition-weighted hectares.

90. With respect to other losses, high alpine cushionfield, rockfield, rocky outcrop and the wetlands (together about 6.8 condition-weighted hectares) are excluded from the offset and are addressed through compensation (Tier 4). Tarn 3 is addressed separately through the creation of a tarn (if achievable, paragraph 79(a)). The values of the NUE landforms and the intactness of the basin are not captured by an area × condition measure and must be addressed in the compensation case. The 55m of intermittent stream lost to the reservoir inflow diversion is addressed separately using stream-specific methods. Mr Rossaak notes that the direct wetland loss is reported as 0.20ha, 0.233ha or about 0.289ha in different documents, and that together with Tarn 3 the direct loss of wetland and tarn is about 0.65ha (Rossaak s3.2 and s4). Those figures need to be reconciled.

Gains

91. With respect to gains, I have assumed that the tussock and shrubland at the offset site has a condition score of 70 (largely indigenous but browsed and with some wilding spread). I have measured the gain at 20 years, discounted at 3% per year, and multiplied it by a confidence factor reflecting the likelihood that sustained control succeeds. I have considered three scenarios:

(a) low improvement: condition rises by 3 points with control and falls by 2 points without it, with a confidence of 0.6 (i.e., more likely than not). The offset area required for this scenario is about 900ha;

(b) moderate improvement**:** a 5-point rise and a 5-point fall, with a confidence of 0.7 (i.e., reasonable certainty). The area required for this scenario is about 385ha; and

(c) high improvement: an 8-point rise and a 7-point fall, with a confidence of 0.8 (i.e., reasonable certainty). The area required is about 225ha.

92. The per-hectare gains are small, because alpine vegetation recovers slowly and the counterfactual must be measured net of existing DOC and Whakatipu Wilding Conifer Control Group effort. The most conservative option is option a) i.e., a low

improvement which is likely, but not certain. Setting the quantum using the low scenario requires about 900ha of alpine and subalpine tussock and shrubland. I would also note that this would need to explicitly consider the rarer/higher value attributes to ensure they are not inadvertently omitted. Because goats and deer are mobile, control needs to be undertaken across a larger area, which I have assumed to be about 3,000ha of the Remarkables Management Unit. The gain would be claimed only for the monitored tussock and shrubland within that block. A full BOAM, using baselines from paired exclosure plots, browse indices and wilding surveys, could be used to confirm the specific quantum within the range I have estimated of about 225–900ha.

Indicative Costs

93. I have estimated the cost of the offset proposed using the following unit costs, which would need to be confirmed with DOC Wakatipu, the Whakatipu Wilding Conifer Control Group and contractors:

    (a) ungulate control at $25/ha/yr for the first three years (knockdown), then $12/ha/yr (maintenance). These rates are well above the landscape-scale rates of about $1–2/ha/yr in the draft project list prepared for NZSki, because a measurable outcome is required;

    (b) wilding conifer control at $40/ha for an initial sweep, then $4/ha/yr for surveillance and maintenance. The Otago Wilding Conifer Strategy gives $5–10/ha for sparse infestations, rising to about $2,000/ha for dense stands, so the extent and density of wildings must be mapped first;

    (c) monitoring at $60,000 to establish plots and baselines, $8,000 per year for annual surveys, and $35,000 every five years to remeasure the plots and rerun the BOAM;

    (d) project management, reporting and governance (including Kā Rūnaka involvement) at $20,000 per year, and $25,000 to secure the site through agreements or a covenant; and

    (e) a contingency of 20% for adaptive management.

94. Based on these assumptions the offset would cost about $170,000 per year for the first five years and about $100,000 per year thereafter. Over the 40-year concession that is about $4.3 million in total, or about $2.6 million in present value terms (at a 3% real discount rate).

Costing compensation

95. In my opinion the cost of any compensation required over and above offsetting for the values at the limits (Tier 4) should be determined as follows:

    (a) define the outcome of each compensation project first, and then cost the full delivery of that outcome (implementation, monitoring, management, securing the site and contingency) for the term of the consent, indexed to inflation and secured by a bond or fund before works begin, rather than working back from a fixed budget;

    (b) size the outcome using a transparent model, such as the Biodiversity Compensation Model (Baber et al. 2021), to provide a sense check, with explicit weightings for irreplaceability, trading up, time lag and uncertainty;

    (c) cross-check the result against DOC's own costings of its package, which DOC has offered to provide (DOC s53 2.10), and against the unit cost of the offset; and

    (d) exclude items not linked to the residual effects, i.e., the concession fee.

Lizard Salvage

96. About 3.47ha of habitat for McCann's skink is within the earthworks footprint. That is roughly 4% of the 85.5ha of habitat in the LMP area. McCann's skink are regarded as "Not Threatened" but are absolutely protected wildlife in terms of the Wildlife Act (1953). The Central–Southern skink ("At Risk – Declining") may also be present within the footprint[19].

97. Opinion on whether lizard salvage is required is divided. I rely on Mr Knox and Ms Anderson in relation to this matter, noting that application of the effects management hierarchy is intended to apply project wide, not piecemeal.

98. In my opinion the eDNA study should not be counted as compensation on its own, for these reasons:

    (a) it produces knowledge, not a biodiversity gain. There is no assurance it will find new populations or improve the abundance, habitat or security of any lizard population;

    (b) it does not demonstrate additionality, time-lag management or long-term outcomes under the NPS-IB Appendix 4 principles;

[19] Dale 33–34; Wildlands s6.5

(c) a financial contribution is a last resort, available only where there is no effective on-the-ground option, and there are such options here; and

(d) Wildlands (s6.7.4) describes trading quantifiable ecological value for speculative knowledge as bad practice. I agree. Mr Knox considers that the eDNA study will provide a tangible outcome by informing survey and monitoring methods for threatened alpine lizards (Knox and Anderson, 'Adequacy of the compensation proposed'). I accept that it has value, which is why I support it in combination with the translocation (paragraph 95), but on its own it does not deliver a biodiversity gain.

99. Mr Harker considers that the eDNA study combined with the Lakes skink translocation would result in a net benefit for lizard conservation, provided the funding is sufficient for both (Harker 49, 54). I agree, on the basis that the translocation delivers the tangible gain. Dr Maseyk and Ms Macleod question additionality because Southern Lakes Sanctuary has proposed similar work (Maseyk SoA 91; Macleod 201). However, Mr Harker is not aware of Southern Lakes Sanctuary having secured funding for either project (Harker 44, 46). In my view NZSki funding for work that would not otherwise proceed is additional. Mr Knox has since confirmed with Southern Lakes Sanctuary that neither its eDNA project nor a Lakes skink translocation has been formalised or funded.

100. The study has merit as a survey method. Specifically:

(a) as a survey tool on site, combined with conventional methods, to target cryptic species (orange-spotted gecko, Central–Southern skink) before construction. That would directly inform avoidance and salvage; or

(b) as a voluntary contribution, offered separately and not counted in the effects accounting.

101. I recommend the focus should instead be on outcomes that can be measured, such as:

(a) funding of the Lakes skink translocation, including a translocation plan, post-release monitoring and contingency; and

(b) a McCann's skink relocation site with habitat enhancement and (where warranted by the number of lizards relocated,) monitoring, included as an offset in the BOAM (Tier 3).

102. The translocation plan should be completed during this process and included in the conditions, rather than after approval to provide certainty of outcome. The $20,000 contingency should be replaced with defined triggers and actions.

Outcome-based conditions

103. DOC, CODC and Kā Rūnaka all seek conditions that are specific, enforceable and outcome-based, and that fix the offset and compensation package before approval or before works commence. I agree that this approach provides substantially more certainty and transparency for all parties. With Ms O'Sullivan I have identified the types of conditions I consider are required below with final wording for the planners to develop. Following DOC's suggestion[20], Doolans projects would sit in the RMA consents, cross referenced in the concession, and lizard measures in the Wildlife Act approval.

104. Each offset project condition should state: the project and site; the values it addresses (by tier); the baseline; the target outcome and date; the monitoring method and frequency; the reporting; the trigger for corrective action; the contingency; and the means of securing the site. Depending on the project(s) adopted, the condition matters required are:

(a) **Offsetting Plan:** If a BOAM is adopted, the BOAM and compensation model outputs require approval, and confirmation of projects, sites and baselines as well as establishment of targets before any Doolans earthworks (not 18 months after). Annual reporting is required, with independent review at years 5 and 10. If outcomes fall short, effort is increased or projects added to restore the modelled outcome.

(b) **Funding:** the full cost of each outcome, for the consent term, starting at construction, secured by a bond or fund before works, audited annually, with the bond drawn if outcomes lapse. In terms of ensuring this performance, I understand obligations captured by the concessions (which will include the offsetting captured) are ensured through a guarantee provided by Trojan Holdings Limited.

(c) **Ungulate control (DOC Project C):** browse index at or below a target set from the pre-works baseline and fixed in the Offsetting Plan, measured at no fewer than 10 paired exclosure monitoring plots within the single offset block in the Remarkables Management Unit, by year 5, starting before works. If the index exceeds that target for two consecutive years, control effort increases [see Maseyk Addendum Table 1].

(d) **Wildings and weeds (DOC Projects A and B):** zero coning wildings, and priority weed cover below the pre-works baseline and declining in the treatment area, with no new priority weed species established, starting

[20] DOC s53 3.7

before works, with annual surveillance and re-treatment within 12 months [see Maseyk Addendum Table 1];

(e) **Rastus Burn rehabilitation:** the area identified in the Offsetting Plan restored to at least 60% indigenous cover, with species composition comparable to adjacent reference vegetation, by year 7, staged, monitored with permanent plots, with re-planting or an extended area as the contingency;

(f) **Snowmaking and Grooming Management Plan:** defined snowmaking areas and water-quality limits for snowmaking water, in place before first snowmaking. Monitoring is by BACI transects up to 100m (from wetlands only, otherwise 20m). Data collected to include soil nitrogen, phosphorus and pH and snow-free date. Monitoring should include the chemistry of the snowmaking source water and of wetland pore water, with an alkalinisation trigger (Rossaak s3.2, 3.6). Mr Salemink-Waldren's grooming measures and monitoring discussed at paragraphs 43 – 45 above should form part of this plan.

(g) **Sediment:** turbidity limits at defined points during works, with continuous telemetry and a stop-work rule; I defer to Mr Hamer and Dr Kavazos on the limit itself (paragraph 60(a)).

(h) **Wetland monitoring:** baseline, three-month, then six-monthly for two years, then annually for five years then five yearly, covering groundwater and vegetation condition, with remediation if triggers are exceeded;

(i) Wetland extent and delineation: authorised wetland loss capped by type (ha), consistent with the confirmed footprint, with any exceedance requiring additional offset or compensation; wetland edges delineated under the MfE wetland delineation protocols; and measurable indicators with baselines and triggers for each wetland type, including string mire (Rossaak s3.6 and s4; ECO.2(f)(iii), ECO.6 and ECO.8(d));

(j) **Revegetation:** 60% (consistent with ECO.16–18, with the TEMP thresholds reconciled) survival by year 7, monitored with plots. The backstop is replanting, then an increase in offset quantum [Wildlands s4.1, s5.3];

(k) **Management plans generally:** prepared by suitably qualified persons, with objectives tied to outcomes and performance measures.

Conclusions

105. In my view e3 Scientific's values and impact assessment is robust and its approach to scale is defensible in principle. Its magnitudes and residual effects are likely to be understated in the three areas I have identified because the ED alpine zone extents are untested, NUEs were not mapped, and basin-level values were not assessed. These can be corrected and at least the ED alpine zone extents are unlikely to materially affect the outcome of the assessment.

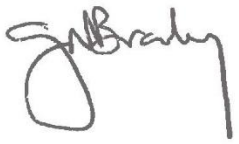
106. The hierarchy has been demonstrably applied at the avoidance step for the construction layout, and pending for the water source. The water-source comparison is one example of this approach to avoidance, and my opinion on it will follow the evidence of Ms McQuillan and e3 Scientific. Using Lake Alta would avoid Tarn 3 and the water-take track, but not all of the effects on the late-glacial moraine and would likely result in other (non-ecological) effects.

107. NUE status alone does not make a feature irreplaceable. Some affected features are at the limits and should be avoided. Others can be addressed through offsetting or compensation once they have been assessed individually.

108. My view is that offsetting is feasible for values within the limits. A tiered offsetting and compensation framework, built on the revised loss inventory, DOC's project list and possibly the additional projects I have identified, can provide the transparent, outcome-based, local and secured package the commenters seek. It should be agreed before Doolans works begin. The exact quantum of offsetting required will depend on the specifics of the project adopted and the outcome of any BOAM developed to support it.

109. Full salvage of McCann's skink is not required, provided a herpetologist supervises lizard habitat clearance and a relocation protocol applies. The eDNA study is not compensation on its own, but together with a fully funded Lakes skink translocation it would provide a net benefit for lizards.

110. In my experience offsetting and compensation actions as close to the Project as possible and within NZSki control to deliver should be the focus of any offsetting proposal and compensation could be scaled from the costs of developing the offsetting package.



Gary Neil Bramley

3 November 2026