To: Central Otago District Council

Submission of Kate Frances Wardle, Botanical Consultant- Ecological Services NZ, Alexandra. On an application by TKO Holdings for consent to subdivide and clear indigenous vegetation at Bendigo, Central Otago (RC230179)

13.11.24.

Introduction

1. My full name is Kate Frances Wardle.

2. I am unable to participate in the Hearing next week for the proposal by TKO Properties Limited for a residential development and subdivision at Rocky Point, Bendigo and therefore provide this written submission that focusses on the ecology

Qualifications and experience

3. I am a private botanical consultant based near Alexandra, and have extensive experience working in the dryland ecosystems and high country of Central Otago and Mackenzie Basin in both the public and private sector over the last 30 years. My clients have included the agencies Department of Conservation, Manaaki Whenua-Landcare Research, Queen Elizabeth II National Trust, Central Otago District Council and Otago Regional Council; rural landholders, the irrigation sector, mining sector, bike parks, cycle trails trusts, and other consultancies including Golder Associates, and e3Scientific.

4. I have extensive experience working in dryland ecosystems including ecological assessments for tenure review and various resource consents, vegetation monitoring and threatened plant surveys. I am familiar with the dryland biodiversity and flora of the Upper Clutha Valley, including the Bendigo Area. I have conducted Spring Annual Flora Surveys for resource consents and the Department of Conservation in the Clutha Catchment from Wanaka to Roxburgh; the Manuherikia catchment from Idaburn to Alexandra and the Mackenzie Basin. I have worked on the few remaining Saline Ecosystems in Central Otago. This gives me the relevant experience to comment on the biodiversity of this Proposal.

5. Prior to working as a private botanical consultant, I was a scientist at Semi Aridlands Research Group, Manaaki Whenua Landcare Research (1992-1995); and a field botanist for the Science Monitoring Group-Landcorp (1989-91) conducting vegetation monitoring of high country pastoral leases throughout the South Island, including dryland areas of properties in the Clutha catchment.

Material Used

6. In preparing this submission, I have read and referred to the following material:

- Brown & Company Planning Group. 2024. Application for Resource Consent for a comprehensive residential development at Rocky Point, Cromwell, Updated 26 July 2024. Prepared for TKO Properties Limited. Hereafter referred to as the 'application'.
- Beale Consultants. 2024. Rocky Point Subdivision Terrestrial Ecology Impact Assessment: Prepared for TKO Properties Limited, July 2024. Referred to as the 'EcIA
- Beale Consultants. 2024. Rocky Point Ecological Enhancement and Monitoring Plan: Prepared for TKO Properties Limited, July 2024.
- Harding M. 2024. Subdivision Application RC 230179 Bendigo Loop Road Central Otago District – Review of Proposed Biodiversity Offsetting. Report prepared for Central Otago District Council. Referred to as the 'offsetting review'
- Expert evidence of Richard Andrew Ewans, Technical Advisor -Ecology for Director General on and application by TKO Holdings for consent to subdivide and clear indigenous vegetation at Bendigo, Central Otago.
- Central Otago District Council (hereafter referred to as 'Council') Supplementary Report of Planning Officer for Application RC 230179.
- Other documents and publications referenced within this submission

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Submission

7. ***This proposal should be declined due to the very high value ecological values present, for which the Applicant fails to avoid, mitigate or offset.***

8. I fully support the Expert Evidence provided by Richard Ewans for the DG Department of Conservation in its entirety that covers (DOC evidence paragraphs in []):

    a. Whether the location constitutes a Significant Natural Area (SNA) [para 35-38];
    b. Presence of flora on the property and within the development area and threat status of flora [para 39-47];
    c. The adequacy of the ecological information provided [para 52-59];
    d. Importance of indigenous vegetation in Central Otago drylands [para 60-65];
    e. The potential adverse effects of the proposal on flora;
    f. Whether the proposed mitigation package could maintain indigenous biodiversity

9. I would like to provide some additional information/comments to some of these factors.

Whether the location constitutes a Significant Natural Area (SNA)

10. In my original submission, I highlighted the need for further information regarding threatened spring annual flora and presence of saline ecosystems. The Applicant has confirmed that spring annuals and saline ecosystems are present (although the rigour of their survey is questioned, as detailed below in parag 12, 13, 15).

11. The Department of Conservation has conducted a timely site visit and gathered further information on plant species present, including threatened and at risk species. There is no doubt that the property and development site has very high

ecological values and meets the evaluation criteria for identifying an area as being a significant natural area (SNA).

12. The mosaic of kanuka shrubland-cushionfield-saline sites-grey shrubland and wetlands found on the lower slopes of Dunstan Range near Bendigo ,located on Rocky Point and adjacent Bendigo Hills Estate, represent the largest area of relatively intact (for dryland ecosystems) indigenous vegetation at low altitude that is also part of an altitudinal sequence of indigenous vegetation that goes from the summit ridge of the Dunstan range to the Lake Dunstan shore at SH8. This gives the area additional value as an SNA.

Presence of flora on the property and within the development area and threat status of flora

13. I conducted a brief search for spring annuals and threatened/at risk[1] flora, primarily in the cushionfield and saline area along Koinga Walking Track that bisects cushionfield, an ephemeral seepage, saline site, and kanuka shrubland near to the development area in October 2023 and again on 10th November 2024. I observed greater native species diversity of at risk and threatened species (Appendix 1; Photos in 2 and 3) at Koinga Track than than the Applicant recorded at Rocky Point. The recent assessment by DOC has confirmed that native species diversity on the property and development area is in line with what I observed, showing that native plant species diversity was under-reported by the Applicant.

14. DOC found that populations, occurrence and diversity of Threatened and At Risk plant species is critically under-reported for the development and property area. This has also taken place at the two offset sites that can be accessed from public land/easement. At 'Hemlock Gully' I found *Myosurus minimus* subsp. *novae zealandiae* in 2023 and even in November 2024 visit, which is late in the season for finding spring annuals that have generally started to die off by now. Healthy. A population is present, growing near and amongst hemlock.

15. My recent survey also included part of 'Pylon Flat' offset site, visible from the Bendigo Scenic Reserve. A 10 minute survey from the Reserve boundary identified the

[1] de Lange PJ, Gosden J, Courtney SP, Fergus AJ, Barkla JW, Beadel SM, Champion PD, Hindmarsh-Walls R, Makan T and Michel P. 2024. Conservation status of vascular plants in Aotearoa New Zealand, 2023. New Zealand Threat Classification Series 43. 105 p.

presence of At Risk-declining species not reported by the Applicant: spring annual *Myosurus minimus subsp. novae zealandiae*, *Poa maniototo*, and *Raoulia beauverdii*. It appears that the Applicant has greatly under-reported the native species diversity (see Appendix 4) and over-stated the dominance of exotic plant species.

The adequacy of the ecological information provided

16. The ecological information the Applicant provided recorded only three At Risk plant species at low occurrence. The survey conducted by DOC and detailed in their expert evidence, recorded most of the species I would expect at a cushionfield at this locality, as found at cushionfields close to Koinga Track.

17. In terms of Spring Annuals, which are common within cushionfield, at the margins of kanuka, and along an ephemeral stream near Koinga Track, I am not surprised that the DOC site visit to the development area likewise found large populations of both *Myosotis brevis* and NZ mousetail.

Importance of indigenous vegetation in Central Otago drylands

18. I support the summary in DOC's evidence [para 60-65] regarding the importance of indigenous vegetation in Central Otago drylands, and the reasons for its demise.

19. Habitat clearance and modification is an ongoing and key cause of indigenous biodiversity decline in New Zealand[2]. Dryland ecosystems are New Zealand's least protected and most threatened ecosystems, and support about 50% of New Zealand's most threatened plant species[3].

20. Habitat clearance has been widespread within the the Upper Clutha catchment in Central Otago, something I have observed during the 32 years of living and working in Central Otago. Examples include the cultivation and subsequent irrigation of dryland

[2] Walker S, Bellingham PJ, Kaine G, Richardson S, Greenhalgh S, Simcock R, Brown MA, Stephens T, Lee WG. 2021. What effects must be avoided, remediated or mitigated to maintain indigenous biodiversity. New Zealand Journal of Ecology 45(2): 3445.

[3] Walker S. 2019. Threats to New Zealand's dryland ecosystems. Threats to New Zealand's dryland ecosystems | NZES. Accessed 11 November 2024.

cushionfields in Hawea Basin for dairying (Figure 1); vegetation clearance for lifestyle block house sites and curtilage between Cromwell and Bendigo both on Dunstan Range, and at Queensberry; and vegetation clearance for vineyards and orchards.

21. I concur with Mr Harding's review of the offsetting proposal that land use change has resulted in widespread loss of kanuka-cushionfield vegetation, and that this has taken place on a incremental property-by-property basis. When the cumulative effect is assessed, there have been substantial areas of kanuka-cushionfield vegetation lost.

22. In terms of vineyard development in 1995, the entire Central Otago Winegrowing Region comprised 92 hectares, rising twentyfold to 1930 hectares by 2020[4]. A proportion of this development has happened on the Dunstan Range.

23. By using the CODC mapping tool, it is possible to see where dryland ecosystems have been developed (Appendix 5). Within 5km of the development area on the lower slopes of Dunstan Range approximately **140ha** of land that would have comprised a mosaic of cushionfield, regenerating kanuka and/or grey shrubland, and areas of dryland herbfield that have a component of to native dryland herbs and grasses, and has been cleared for horticultural use and associated infrastructure. Bannockburn area has seen a similar widespread development of cushionfield to horticultural and lifestyle block uses. Photos of examples of the resulting change inf vegetataion cover are in Appendix 6A

24. The Applicant (Wildlands Report) provides a record of how land use intensification has been at the expense of the native kanuka-cushionfield vegetation (Appendix 6B).

The potential adverse effects of the proposal on flora [66-73]

25. I support DOC's evidence detailed in para 66-73. The assessment fails to assess and therefore adequately mitigate/offset, the effects of the development on the whole ecosystem. It is rather focused on indiviual plant communities and the level of effects on each of them, which can lead to an under-estimation of the effects on the whole ecosystem.

[4] New Zealand Winegrowers https://www.nzwine.com/en/media/statistics-reports/ Sourced 11.11.24

26. The assessment of effects of the development do not take into account the ecological integrity of the whole site, nor how it connects with the wider area. The development area lies within the best altitudinal sequence of indigenous vegetation on the Dunstan Range, if not, more widely within the Clutha catchment. This sequence includes indigenous tussockland at the crest of the Dunstan Range (Conservation land and Conservation Covenants), right down to the dryland lowlands just above the Dunstan Lake shore at Rocky Point/Bendigo Hills. This development will erode this important and rare sequence.

27. The Applicant minimises the loss of indigenous cushionfield dominated by At Risk *Raoulia australis,* and with native species diversity that include other At Risk plant species. A fly-over method of identifying cushionfield elswhere, and their quality is not an appropriate method, especially when the Applicant has already demonstrated a propensity to unestimate species diversity and presence of At Risk plant species during ground surveys where individual plants can be identified properly.

Whether the proposed mitigation/offset package could maintain indigenous biodiversity

28. Avoidance Measures

    The proposal fails to avoid the most ecologically significant areas, in particular cushionfield and spring annual habitat that are collectively part of a nationally important dryland sequence of vegetation. It fails to avoid Threatened, At Risk and regionally important plant species.

29. DOC has documented the failings of botanical survey at the development site. I have briefly visited a small part of two of the proposed offsetting sites – Hemlock Gully and Pylon Flat, and can confirm that these have not been adequately surveyed either, as these areas are both ecologically significant (spring annual habitat, and cushionfield with spring annuals respectively).

30. I concur with the DOC evidence [para 82] that the proposed activity should be located in more modified parts of the property so as to avoid significant ecological areas.

31. Mitigation Measures

    The mitigation package comprises high risk planting measures of small herbaceous Threatened and At-Risk plants. Given the semi-arid climate and poor soils,

transplanting such plants would be very risky, particularly at the scale required. I do not know of any successful translocation of cushionfields. Individual *Raoulia australis* were transplanted along the Lake Dunstan Cycle Trail without irrigation, but virtually all died[5]. A resource consent at Lake Hawea required the translocation of *Raoulia* mats, with post planting irrigation and rabbit control. This was also unsuccessful[6] (Dawn Palmer pers comm).

32. Off setting

    The Applicant proposes to plant three offsetting sites with shrubs and tree species respresentative of a climax woody community. Most of the species are common, with a handful of At Risk shrub species. The offsetting proposal therefore proposes to replace a *low growing cushionfield* ecosystem that is vulnerable to development, and is characterised by native herbs and grasses including multiple At Risk or Threatened plant species present, and with a *shrubland* that has a completely different structurre and composition.

33. I concur with Mr Harding's independent review of the offsetting proposal, and with DOC's expert witness statment [para 75-80] that the proposed offsetting package fails to provide a 'like for like gain' where cushionfields destroyed in the development area will be offset by climax woodland species elsewhere. Principle 3(c) of the NPS-IB[7] (Appendix 3) requires that the condition (structure and quality) of the indigenous biodiversity values at the offset '*are equivalent to or exceed those being lost at the impact site'*.

34. The proposed offset plantings will remove *in situ* healthy native cushionfield at Pylon Flats, and disturb NZ mousetail populations at Hemlock Gully, which is also an ephemeral seepage wetland - a nationally uncommon eosystem with a threat category of Endangered[8]. The proposed biodiversity offset is therefore inconsistent with the Leakage Principle (Principle 5) of the NPS-IB (Appendix 3), which requires that the offset 'avoids displacing harm to other indigenous biodiversity'.

35. I concur with Mr Harding's conclusion in his independent review of the offsetting proposal that the proposed biodiversity offset is inconsistent with four of the NPS-IB

[5] pers comm. Tim Dennis, Track Builder of Lake Dunstan Cycle Trail

[6] Pers comm. Dawn Palmer, ecological consultant who oversaw consent conditions for QLDC

[7] NPS-IB, Appendix 3 Principles for Offsetting, Principle 7.

[8] Holdaway, R.J.; Wiser, S.K.; Williams, P.A. 2012. Status assessment of New Zealand's naturally uncommon ecosystems. *Conservation Biology 26*: 619-629.

(Appendix 3) principles for biodiversity offsetting: Principle 2 (appropriateness), Principle 3 (net gain), Principle 5 (leakage), and Principle 6 (long-term outcomes).

Conclusion

36. **The Application should be declined. The ecological values are very high and meet the criteria to be a SNA. The effects on these values are high. It is unlikely that they can be mitigated or adequately offset with plantings as detailed in this Application.**

37. In the event that the Application is granted, it is my opinion an offset area containing the mosaic of values (of equal or better condition) should be protected in perpetuity.

38. In my opinion a large (20+ha) area of indigenous cushionfield-kanuka shrubland with spring annual habitat and saline areas on Bendigo Hills (the adjacent property also owned by TKO Properties) be protected in perpetuity from developments including subdivision, erection of structures, indigenous vegetation removal, earth disturbance and infrastructure such as roads.

39. Given the very high values being lost at the Development, the area should be gifted to the Crown as public conservation land under the Reserves Act (with all costs including surveying borne by the Applicant) to afford adequate protection, and enable conservation ecologists to actively manage the values for conservation objectives.

40. Ideally, the offset area would provide a contiguous and meaningful corridor between the lake shore by SH8 and Bendigo Scenic Reserve above, thus meaningfully protecting the lakeshore and toeslope section of the altitudinal sequence discussed in paragraph 22 above.

41. Having walked up Koinga Walkway to Bendigo Scenic Reserve and viewed the vegetation on Bendigo Hills from there, the mosaic of indigenous dryland vegetation is present at that locality and a sizable corridor there may be a suitable candidate (Location Plan in Appendix 7). However, the area must be identified by botanists and ecologists highly skilled in dryland ecosystems to ensure that it represents the high values being lost through the development, and that it is large enough to maintain ecological integrity. This area is contiguous with Bendigo Scenic Reserve and the Mt Koinga Conservation Covenant.

42. This would be subject to the Department of Conservation agreeing to this land becoming public conservation land. The alternative protection mechanim is a conservation covenant. If the area became covenant, it would require conditions to protect it in perpituity from subdivision, indigenous vegetataion removal, aerth disturbance and infrastructure including roads.

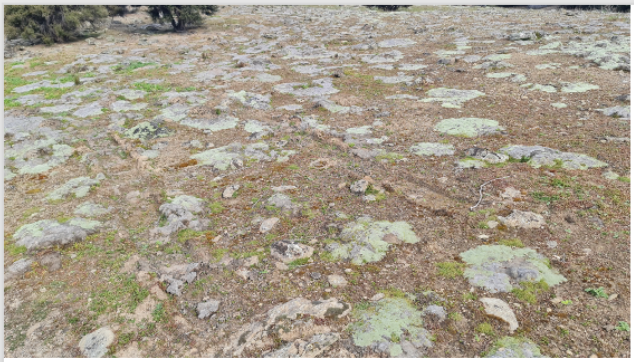
Kate Frances Wardle

13th day of November 2024

Appendix 1: Table of Threatened and At Risk Flora recorded during brief visit along Koinga Track (within 10m of track) and Offset sites Hemlock Gully and Pylon Flats

Threat Category	Species	Common Name	Habitat
Nationally Vulnerable	*Raoulia monroi*	Fan mat daisy	Raoulia cushionfield- Koinga Track
	Myosotis brevis	Small-flowered forget-me-not	Scattered in *Raoulia* cushionfield along Koinga Track; beside saline site
At Risk - Declining	*Colobanthus brevisepalus*	Desert pin cushion	*Raoulia* cushionfield along Koinga Track
	Myosurus minimus subsp. novae-zelandiae	NZ mousetail	Widespread. Along Koinga Track- in *Raoulia* cushionfield, saline ecosystem, at edge of kanuka wetland; seepages along Koinga Track and in Pylon Flat (GR 1307988 5016525) and Hemlock Gully (e.g. GR 1307481 5016579; 1307481 5016573) Offset Sites
	Olearia lineata	Tree daisy	Occ. along Koinga Track; Hemlock Gully
	Olearia odorata	Scented Tree daisy	In Hemlock Gully
	Poa maniototo	Desert poa	In cushionfield inc. Pylon Flat
	Raoulia australis	scabweed	Common along Koinga Track cushionfield, saline site edge; Pylon Flat
	Raoulia beauverdii	Beauverd's mat daisy	Raoulia cushionfield beside Koinga Track; Pylon Flat (eg. GR 1307856 5016483)
	Xanthoparmelia semiviridis	Vagrant lichen	*Raoulia* Cushionfield, kanuka woodland, seepages inc Pylon Flat

Appendix 2: Photos of Threatened and At Risk Plant Species Likely to be present at Proposal (recorded here at Koinga Walking Track



Raoulia cushionfield with threatened spring annuals widespread- Saline Koinga Walking Track

While exotic hemlock (bright green) appears to be the only plant growing on an Ephemeral seepage at Koinga Walk Track, both species of Spring Annual grow on the dark soils. At Risk tree daisy form groves.

Raoulia cushionfields at Koinga walking Track comprise three species of *Raoulia. R. monroi* (Nationally Vulnerable), *R. australis and R. beauverdii* (At Risk-declining).

Desert pin cushion *(Coobanthus brevisepalus-* At Risk-declining) grows in scabweed *(Raoulia australis)*cushions. Koinga walking Track

Appendix 3: Saline Ecosystem with Spring Annual herbs at Koinga Walking Track

Saline Ecosystem on Koinga Walking Track

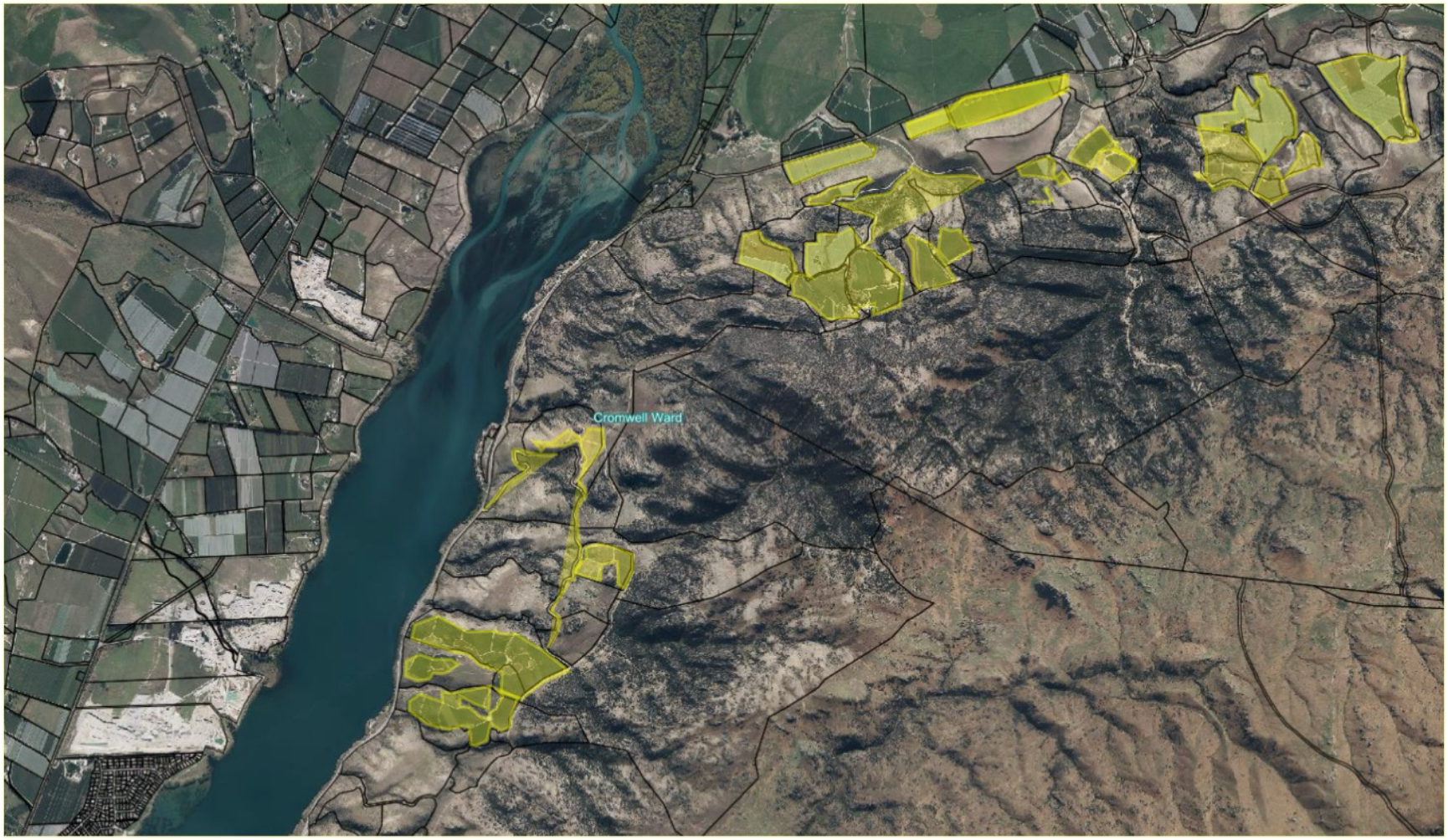
Nationally Vulnerable small flowered forget-me-not *Myosotis brevis* Spring Annual growing in moss at margin of saline ecosystem on Koinga Walking Track

Nationally Vulnerable NZ mousetail (*Myosurus minimus subsp. novae zelandiae*) growing in salty margins of Saline Ecosystem on Koinga Walking Track

Appendix 4: Native Species Recorded at Offset Sites during a 10 minute survey at each site as viewed from [public Track or Bendigo Scenic Reserve. Nov 2024

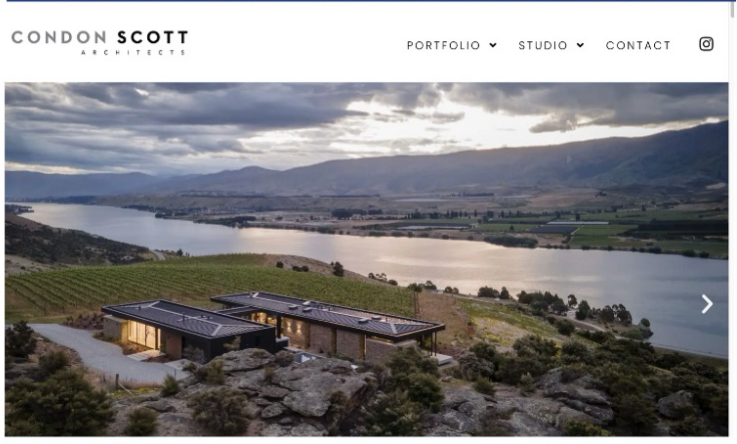
Native Species Recorded	Hemlock Gully	Pylon Flat
Carex sp.		
Cheilanthes sieberi		
Kunzea serotina		
Melicytus alpinus		
Myosurus minimus subsp novae zealandiae		
Olearia lineata		
Olearia odorata		
Oxalis exilis		
Poa cita		
Poa lindsayi		
Poa maniototo		
Raoulia australis		
Raoulia beauverdii		
Stelleria gracilenta		
Vittidinia australis		
Xanthoparmelia semiviridis		

Appendix 5: Cushionfield-kanuka vegetation likely removed from yellow areas (~140ha) where horticulture, house sites, roading has taken place around Bendigo and Lower Slopes of Dunstan Range



Appendix 6A: Photos showing loss of native cushionfield +/- kanuka with land use intensification and housing, Dunstan Range

Contrast between different sections of land.



Appendix 6B: Photos provided in Resource Consent Application showing loss of cushionfield with vineyard development

Plate A1-8. A fence line on the crest of the postglacial terrace just east of Rocky Point. The area to the left of the fence has been developed as a vineyard, and stock and rabbits have been excluded.

Plate A1-9. This fence line just south of Rocky Point separates Bendigo Scenic Reserve (to the right) from private land managed for vineyards. Grazing has ceased on both blocks, but rabbit control has also been undertaken on the private land.

Appendix 7: Suggested Offset Area (pink) on Bendigo Hills near the Rocky Point Development if consent is granted