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## **Matakanui Gold Terrestrial Ecology- Technical Review Terrestrial Ecology**

### **Final Response 18/03/2026**

#### 1 Introduction

Matakanui Gold Limited (MGL) are proposing to establish a new gold mine and ancillary facilities on Bendigo and Ardgour Stations in the Dunstan Mountains, Central Otago. The project is called the Bendigo-Ophir Gold Project (BOGP) and is proceeding under the Fast Track Approvals Act 2024 (FTAA). The Otago Regional Council (ORC) have sought external support for the technical review of the terrestrial ecology documentation, including vegetation, lizards, invertebrates, avifauna, wetlands, bats, and the associated impact management.

The proposed BOGP would be an open pit gold mining operation with a maximum disturbance footprint of 610 hectares. The 610 ha is referred to as the Direct Disturbance Footprint (DDF), additional to this is the Potential Dewatering Drawdown Zone (DDZ) and the Surrounding Landscape (SL), which together make up the 5,386 ha Ecological Study Area (ESA).

This letter documents the findings of the e3s review, which included review of the relevant documents, three site visits, a written response, a Teams meeting, and a three-day workshop with MGL's consultant Ecologists. Due to time constraints this memo assesses the application information provided up to the end of the workshop period (20/02/26). The structure of this review is as follows:

- Review of the ecological surveys completed to characterise ecological values.
- Review of the ecological impact assessment and management plans.
- Review of the consent conditions supporting the consent application.
- Final Review Summary.

## 2 Ecological Values

The ecological values have largely been surveyed and characterised as would be expected. There are some areas where further information, or changes are needed, to consequently ensure the ecological impacts are assessed and managed appropriately.

### 2.1 Vegetation (B.13)

During the workshop with the Applicant (18-20/02/26), e3s became aware that additional populations of notable plants, and plant species that had not been recorded at the site, were identified. This has created doubt over the completeness of the vegetation assessment. In addition, e3s also became aware of an additional spring annual survey that could have considerable implications on the Vegetation Values report, AEE, and Management Plans. It is essential that reporting, uses all data available to ensure robust decision making. Due to time constraints this memo assesses the application information provided up to the end of the workshop period and the implications of the additional data have not been assessed.

### 2.2 Wetlands (B.12)

The key issues with the Wetland Values Assessment are:

- Clarification is requested on how the 2.37 ha of wetlands within the DDZ have been addressed in the AEE. It appears in the AEE that the wetlands outside of the DDF, but inside the DDZ have not been included in the assessment (see Table 26), which potentially increases the ecological loss further. However, the AEE also states (pg. 166) *"drawdown impacts on 0.43 ha of wetland outside the DDF but within the DDZ"*, but there is no obvious reasoning for the 0.43 ha relative to the 2.37 hectares. Further, in the Wetland Values Report states (pg. 15) *"Regarding the DDZ, BOGP has committed to augment any drawdown effects to the surface-water fed swamp/marsh wetlands along the RAS valley floor; other wetlands within the DDZ, such as hillside seepages or gully fens, are excluded from this augmentation plan and are assumed to be impacted. We have not mapped other indirect effects, such as water quality impacts or surface water diversion."*
  - Further, the Values report states (pg. 73) *"Uncertainty exists around the indirect effects of groundwater drawdown and surface water diversion, particularly in Rise and Shine Valley, where the greatest*

*potential effects and highest value wetlands occur. These matters will be addressed in the ecological effects assessment report prepared by Alliance Ecology Ltd". Clarification is sought as to where these are addressed specifically in the AEE.*

Further information was provided by the Applicant in a written response (14/01/2026), which states "Gully Fen and seepage wetlands within the dewatering zone are considered to be lost and this loss has been factored into the assessment of ecological effects as is stated throughout the report. The confusion is valid, however, as Table 26 incorrectly states otherwise and this table requires updating accordingly.

*Drawdown effects (as well as direct loss) of these wetlands are not and cannot be feasibly addressed in a like for like manner via effects management as this would require the re-creation of wetland hydrology. This is why we have claimed net loss outcomes for these wetland types.*

*Conversely, drawdown effects on swamp/marsh wetlands can be minimised by augmenting flows to affected wetlands as detailed in the Mine Impacted Water Management Plan and residual effects can be addressed through the creation of 7.5 ha of swamp/marsh wetland as part of the ecological rehabilitation package. Details on this are set out in Report B.12 (Assessment of Ecological Effects) and in G.07A (Landscape and Ecological Rehabilitation Plan)."*

An updated version (of Table 26) is yet to be received.

- No evidence provided that the constructed ponds/wetlands (pg. 38) excluded from the assessment are constructed, to thus not meet the classification of natural inland wetlands. At the workshop with the Applicant (18-20/02/26) there was discussion regarding this matter, and it appeared that bunds had been previously constructed, however likely because these areas were wetlands, and there appeared to be wetlands up/down stream of the two constructed bunds; further information was to be provided once these areas were reviewed; an update is yet to be received.
- On pg. 46, the justification that sufficient survey was done based as the average rate of new species detected per plot, notes a slight increase from plot 84 due to those particular surveys being done in spring. However, if not all surveys were done in spring, would a corrective factor not be required to account for this, and potentially species were missed (or unable to be identified). The Applicant's written response (14/01/2026) stated "No corrective factor was applied nor was it considered necessary on the grounds that these wetlands were exotic-dominated, and all native species present where able to be identified year round – It would be useful for E3 to clarify which species they consider to be likely or possibly present that would be undetectable or unable to be identified

outside of spring". The species that would be season dependant are *Carex tenuiculmis* with fruits present in summer and *Thelymitra* species (sun orchards).

- No invertebrate survey of wetlands has occurred. Further information was provided by the Applicant in the written response (14/01/2026), which indicated that wetlands had by proxy been surveyed: *"Wetlands were not specifically targeted as sampling units within the invertebrate study design. However, wetland habitats and their associated invertebrate fauna were captured through several survey methods: 1. Integrated monitoring sites detected wetland-specific invertebrate species, indicating these habitats were within the sampling catchment of our IM station capture devices. 2. High-value transects traversed wetland areas, with hand collection of invertebrates conducted within these wetland habitats during transect surveys. 3. eDNA sampling was obtained from stomach contents of feral pigs shot in wetland areas. While these samples were collected outside the ESA boundary, they provided additional records of invertebrate species utilising wetland habitats within the broader study area.*

*While wetlands were not delineated as discrete sampling strata, the survey design captured invertebrate assemblages associated with these habitats through multiple sampling methodologies, providing representation of the wetland invertebrate fauna present.*

*Wetland invertebrates were covered off in part in report B.17 Waterways Consulting Assessment of Effects on Aquatic Habitat) Freshwater Ecology Report.*

*While other invertebrate surveys did not specifically target wetlands a) wetland obligate species were captured in light traps, b) the transects included (the tiny) wetlands and (narrow) streams, areas targeted as part of high value invertebrate habitat (due to diversity and structure of adjacent vegetation). There was hand collection done across wetlands (picking up a significant obligate moth)."*

- The values assessment in Table 8 doesn't state how the overall values assessment was obtained. However, the values appear lower than expected. It would be expected that the DDF and DDZ Seepages would have an overall value of High (not Moderate; conservatively taking the Low-Moderate as Moderate). The SLSW Seepages would have an overall value of High (not Moderate) and the SLSW Fens would have an overall value of Very High (just as the SLSW swamps/marshes do with the same values for each criteria; not High). These changes, if accepted, would need to be incorporated into the AEE.

## 2.3 Lizards (B.15)

There are some key issues with the lizard value assessment:

- Sampling locations within the DDF were low in number, not in all vegetation types and altitudes were sampled (in particular, no sampling in wetland communities), with no replication of sample sites. The survey was design and conducted over the wider ESA but it is not clear how the results have been extrapolated across the wider area. During the RFI process further information was shared regarding the extent of handsearching areas. However, this information also focusses on the wetland areas close to the survey hubs that were sampled. There remains no visibility of GPS tracking logs or similar to assess the adequacy of coverage across and along gully floors and damp areas. This is particularly important to inform of knowledge tussock skink distribution and possible lakes skink habitat (if present).
- There has been little survey effort using trapping as a method, which may have reduced the estimated abundance of tussock skink, and reduced the likelihood of finding lakes skink should they be present. For example, detection of tussock skink was highest using trapping (60% vs 30% for ACOs and 11% for manual searches, Table 9A and 9B pg. 65), however only two sites within the DDF were trapped. The Applicant has subsequently advised they consider these results may be due to trapping being conducted in places where tussock skink are most likely to be found. Regardless, the extent of survey effort within in some habitats (particularly at damp sites) appears to be low based on the currently shared information.
- The values report does not map the location of tussock skink and gecko habitat across the ESA. In the absence of this, it is not possible to determine whether the Low, Moderate, and High Value sites have been appropriately mapped and how the distribution of these species compares to the DDF. This information would usefully inform population estimations, the AEE, and the Lizard Management Plan (LMP).
- The methodology has not been sufficient to conclusively exclude the presence of some species that would be notable. e3S consider the likelihood of additional species presence in the context of the survey undertaken to be low, but possible. Accordingly, e3S consider it appropriate that the Lizard Management Plan contains contingency planning and salvage methodology that target possible additional species and their habitats and stop work triggers should these species be found. Relevant species are:
  - Lakes skinks. This species has been recorded on the Dunstan Mountains and occupy diverse habitat with lots of cover in damp gullies.

- Mokopirirakau “Roys Peak” are known from elsewhere on the Dunstan Mountains in a boulderfield with a woody component in predominantly grassland habitat.
- Further clarification is needed to justify the assigning of Low value to any location that provides habitat for an “At Risk” species. Following discussion at the workshop with the Applicant (18-20/02/26), e3s understands that the Low value lizard habitat contains a lower density of lizards and that the lizard habitat in these areas is patchy. e3s consider that more detailed mapping could be undertaken to further define the areas of habitat of genuine Low value (such as the central areas of cultivated paddocks) compared with those that provide habitat for At Risk species (such as rockpiles adjoining fencelines and roads, or damp gullies) and that areas providing habitat for At Risk species be mapped as Moderate value at a minimum.
- Clarification is needed as to how the estimated population sizes of the lizard species have been determined. Although difficult to estimate, some rationale referencing the numbers observed by various survey methods across the different habitats present is needed. This topic has been discussed during RFI and Workshop discussions with the Applicant. e3s understand the challenge with population estimation and the additional issue of possible underestimation of tussock skink population due to a local McCann's colour morph. The uncertainty regarding population estimation is particularly important for tussock skink and Kawarau gecko (both At Risk species). Unlike McCann's skink, their habitat requirements are more specific. Proportional population estimations in both the DDF and the ESA could be well informed by habitat mapping as discussed above.
- e3S disagree with parts of the value assessment in Table 15 pg. 72 due to the large scale of the assessment areas. There are areas of Low, Moderate, and High ecological value across the ESA but when they are grouped into the Landscape scale units described then the overall value of the areas is higher than that described. For example, the representative assessment for the Hilly Landscape Unit should be High. The presence of three species across the site is highly representative of remaining herpetofauna values in a landscape that is becoming increasingly modified. Ecological Context is also High due to the area adjoining PCL and location across multiple altitudinal gradients from valley floor to mountain top. The lizard habitats present are intact and recovering from prior land use, and provide an important buffer between the reserve land to the south and more intensive pastoral use to the north.
- e3s do not consider the loss of 610 ha to be temporary, due to the success of the mitigation measures being unknown, unquantified, and not consistent across the

three lizard species present. This was acknowledged by the Applicant during workshopping. The statement that injury and death is only to a small portion of the native lizards present needs further justification in the context of the lizard salvage numbers compared with the population sizes.

## 2.4 Avifauna (B.14)

The avifauna values were surveyed largely as would be expected, however, there are some key issues with the avifauna survey method and value assessment:

- Targeted call playback at wetlands was used to elicit a response for wetland species, however, e3s notes Acoustic Recorder Devices (e.g. AR5s) would have captured more reliable data for cryptic wetland species due to their ability to be deployed for extended periods increasing chances of detecting cryptic species. Overall, e3s concludes methods were not sufficient to exclude the presence of wetland species from the area that would be notable. At the workshop with the Applicant (18-20/02/26), they stated that ARDs were not used because the habitat was not good enough quality for cryptic species. However, we note that bittern are known to utilise highly degraded habitat.
- The Five-Minute Bird Count (5MBC) surveys on the western aspect of the Ecological Study Area showed low coverage (pg. 18) and some patches of scrubland missed. The accuracy of the 5MBC method could have been improved by repeating each station at least twice (ideally more) to increase consistency and reliability. e3s notes tomtit were observed onsite through incidental counts but not detected via 5MBC (pg. 37), indicating some limitations in 5MBC method.
- RMA Ecology identified an isolated record (by others) of a fernbird detection in matagouri scrub along the Rise and Shine stamper battery track in the SL of the ESA (refer Section 3.3.7). Relatively abundant habitat for fernbird exists in the ESA in the form of scrub and wetland. However, given no fernbirds were detected in surveys, RMA Ecology assumed that fernbird were not present on the site or in the immediate surrounds. e3s recommends fernbird be treated as potentially present given lack of data, noting that habitat loss for wetland species is predicted to be negligible, based on the assumption that these species are not present onsite. Clarity is needed for fernbirds as they are not included in the ecological value assessment, (e.g. Table 1, Table 13 and Table 18), however, it is considered a notable species present or potentially present in the DFF in Table 8. It is recommended that the fernbird is included with the Regional Threat status of At Risk - Declining and a High ecological value.

- The Regional threat status of black shag needs to be updated to Regionally Endangered and a Very High ecological value. Little shag has also been updated to Regionally Vulnerable so should also be Very High. Based on the Applicant's written response (14/01/2026), the threat status of the little shag will be updated, however, the black shag remains outstanding.
- There is inconsistency throughout the report regarding key avifauna species present. For example, the executive summary does not list fernbird as potentially present, yet Table 2 identifies them as potentially occurring within the ESA. This requires clarification. Table 2 is also missing other Threatened or At Risk species found in the area including little shag, black-fronted tern, and black-billed gull.

## 2.5 Bats (B.10)

The site was thoroughly surveyed for bats, after a desktop review indicated a possible bat detection approximately 2 km from the site in past DOC records. However, this record was later removed by DOC due to uncertainty around its validity. e3S agree that no further assessment or consideration of native bats is required.

## 2.6 Invertebrates (B.11)

There was a reasonable attempt to survey for invertebrates across the DDF and SL using a range of methods. The only comments that require further clarification, or may be key issues, are as follows:

- As malaise trapping was excluded, which target Hymenoptera and Diptera orders (pg. 13), clarification is needed on how or if this has been accounted for in the Values report and/or the AEE, as the invertebrate values may be lower than actually present. The written response provided by the Applicant (14/01/2026) offered sufficient supplementary information to show that the exclusion of malaise trapping did not affect the Values report or AEE.
- It is stated that numerous species remain unassessed due to insufficient data (pg. 22). This leads to a potential underestimate of the invertebrate values within the site. Clarification is needed on how, or if, this has been accounted for in the Values report and/or the AEE. The written response provided by the Applicant (14/01/2026), indicated that ecological significance has been determined by experts in appropriate fields where this information is formally/officially lacking, and thus should not affect the Values report or AEE.
- Clarification of the sweep netting being sufficient to sample for day flying moth species is needed (as part of the systematic manual searches (pg. 19)). The

written response provided by the Applicant (14/01/2026), indicated that a sufficient sample of day flying moths has been achieved.

## 2.7 Pest Species (B.09)

Habitat NZ conducted a comprehensive mammalian pest survey across the Bendigo-Ophir Gold Project to provide a detailed baseline of the mammalian pest community within the Ecology Study Area (ESA). Habitat NZ used four mammalian survey methods to establish pest species' presence and relative abundance and dietary requirements:

- Camera traps targeting cats, mustelids, and hedgehogs.
- Chewcard lines targeting mice, possum, and rats.
- Aerial surveys for ungulates such as feral deer, goats, and pigs.
- eDNA samples identifying the diet of mammal predators.

The potential risks from the **camera survey** are:

- Four cameras per 357 ha represents low camera density, although, does still help to provide indication of the presence of target species. However, given home ranges of feral cats in Central Otago, mustelids, and hedgehogs are smaller than 357 ha, detection was likely limited, and absence of detection should not be interpreted as true absence.
- All cameras were installed generally following best-practice protocols. Due to livestock presence, cameras were mounted on waratahs and angled downward toward bait stations. While this reduced the risk of disturbance, e3s noted this may have narrowed the field of view. Also, traps were baited with PoaUku-scented long-life lures housed inside bait stations that were accessible from one end only (Figure 5). This design may have reduced interaction from some pest species compared to fresh rabbit meat in mesh cages which is best practise, and is familiar and fully visible to predators. Notably, no stoats were recorded in the SL, though one was sighted approximately 1,100 to 1,400 m from the nearest survey line. This may reflect bait aversion or neophobia common in stoats.
- Overall, this monitoring provides a useful baseline for identifying pest species presence. However, additional monitoring is recommended to improve the reliability and accuracy of the data, particularly given the large size of the site. Current sample numbers are insufficient to accurately represent relative abundance.

The potential risks from the **chew card survey** are:

- While chew cards are useful for detecting the presence of multiple species, it is important to note that they may not be the most reliable method for monitoring rat activity. Larger predators such as possums can interfere with the cards, potentially removing or masking evidence left by smaller species like rats and mice. Tracking tunnels may be a more effective tool for monitoring rats, providing clearer and more distinguishable footprints, making it easier to accurately identify rat presence, even in environments where multiple pest species coexist. At the workshop with the Applicant (18-20/02/26), there was discussion around the use of Chew Track Cards (CTCs) for rodent monitoring. CTCs are currently proposed for possum monitoring and could also be used for rodents. However, as mentioned above, targeting multiple pest species with one method using one layout plan, can effect results and interpretation of results. This was to be investigated and further information provided; an update is yet to be received. In the absence of this information, rat activity is likely to have been underestimated.
- Rats were detected at low levels in the SL zone (1.2% CCI) and were absent from the PSA/DDF, consistent with no rat detections on camera traps. Note that camera traps were not baited specifically for rats, possibly lowering detection rates. Therefore, the absence of rats in the PSA/DDF is unexpected and requires further monitoring with other methods such as tracking tunnels.

The potential risks from the **aerial survey** are:

- Flight coverage seemed to be unevenly distributed across the block, with the southwest section receiving more focused attention than the northeast, as illustrated in Figure 4, this could cause bias in the spatial distribution data. At the workshop with the Applicant (18-20/02/26), the flight distribution was explained by the topography in the northeast allowing a greater field of view of the area, therefore the flight path data presented underrepresents the actual coverage achieved in the northeast area and indicates there shouldn't be a spatial bias in the data.
- Professional hunters were observed within and around the ESA during the second day of surveying. Their presence may have influenced animal movement and visibility, thereby affecting survey results.
- Survey dates were not provided, which limits the ability to assess potential issues such as animal movement between days. Ideally, surveys conducted across multiple days should occur in close succession to minimise the risk of double-counting individuals.
- Despite no pigs being detected from the air, 11 feral pigs were subsequently caught by dogs and used for eDNA sampling, suggesting that aerial methods

may be less effective for detecting pigs, likely due to their tendency to remain in dense cover.

The potential risks from the **eDNA analysis** are:

- eDNA analysis methods were suitable for identifying the diet of most target species however rats, stoats, and weasels were not dissected, which is a notable limitation as these species are known to exert significant predation pressure on native species.
- When only presence/absence data is collected, it limits the ability to understand the dietary importance of different taxa to the target species, as it only indicates whether a species is detected within the target species' diet, but doesn't give an indication of how much has been consumed. It is also noted that DNA from different taxa may degrade or amplify at different rates leading to potential biases. Limited samples can also skew results.

Overall, although the methods have some limitations, they provide a baseline dataset for pest species present in the ESA. The key issues are the low number of rat detections and the absence of eDNA analysis for rats, stoats, and weasels. It is recommended running tracking tunnels to improve understanding of rat numbers, which will also provide useful information on mouse activity at the same time.

### 3 Ecological Impact Assessment (B.08)

Based on the Assessment of Ecological Effects, there will be a direct loss and associated effects of 610 hectares of vegetation and habitat. Across the ESA there are seven vegetation communities, all of which satisfy the criteria as significant indigenous vegetation or habitats of indigenous fauna under the NPS-IB and the Otago Regional Policy Statements. The impact assessment has been carried out using accepted best practice structure and guidelines.

The proposed impacts will affect at least 48 Threatened or At Risk vascular plant species, 10 bird species (including Threatened or At Risk species), two At Risk lizard species and 18 notable invertebrate species including four Threatened species and four newly identified species.

In applying the hierarchy of impact management, avoidance measures are proposed or have been applied to the proposed activity already (see Section 7.3.2.1 of the AEE (Terrestrial Ecology)), for example the relocation of Thomson Gorge Road, and delaying the open cast mining of the CIT Pit.

The mitigation and offset measures proposed alleviate some, but not all, of the ecological effects from the mine's impacts, and are summarised as follows:

- Ecological Rehabilitation of 480 ha within the DDF;
- Ecological Enhancement of Mine Regeneration Zones (MRZs) across 889 ha (outside of the DDF).
- Ecological restoration of the Ardgour Restoration Area (ARA) across 1,263 ha; and,
- the creation of two predator proof fences sanctuaries (38 ha and 29 ha).

The minimisation/mitigation measures are also listed in Section 7.3.2.1 of the AEE, with further details located in the Management Plans. Any key risks associated with specific management plans are provided in Section 3.2 below. In terms of the impact assessment specifically, the key issues are presented immediately below in Sections 3.1.1 to 3.1.5.

### 3.1.1 Vegetation

A key issue in the vegetation impact assessment is that the assigned ecological values to the vegetation communities differ between the Values report and the AEE. After RFI and Workshopping with the Applicant, the differences between these reports remain. It is the opinion of e3s that this has resulted in the underestimation of the significance criteria and hence potential underestimation of overall value. This remains an area of disagreement with the Applicant.

- In the assessment of ecological value for "Mixed tussock shrubland and exotic grassland", e3s agree with the overall rating of High in the Values report, however, it is noted that in the AEE it is reduced to Moderate. In the AEE, e3s consider that the Representative score should be Moderate (although modified, e3s consider the native components are sufficient to meet this criteria) and that Diversity and Pattern should be High (the area is large and the native components contain natural diversity and pattern), with an overall score of High. This remains an area of disagreement with the Applicant.
- In the assessment of ecological value for "Mixed scrubland", e3s agree with the overall rating of High in the Values report, however, it is noted that in the AEE it is reduced to Moderate. In the AEE, e3s consider that the Representative score should be Moderate (the native vegetation values of the community are highly representative of this community in the Ecological District) and the Ecological Context should be High (the situation of this native community amongst the other described scrubby vegetation communities at the site, combined with the wider context on the Dunstan Range is sufficient to meet this criteria), with an overall score of High. This remains an area of disagreement with the Applicant.
- The application of Representativeness for most, if not all, habitat types appears to take into account the extent elsewhere in the ED and pre-human conditions. However, Representativeness is the extent to which the vegetation is 'typical' of the ED not necessarily the extent, and it is not restricted to pre-human conditions as it is not restricted to best examples or what indigenous values were pre-human. Therefore, the assigned ecological value for Representativeness are considered likely too low for the habitat types. This remains an area of disagreement with the Applicant and may increase the level of Net Loss.

The key issues with the **magnitude of residual effects** for vegetation (AEE Table 16 and 17, pg. 110) are:

- For all vegetation communities there is a lack of supporting information for the statements around the effects at the Ecological District level in Table 16 (i.e. how

were the proportionate loss percentages calculated). e3s mostly agree with the assigned magnitude of residual effects after management measures (in Table 16), provided the assumptions around the Ecological District impacts are better justified (for example the proposed proportionate loss percentages should be based on knowledge of the distribution of the community in the Ecological District). This is particularly important for the "Mixed depleted herbfield (cushionfield) and grassland" which e3s consider to be Very High (not High) due to the large proportion of habitat being impacted and the highly experimental nature of the rehabilitation. Given the probable significance of this habitat more information should be provided how the proportion of "Mixed depleted herbfield (cushionfield) and grassland" impacted compares with remaining habitat in the ESA and wider Ecological District. This information would confirm the values assigned with regards to the ecological value, magnitude of effect and thus overall level of effect.

- There are no proportion loss percentages for any of the three wetland types or evidence/justification provided.
- The proposed number of plants to be planted for some species is low (10 to 500 individuals only, Table 15 AEE). To achieve good restoration outcomes numbers of 100 or higher would be expected, and with more balance in numbers between species to achieve greater diversity.
- For notable plant species there is a lack of information to support the assumptions that have been made regarding the proportional effect of the proposal on the populations of notable flora in the Ecological District. Where the distribution of a species in the Ecological District is not known, justification for the assumptions made should be clear and a conservative approach to the values given provided. The additional information required should be informed by habitat availability and location records elsewhere in the Ecological District. For example, *Colobanthus brevisepalus* has a High Magnitude of Residual Effect due to the loss of up to 103.82 ha of potential habitat and a minimum of 5000 plants, and a very high proportion of plants are known from the DDF relative to the SL. The proportional effect on the surrounding landscape is unclear and the effects on the total population are assumed to be minimal. e3S disagree with this assessment due to the rehabilitation outcomes being experimental, with a low likelihood of success. In the absence of information justifying the assumption that there is a Negligible effect on the total population in the Ecological District e3S consider the Magnitude of Effect should be Very High.
- The level of residual effects on vegetation and plant species descriptions should be relevant to the DDF rather than the ESA. Currently, Table 21 refers is to the ESA and Table 22 the DDF (pg. 134). Clarification is sought.

The key issues with the **impact management** for vegetation are:

- The detail is not clear how the proposed rehabilitation approach in Table 15 (pg.105) directly equates with the current population size or aerial extent of the species to be rehabilitated at the site. This is described for some, but not all, of the species in Table 17 (pg.113). At the Workshop, the Applicant acknowledged that the rehabilitation of many of the dryland species is experimental and is not able to be factored into any positive benefit for the species at the site. There remains differences in opinion regarding the accuracy of the Magnitude of Residual Effect for some species in Table 17 of the AEE. The impact of this is likely to be less for those species where numbers at the site are known and the likelihood of success rehabilitation is higher. Additional work is needed to quantify the impact on species where these criteria are not met to better inform compensation and offsetting/the level of Net Loss. Of particular concern are the non-shrub species that are not typically used for revegetation.
- The impact assessment of the activity in herbfield habitat and the associated spring annual species is potentially significant. The national context relating to these habitats is currently not accurately represented in the AEE. More visibility of the recent survey conducted (in 2025) and the distribution of this habitat in the Ecological District is needed to better understand the significance and impact of the activity on these species.

### 3.1.2 Avifauna

The Regional threat status of black shag needs to be updated to Regionally Endangered and a Very High ecological value. Little shag has also been updated to Regionally Vulnerable so should also be Very High. These changes in values may affect mitigation and management required and the residual effects. Based on the Applicant's written response 14/01/2026, the threat status of the little shag will be updated, however, the black shag remains outstanding.

The **magnitude of residual effects** for avifauna (AEE Table 18, pg. 125) are likely too low for certain species and impacts given the following considerations:

- There are no quantified percentages of foraging and breeding habitat within the Ecological District (ED) provided for any of the species (i.e. what are the percentages of habitat available in the ED relative to that being lost (even if temporarily) and how it is calculated).

- The proposed blasting activity has a wide radius of impact (temporally and spatially) with 4-5 times per week with noise out to 4 km, as well as vibration effects. The impacts and residual effects from this activity are not clearly accounted for and/or stated (i.e. what are the specific management measures and thus any residual impact). At the workshop with the Applicant (18-20/02/26), they stated that predator control and habitat restoration is mitigation against these activities, however, this type of mitigation does not directly address this type of effect.
- Fernbirds and other wetland avifauna have not been considered in terms of residual effects. At the workshop with the Applicant (18-20/02/26), they stated that ARDs were not used to detect cryptic wetland bird species due to lack of habitat suitability. However, we note that bittern are known to utilise highly degraded habitat.

The key issue around **mitigation and management** is that detail and clarification is needed for each species (AEE, pg. 96), including:

- The assessment is lacking a clear explanation of whether mitigation is required for each species, and if so, what mitigation measures are applied. The AEE lists some of the effects then refers to the Avifauna Management Plan which is also lacking such detail. For example:
  - How will the risk of collision be minimised (what are the specific measures, e.g. use of decals, positioning of buildings etc.), as well as for habitat fragmentation, noise, dust, and vibration, which apply to all native bird species.
  - The potential risk (or evidence of a lack there of) of the tailings dam to birds (and other fauna) including poisoning, getting trapping in mud if dam levels fluctuate, prior to being capped by the proposed wetland.

Overall, there are key updates needed to the avifauna assessment (i.e. updates to values and species) and avifauna impact management measures need to be specifically stated in detail, including (but not limited to) lighting controls, noise management, and predator control, and the residual effects, and then the offsetting and compensation updated accordingly.

### 3.1.3 Lizards

The key issues with the **magnitude of residual effects** for lizards (AEE Table 19, pg. 127) are:

- Important information is missing to inform an assessment of the effect of the activity on tussock skink and Kawarau gecko. Population estimation and / or habitat mapping of these species would enable a better understanding of the proportion of local habitat impacted by the activity and whether the proposed mitigation is successful in addressing this loss.
- RFI clarification confirmed that a Moderate Magnitude of Residual Effect has been assigned to all three lizard species (AEE B.08 Table 19). e3S consider the Magnitude of Residual Effect may be High for Kawarau gecko based on the criteria in Table 8 of the EclA guidelines. e3S consider that the number of lizards and the size of impacted habitat constitute a major loss. The site in question is a key element of the known population for this species due to the site in the DDF being at the eastern distributional limit for the species (Thomsons Gorge is the current described boundary). Additionally, the Bendigo area is a stronghold for the Kawarau gecko, with very high (possibly the highest) population densities for this species being recorded here.
- e3S does not agree (from Workshopping and RFI with the Applicant) that there has been enough information supplied detailing the quantified benefits of the mitigation on the three lizard species to support proposed measures making a difference to the impact of the activity. e3S note that in the workshop the applicant agreed that the proposed mitigation will not result in any reduction in the severity of effect and that there is subsequently a significant Net Loss to lizard populations. A more secure outcome for lizards could be achieved by implementing a larger predator-proof sanctuary in a suitable location. This may not necessarily reduce the level of effect on lizards but would be an appropriate attempt to compensate for effects, with a greater chance of success; this has not been proposed by the Applicant at this point.

The key issues with the **impact management** for lizards are:

- Predator control areas in the Ardgour Restoration Area have been unable to address the issue of mice predation on lizards and control of higher guild predators may create effects more adverse for lizards than the status quo. The area therefore does not provide suitable additional ecological niches for salvaged lizards to occupy.
- Habitat suitable for tussock skink is particularly notable in the lack of suitable detailed mitigation measures.
- The predator-proof sanctuaries have not been located in places optimal for lizard habitat. There is no detailed information regarding the expected increase in lizard species populations and habitats and the sites are small in size compared to the habitat being lost, even when expected increases in lizard

numbers are taken into account. The management of these areas in perpetuity is also unclear.

- There is minimal information or certainty provided on how much habitat the rock stacks are going to create compared to the habitat that is going to be lost, or how long it will take for these areas to be used by lizards.
- The salvage plan does not detail how salvage sites will be prioritised, how much habitat is available at release sites suitable for the species being salvaged, and how they are creating an increased ecological niche for released lizards to survive. e3S considers that the salvage in its current form is unlikely to result in survival or gain for lizards.
- The described Net Gain for Otago skink, grand skink and jewelled gecko is assumptive due to the required reliance on an available source population and DOC approval.
- Not all effects appear to have been addressed in the AEE. For example, the impact of fence construction is stated as being part of the DDF which is assessed however, the figures referred to show the Sanctuaries as sitting outside of the DDF. It is also not possible to understand how the indirect effects of construction (such as dust, lighting and noise) have been accounted for, as well as the impact on current lizards at a release site of having new lizards released there.
- There is a significant Net Loss for lizards after mitigation (see Table 26 in AEE), due to the impact of these measures being undefined but likely low. It is then not stated in Section 8.7.2, Section 10, or Table 29 of AEE as an effect that is not mitigated, offset or compensated for. Clarification is needed and further information to quantify the Net Loss to the lizard population.
- To alleviate some key issues, it is recommended that:
  - Additional work is undertaken to have more certainty over population estimates and species distribution at the site, particularly for tussock skink.
  - Salvage targets At Risk species. Incorporate trapping in the salvage plan and use trapping results to trigger when salvage can finish at that microsite.
  - Ensure salvaged lizards are being released at a location where an ecological niche is available for them and contains habitat suitable for that species.

The following compensation options are recommended:

- Develop eDNA sequencing for species present or possibly present at the site and test the use of this technology at the site. Make the results of this available for others to use in other locations (see Reeves et al 2025).

- Lizard Conservation fund to benefit lizards elsewhere in Ecological District/Region/Otago.
- Funding research on practical methods for establishing salvage success using project as case study.

#### 3.1.4 Invertebrates

The key issues with the **magnitude of residual effects** for invertebrates (AEE Table 20, pg. 128) are:

- For *Meterana exquisite*, given the success of colonisation of created habitat is not guaranteed, nor the effect of the planned *Olearia* planting, the current Low overall magnitude is too low.
- For *Ichneutica sistens*, given the numbers at site may represent an important population stronghold, and the lack of effects management, the current Low overall magnitude is too low.
- For *Asaphodes recta*, given it is uncommon and the lack of effects management, the current Low overall magnitude is too low.

The key issue with the **impact management** for invertebrates is:

- The 'Uncertain' expected biodiversity outcome (Table 26, AEE) downplays the potential ecological loss, 'Net Loss' would be a more conservative approach, unless evidence of the how Uncertain has been accounted for in the overall level of Net Loss shows otherwise.

#### 3.1.5 General Comment

Overall, the AEE lacks details, stating 'where possible/feasible' or refers to Management Plans, which do not necessarily provide the details (see Section 3.2 of this report immediately below). Given there is an overall significant Net Loss of ecological values and a lack of detail and clear overall structure of management, there is a lack of confidence that the ecological benefits that are proposed will be achieved. Further key concerns:

- The ecological values that will have "significant residual adverse effects that cannot be addressed", are the Nationally Vulnerable *Myosotis brevis*, the Nationally Critical *Ceratocephala pungens*, the newly identified ground beetle *Harpalus* species and weevil *Inophloeus* species. However, in Table 1 and Table 26, there are further habitats and species where a Net Loss is expected (i.e. residual adverse effects that are not addressed), specifically: over 20 native plant species, seepage wetlands, gully fens, the At Risk – Declining tussock skink

and Kawarau gecko, and the McCanns skink, as well as species with Uncertain expected outcomes, and includes 12 invertebrate species (Table 1, pg. 24) and four Threatened avifauna species. Further, given the expected decrease in tussock grasslands, a Net Positive for New Zealand pipit might not be accurate (Table 1, pg. 24). These additional Net Loss/Uncertain residual effects are not mentioned throughout the AEE when stating that not all residual effects are likely to be effectively addressed (as per the offsetting/compensation principles of the NPSIB), which could serve to give the appearance of fewer ecological values not being managed/less of a Net Loss than will actually occur.

- Further to the above point, at the workshop with the Applicant (18-20/02/26), the quantification of the Net Loss was requested and actioned to be an outcome provided, which could show comparatively how close or far from Net Gain/Positive the proposed development/Net Loss is; the information is yet to be provided/released.
- In Table 12, the Ecological Values Assessment for Habitat Types, exotic pasture and herbfield should include SIPO, black fronted tern, and black billed gulls as they will use this for foraging habitat.
- A lot of the ecological mitigation has a level of risk in terms of the likelihood of success. For example, the use of rock stacks, storage and survival of translocated vegetation, and finding suitable sites for lizard release. If the mitigation measures do not work, there is currently no clearly stated corrective actions. For example, if any vegetation dies during translocation, stockpiling, or within five years of being re-planted, the same number and species of plants will be bought and planted until they have survived five years.
- The Broad Objectives listed on pg. 146 of the AEE are not all carried through clearly into the Management Plans and BOMP. The objective measure of ecological benefits needs to be clearly stated in every relevant document. Further the >50% survival rate for podocarp species planted is very low and should be >80%.
- The proposed biodiversity and heritage enhancement fund has no hard quantitative measures of success. It is also noted that given the dual purpose of the fund, biodiversity only receives \$2.5 million which is 0.07 % of the expected mine profits. This fund (as discussed at workshop) has no link to the ecological mitigation package. It is proposed by the applicant as a separate to the application, with the intention that it be used by the local DOC office for local ecological or heritage enhancements. It should not in any way be construed as reducing, offsetting, or compensating for any of the ecological impacts described in the application.

- In Table 27 (pg. 161), which is the assessment against biodiversity offset and compensation principles set out in the NPSIB:
  - the long-term outcome Principal is 'preferably in perpetuity' however the proposed mine is stating a 35-year period with an unknown covenant system after that. Weed and predator control will be required in perpetuity. At the workshop with the Applicant (18-20/02/26), they stated that the ecological requirements (including predator control, weed control) will be covenanted in a Land Use Covenant, in perpetuity; updated versions of reports reflecting this are yet to be received.
  - The Financial Contributions Principle is stated as being met due to the biodiversity and heritage enhancement fund, however, this is stated as not to be considered compensation therefore the Principle appears not to be met.
- In Table 28, ultimately the offset and compensation principles are not met as not all wetlands (i.e. fens and seepages) will be offset or compensated for.
- The type of covenant in Table 27 and 28 needs to be stated to ensure there is a sufficient legal mechanism behind the protection. At the workshop with the Applicant (18-20/02/26) they stated that the ecological requirements and outcomes be covenanted in a Land Use Covenant, in perpetuity; updated versions of reports reflecting this are yet to be received.

## 3.2 Management Plans

### 3.2.1 Biodiversity Outcome Monitoring Plan (BOMP) (G.12)

The Biodiversity Outcome Monitoring Plan (BOMP) is the document that ensures the proposed ecological outcomes are achieved within the relevant timeframes. The key issues with the management plan are:

- Leaving the invertebrate and lizard salvaging and relocation operations out of the BOMP creates greater complexity and opportunity for ecological outcomes to be missed. The BOMP should be overarching, to provide greater confidence that the ecological outcomes will be achieved.
- Tables 1 to 3 provide the expected outcomes, however no quantifiable thresholds are provided. This information is also not provided, or too low, in Section 3: Biodiversity Outcome Targets.
  - For the Ecological Rehabilitation Sites, after 35 years, greater than 80% cover would be expected, ideally greater than 90%. There is also only "an increase" stated for the rest of the targets, which would allow only a 1 %

increase in plant species richness and dominance and bird abundance to meet the target outcomes. This is not sufficient given the proposed ecological impact. Specific targets are required to ensure stated ecological mitigation/offsets are achieved, e.g. > 80 % increase in biodiversity metrics within 35 years of approval.

- Similarly for the biodiversity offset/compensation sites, only a “net increase” is stated for the vegetation and fauna values. It is noted that it must exceed residual loss for each value, however a 1% increase seems low for the impact proposed.
  - For the increases proposed in native bird species it is recommended that the outcome is a quantified increase to a set percentage for all, or specified, native bird species (e.g. 75% increase in bird species across the site).
  - For the Ardgour and Bendigo Sanctuaries, specified outcomes are needed, e.g. zero pest species is maintained, and all the plant species listed to be present in numbers greater than at least 30 individuals, at the two locations.
  - A further biodiversity outcome is that plant and invertebrate species are present in sufficient density and cover to allow for the foraging, feeding and breeding of the total number of lizards present.
- Tables 1 to 3 are also not clearly linked to the proposed monitoring in Sections 5.2.3 to 5.2.6. Clear linkage, or combining, would help provide needed detail.
  - There are no targeted outcomes stated for invertebrates, yet monitoring is stated in Section 5.2.6. Targeted outcomes are needed.
  - The Terrestrial Biodiversity Monitoring (Section 5) needs the stratified random categories stated to provide confidence in the coverage of the full suite of habitats.
  - The timing of the integrated terrestrial biodiversity monitoring is likely to miss key species. It is proposed that the monitoring stations will be visited between February and March, however spring annuals need to be surveyed in spring (Sept-Nov) and bird species such as SIPO, black fronted terns and black billed gulls will have finished breeding and likely departed by end of January.
  - The vegetation monitoring stated in Table 4, does not clearly state that all species and their cover percentage will be recorded. This would be crucial data to obtain.
  - The lizard monitoring (Section 5.2.5) doesn't state the species, and their associated number will be recorded.

- The invertebrate monitoring (Section 5.2.6) does not specify the manual searching methods, for example, if this will include monitoring method for day flying moths. Further:
  - There is a decrease in the number of monitoring stations proposed without justification (e.g. does the distance the method covers justify a decrease in monitoring stations).
  - It is stated that “This method is not ideal for a quantitative comparison of abundance...”. What assurance is there that this monitoring will then provide the necessary data to determine if outcomes have been met.
  - Needs to be clearly stated the specific data that is going to be recorded (e.g. all species and number). Having the templated data sheets would clarify and provide detail and confidence in achieving outcomes.
- The wetland monitoring (Section 6), needs to occur across all existing and created wetlands (currently stated as ‘or’).
- The 100 wetland biodiversity monitoring stations are considered to be additional to the 500 already stated. This needs to be confirmed in the document.
- For the wetland monitoring of vegetation and birds, this should occur at all wetlands (or certainly a reasonable number across all types of wetlands), with clear metrics measured. The use of ARDs for bird monitoring in the wetlands is needed to capture cryptic species.
- The biodiversity outcome reporting needs to include a larger summary report every five years to clearly show progress once all monitoring stations have been surveyed.
- The reporting also needs to include the evidence that all monitoring has been completed, along with the results, for both the Management Plans and BOMP (not just the BOMP, which is currently stated in Section 7.2).
- The monitoring reports need to include the predator and weed control results. All the data in one monitoring report will ensure the ability to confirm progress toward ecological objectives.

Overall, given the number and range of ecological Management Plans proposed for the development, there is a lack of detail and structure on how the work will be achieved, and a lack of ecological outcomes/targets clearly stated, or if stated, are considered low without clearer links to the impacts. All the above decreases the confidence that the biodiversity outcomes will be achieved.

### 3.2.2 Habitat Impact Management Plan (G.03)

This Management Plan relies on the other ecological Management Plans containing sufficient detail, in particular the Landscape and Ecological Rehabilitation Management Plan. The key issues with the Habitat Impact Management Plan are:

- The need and timing for a SEQE (Suitably Experienced and Qualified Ecologist(s)) needs to be clarified. It would be expected given the ecological values present that the SEQEs are present on site for a significant period while vegetation and habitat clearance is being undertaken. Further, that a specified number of SEQEs will be on site relative to the areas being cleared (e.g. one SEQE, per machine, which would cover the need for a SEQE to be present in multiple locations across the site).
- The annual compliance report should include information on the species and number of At Risk plants not just Threatened. The report also needs to include the GPS data, management measures undertaken, and the outcome of all measures for all faunal species.
- The Management Plan refers to proposed conditions (Table 1, Section 1), however, it is not clear what the said conditions are. Clarification is needed.

Overall, the ecological outcomes the HIMP is supporting to be achieved, are expected to be detailed in the individual MPs that the HIMP refers to. The HIMP provides a summary of measures to be undertaken although is perhaps missing the Conditions that underpin these (as per last bullet point above), and potentially adds more confusion to achieving ecological outcomes.

### 3.2.3 Ecological Management Plan Framework (G.02)

The Ecological Management Plan Framework provides a concise summary of impacts, management measures, roles and responsibilities for enacting the Management Plans. However, it does not include/reference any Project Management software, which would include the likes of a timeline/Gantt chart to ensure all steps and targets/outcomes are well documented and known, in one place. The use of Project Management software would be expected for a project of this scale, and its implementation already would help with gaining a clear and concise view of the full mitigation package proposed including ecological targets and outcomes, which would ultimately provide confidence that all the impact management measures will be achieved.

### 3.2.4 Landscape and Ecological Rehabilitation Management Plan (LERMP) (G.07A,B)

The Landscape and Ecological Rehabilitation Management Plan (LERMP) is intended to manage the impacts and restoration of the Ecological Rehabilitation of 480 ha within the DDF and the Ecological Enhancement of Mine Regeneration Zones (MRZs) across 889 ha (outside of the DDF). It does not manage the ecological restoration of the Ardour Restoration Area (ARA) across 1,263 ha, nor the creation of the two predator proof fence sanctuaries (38 ha and 29 ha).

Upon review of the Management Plan the key issues are:

- The reliance on natural regeneration of small nodes of native vegetation to then cover larger areas within 20-35 years is risky. While evidence has been provided for natural regeneration occurring in the area within these timeframes, this is within a system where the conditions that have led to expansion from the nodes of vegetation are not fully understood or quantified. The approach proposed may work, but the room for failure appears large, if natural processes are not achieving the restoration objectives. What could further exacerbate this risk is the small size of the nodes, some as little as 2.5 % per hectare (250 plants/ha Table 6).
- Further to the above, given the LERMP relies on natural regeneration from the planted nodes, this puts an importance on the area over which native vegetation is expected to cover. Table 1.1 in Appendix E of the LERP states the number of hectares that will be rehabilitated relative to those removed, however, it does not appear to state what percentage of native cover is required within these hectares.
- The weed species to be controlled exclude lupin and vipers bugloss in the cushionfield/spring annual habitat, these should be included.
- The LERMP states that a detailed site rehabilitation plan will be developed (pg. 25); given the difficult nature of the site rehabilitation and no case studies or data or rehabilitation in the area, this document should be provided soon/now to understand the approach to rehabilitation.
- It is proposed to take cuttings from onsite kowhai for growing and planting into proposed kowhai clusters. It would be better genetically to collect the seed (or at least a mixture of cuttings and seed, with cuttings only used where seed may not be found or viable). Use of the approach detailed in the ARAMP is recommended.

- There is a mixture of proposed ecological management measures being applied for 35 years or in perpetuity. Clarity is needed on those that are only for 35 years and those that are in perpetuity, to ensure these are appropriate for enduring ecological improvements (e.g. soon after predator control is stopped ecological gains would be lost). At the workshop with the Applicant (18-20/02/26) it was understood that all ecological outcomes will be covenanted to occur in perpetuity; the LERMP should be updated to reflect this.
- The establishment of wetlands is a very complex process, there is little detail to show this has been taken into account to provide confidence in the successful establishment of wetlands. If this information is provided in other application documents, the LERMP needs to incorporate this information to support its purpose. In the Applicant's written response (14/01/2026) examples are provided however, they are not from the harsher Central Otago environments, which is acknowledged and then it is stated that 'adaptive management' will be used to address this. However, this indicates a high degree of experimentation/risk.
- Tables 1 through 4 have some numbers for plants per hectares, some may be found in Appendices, but not easy to find. Also, some areas have coverage requirements but not all. Annual vegetation surveys and two-yearly plant surveys are noted, but it is unclear how this aligns with the five-year rotational monitoring in the BOMP.
- In Section 11.6, it is stated that the specific outcome is that the 222 ha of native tussock land will contain 20% tussock cover. This seems a low percentage of tussock coverage for an area that is to be considered 'native tussockland'. For further outcomes stated in this Section, there are no percentages of native cover to be achieved (i.e. bullet points 2 through 7), unless 100% coverage is assumed (and should be stated to avoid confusion). These are needed to have confidence and clarity in the proposed ecological outcomes.
- In Section 11.9, there is a 75 % survival rate, and 34 % coverage stated. If these are the overall outcomes for all restoration areas, these numbers need to be stated more frequently across documents. The coverage of 34 % is low, as it appears to only achieve a pre-mining cover, rather than any further enhancement. If this is the objective, weed establishment will be an issue.
- It is not clear if plants will be installed with shelters or if predator control is being relied on solely, if so, this would likely lead to low survival rates, and puts even greater importance on back stop measures such as replanting, if outcomes are not met.

Overall, the specific information key to understanding the outcomes is not easy to find nor navigate (e.g. found in multiple places (sometimes in Appendices, or buried in paragraphs of text and/or in Tables), including across Management Plans and sometimes not worded in the same manner to be confident the same meaning would be interpreted for all locations/documents). Consequently, to determine if the ecological outcomes are appropriate is difficult, and if they were appropriate, confidence in the ability for the proposed ecological outcomes to be implemented and achieved is low.

There is a Framework document (EMPF) and Monitoring Plan (BOMP) and a host of specific Management Plans. The necessity for these is acknowledged and understood. However, to implement all the proposed management measures across the plans, and thus the landscape, would currently require multiple reviews of every document and the use of Project Management software (including an overall plan/Gantt chart) to ensure all requirements (i.e. management measures, outcomes, and timeframes) are identified, understood, and able to be implemented. Such a program would also be needed to fully understand any inconsistencies. Further, such a program would be useful to understand what the ultimate bottom line/key information is (e.g. total native cover and species number at 35 years) and what will be done if not achieved. This project management should be the responsibility of the applicant, and not fall to compliance officers within the relevant administering authorities to undertake this complex assessment and data management task.

### 3.2.5 Ardgour Restoration Area Management Plan (G.08)

The Ardgour Restoration Area Management Plan (ARAMP) contains a number of the necessary details, although some need to be transferred to the BOMP to ensure accurate implementation of management and monitoring.

Key issues remaining are:

- If the uplifting from the DDF is not successful, what is the contingency. e3s recommend that the same number and species of eco-sourced plants lost are grown and planted within the relevant LMUs.
- Confirmation/clarity of what the ">50% of the ground cover has increased by 50% over that mapped in 2026" means, i.e. will there be a quarter, double, or 100% increase in native vegetation cover in LMUs 1, 2, and 3. At the workshop with the Applicant (18-20/02/26) they stated that this will be changed to hectares for clarity; an updated version is yet to be released.

- The detail provided for the 35-year outcomes is good (Section 1.1). This needs to be reflected in the BOMP, or confirmed that the BOMP will adhere to these. It is important that the most conservative outcome (i.e. ecological greater outcome) between the BOMP and any Management Plan is what will be required by Condition. Further the photo-monitoring in Section 3.13 needs to align with the BOMP (or again the above conservative approach taken).
- Clarity when all fencing will be complete (Section 3.2) is needed, as currently appears only LMU 1, 2, and 4. If others are after 5 years, then stating this and justification. At the workshop with the Applicant (18-20/02/26) they stated that the next iteration of the Management Plan will state this; an updated version is yet to be released.
- For Section 3.4 (Grazing and fertiliser), the listed "final decisions on specific grazing management" need to be confirmed not expected, to provide confidence in ecological outcomes. At the workshop with the Applicant (18-20/02/26) they stated that the grazing management must support the LERP and ARAMP, which is understood. However, upon consideration the co-ordination of these two plans at this time would be best to allow a full review of the potential ecological outcomes.
- Autumn planting can be included, as can be more beneficial than spring planting that then goes into very hot, dry summers, i.e. autumn plantings give a stabilisation period over winter and maximises time in ground ahead of a dry summer. At the workshop with the Applicant (18-20/02/26) they stated that this inclusion will be made; an updated version is yet to be released.
- No weed matting or mulch (rock or tree based) is included, which can be crucial for moisture retention in summer and heat retention in winter. At the workshop with the Applicant (18-20/02/26) they stated that matting/mulch is planned for use in LMU 4, which is stated on page 81 of the ARAMP. However, this does leave plantings in other LMUs without such benefit.
- The required size and measurements of each plant species prior to being installed should be stated. For example, T28, 35F, PB2, PB3 container size, along with a required 4 mm stem diameter for the tree and shrub species, and a shoot to root ratio of 1:1 (or at most 2:1).
- Clarification over the potential for water to be drawn from wetlands, and if so reference to the application document detailing the hydrological assessment showing this is possible without impacted the wetlands (Section 3.8) is needed.
- Clarification that all plants will have guards/shelters. Even rabbits that are being managed, including with rabbit-proof fencing, can destroy a planting area in one night without guards. At the workshop with the Applicant (18-20/02/26) they

stated that in some areas there will be rabbit protect, however, this is still a risk for all other plantings.

- Mice and rats impact lizards, and their numbers could be released with mustelid control. Therefore, monitoring needs to be installed up front (i.e. tracking tunnel lines established within first year). This is especially crucial for LMU 8 which is proposed for lizard release. Further, the threshold at which mice control will occur needs to be set, and then mice control (trapping or poison) needs to occur at a very high density (e.g. one every 5 m). At the workshop with the Applicant (18-20/02/26) they stated that the use of CTCs/TT for mice and the inference potential from possums would be looked at; an update is yet to be received.
- Section 3.9, Ardgour road corridor, needs to include the allowance for fencing if impacts from use are detrimental to ecological outcomes and cannot be managed otherwise. At the workshop with the Applicant (18-20/02/26) they stated that the road corridor is now going to be fully fenced on both sides; an updated version is yet to be released.
- Clarity as to why carnivore control only starts at Year 3 and not sooner.
- The planting areas are yet to be confirmed/located, ideally they would be known already. At the workshop with the Applicant (18-20/02/26) they stated that these are specified to the LMU level, which leaves a level of uncertainty.
- In Section 4.4, which is LMU 3, "more active restorative management is proposed for subsequent five-year periods", greater detail is needed on what is meant by this. At the workshop with the Applicant (18-20/02/26) they stated that this occurs via the project SQEP, which highlights the importance of the MGL staff having highly experienced and qualified Ecologists on staff, with particular experience in the Central Otago restoration space.
- Recommend that for LMU 4 podocarp plantings that proposed matai planting is replaced with kowhai and bog pine, as these are more ecologically appropriate species for the site.
- Section 4.8 for LMU 7 has a management action of exploring and implementing short-tussock and taramea planting if necessary for offsetting – this needs to be confirmed and detailed.
- In Appendix 1, Constraints, cost is stated as a limiting factor in terms of predator control, this could well have implications for what ecological benefits are achievable and if cost is an issue this needs to be taken into account in the impact assessment; clarity is needed as to whether this has and if the ecological benefits are still as stated despite cost implications in the ARAMP.
- The ARAMP suggests a guarantee to long-term management via a non-wasting endowment fund. e3s is in agreement and this needs to be confirmed and conditioned. This is considered a key requirement. Such a fund sits outside that

of the Bond proposed, as the trigger for the use/release of the bond is greater than being required to meet the ecological outcomes of the ARAMP.

- The Appendix 3 Work Plans need to be stated that they will be prepared by a SQEP and reviewed by an independent SQEP.
- Appendix 4 planting species excludes *Coprosma propinqua*, which is a very hardy native species that is recommended to be included in the list.
- In Appendix 5, the species that may decline with restoration, it is recommended that these be planted in LMU 6 or another LMU to get a fuller ecological outcome.
- Table A6.1 has no species with an expected change that is decreasing, yet lists species that are in Appendix 5 as declining with restoration. Clarity is sort.

Overall, the ecological outcomes are stated, however clarity on the exact definition of each outcome is still needed (Section 2.3) to then allow comparison of the benefits relative to the Net Loss. There is also a lot of risk in achieving the stated ecological outcomes given the environmental conditions (both abiotic and biotic). This has been acknowledged in Appendix 1 of the Plan with listed constraints alongside proposed management responses, however, the management responses haven't all been detailed and/or included as actions to occur. Consequently, the ecological outcomes are not yet fully appropriate, and confidence in the ability for the proposed ecological outcomes to be implemented and achieved is low.

### 3.2.6 Avifauna Management Plan (G.04)

The following are recommended edits to the Avifauna Management Plan:

- The proposed 50-meter radius for pipits and other Threatened or At Risk bird species should be adjusted by a SQEP if birds are showing signs of distress.
- The fernbird needs to be incorporated into the Plan (and any wetland management).
- The current recommendation of conducting surveys within five working days prior to clearance is too long. It is recommended they occur within 72 hours.
- The correction of two additional Very High value ecological species and one additional High value species (little shag, black-fronted tern and black-billed gull) are currently not accounted for and need to be.

Overall, the Avifauna Management Plan needs to clearly include and/or detail all mitigation measures to be managed including (but not limited to) lighting controls, noise management, minimising electrocution risk, and predator control, which are in

place for managing avifauna. Currently, the management measures are not all clearly outlined and/or lack sufficient detail, and thus ecological outcomes are unlikely to be achieved. Although Table 1 refers to other plans, the Avifauna Management Plan itself does not clearly describe the mitigation actions that are in place to address effects on avifauna.

### 3.2.7 Lizard Management Plan (LMP) (G.05)

The specific key issues with the Lizard Management Plan are:

- Manual searching should not be the only method that is used for lizard salvage as this is not the best method for capturing tussock skinks. The proportion of "At Risk" lizards able to be salvaged with the same amount of effort is likely to be increased by using trapping and/or other methods in addition to manual searching.
- The targeted totals for salvage are disproportionately high for McCanns skink, the only non-threatened lizard at the site. The salvage effort would be more effectively targeted on At Risk species and their habitats.
- The map detailing areas to be excluded from salvage (Figure 3) appears to exclude a large proportion of the habitat suitable tussock skink. The salvage area also does not cover the low value habitat detailed in green on the map in Figure 2 which also appears to exclude gully floor habitats suitable for tussock skink. This issue is a compounded outcome of the lizard survey issues detailed in Section 2.3 above.
- Further information is needed regarding the availability of habitat for the three different species at the release site(s). Tussock skink and Kawarau gecko in particular have very specific habitat requirements that should be met and the extent of these habitats at the release site are not described and likely to be insufficient. In addition, for a release success to be possible, there must be a niche to be filled. This is typically created by removal of predator pressure (including mice) or creation of more habitat (provision of rocky cover and suitable vegetation), or both. The LMP does not currently adequately address these matters.
- It is agreed that predator control may increase the habitat availability, however, it is unclear how this will be measured and determined prior to relocation. In addition, there is no mouse control detailed in the Mammalian Pest Management Plan. Mouse control is needed as mice are known to impact lizard populations and are likely to increase following control of other mammalian pests. The absence of mice control may result in greater predation pressure than

the status quo and eliminate all available habitat opportunities to support lizard release.

- The timing of predator control and habitat creation in relation to salvage and release is unclear and needs clarification within the LMP.
- Further information is needed to determine whether all alternatives to the request for toe-clipping have been adequately explored. If toe-clipping is determined to be necessary, further information should be provided regarding whether this needs to occur on all individuals, or whether a proportion would suffice.
- Further information is needed to outline the process that will occur if additional At Risk or Threatened species are found within the DDF. The discovery of additional species should trigger a “stop work” protocol in the habitat until a suitable adjustment to the LMP is made. If the new species is “Threatened” the adjusted LMP should require agreement from DOC prior to the “stop work” protocol being lifted in the affected habitat.

### 3.2.8 Terrestrial Invertebrate Management Plan (TIMP) (G.06)

Specific key risks, and/or areas of clarification include:

- Captive breeding studies are experimental and little information on how this will be structured or run is provided.
- Of the 18 key invertebrate species listed in Table 2, seven species have no targeted management actions but are listed in Table 1 as At Risk – Declining, Nationally Endangered, or Potentially Threatened. Given these are species prioritised for management, some actions would be expected.
- For *Nyctemera annulata*, because one of its host plants is ragwort (a weed), ragwort is proposed to be maintained. It is recommended that instead, the native *Senecio* host species should be planted and ragwort fully controlled.
- The Disturbance Minimisation is noted as ‘may happen’, clarification that the measures will happen and happen at the appropriate time is needed.
- The areas for relocating the salvaged invertebrates should already be determined or the implications of not having any that are appropriate addressed. For example, the number of individuals at a release site is to be ‘considered’ to prevent overcrowding, however what those numbers/limits are, and how they will be dealt with are not included.
- This Management Plan refers to other Plans (e.g. LERMP) and is relying on these outcomes, which again speaks to the need of an overall Project Management software/structure to ensure that the overall management is in sync and can be

achieved. This is highlighted in the number of references to the LERMP, yet the LERMP states “*Species-specific protection is addressed through targeted management plans. The Lizard Management Plan (LMP) and Terrestrial Invertebrate Management Plan (TIMP) detail measures to avoid or minimise effects on indigenous lizards and terrestrial invertebrates through salvaging and relocation operations*”.

- Given the experimental nature of aspects of this work, it is recommended that the Management Plan includes the experience and previous similar successes of the experts who will lead and carry out this work.
- Design of pitfall trap should be included, e.g. the Plan mentions holes to be drilled in bottom to prevent drowning but would also expect raised covers over top.
- It is recommended to include the full amount of time for the proposed manual searching effort.
- The salvage and relocation of host plant and At Risk or Threatened invertebrates is stated as ‘experimental, success outcomes can’t be guaranteed’, which highlights the high ecological level of values that cannot be managed to ensure a low level of effect. Ultimately Threatened and At Risk species (i.e. high biodiversity/ecological values) will be lost if this development proceeds.
- Given the large impact lighting has on invertebrates, the ALAN management plan is very light on detail. Key details are not defined for ease of use, e.g. does bollard support mean a downward shield, and what are the design specs for “mobile rigs customised or retrofitted”. Further, the application of the ALAN is only “where feasible” which does not equate to the invertebrate values present. If measures cannot be detailed or implemented sufficiently (or offset/compensated for), there is risk to delivery of the ecological outcomes.
- A comprehensive plan is yet to be developed for the salvage and relocation of *Phaulacridium otagoense*, this decreases the ability of certainty regarding the ecological outcomes.
- References needed for the statement “evidence shows weevil and grasshopper re-locations are generally successful” (Section 6.1).
- There is a significant time gap between the first and second round of monitoring (Section 6.2 and Section 6.2.3), post eight weeks then one year. At least two other rounds would be expected given the experimental nature (at least to look at seasonality effects results).
- The long-term monitoring of host plant relocation (Section 6.2.3) is to operate independently of the BOMP monitoring programme. This adds to potential confusion and risk of management measures and monitoring being missed.

- Captive breeding doesn't appear to be integrated into the Implementation Timeline and Sequencing (Section 7).
- Section 6 includes some ecological outcome measures, however it does not include what the specific outcome measures are for all the targeted management actions in Table 2. There is reliance on the LERMP (but specifics not stated within TIMP) and a  $\geq 40\%$  of target invertebrates on relocated plant species in (Section 6.2.3), but it is unclear if the 40% is based on baseline information.
- The Compliance Monitoring and Reporting Section (8) does not include what the specific outcome measures are. For example, the stated target invertebrate relocation of species is  $>40\%$  in Section 6.2.3. Quantifiable measures, not just photographs, are needed for faunal species monitoring.
- A lot of the proposed research (e.g. captive-breeding studies) will take significant resourcing (money, time, and experts) to ensure best practise and processes are followed for the necessary length of time.

Overall, there are many steps and requirements associated with this Management Plan (as would be expected), however, it is not clear/easily understood what the exact steps are for each of the key species, and thus what the specific ecological outcomes are and whether they can be met (which decreases the likelihood of success). Structuring of the Management Plan by species might provide clearer structure and confidence in the ability to achieve the ecological outcomes stated. Further, project management software/structure is crucial to understand the proposed invertebrate management relative to all the other Plans.

### 3.2.9 Biosecurity and Plant Pest Management Plan (BPPMP) (G.11)

The BPPMP establishes the operational framework for managing biosecurity risks and controlling plant pests at the BOGP site. It targets 27 plant pest species based on biology, distribution, and threat level. Overall, there is good detail included, although still some missing which decreases the confidence in the successful implementation if approval is granted.

The key issues with the Plan are:

- Greater detail regarding the nursery and plant production biosecurity measures is needed, for example, what are the cleaning measures and sterilization protocols in regard to 'Equipment Hygiene' in Section 2.2.2. To ensure

compliance with the biosecurity protocols for the nursery and plant propagation e3s recommends compliance monitoring.

- For 'Equipment and Vehicle Contamination' (Section 2.2.3), it is not stated where equipment and vehicle de-contamination occurs and who authorises sign off onto site.
- Detail is needed on what protocols and compliance will occur to prevent human mediated spread.
- The BPMP states that the biosecurity implementation builds biosecurity requirements into standard operations rather than treating them as separate compliance task and are incorporated into all contractor agreements. It states site induction includes biosecurity components and that compliance monitoring will occur, however, the frequency details such as how often and who will be responsible for this are not included.
- The Target Plant Pest Species (Table 1, pg. 11) does not include ragwort. The Terrestrial Invertebrate Management Plan notes that it is a host plant for the native invertebrate *Nyctemera annulata*, therefore ragwort is proposed to be maintained rather than fully controlled, however, this is not currently found within the BPPMP (except in Appendix B as a weed to be managed under the RPMP). It is recommended that the native Senecio host species should be planted and ragwort fully controlled.
- The Target Plant Pest Species (Table 1, pg. 11) does not include lupins (Russell and tree), it is recommended to include this species.
- The knockdown phase goals (Section 4.2.1), in Plant Pest Control Framework, don't have timeframes associated for which the goals are achieved within, which would be useful to help determine success (pg. 14).
- Section 4.2.2 has the Primary Goal as maintain weed population recovery to <5% of pre-treatment levels, however if pre-treatment levels were high this still allows for large areas to be infested. May just require clarification regarding meaning.
- Confirmation that Phase 3 Surveillance is maintained for the full 35-year period, however, to ensure that any ecological gains are not lost, weed control should be in perpetuity. At the workshop with the Applicant (18-20/02/26) it was understood that weed control will be covenanted and thus occur in perpetuity; the BPPMP needs to be updated to reflect this.
- The Figure 1 legend needs updating, as it is not easy to decipher which Zone is which, and Figure 1, or another figure, showing with restoration zones overlapped would be beneficial to understand pest plant management in conjunction with restoration efforts. Further, detail on the size of the different control zones would be beneficial as the actual size is not obviously stated in the plan, and the intensive control zone looks small from the map.

- All zones lack measurable objectives, it would be expected that in the Section 4.2.2 Primary Goal is the minimum for all Zones to maintain consistency and ease of applicability across the site.
- In the Bendigo Historic Reserve Zone, the removal plan proposes to remove willows only 'as far as practical.'. However, for meaningful long-term gains, full removal of willows is recommended.
- In the Wetland Zone, control not removal is proposed, again for meaningful long-term gains, full removal of willows is recommended.
- In Section 5, Points of Interest Management, the follow up monitoring schedule only remains active until two consecutive inspections, however, points of interest should remain active for longer than two consecutive inspections, as seed banks can persist in the soil beyond this period for example wilding conifers, broom, and gorse.
- Appendix E provides good detail, however, still missing some key information, for example, Group 7 Wildings must be cut below any green growth and willow disposal is important and noted but the actual disposal method(s) is not stated.

Overall, some ecological outcomes are stated, however, greater detail and clarifications are still required to fully understand what the outcomes will be and if they are appropriate.

### 3.2.10 Matakanui Sanctuary Management Plan (MSMP) (G.09)

Two predator proof sanctuaries are proposed, to protect and enhance existing ecological assets while preventing invasive pests from accessing sensitive habitats. The proposed predator-free fenced area of the Bendigo Sanctuary is 29 ha, while Ardour Sanctuary is 38 ha.

The key issues are:

- the MSMP provides only general program aspects and timings, while a detailed operational plan confirming exact timing and specification to be done prior to eradication starting. There is risk inherent in the applicant not fully understanding the scope and costs of this work, nor can it be reviewed at this time, and the 'trade-up' gains being put forward from these sanctuaries (in the AEE) cannot be confirmed.
- Please clarify when the construction of the fences will start and are expected to be finished.

- There is no specific baiting method targeting mustelids, and no consideration about using brodifacoum long term at the same site and how frequently it can/should be applied.
- The MSMP states that during months 0 – 6 rodent bait stations will be deployed at 25 m by 25 m grid networks to target mice. The suggested grid layout does not provide sufficient coverage for mice, as mice have very small home ranges, a 5 m by 5 m grid is recommended for effective control. It is also noted that Figures 2 and 3 look to have larger gaps around the edge.
- The MSMP states between 0 – 6 months kill traps targeting feral cats, possums, hedgehogs, and mustelids not targeted during aerial operations will be used. The plan does not state the trap intervals or how frequently traps will be set. Trapping alone for mustelids is unlikely to remove all mustelids from the proposed sanctuary, further, it is recommended that traps are at 100 m spacing and maintaining network long term.
- The MSMP states an Operational Plan for weed control will be development prior to starting plant pest control work using methods specified in the BRPMP. It is a risk not to have this at least drafted at this stage.
- Gates of a size, and opening, for vehicles are a concern, protocols from other Sanctuaries should be included (e.g. Mokomoko and/or Orokonui).
- It is a significant risk that there isn't a long-term plan for the sanctuary after the completion of the 35-year consent, and that any gains made may be lost once this period ends. At the workshop with the Applicant (18-20/02/26) it was understood that Sanctuaries, their management and ecological outcomes will be covenanted and thus occur in perpetuity; the MSMP needs to be updated to reflect this.
- Additional pest detection dogs should be included to target other pest species in the sanctuaries other than just mustelids and possums as outlined in Appendix B. Additional sweeps may also be required from Year 3 onwards if eradication is not achieved within the first 18 months.
- One device per three-hectare range for camera monitoring is likely insufficient for detecting pest species with a smaller home range such as mice and may be too small for rats. A higher density of cameras is needed to confirm absence.
- Clarify what bait will be used for non-toxic bait stations, e3s notes that bait stations are likely not at high enough densities to detect all mice.
- An incursion response rapid assessment should always involve certified detection dogs, and toxic control needed for rodent control rather than relying on live and kill traps.
- The MSMP state the Sanctuaries as having potential to be used as part of a threatened species recovery program and specifically state the Grand and

Otago skinks as having optimal relocation characteristics. This however would need a to be implemented with a full partnership with DOC, of which there is no evidence provided of such a partnership.

Overall, the key issues with the MSMP include the proposal to eradicate stoats solely through trapping; however, e3s notes that some level of secondary poisoning may occur. Additionally, the bait-station network is too sparse to provide effective mouse control, which is essential within the sanctuary for the protection of lizards. More intensive monitoring, including more bait stations and the use of additional cameras, would provide greater confidence that eradication has been successful and enable faster detection of any incursions when they happen.

In terms of the ecological outcomes, there are “Eradication Completion Criteria” and then broad descriptions of biodiversity outcomes (Section 10). The ecological outcomes are referred to being fully described in the BOMP. Please see Section 3.2.1

### 3.2.11 Mammalian Pest Control Management Plan (G.10)

The Mammalian Pest Management Plan sets out the methods used for monitoring and controlling pest across 2,400 ha of mining, rehabilitation, and ecological enhancement. It covers all pest control other than the fenced sanctuaries.

The key issues with the Management Plan are:

- The success criteria listed in the overview management tables for each species (Tables 3–10) do not specify the timeframe in which success is expected to occur. Without defined time-bound targets, it is difficult to assess progress or measure the effectiveness of management actions. Recommend putting some time frames in for monitoring success.
- The aerial baiting plan states that aerial operations will occur in Zone A every three years. Fixed interval may not be the most appropriate. Operation timing should instead be triggered by predator monitoring results.
- The aerial baiting plan recommends targeting rabbits and possums at the same time, however, it is not clear whether this means both species will be controlled during the same operations every three-year or whether operations alternate. Additionally, simultaneous targeting rabbits and possum may be impractical because they require different bait types. At the workshop with the Applicant (18-20/02/26) they stated that the bait type, toxicity and application rate would be investigated to determine if different bait types would be needed; an updated version is yet to be released.

- The aerial baiting plan does not mention any required applications or permissions regarding aerial baiting protocols, e.g. adjoining landowner notification, Public Health and DOC permission approvals etc. This should be included, or stated if not needed, to ensure compliance with relevant legislation and requirements.
- For the aerial baiting (pg. 24), a condition should be added requiring Zone B to be included at defined intervals, as its exclusion represents a gap that will allow for very easy reinvasion into Zone A.
- For the predator control network:
  - Most trap lines in Zone A are located along ridgelines. It would be beneficial to establish additional trap lines within the valleys to better protect species also likely to be found at lower elevations.
  - Calibrating traps yearly is needed.
  - More intensive trapping around the site boundary is needed, where reinvasion of predator species is likely after aerial operations, to help suppress numbers for longer.
- The proposed rat control zone is insufficient. The Plan assumes rat numbers are low across the landscape, however, this assumption is based on baseline data limited by methodology for the baseline method (i.e. chew cards instead of tracking tunnels). It is recommended that a control and monitoring plan be put in place (trapping or bait stations) and should not need to be triggered by ARAMP forest development decisions (pg. 76) (which is currently the case) and is activated as soon as monitoring exceeds success target (> 10% tracking). Mice should also be included, with control measures implemented when monitoring thresholds exceed a set threshold. This is particularly important as the introduction of other predator-control measures may suppress larger predators in the area, potentially allowing mouse populations to increase. It is of particular importance around where lizards will be released. At the workshop with the Applicant (18-20/02/26) there was a discussion around the use of Chew Track Cards (CTCs) for rodent monitoring. CTCs are currently proposed for possum monitoring and could also be used for rodents. However, targeting multiple pest species with one method using one layout plan can affect results and interpretation of results. This was to be investigated and further information provided; an update is yet to be received.
- Both PoaUku and rabbit meat should be used for camera trap bait to attract a range of pest species.
- It is recommended having tracking tunnels and chew cards outside of the treatment area to provide a comparison and assess whether the treatment is effective relative to areas not being treated. At the workshop with the Applicant

(18-20/02/26) they stated the targets would be outcome focused rather than have a non-treatment/control area. This will not provide evidence that the predator control was the cause of any potential improvement observed (i.e. causation vs correlation). Without a control site, monitoring only shows a trend not attribution. Predator numbers could change because of other factors (climate change, habitat change) which outcome focused targets alone will not show. A control site protects against a false negative, as without one it cannot be known whether the predator control isn't working because of the methodology or wider environmental factors. Conversely, outcome-only monitoring is also vulnerable to misinterpreting natural cycles/events as success (i.e. false positive), e.g. predator population crashes after many years might be erroneously attributed to predator control.

Overall, the targets for predator control/ecological outcomes are stated in the "Programme objective" sections for each species; however, there is no target for hares, which are considered for opportunistic control despite the noted damage they can do. Some of the targets may not allow for the ecological outcomes of the proposed plantings and natural revegetation, as one rabbit alone can decimate a planting site in one night. Further, for ungulates once two detections occur within a 3-week period additional control is called for, however, the system for these detections to be observed, recorded, and trigger a response is not provided in detail.

### 3.2.12 Erosion and Sediment Control Management Plan (G.14)

For the purposes of this review, this Management Plan has only been reviewed from a terrestrial ecology/habitat perspective. The key issues with the Erosion Sediment Control Management Plan are that:

- The Management Plan does not include any Erosion Sediment Control Plans, and therefore cannot be reviewed prior to proposed works starting which has inherent risk.
- The Plan does not mention or address the protection of vegetation or wetlands.
- The need for a Suitably Qualified and Experienced Professionals is limited to very specific and isolated parts of the Management Plan. This is of concern given importance of getting the control measures correct for a mine site. Specifically:
  - In Table 1, several of the responsibilities that currently sit with the Environmental Manager, should sit with the SQEP (e.g. ESCMP updates and compliance). Further, the SQEP should carry out much more frequent checks than the current annual audit.

- The Flow Chart (pg. 9) should have all ESCPs being prepared by a SQEP and reviewed by another SQEP. Further the Compliance audit by ORC must be done by an independent SQEP.
- For the Site Specific ESCPs (Section 2.2), the monitoring, review, and reporting should be by a SQEP.
- All of Section 2.3 needs close oversight by SQEP.
- Section 8 (ESC Monitoring), needs to be, at the very least, overseen by SQEP.
- The SQEP should be a part of the External ORC Site Inspections (Section 8.1.1).
- The suitability of the ESCPs must be confirmed prior to implementation and by SQEP.
- Any Change Management (Section 11) needs SQEP approval.
- The SQEP (Section 1.5) should have 10+years' experience, and a large proportion of which should be in the mining industry. Further, if the CEnvP certification is held they must have a specific practise area stated in their certification of 'Sediment Erosion Control'.
- Records should be provided (not 'available') to ORC, and reviewed by ORC.
- Any Incidents (Section 9.2) must be reports.

Overall, any ecological outcomes (or protection of) from the ESCMP cannot be reviewed until ESCPs are prepared. As the current ESCMP does not mention or address the protection of vegetation or wetlands, this would suggest based on current information a potential lack in appropriate ecological outcomes.

### 3.2.13 Applied Research Plan for Conservation Management, Rehabilitation and Expansion of Cushionfield. (B.16)

The key issues with the Applied Research Plan are:

- The work for ARP 1 component listed on pg. 18, needs to include spring annuals (as stated in paragraph 3 of Section 6.2).
- The Program Review and Closeout (Section 7) needs be reviewed by, and final decision made by, an independent SQEP.

Overall, the ecological outcomes are stated in Section 4 – Research Aims – however specific quantification of these overarching aims are only a suggestion in the footnote (#6). It is recommended that the proposed conditions are set as the ecological

outcomes to be achieved, with justification provided on why only 10-15% increase is suggested.

## 4 Proposed Conditions

The following adjustments and additions to the Conditions are needed:

- D.03, C21 is not appropriate to ensure ecological outcomes are achieved as proposed. Once final Management Plans are agreed, this should be the standard of management that is achieved. Therefore, the relevant Council must take as long as necessary to ensure that any proposed amendment to any Management Plan or document is appropriate.
- D.03, C13 needs to include the date and version for each Management Plan to ensure adherence to the correct document.
- D.03 needs to include the critical ecological outcomes that each Management Plan proposes as Conditions of Consent. Currently only the LERMP (C34-C41) has specific Conditions regarding what that Management Plan should achieve.
- D.04 Condition 2, needs to include that all Site-Specific Erosion and Sediment Control Plans will protect all wetlands, waterways, and native vegetation from any erosion and sedimentation.
- An overall condition is required that the costs of any and all obligations arising from all Management Plans, Surveys, and Assessments, as well as all work completed by ORC, CODC, and Government Departments in relation to the mine (and all associated aspects), are to be funded directly and fully by the consent holder (in perpetuity).
- For the proposed ORC and CODC Land Use Consents and Conditions, given the scale and scope of the proposed mining development and associated number and detail of ecological impact management measures, it is recommended there is an overarching Condition that all aspects of all Management Plans and the AEE must be met, this is to avoid confusion and prevent missing any needed requirements. Further, the Condition should include that if there are any discrepancies (e.g. within or between Management Plans or between Management Plans and the written Conditions) the most conservative (i.e. greater ecological benefit) option is to be the implemented measure/outcome.
- Below are high-level outcomes that have been adapted from the Management Plans, which should be Conditioned:
  - Ecological Rehabilitation of **480 ha within the DDF** requires the 480 ha to have > 90% native vegetation cover, which is dominated by diverse indigenous woody shrubland and tussock with lesser amounts of diverse cushionfield, taramea and marsh and swamp wetland habitats. The area of cushionfield, taramea and marsh and swamp

wetland habitats must be at least 20% greater than the area of these habitats prior to the proposed development. This all is to be achieved within 35 years from the start of mining. Native vegetation cover across the 480 ha at >90% cover is to be maintained in perpetuity.

- Ecological Enhancement of **Mine Regeneration Zones (MRZs) across 889 ha** (outside of the DDF) requires the 889 ha to have > 90% native vegetation cover, which includes diverse indigenous woody shrubland and tussockland with diverse cushionfield and herbfields. This all is to be achieved within 35 years from the start of mining. Native vegetation cover across the 889 ha at >90% cover is to be maintained in perpetuity.
- Ecological restoration of the **Ardgour Restoration Area (ARA) across 1,263 ha** requires the 1,263 ha to have >70 % native vegetation, or double what is currently present, whichever is greater, and the following:
  - The diversity of native tree, shrub and liane species in existing native scrubland has increased so that on average there are at least five native woody species (comprising at least two tree, two shrub and one liane species) in monitoring transects in LMUs 1 and 2.
  - The average annual abundance of native birds is at least double the number in LMUs 1, 2 and 3 than they were in the 2023 and 2024 bird surveys in these areas.
  - There is evidence of natural dispersal of native species within the areas of native woody vegetation in LMU 1 and 2 as evidenced by the presence of unplanted individuals of native shrubland and forest species (fern, herb, woody) (excluding matagouri, scented tree daisy and mingimingi) in at least 50% of vegetation monitoring transects.
  - Kōwhai seedlings are establishing naturally in proximity (within 100 m) to at least five of the nine kōwhai groves that are currently present in the Ardgour Restoration Area).
  - Survival of planted tōtara on alluvial surfaces in LMU 4 is >80% and surviving plants are >5m tall.
  - The extent of cushionfields in LMU 5 is the same as mapped in 2026. The number of individuals of the three key Nationally Threatened and At-Risk cushionfield plant species present within monitored populations shows an increasing or at least stable population in comparison to 2026 base line numbers.

- The costs of the obligations arising from management plans are to be funded directly by the consent holder;
- A covenant is registered which provides legal protection in perpetuity for the Ardgour Restoration Area within 12 months of mining activities within the BOGP commencing;
- The provision of an annual report on progress on achieving the 35-year outcomes set out in the Ardgour Restoration Management Plan to the ORC and CODC District Councils each year. Each annual report should report on progress with the proposed conservation actions including:
  - Verification that livestock have been excluded and/or that their numbers have been reduced to target stock density levels and/or stated timings in the Ardgour Restoration Area;
  - A summary of native planting undertaken including representative photo monitoring points (taken in same location each time);
  - A summary of all mammalian pest and ecological weed management activities undertaken during the year, including corresponding results, dates and methods for each control activity;
  - A summary of any adaptive management or contingency responses during the year where thresholds for control targets have not been achieved;
  - Any challenges or issues encountered with livestock management, habitat relocation, mammalian pest or ecological weed management, or monitoring, along with how these difficulties were overcome;
  - Any new tools, technologies and methods deemed likely to improve the efficiency and effectiveness of livestock management, vegetation enhancement and habitat relocation, mammalian pest, or ecological weed management, which should be incorporated into the following years' pest management practices if suitable.
- Prepare and submit to the Central Otago District Council successive detailed five-year restoration plans ("the Ardgour Restoration Area Plan") by the end of the five-year anniversary of the granting of all necessary approvals for the BOGP under the Fast-track Approvals Act. These plans should be prepared by a

- qualified Ecologist experienced in restoration ecology and include a detailed programme of activities to be carried out in next five years to contribute to achieving the 35-year outcomes set out in this management plan. These successive restoration plans should continue to be prepared until it can be demonstrated that the 35 year-outcomes set out in this management plan have been achieved.
- The permanent removal of cattle grazing and cessation of the application of fertiliser or seed within the Ardgour Restoration Area prior to the commencement of any works within this area directed by this management plan;
  - In sourcing seeds for propagation and planting, ensure that at least 25% are sourced from outside the Dunstan Ecological District but within the Central Otago Ecological Region and, where appropriate, from sites in adjacent ecological regions.
  - Where the opportunity occurs, source seeds for propagation and planting from plants within the Direct Disturbance Footprint (“DDF”).
  - Initiate and continue animal and plant pest control programmes within the Ardgour Restoration Area as laid out in the Mammalian Pest Management Plan.
  - Undertake annual operation monitoring within the Ardgour Restoration Area, including using photo monitoring points.
  - Undertake biodiversity outcome monitoring to assess progress against the 35-year outcomes as described in the Biodiversity Outcome Monitoring Plan.
- The two **predator proof fences sanctuaries (38 ha and 29 ha)** must be constructed and that meet industry standard best practice within 3 years of the start of any mining activity.
  - The two sanctuaries must be 100% pest free (including all cats, mustelids, rodents, hedgehogs, possums, ungulates, and lagomorphs) within three years of the fence completion. Noting that Ardgour Sanctuary will have controlled levels of rabbits.
  - Sustain pest-free sanctuary status through rapid response eradication of any target species incursions, with complete removal achieved within 6 months of detection.
  - Create a suitable environment for reintroduction of critically threatened species (from outside of the BOGP area) within 6 years.

- The two sanctuaries will be legally covenanted to remain pest free with management to ensure all ecological values protected and enhanced in perpetuity.
- Across the **2,762 hectares (610 ha, 889 ha, and 1,263 ha)**, **predator control** will occur in perpetuity (and be a condition of a legal covenant), and will include control of possums, rabbits, all ungulates, all mustelids, and all rodents. The targets to be achieved every year (within 5 years of the start of any mining) will be:
  - <10% tracking for rodents.
  - <6% CCI for possums.
  - < 3 detection/2000 CHs for mustelids, hedgehogs, and cats.
  - ≤3 Modified McLean Scale.
  - meeting seedling survival and recruitment targets set by ARAMP and LERMP.
  - < 2 ungulate detections per six-month period.
  - achieve browse damage targets of ARAMP and LERMP.
- If necessary to meet any lizard, avifauna, invertebrate, or native plant requirements or improve ecological outcomes, the listed target levels will be reduced further.
- All **weed species must be reduced by 80%+**, and maintained at this, and seed production prevented, **across the 2,762 ha area** in perpetuity.
- No new weed species must establish across the 2,762 ha area.
- All electrical equipment including transmissions lines we be insulated to prevent any electrocution of **avifauna** species, and to provide underground cabling where possible.

Overall, while the above adjustments/additions to consenting conditions would help improve the likelihood that the proposed ecological outcomes are achieved, given the experimental nature of parts of the Management Plans and the lack of targets or necessary detail in targets or recommended changes, **these are not a final position nor, by any means, the only conditions needed to ensure confidence that the proposed ecological outcomes would be achieved.** These are only what has been able to be discerned and edited from the documents in the available timeframes. Further conditions are needed, as well as edits to the above, after additional work is completed for each Management Plan (to have clear and obvious stated ecological outcomes with well-defined targets to achieve outcomes). For example, there is currently not sufficient information to be able to provide any suggested Conditions for lizards, as the Lizard Management Plan requires significant changes. Once/if the

Management Plans are updated, final consent conditions might be able to be achieved.

## 5 Summary

Overall, as stated in the AEE, after impact management there is a significant Net Loss in ecological values, including the permanent loss of irreplaceable and vulnerable species and communities. No compensation has been offered to address these outstanding ecological impacts. The ecological values that will experience a Net Loss are the Nationally Vulnerable *Myosotis brevis*, the Nationally Critical *Ceratocephala pungens*, and over 20 other native plant species that are Threatened or At Risk. It is Uncertain what the effect will be for 12 Threatened and At Risk invertebrate species including the newly identified ground beetle *Harpalus* species and weevil *Inophloeus* species, along with four avifauna species. A loss of seepage wetlands and gully fens is notable given New Zealand has already lost over 90% of our wetlands. There will also be a Net Loss of the At Risk – Declining tussock skink and Kawarau gecko, and the McCanns skink. There is a Net Loss in habitats, including native dominated tussockland, and herbfield/cushionfield.

Many of the proposed mitigation and offsetting measures are experimental. They rely on rehabilitation in a difficult dryland environment where restoration processes have not been well established and rely on natural regeneration which is not a given and will require intensive management, or are awaiting research results (e.g. cushionfield research, invertebrate captive breeding programmes, natural regeneration from nodes). Lizard salvage, habitat creation, and predator sanctuaries are unlikely to make a difference to lizard populations, or allow salvaged lizards to survive, in their current form. Consequently, overall the risk of failure is high, the outcomes are unknown, and the work will be very resource heavy both in terms of money and time. Further, adverse ecological impacts of the proposed mine will already be realised, prior to knowing the success or otherwise of the proposed ecological outcomes. Overall, the potential for the Net Loss to be larger than currently assumed (given the reliance on experimental restoration) is high.

The Ardour Restoration Area Management Plan states, that in being realistic in achieving biodiversity outcomes, non-wasting endowment funds can be a useful tool, which can be established to help ensure ecological benefits are achieved in perpetuity. A non-wasting endowment fund is separate in purpose to the proposed Bond, as a Bond covers the eventuality of a company leaving prior to approved mine closure. Thus, the trigger for the use/release of the bond is greater than being required to meet the ecological outcomes of Management Plans. A

non-wasting endowment fund for ecological management is recommended to assist in providing confidence that the proposed impact management will be achieved.

Given the complexity of the proposed development and associated Management Plans, it was expected that a project of this scale would be using Project Management software to ensure all steps and ecological targets/outcomes are well documented in one place. The project needs a clear and concise view of the full mitigation package proposed, including explicitly stating ecological targets and outcomes, which would help provide confidence that all the impact management measures will be achieved. Project Management software would include a Gantt chart showing all the impact management measures (avoidance, mitigation, offset, compensation), targets, and reporting (monitoring and compliance) along with timing. Currently, in lieu of such software/chart, this information is split across multiple reports, which makes understanding ecological outcomes and targets, and ensuring adherence, almost impossible for any agency, or MGL staff.

An "Ecological Impact measures Management Schedule" in the form of an Excel spreadsheet, has been provided as part of the RFI by the Applicant; however, this has highlighted further discrepancies. The focus for MGL for ecological efforts appears to be only within or under 35 years and targets are not clearly stated, e.g. the BOMP (Row 236-239) states the types of monitoring rather than the actual targets and some of the pest management appears to end well before 35 years. Overall, there appears to be a lack of an in place, in use, robust Project Management system, which would produce a detailed, well formatted, and referenced chart highlighting all the ecological actions needed and targets to be met.

The quantification of the proposed Net Loss is needed. At the workshop with the Applicant (18-20/02/26), the quantification of the Net Loss was requested; it is yet to be received. Regardless, based on the Assessment of Ecological Effects "*the residual adverse effects after the full effects management hierarchy has been applied **remain significant** despite this package*" and the "*unavoided loss of irreplaceable and vulnerable species or communities will be permanent*". Given the significant Net Loss of ecological values, monetary compensation might help counterbalance the significant loss. This has not been proposed, as the \$5 million biodiversity and heritage enhancement fund "*is not considered to be part of the residual effects management package*". A non-wasting endowment fund,

depending on its value, could potentially help compensate for the ecological loss. For example, such a fund with a value that is 1% of the expected mining profits, (i.e. \$38.4 million NZD)), could be established to reduce the ecological Net Loss and ensure greater ecological benefits are achieved.

Ultimately, as the proposed development stands at this time, there is a significant Net Loss of ecological values which have not been fully avoided, mitigated, offset, or compensated for. Further, the Net Loss could be higher than currently described, due in part to the experimental nature of the mitigation efforts, and Management Plans that require further work. Therefore, based on the ecological aspects of this proposal, it is recommended that the project should not proceed.

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If you have any questions regarding the information provided in this document, please contact Rebecca Teele on 03 409 8664 or via email at [Rebecca.teele@e3scientific.co.nz](mailto:Rebecca.teele@e3scientific.co.nz)

Yours sincerely,



Rebecca Teele  
Technical Director – Terrestrial Ecology

## Attachment A: e3s Reviewers

### **Rebecca Teele**

*Technical Director – Terrestrial Ecology*

- Overall compilation and review.
- Ecological Values & Impact Assessment – Wetlands
- Ecological Values & Impact Assessment – Invertebrates
- Impact Assessment – Avifauna
- Overall Impact Assessment
- Biodiversity Outcome Monitoring Plan
- Habitat Impact Management
- Ecological Management Plan Framework
- Landscape and Ecological Rehabilitation Management Plan
- Ardgour Restoration Area Management Plan
- Terrestrial Invertebrate Management Plan
- Erosion And Sediment Control Plan
- Applied Research Plan for Conservation Management Rehabilitation and Expansion

### **Trudy Anderson**

*Senior Environmental Scientist*

- Ecological Values & Impact Assessment – Lizards
- Ecological Values & Impact Assessment – Vegetation
- Lizard Management Plan

### **Lisa Milliken**

*Ecologist*

- Ecological Values – Bats
- Ecological Values - Pest Species
- Ecological Values – Avifauna
- Matakauui Sanctuary Management Plan
- Biosecurity and Pest Plant Management Plan
- Avifauna Management Plan
- Mammalian Pest Management Plan