SUBDIVISION APPLICATION RC 230179 BENDIGO LOOP ROAD CENTRAL OTAGO DISTRICT

REVIEW OF PROPOSED BIODIVERSITY OFFSETTING/COMPENSATION

Report prepared for

Central Otago District Council

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25 March 2024

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1.0 Introduction

This report presents the results of a review the proposed biodiversity offsetting/compensation associated with a proposal to subdivide land at the corner of State Highway 8 and Bendigo Loop Road (RC 230179). This review was undertaken at the request of Adam Vincent, Planning Officer, Central Otago District Council.

2.0 Review Scope and Method

The specific questions I have been asked to consider in this review are:

- 1. Will the measures proposed in the adaptive land management regime be sufficient to fulfil its intended purpose?
- 2. Will the offsetting and compensation measures proposed in the adaptive land management regime likely be sufficient to achieve no net loss in biodiversity?
- 3. Are the proposed offset and compensation areas sufficiently proximate and equivalent that offsetting and compensation in these areas is useful to offset the effects on the application site?

I have also been asked to consider whether the application contains sufficient information to answer those questions.

This review is based on material provided to me by Central Otago District Council (Adam Vincent). It is a desk-top exercise undertaken over three to four days in March 2024. A site visit was not possible – or deemed critical – within the time available for this review.

This review is confined to my area of expertise – terrestrial ecology – and benefits from more than 30 years' experience of survey, research, and assessment of eastern South Island dryland ecosystems.

3.0 The Biodiversity Offsetting/Compensation Proposal

The biodiversity compensation proposal is outlined in a four-page document titled Adaptive Land Management Regime for Rocky Point Compensation Sites (ALMR). Further information, which includes offsetting proposals, is outlined in a five-page Memorandum. Both documents are dated 29 February 2024.¹

I understand that the offsetting and compensation proposal outlined in the ALMR and Memorandum is the current proposal, and that it supersedes that described in Appendix H of the application.

¹ The author of both documents is Simon Beale, Senior Ecologist, Beale Consultants.

The ALMR describes the biodiversity compensation as management of indigenous biodiversity within two protected (covenanted) areas on Bendigo Station, to address the residual adverse effects of the proposed subdivision.

The purpose of the biodiversity compensation is to enhance the ecological values of cushionfield plant communities within the covenanted areas, specifically to "allow for natural regeneration of the cushion plants in the absence of competition from exotic weeds and improve habitat quality for indigenous flora, lizards and invertebrates dependent on the cushionfields."²

In summary, the proposal includes removal of woody plants (including indigenous species), control of unwanted herbaceous plants (other than grasses) by herbicide, rabbit control, and continued sheep grazing. The percentage cover of cushionfield vegetation and presence of unwanted plants will be monitored and reported annually.

The ALMR concludes that "if climate change/unforeseen ecological changes make enhancement of cushionfield impractical in the longer term, transition of the vegetation to other ecologically important indigenous plant communities will be considered in conjunction with the Council."³

The Memorandum outlines additional actions for biodiversity compensation through planting kanuka, and compensation through "enrichment plantings" and to "transpose areas of cushionfield from within the development footprint to the compensation sites."

4.0 Information Requirements

Field Survey Method

The information on terrestrial indigenous biodiversity at the location of the proposed activity is provided in a terrestrial ecology impact assessment (EIA), presented as Appendix H of the application.⁵ No additional ecological information is provided in the ALMR or Memorandum.

The methods for the field assessments upon which the EIA is based are described as "A survey involving a walk over of the Bendigo Hills Estate was conducted on 18 November 2022 and Rocky Point property on 2 December 2022 and 24 April 2023" and "During the inspection of the properties indigenous and exotic vegetation communities and habitats were recorded along with native bird species, either observed or heard."

The method for the herpetofauna survey is described as "The 3-day visual encounter survey/walk through survey was carried out over the Bendigo Hills Estate site, during weather conditions suitable for lizard survey in Central Otago."

² ALMR, p1.

³ ALMR, p4.

⁴ Memorandum, p3-4.

⁵ Beale, S. 2023. Bendigo Hills Estate and Rocky Point subdivisions terrestrial ecology impact assessment. Prepared for TKO Properties Limited, June 2023. Beale Consultants. (hereafter called the EIA)

⁷ Tocher, M. June 2023. Lizard Survey Report: Proposed Bendigo Hills Estate Subdivision. p3

The descriptions of the field survey methods are inadequate. The EIA provides little information on survey effort (the time spent surveying) except the dates the location was surveyed. The report provides no information on survey routes (e.g., GPS tracks), vegetation plots, or assessment locations (e.g., GPS waypoints), except the locations at which lizards were observed.

Surveys of vegetation, especially those used for ecological assessments, typically use a recognised method, such as the RECCE plot method⁸. Use of a standard method helps ensure that the survey is thorough, and that the data can be independently verified and compared with data from other sites. A description of the number and location of survey routes and sampling points enables review of the adequacy of the field survey.

Similarly, surveys of birds typically use a recognised method, such as five-minute bird counts, so that survey data can be independently verified, and the adequacy of the field survey reviewed. Avifauna surveys should cover all seasons.

Robust herpetofauna (lizard) and invertebrate surveys usually require specialised methods (such as pitfall traps), appropriate weather conditions and seasonal sampling. ¹⁰ Comprehensive invertebrate surveys must include night-time sampling – such as light traps – to detect nocturnal species (e.g., moths), ¹¹ which are an important component of the indigenous invertebrate fauna.

In summary, the field assessment method – as described in the EIA – is inadequate for an activity of this scale and extent. It provides little confidence that indigenous biodiversity at the location has been adequately described.

Adequacy of Information

The EIA describes each of the plant communities identified during the survey. Each description is brief and does not appear to include all species present in the plant community; no list of species is provided. For example, the description for 'kānuka scrub and shrubland' does not include pygmy mistletoe (*Korthalsella salicornioides*)¹², which is a 'threatened' (nationally critical) species.

The EIA notes that an earlier survey¹³ "identified saline-sodic soils sporadically distributed across parts of Bendigo Hills," and that no halophytic plants were recorded in either survey. ¹⁴ It is difficult to review the robustness of that conclusion without further information on the survey method.

⁸ Hurst, J.M.; Allen, R.B. 2007. The Recce Method for describing New Zealand vegetation – Field Protocols. Landcare Research-Manaaki Whenua, Lincoln, New Zealand.

⁹ Hartley, L.; Greene, T. 2012. Birds: incomplete counts; five-minute bird counts. DOCDM-534972. Department of Conservation, Wellington.

¹⁰ Lettink, M.; Monks, J. 2012. Introduction to herpetofauna monitoring, Version 1. DOCDM-878835. Department of Conservation, Wellington.

¹¹ Evans, A. 2016. Introduction to invertebrate monitoring, Version 1. DOCCM-383329, Department of Conservation, Wellington.

¹² The species is recorded (EIA Section 5.9, p15) as present on kanuka.

¹³ Gibson R. 2021. Bendigo Hills Estate Subdivision. Ecological Assessment. Roger Gibson Land and Sea Services (as referenced in the EIA).

¹⁴ EIA, Section 5.4, p13.

The EIA lists five 'at risk' or 'threatened' species recorded during the November 2022 and December 2022 surveys. ¹⁵ An additional 'at risk' (declining) species recorded in the cushionfield community is *Raoulia beauverdi*.

The EIA lists additional 'at risk' and 'threatened' species that were recorded along the nearby Bendigo Loop Track in 2009 and acknowledges that the presence of those species "cannot be discounted owing to the presence of suitable habitat for these plants in the project area." ¹⁶

I am familiar with the habitats present in the vicinity of the application area. I have walked through similar habitats elsewhere on the Dunstan Mountains and have recently surveyed saline habitats throughout Central Otago. ¹⁷ Based on that experience, and my knowledge of eastern South Island dryland ecosystems, I would expect a greater number of indigenous plant and animal species to be present at this location, including additional 'at risk' and 'threatened' species.

Additional plant species – often diminutive and cryptic – are likely to be present at saline sites and/or visible only at certain times of the year, such as for 'spring annual' species.

The likelihood that indigenous species at the location are more numerous and diverse than described in the EIA is supported by the submission of Kate Wardle. Ms Wardle lists seven additional 'at risk' or 'threatened' plant species that have been recorded in similar habitats at or near (within 600m of) the application area. 19

Kate Wardle is a respected ecologist with long experience of Central Otago dryland ecosystems; she should be regarded as a highly credible expert. I expect that Ms Wardle's assessment of indigenous biodiversity at the location is more reliable than that of Mr Beale, even though Ms Wardle has not surveyed the application area.

In summary, the EIA contains insufficient information for the assessment of effects on indigenous biodiversity. The EIA does not assess effects on additional species identified in the EIA as likely to be present (Table 5.1). These limitations constrain review of the proposed biodiversity offsetting and compensation.

¹⁵ EIA, Section 5.9, p15.

¹⁶ EIA, Table 5-1, Section 5.9, p16.

¹⁷ Walker, S.; Harding, M.A.C.; Loh, G. 2023. The pattern of declines and local extinctions of endemic inland *Lepidium* species in the eastern South Island. NZ Journal of Ecology 47(1): 3547. https://doi.org/10.20417/nzjecol.47.3547

¹⁸ Submission of Kate Wardle, Ecologist and Botanical Consultant (received CODC 12/10/2023), 18p.

¹⁹ Five of those species are additional to those listed in Table 5-1 of the EIA as likely to be present.

5.0 Assessment of Effects

The crafting of a biodiversity compensation – or offsetting – proposal arises from the assessment of effects, using the effects management hierarchy.²⁰ The assessment of effects in the application is constrained by inadequate information (section 4, above). It is further constrained by use the EIANZ Guidelines.²¹

The EIANZ Guidelines were developed by the Environment Institute of Australia and New Zealand Inc. They are not endorsed by the Ministry for the Environment, Department of Conservation, nor Ecological Society of New Zealand. Recent hearing decisions have expressed concern that use of the EIANZ Guidelines can result in wide differences in assessed ecological value and magnitude of effect and noted that use of the guidelines is problematic.²²

The EIA assess the ecological value of the project location as "very high." The EIA then proceeds to assess selected components of the location separately, using the EIANZ Guidelines method. This method disregards the importance of ecological processes (including habitat integrity) at a location and ignores the contribution a location makes to the surrounding environment (ecological context).

For example, the EIA assesses the loss of kanuka scrub/shrubland as a "low magnitude of ecological effect" because only a small extent of this plant community will be lost, resulting in a "very slight change to the existing baseline condition." Physical extent (area) is not equal to ecological condition or value. Kanuka at this location supports a 'threatened; nationally critical' species (*Korthalsella salicornioides*) and is part of one of the most extensive extant stands of this plant community in Central Otago.²⁴

The EIA assesses the loss of kanuka scrub, cushionfield communities, lizard habitat, and avifauna. It concludes – based on the EIANZ Guidelines – that the 'magnitude and level of ecological effects' is moderate (for lizards) and low (for kanuka and avifauna), regardless of the presence of the threatened (nationally critical) pygmy mistletoe (on kanuka) and the threatened (nationally vulnerable) eastern falcon (*Falco novaeseelandiae*). The EIA provides a very selective assessment of effects, compromised by lack of data and the limited scope of the EIANZ Guidelines method.

²⁰ National Policy Statement for Indigenous Biodiversity 2023, Clause 1.6(1).

²¹ Roper-Lindsay, J.; Fuller, S.A.; Hoosen, S.; Sanders, M.D.; Ussher, G.T. 2018. Ecological Impact Assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

²² Report and Decision of the Hearing Commissioners, Bathurst Coal Limited v Canterbury Regional Council and Selwyn District Council, 17 June 2022; and Joint Report and Decision of Hearing Commissioners, AW & AK Simpson v Mackenzie District Council and Canterbury Regional Council, 8 November 2023.

²³ EIA, Section 8, Table 8.4, p20-21.

²⁴ The submission of Kate Wardle affirms the value of kanuka at this location.

6.0 Appropriateness of Biodiversity Compensation

The relevant tests to determine whether biodiversity compensation is appropriate at the location of the proposed activity are set out in the Otago Regional Policy Statement 2021 (ORPS) Policy 5.4.6A and the National Policy Statement for Indigenous Biodiversity 2023 (NPS-IB) Appendix 4.

The biodiversity compensation as proposed in the EIA (and ALMR) is <u>not</u> appropriate when considered against the ORPS²⁵ because it will result in:

- 1. The removal of habitat of threatened and 'at risk' species²⁶ (Policy 5.4.6A (a)(ii)(2)): several are present, notably pygmy mistletoe (threatened; nationally critical), Raoulia australis (at risk, declining), and Kawarau gecko (Woodworthia "Cromwell") (at risk, declining).
- 2. The removal of an originally rare or uncommon ecosystem type ²⁷ (Policy 5.4.6A (a)(ii)(3)): the presence of inland saline ecosystems was noted in an earlier survey, acknowledged in the EIA, and proposed by Kate Wardle. Inland saline ecosystems are listed as 'threatened' (critically endangered).²⁸

The biodiversity compensation as proposed in the EIA (and ALMR) is <u>not</u> appropriate when considered against the principles set out in Appendix 4 of the NPS-IB because:

- 3. The indigenous biodiversity affected is irreplaceable or vulnerable (Clause (2)(a)): several species at the location are listed as 'at risk' of or 'threatened' with extinction. These listed species are vulnerable, as assessed under the New Zealand Threat Classification System.²⁹
- 4. Effects on indigenous biodiversity are uncertain, unknown, or little understood, but potential effects are significantly adverse or irreversible (Clause (2)(b)): indigenous biodiversity at the location has been inadequately surveyed and described, so potential adverse effects are uncertain, unknown, or little understood.

Application of the effects management hierarchy of the NPS-IB leads to the conclusion that the "activity itself is avoided" because biodiversity offsetting is "not possible", and biodiversity compensation is "not appropriate," to manage the residual adverse effects of the proposed activity.³⁰

I disagree with the conclusion reached by the applicant with respect to the appropriateness of offsetting and compensation, as set out in the Memorandum dated 29 February 2024.

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²⁵ Operative Otago Regional Policy Statement 2021 (the Proposed Otago RPS has the same policy).

²⁶ de Lange, P.J; Rolfe, J.R; Barkla, J.W; Courtney, S.P; Champion, P.D; Perrie, L.R.; Beadel, S.M.; Ford, K.A.; Breitweiser, I.; Schönberger, I.; Hindmarsh-Walls, R.; Heenan, P.B; Ladley, K. 2018. Conservation status of New Zealand indigenous vascular plants, 2017. New Zealand Threat Classification Series 22. Department of Conservation, Wellington, New Zealand.

²⁷ Williams, P.A.; Wiser, S.; Clarkson, B.; Stanley, M.C. 2007. New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. *NZ Journal of Ecology 31*: 119-128.

²⁸ Holdaway, R.J.; Wiser, S.K.; Williams, P.A. 2012. Status assessment of New Zealand's naturally uncommon ecosystems. *Conservation Biology* 26: 619-629.

²⁹ Townsend, A.J.; de Lange P.J.; Duffy, C.A.J.; Miskelly, C.M.; Molloy, J.; Norton, D.A. 2008. New Zealand Threat Classification System Manual. Department of Conservation, Wellington.

³⁰ NPS-IB 2023, Clause 1.6(1).

7.0 Review of Proposed Biodiversity Offsetting/Compensation

Regardless of the conclusion of the preceding section, the proposed biodiversity offsetting and compensation are assessed here in response to the three questions addressed by this review.

Will the measures proposed in the adaptive land management regime be sufficient to fulfil its intended purpose?

The intended purpose of the biodiversity compensation measures as set out in the Adaptive Land Management Regime (ALMR) is "to enhance the ecological values of the resident cushionfield plant communities" and specifically "to improve habitat quality for indigenous flora, lizards and invertebrates dependent on the cushionfields."

The proposed biodiversity compensation measures are only cursorily described in the ALMR as removal of woody plants (including indigenous species), control of unwanted herbaceous plants (other than grasses) by herbicide, rabbit control, and continued sheep grazing.

The ALMR and EIA contain no descriptions of the vegetation and habitat present at the proposed biodiversity compensation areas. It is therefore difficult to determine the conservation management required to achieve the stated purpose, and to review the measures proposed in the ALMR.

The proposed monitoring will be of little assistance in determining whether the purpose has been achieved. Ecological monitoring is described as annual "walk over inspections" to assess (subjectively) the percentage of cushion plant cover.³² Subjective assessments are insufficient. Assessment of vegetation (e.g. cushionfield) must be by measurement at fixed locations using a scientifically robust method and adequate sample size (number of measurement sites). Assessment must include measurement of vegetation at 'control' sites that are not affected by the conservation management activities.

Assessment of other ecological values would require measurement of flora (species diversity), invertebrates, lizards, and birds (to achieve the stated purpose). Again, scientifically robust methods must be used, and measurement at control sites included.

Any monitoring must be preceded by comprehensive baseline surveys of indigenous biodiversity, by appropriately qualified experts, at the location of the compensation activities.

In conclusion, it is not possible to determine – from the material available to me – whether the measures proposed will achieve the intended purpose of the ALMR; and the monitoring proposed in the ALMR will not assist in that determination.

³¹ ALMR, Section 2, p1.

³² ALMR, Section 6, p3.

Will the offsetting and compensation measures proposed in the adaptive land management regime likely be sufficient to achieve no net loss in biodiversity?

Consideration of this question is – again – constrained by the lack of comprehensive information in the EIA (or ALMR). The indigenous biodiversity that will be lost at the location of the proposed activity, and that gained at the biodiversity compensation areas, are unclear.

Protection and restoration of cushionfield is proposed in the ALMR, and planting of kanuka is proposed as a biodiversity offset measure in the Memorandum. For other components, such as invertebrate and avifauna habitat and other 'at risk' or 'threatened' species, the ecological effects of habitat removal/fragmentation/disturbance are unclear. The biodiversity compensation measures contain no measurable objectives for invertebrates, avifauna, or notable flora except for Raoulia australis.

Also unclear are the effects of the proposed development (roads, houses, gardens) on the health and survival of 'at risk' or 'threatened' species, especially any species that may be present at saline habitats. The loss of such species appears to be strongly correlated with an intensification of landuse in the surrounding area.³³

In conclusion - based on the information available to me - the biodiversity offset area and compensation areas proposed in the ALMR will not be sufficient to achieve no net loss of indigenous biodiversity.

Are the proposed offset and compensation areas sufficiently proximate and equivalent that offsetting and compensation in these areas is useful to offset the effects on the application site?

The proposed biodiversity offset area and compensation areas lie close to the location of the proposed activity. They are in the same ecological district (Dunstan), though are close to boundaries of adjoining ecological districts (Pisa and Lindis).³⁴ Geographically, the areas are proximate.

The proposed biodiversity offset area and compensation areas lie on eroded Mid-Pleistocene glacial outwash deposits. These comprise "slightly to moderately weathered, sandy to bouldery clayey gravel." The location of the proposed activity lies predominantly on undifferentiated Rakaia Terrane Permian to Triassic Schist. Base rocks at the activity location are "schist." 35

The proposed biodiversity offset area and compensation areas lie within the N8.1b Level IV Land Environment. The location of the proposed activity lies predominantly within the N4.1e Level IV Land Environment. 36 Land environments reflect the physical (substrate and climatic) attributes of the land.

³³ Walker, S.; Harding, M.A.C.; Loh, G. 2023. The pattern of declines and local extinctions of endemic inland Lepidium species in the eastern South Island. NZ Journal of Ecology 47(1): 3547. https://doi.org/10.20417/nzjecol.47.3547

³⁴ McEwen, W.M. (editor) 1987. Ecological regions and districts of New Zealand, third revised edition (Sheet 4). New Zealand Biological Resources Centre Publication No.5. Department of Conservation, Wellington, 1987.

³⁵ GNS 1:250,000 Geology Map of NZ.

³⁶ Leathwick, J.; Wilson, G.; Rutledge, D.; Wardle, P.; Morgan, F.; Johnston, K.; McLeod, M.; Kirkpatrick, R. 2003. Land Environments of New Zealand. David Bateman, Auckland. 184p.

The proposed biodiversity offset and compensation areas both lie adjacent (on two sides) to intensively developed land. They are – in effect – enclaves of undeveloped and substantially degraded land in an otherwise developed landscape. Indigenous biodiversity at the proposed areas will be compromised and threatened by the effects of activities on adjoining land. Recent research has shown that such 'edge' (or 'offsite') effects can extend over several hundred metres.³⁷

Conversely, the location of the proposed activity is uninterrupted by – and relatively well buffered from – any intensive land uses. It is undoubtedly modified, which is typical for eastern South Island dryland ecosystems, though appears to be rapidly recovering from former disturbance.

The differences between the activity location and offset/compensation areas are profound. Those differences are reflected in their protected status: part of the activity location is protected as a conservation covenant and lies within an outstanding natural landscape (ONL), whereas the offset and compensation areas are unprotected.

In conclusion, the biodiversity offset area and compensation areas are close (proximate) to the location of the proposed activity but are not equivalent. The compensation areas and activity location have different underlying geology and landform. They will therefore naturally support quite different indigenous biodiversity. The areas are highly vulnerable to further disturbance, whereas the activity location is well buffered and parts of it are formally protected.

8.0 Conclusions

- 1. The application to subdivide land at the corner of State Highway 8 and Bendigo Loop Road (RC 230179, as set out in the Ecological Impact Assessment (EIA), Adaptive Land Management Regime for Rocky Point Compensation Sites (ALMR), and Memorandum, contains insufficient information for the assessment of effects on indigenous biodiversity. The surveys upon which the EIA is based were inadequate.
- 2. The EIA provides a very selective assessment of effects, which is constrained by lack of data and the limited scope of the assessment method (the EIANZ Guidelines).
- 3. The biodiversity offsetting and compensation as proposed in the EIA, ALMR, and Memorandum is not appropriate when considered against the Otago Regional Policy Statement or when considered against the principles set out in Appendix 4 of the National Policy Statement for Indigenous Biodiversity.

³⁷ Walker, S.; Brownstein, G.; Monks, A. 2019. Avoiding cross-boundary effects of agricultural land use on indigenous dryland habitats in the Canterbury region: consenting guidelines and planning recommendations. Manaaki Whenua-Landcare Research Contract Report LC3636. Canterbury Regional Council, Christchurch.

- 4. Review of the biodiversity offsetting and compensation measures is constrained by the lack of information on biodiversity values of the proposed location of the activity and of the proposed biodiversity offset and compensation areas.
- 5. It is not possible to determine from the material available to me whether the proposed biodiversity compensation measures will achieve the intended purpose of the ALMR. The monitoring proposed in the ALMR will not assist in that determination.
- 6. The biodiversity offset and compensation proposed in the ALMR will not be sufficient to achieve no net loss of indigenous biodiversity.
- 7. The biodiversity offset area and compensation areas are close (proximate) to the location of the proposed activity. The biodiversity offset area and compensation areas are not ecologically equivalent to the location of the proposed activity.

Mike Harding

25th March 2024