BEFORE A HEARINGS PANEL APPOINTED BY THE OTAGO REGIONAL COUNCIL

IN THE MATTER OF	the Resource Management Act 1991 ("the Act" or "the RMA")
AND	
IN THE MATTER OF	Applications RM24.184 to the Otago Regional Council (ORC), 201.2024.2373 to the Waitaki District Council (WDC and LUC 2024-126 to the Dunedin City Council (DCC) by Oceana Gold (New Zealand) Limited for various consents relating to the Macraes Phase Four mine expansion

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STATEMENT OF EVIDENCE OF GLENN ALISTER DAVIS ON BEHALF OF OTAGO REGIONAL, WAITAKI DISTRICT, AND DUNEDIN CITY COUNCILS

6 June 2025

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1. INTRODUCTION, QUALIFICATIONS AND EXPERIENCE

Qualifications and experience

1.1 My full name is Glenn Alister Davis.

1.2 I am a Director and Principal Environmental Scientist of e3Scientific Limited. I have been in this position since 2007. I have over 25 years' postgraduate work experience in environmental management and hold a BSc in Ecology and MSc in Geography.

1.3 I have worked as a professional ecologist in Otago and Southland since 2007. During this time, I have completed ecological investigations for a wide range of projects for the tourism, agricultural, forestry, mining and land development sectors and a provided ecological support to regional and territorial authorities through plan change, technical review and compliance work.

Involvement in the Consent Application

1.4 In April 2024 I was engaged by Otago Regional Council (ORC) to undertake a technical review of ecological assessments undertaken to support the Oceania Gold Limited (OGL) proposal to expand the extent of the Macraes gold mine. The expansion is known as the Macraes Phase 4 mine expansion (MP4).

1.5 To assist my review of the application I visited the site on two occasions. My first visit was on the 20th June 2024 where I viewed the proposed mine extension areas. I also visited the site on the 25th November 2024 to view the proposed Murphys Ecological Enhancement Area (MEEA).

1.6 My technical review of the ecological effects of the application consisted of reviewing the following documents:

a) Macraes Phase 4 Project. Resource Consent Application and Assessment of Environmental Effects. OGL 28 March 2024.

b) Appendix 15: Ahikā - Assessment of Effects on Vegetation & Avifauna.

c) Appendix 16: Ahikā - Macraes Phase 4 Project – Ecological Impact Management Plan. I note this document was amended with the new document dated 17 February 2025.

d) Appendix 17: Bioresearches - Herpetofauna Survey & Assessment – Macraes MP4.

e) Appendix 18: Bioresearches - Lizard Management Plan – Macraes MP4 Projects.

f) Appendix 19: Bioresearches - Invertebrate Survey & Assessment – Macraes MP4.

1.7 In reviewing the ecological assessments, I was asked to identify areas of additional information that would assist the Councils understanding of the MP4 expansion. I

provided a series of questions to the ORC that were subsequently incorporated into a s92 request. OGL provided further information to the ORC in response to the s92 request in two responses in August 2024 and February 2025. The additional information provided by OGL that I have reviewed is provided in the following documents:

a) MP4 consent application – s92 requests for additional information from DCC and WDC. Prepared by Ahika dated 24 August 2024.

b) Responses to s92 requests prepared by Bioresearches in respect of terrestrial ecology matters. This also included an updated Lizard Management Plan dated 30 July 2024.

c) Clarifications on s92 responses, MP4 project. Prepared by Whirika Consulting dated 5 February 2025.

d) MP4 ORC further information response – Planning and overarching responses dated 7 February 2025.

1.8 I have reviewed all of the terrestrial ecology documentation to inform my statement of evidence. In addition, I note that OGL shared the Whirika Geographic Information System information which enabled a more detailed review of the vegetation mapping undertaken.

1.9 I have also reviewed Ms Shay McDonald's Notification Report prepared on behalf of the Otago Regional Council.

Expert Witness Code of Conduct

1.10 I confirm that I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and agree to comply with it while giving oral evidence before the Hearings Panel. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

1.11 I note that statistical analysis undertaken to predict lizard populations is not in my area of expertise. For the purpose of my assessment I accept that the predicted lizard populations provide a reasonable basis for understanding the number of lizards that may be affected by the mine expansion.

2. SCOPE OF EVIDENCE

2.1 The scope of my ecological evidence includes:

- Section 3: Review of the characterisation of ecological values.
- Section 4: Review of the assessment of ecological effects.
- Section 5: Review of mitigation, remediation, offset and compensation measures.
- Section 6: Review of submissions.
- Section 7: Review of consent conditions.

3. CHARACTERISATION OF TERRESTRIAL ECOLOGICAL VALUES

3.1 The terrestrial ecological values within the various project components (PC's) of the MP4 expansion were undertaken by two ecological consultancies Whirika Consulting (formerly Ahika) and Bioresearches. Whirika has characterised vegetation and avifauna values while Biosciences assessed the herpetological and invertebrate values. The following evidence sets out my opinion on the ecological work completed to describe the ecological values of the site. My opinions are based on both a review of the reports and the two site visits I completed.

Ecological Context

3.2 Section 5 of the Whirika Assessment of Effects on Vegetation and Avifauna summarises the ecological setting providing helpful information on the project areas geology and landforms. It also presents information on the likely prehuman vegetation and describes the disturbance that has affected the condition of the vegetation cover today. The information provided shows that much of the Macraes Ecological District is highly modified with 75% of the district dominated by exotic vegetation. It also shows that most of the remaining vegetation is also modified from the predicted original dryland forest and shrubland cover to a short tussock grassland and subalpine tall tussock with areas of forest and shrubland.

3.3 The loss of indigenous vegetation cover is supported by the threatened environment classification (TEC) undertaken by Manaaki Whenua Landcare Research 2014 (MWLR) which shows that much of the MP4 project components lie within LENZ (Land Environments New Zealand) environments that have less than 20% indigenous vegetation cover remaining. The 20% threshold is an important figure as it is at this point that biodiversity loss can accelerate, therefore highlighting the importance of the remaining biodiversity within these depleted environments.

3.4 Despite the loss of indigenous vegetation within the Macraes area the remaining indigenous vegetation continues to support diverse indigenous plant assemblages as shown by the 128 indigenous species recorded by Whirika botanists during the survey of the MP4 project area. Whirika notes that the diversity is suppressed compared to indigenous vegetation communities in the wider landscape due to the influences of pastural and mining activity.

3.5 I consider the general ecological information provided accurately reflects the ecological context of the site and is a sound basis to support the proposed MP4 mine expansion ecological effects assessment.

Vegetation

3.6 The methods undertaken to describe the vegetation are set out in section 4.4.1 of the Ahika Assessment of Effects on Vegetation and Avifauna. The vegetation was surveyed over two days on the 24 April & 5 May 2022 with vegetation communities, plant species and plant species abundance recorded as the areas of disturbance were traversed. OGL supplied the ORC with GPS information on the survey routes walked and the waypoints of plant species that are on the Department of Conservation threatened plants list.

3.7 Using the botanical information collected and aerial photographic interpretation Whirika has mapped the vegetation communities within the Zone of Interest (ZOI) of each project component. The vegetation community mapping is presented in Figures 7 – 9 of the report and areas of disturbance within the project components provided in Table 5 of the Ahika report.

3.8 The mapping shows the MP4 footprint covers an area of 280.8 ha, however 196 ha of this area is within existing mine workings and a further 50 ha contains felled pine forest, improved pasture and rough pasture. The total area of indigenous communities is estimated at 35.3 ha and is dominated by tussockland with small areas of rock tor, shrubland, riparian vegetation and ephemeral wetland. Most of the indigenous vegetation disturbance occurs within the deposition of waste rock in the Golden Bar waste rock stack and the extension of the Golden Bar mine pit. Whirika notes that the tussockland community is not classified by Singers and Rogers as a naturally occurring community and is best described as an analogue of AL1: Narrow-leaved and slim snow tussock tussockland shrubland. I agree with this interpretation although it should be recognised that modified communities are important in the maintenance of biodiversity even if vegetation community range extension and species assemblages vary from the original community.

3.9 The Whirika report identifies that there is some disturbance to ephemeral wetlands

and wetlands in the footprint and buffer of the Coronation 6 extension and the buffer of the Innes Mills and Golden Point realignment. Wetlands are uncommon and a National Priority for Protection while ephemeral wetlands are also listed by as a threatened naturally uncommon ecosystem that is Critically endangered in accordance with Holdaway *et al.* (2012).

3.10 The survey work identified a total of 128 indigenous species although I note a discrepancy in the number listed in Table 6 where the total species number is 101. The Ahika report identifies a total of 14 plant species recorded within the ZOI that are listed as "at risk – declining', 'at risk naturally uncommon' or data deficient. Some of the species have had a status change in 2023. I record these below to ensure the data is up to date with the most recent assessment on the threat status of plant species.

Species	Ahika Report	2023 Threat Status
Discaria toumatou	At Risk – Declining	Not threatened
Juncus distegus	At Risk – Naturally Uncommon	Not threatened

3.11 In summary, I consider the flora and vegetation is well described and mapped accurately and can be relied upon for the purpose of assessing the effects of the proposed MP4 expansion.

Avifauna

3.12 The methods undertaken to collect avifauna information consisted of a single walk through of the Innes Mills, Golden Bar and Coronation project components in April and May 2022. Ahika considers a more intensive sampling effort such as 5- minute bird counts was not required given the low species diversity and low abundance of birds. While I consider this approach was reasonable for the site, it would have been helpful to complete additional survey work during different times of the day and year in order to get a better understanding of the variability of species present and bird abundance.

3.13 The bird survey recorded a total of 23 bird species within the ZOI. Ten of the species recorded are indigenous. I concur with the Ahika report that bird species and numbers are typically low in this environment due to the lack of forest cover and degraded wetland habitat.

3.14 A total of 3 bird species are listed as threatened (eastern falcon) or at risk (NZ pipit and banded dotterel).

3.16 In summary, I consider the bird species recorded would be expected in this environment and it is unlikely further survey effort would significantly alter the characterisation of the avifauna exposed to the MP4 expansion.

Invertebrates

3.17 Bioresearches completed a survey of invertebrates through installation of nine Heath moth traps in project components that contained indigenous vegetation that was most likely to support invertebrates such as the tussocklands, riparian vegetation and wetlands in the Golden Bar Pit, Golden Bar waste rock stack, Golden Bar road realignment and the Coronation 6 Pit. In addition, a further 5 light traps were installed into nearby covenants to provide a comparison with the MP4 expansion areas. The location of the light trapping is provided in Appendix 1 of the Bioresearches report.

3.18 Light trapping was also supported by sweep netting through tussocklands, riparian vegetation and wetlands. In addition, hand searches and visual observation was also undertaken. The location of this work does not appear to be provided in the reports.

3.19 Bioresearches clearly sets out the limitations of the invertebrate survey work and states that there were time constraints to complete the work and that surveys were not completed during Spring or Summer when temperatures are warmest and species composition and abundance is at its peak.

3.20 Section 3.2.3 sets out the survey results of the invertebrate assemblage collected through the various light trapping, sweep netting and hand searches. The sampling effort yielded a total of 748 individual specimens, and these were classified into 56 taxonomic units at either the genus or species level.

3.21 The taxonomic analysis recorded one threatened moth specimen, Orocrambus sophistes from a light trap installed in the Golden Bar waste rock stack.

3.22 I find the invertebrate survey raises a number of questions regarding the ecological values of tussockland (and possibly other communities) in the Golden Bar mine pit expansion and the Golden Bar waste rock stack. Firstly, Orocrambus sophistes a 'threatened – nationally vulnerable' moth species has been recorded. Understanding if this specimen is part of a wider population is required to draw a conclusion on the ecological value of the vegetation and habitat it was recorded within. Secondly, the work completed was not undertaken during the best time of the year for sampling which suggests the identified taxa is likely to be significantly reduced from the taxa that would be affected by mine expansion activity. It is possible that other at risk or threatened species may be present which should be

characterised to support the assessment of effects.

Herpetofauna

3.23 Bioresearches completed a desktop analysis of the habitats across the MP4 project to assist with focusing on the areas of that provided the best habitat for the skinks and geckos. This work resulted in the survey effort focusing on the Coronation 6 Pit extension, Golden Bar road realignment, Golden Bar mine pit extension and Golden Bar waste rock stack.

3.24 Bioresearches completed a survey of lizards across habitats within the MP4 expansion during two systematic search efforts from the 2-4 April 2022 and the 18-20 April 2022. The search effort included rock scanning, habitat searches and opportunistic encounters as set out Section 3 of the Herpetofauna Survey report. Bioresearches provided useful information on the limitations of the survey methodology and specifically mentioned the timing of the survey effort being at the end of the generally accepted lizard season. Furthermore, time constraints meant the survey was limited to systematic searches rather than employing other standard survey methods such as pitfall traps, Gees minnow traps or artificial cover objects (ACOs).

3.25 Since the work completed in April 2022, Bioresearches have undertaken further survey work in April 2024 in an effort to gain a deeper understanding of lizard abundance within the MP4 expansion area. This work has been used to support modelling of populations and therefore assist in the characterisation of the number of individuals that may be affected by the MP4 mine expansion work.

3.26 The survey work completed has recorded three lizard species present within the MP4 project area and includes the at 'risk – declining' korero gecko (*Woodworthia "Otago/Southland large*"), tussock skink (*Oligosoma chionochloescens*) and not threatened McCanns skink (Oligosoma maccanni).

3.27 The assessment notes that a further 4 skink and gecko species have been recorded immediately surrounding the MP4 project with two of these species Otago skink (*Oligosoma otagense*) and grand skink (*Oligosoma grande*) listed as 'threatened – nationally endangered' and two species Herbfield skink (*Oligosoma murihiku*) and Otago green skink (*Oligosoma aff. chloronoton "Eastern Otago*") listed as 'at risk – declining'.

3.28 Bioresearches completed further assessment to assist in the characterisation of lizard species abundance within the various project components of the MP4 project. The results are set out in section 3 of the amended Lizard Management Plan (LMP)

dated 30 July 2024. This work utilised 3 methods to estimate possible numbers of lizards that may be disturbed by the MP4 expansion. The results are provided in Table 4.5 of the LMP and show the total number of lizards within the impact area ranging from 18,744 lizards using the in density extrapolation method to over 100,000 lizards in the N-mixture modelling. Bioresearches is of the view that the density extrapolation method underestimates lizard numbers and the total probably ranges from 26,387 to 111,559. The work clearly shows the habitat within the MP4 impact area is important ecologically for the species recorded.

3.29 For additional context it is important to highlight that there is significant variability in the skink species abundance with the not threatened McCanns skink estimated to make up 65-70% of the total lizard population and the 'at risk-declining' korero gecko and tussock skink making up the remaining 30-35%.

3.30 Notwithstanding the limitations of the initial survey methodology, I consider the herpetofauna work completed as a whole provides the assessment with a reasonable understanding of the lizard species present and some understanding of the possible lizard abundance across the MP4 impact area.

Summary

3.31 In summary, I find the ecological values of the site are well understood for vegetation, birds and lizards. The invertebrate information is weaker and lacks detail largely due to the limitations of the timing of the survey and any understanding of the relevance of the finding of a single specimen of the nationally threatened moth *Orocrambus sophistes.*

4. ASSESSMENT OF ECOLOGICAL EFFECTS

4.1 Ahika and Bioresearches have undertaken ecological effects assessments utilising the approach set out in the EIANZ Ecological Impact Assessment Guidelines. This approach has two core elements to assess effects including assigning a value to ecological features and assigning a magnitude of effect. The robustness of the EIANZ impact assessment guidelines is debated by professional ecologists but it remains the only nationwide guidance to support ecological impact assessments in New Zealand and I consider it offers an appropriate framework for the assessment of effects of the MP4 mine expansion proposal.

4.2 The ecological assessment uses all of the tools available to ecologists to consider the value of vegetation communities and species that may be impacted. Section 4.6 of the report sets out the matters of ecological importance that have been considered in assigning ecological value.

4.3 I have reviewed the assignment of ecological values to the various ecological features within the MP4 footprint. These matters are traversed in section 6 of the Ahika report and summarised in Table 9 of the report. I agree with the Ahika assessment of ecological importance.

4.4 While I agree with the assignment of ecological values there is a reasonable amount of uncertainty regarding the magnitude of effect. This is acknowledged in the Ahika report where it addresses confidence in the magnitude of effect assessment. In many cases the confidence in the assessment is characterised as moderate or moderate-low. Additional analysis would have been helpful to understand the extent of vegetation communities or prevalence of species in order to reach a stronger conclusion on the magnitude of effect. An example would be to have completed some analysis on the distribution and number of ephemeral wetlands on OGL property to provide some local context regarding the wetland loss compared to the wetlands remaining in the nearby environment. Without this level of work I consider the magnitude of effect of the MP4 footprint is higher than estimated by Ahika. This view is based on the 2000 ha of disturbance associated with the existing Macraes mining operation and that much of the project expansion occurs within land environments with less than 20% indigenous vegetation cover remaining.

4.5 With respect to the overall level of ecological effect, I consider the effects at the Golden Bar mine pit extension and Golden Bar waste rock stack are high prior to implementation of remedial, offset and compensation measures. This view is based on the direct (development footprint) and indirect effects (buffer area) of 69 ha of high value tussockland, shrubland, rock tor and riparian vegetation that supports a range of bird, lizard and invertebrate values some of which are at risk or threatened species.

4.6 In addition to the above I agree with the Ahika assessment that there will be a Very High level of effect associated with the loss of ephemeral wetlands associated with the Coronation 6 pit extension.

4.7 The assessment also addresses the significance assessment criteria set out in the WDC and DCC District Plans, the National Policy Statement – Indigenous Biodiversity (NPS-IB), the Partially Operative Otago Regional Policy Statement (POORPS) and the proposed Otago Regional Policy Statement (pORPS).

4.8 With respect to the assessment of significance I agree with the Ahika and Bioresearches assessments that the indigenous communities within the MP4 project footprint meet the significance matters set out under the WDC and DCC District Plans, the NPS-IB, POORPS and the pORPS assessment criteria. This is

well summarised in Table 8 of the Ahika report. I would note that I also consider the tussockland within the Golden Bar mine pit extension and Golden Bar waste rock stack also meets the representative criteria.

4.9 In summary the ecological effects assessment has identified that the MP4 project will have a moderate to very high level of effect on ecological values associated with the disturbance of tussocklands, shrublands and wetlands and rock tors. This finding is not consistent with general comment made in the Ahika report where it states *"Overall, the MP4 project is assessed as having a low to moderate effect on most of the terrestrial ecological features".* I do not consider this statement accurately reflects the Ahika assessment especially considering the largest area of effect is associated with tussockland, rock tors and riparian vegetation in the Golden Bar WRS and mine expansion. These areas are the largest project components of the MP4 project with respect to direct and indirect effects on indigenous vegetation and habitat and supports at-risk plant species, threatened invertebrates, high numbers of lizards and the at-risk NZ pipit.

4.10 While I disagree with the general characterisation of the mine expansion causing a "low to moderate effect" I agree with Ahika's view that an extensive suite of mitigation, remediation, offset and compensation measures are required to mitigate the effects of the mine expansion as set out in the Whirika Consulting (2025) Macraes Phase 4 Project Impact Management Plan V3 (IMP).

5. REVIEW OF MITIGATION, REMEDIATION, OFFSET AND COMPENSATION MEASURES

5.1 The Whirika IMP sets out an extensive suite of mitigation, remediation, offset and compensation measures. I discuss these matters below.

Mitigation

5.2 Dust, noise, sediment deposition, accidental spills and fire effects are all identified as matters that should be mitigated to reduce ecological effects. The methods of control are not detailed in the IMP but this information will be included in the proposed Ecological Management Plan or related Management Plans such as an Erosion and Sediment Control Plan. I agree that these are all matters that can be specified post consenting within the EMP.

5.3 Importation of weeds is recognised as a risk to biodiversity in the vicinity of the mining area. The IMP sets out a mitigation strategy to monitor and remove new environmental weeds. I concur with the approach set out in the IMP.

5.4 The mitigation package includes the rescue of locally important plants within the mine expansion footprint and increasing the population of the rescued species in accordance with proposed consent condition 24. I support this initiative and concur that this mitigation is a positive step in minimising effects on the identified species. Monitoring of performance will be critical to confirm the objectives are achieved. Adaptive management should also be incorporated into the EMP should the translocation and planting efforts not meet the survival and growth rates set out in the draft condition 24.3. This should include supplementing any losses with planting of nursery grown plants such that the objective of consent condition 24 is achieved.

5.5 Rescue of the threatened invertebrate *Orocrambus sophistes* is proposed through the removal of host plants, stockpiling and caring for the plants within an area of existing tussock grassland and subsequently replanting the tussock grassland back onto the Golden Bar WRS. In principle I support the proposed mitigation through the excavation of tussock grassland and subsequent re-establishment. I have overseen tussock grassland excavation and re-establishment on other projects and I can confirm successful outcomes for the tussock component of the community can be achieved. Notwithstanding this point, the work will need to be carefully managed to ensure the survival of the vegetation to give the moth a chance of surviving the translocation process. A detailed methodology for translocating the vegetation needs to be prepared to set out the vegetation to be excavated, the location where it will be stockpiled, length of time it will be stockpiled and the management of the vegetation once placed back into the ground. In addition, a detailed monitoring programme will be required to assess the performance of the translocation work to determine if the threatened moth survives the translocation process. Additional information regarding the extent of the tussock grassland translocation will need to be provided which will need to link back to further invertebrate survey work regarding the *Orocrambus sophistes* population.

5.6 With respect to translocation of tussockland to support the threatened moth, my preference would be for OGL to find a site whereby only one movement of the vegetation is required, rather than a subsequent movement back onto the WRS.

5.7 The salvage of lizards from the mine expansion area and translocation introduction into the MEEA is a mitigation measure to minimise effects on the lizard populations. This will be undertaken in accordance with the Lizard Management Plan and any conditions required through the application of the Wildlife Act Authority. I concur that salvaging lizards is necessary to mitigate effects on lizard populations.

Remediation

5.8 A range of remedial measures are proposed to further mitigate effects of the mine expansion.

5.9 The proposal to place larger aggregate and boulders on the margins of WRS's is supported given there is anecdotal evidence that lizards will colonise this habitat. To encourage colonisation, I recommend that restoration planting with suitable plant species such as Melicytus alpinus and Coprosma spp. is incorporated into this remedial effort.

5.10 OGL proposes a significant planting project to restore 23 ha of the 48 ha of the Golden Bar WRS to 80% tussock grassland cover. Evidence to show OGLs successful delivery of ecological restoration projects would be helpful to provide council with confidence the objectives of the restoration can be achieved. I am however familiar with similar scale successful restoration projects in Otago, although not specifically utilising tussock grassland species. That being said, I have no reason to consider tussock grassland could not be re-established on a WRS. I do note that it will take a long time for the community to resemble a natural tussock grassland with the a range of intertussock species present. This is acknowledged by Whirika Consulting who suggest it will take 50 – 100 years for this to occur.

5.11 Some detail regarding the remedial work including the density of planting, number of plants and size of plants to be used in the remedial work is provided in the IMP. However, more detail on performance measures, monitoring (including monitoring methods) and adaptive management (such as replanting) will need to be supplied to support the councils monitoring of remedial performance.

5.12 Should the restoration be successful, I agree with Whirika that additional benefits will arise from the vegetation cover and food supply the vegetation will provide with lizards, birds and invertebrates colonising the restored WRS.

5.13 Rehabilitation of exotic vegetation is proposed as remedial work to support lizards and birds (notably NZ pipit) that inhabit these environments. I support this work and can confirm that exotic vegetation is readily established on Macraes mine WRS's. I understand the area of exotic vegetation directly lost as a result of the mine extension is 45 ha (page 7 of the Whirika Consulting IMP) and OGL proposes to rehabilitate an equivalent area which is approximately 45 ha as set out on page 7 of the Whirika Consulting IMP. This should be incorporated into the Ecological Management Plan.

5.14 The final remedial measure proposed is the restoration of Coronation Spillway with snow tussock and Celmisia hookeri. Again, I support this measure but detail regarding the density of planting, plant numbers, performance metrics, adaptive management all need to be documented to ensure performance can be monitored accurately.

5.15 In summary, the mitigation and remedial work proposed is designed to minimise some of the ecological effects associated with the MP4 project. However, even if the mitigation and remedial measures are successful in achieving project objectives a range of ecological effects remain including the effect on lizard populations, loss of rock tors, riparian vegetation and shrubland, loss of wetlands including ephemeral wetlands and the potential loss of the nationally threatened Orocrambus sophistes. The residual ecological effects are well set out in the Whirika Consulting IMP and I agree that further measures to minimise effects are required. The OGL approach to addressing the residual effects is through the development of an offset and compensation package which I discuss below.

Offsets

5.16 Whirika has identified that subsequent to proposed mitigation and remedial measures a range of residual ecological effects will need to be offset or compensated. I agree that these are the only measures available to further reduce the residual effects of the development. I have reviewed the characterisation of the residual effects provided in Table 2 of the IMP. While it is difficult to accurately estimate residual effects given the uncertainty of the success of the mitigation and remedial work proposed, I consider the residual ecological effects on tussockland, shrubland and wetlands is appropriately characterised.

5.17 The Murphys Ecological Enhancement Area (MEEA) is the core area where offsets will be utilised to minimise the ecological effects of the MP4 project. The MEEA includes the installation of a stock exclusion fence over a 45 ha area with the objective of supporting the natural regeneration of tussock grassland that currently has a percentage cover of approximately 15% according to the Whirika report. In addition, the stock proof fence will include restoration planting to offset effects on shrubland directly affected by the Golden Bar WRS and indirectly effected by the Golden Bar WRS, Golden Bar mine Pit and the Golden point Backfill buttresses. The objectives of the offset with respect to the tussockland and shrublands are well set out in the IMP. Providing the objectives are achieved I consider the offsets can provide ecological enhancement that can achieve a no-net-loss ecological outcome. I do note that the Whirika Consulting IMP proposed a predator proof fence around 45 ha to exclude mammalian predators to benefit lizards and birds. The

size of the predator proof fence has been reduced in the consent conditions but the rationale for the size reduction has not been provided in the IMP. I discuss this further in the Compensation section below. On this point,

5.18 I have visited the MEEA offset site and I concur with Whirika that it appears to be well situated for the purpose of achieving the proposed offset. Notwithstanding that limited information is provided with respect to tussock establishment in the Macraes area following stock exclusion, in principle I agree that it should support the natural regeneration of tussock on the site. I also note that should this not be the case OGL has committed to supplementing natural regeneration with planting of tussock which can support the project objective of achieving 50% tussock cover. I therefore consider the offset can achieve the objectives to significantly increase tussock cover and in doing so can meet many of the core principles of offsetting set out in the NPS-IB such as:

- achieving a net gain,
- achieving additional gains above and beyond that would occur without the installation of the stock exclusion fence
- unlikely to displace existing biodiversity (leakage)
- likely to achieve long term gains
- likely to see the gains within the duration of the consent
- monitoring of offset progress will be undertaken and therefore transparency of project implementation should be achieved.

I note I am not able to comment on the engagement process with mātauranga maori, tangata whenua or other stakeholders which are important principles under the NPS-IB.

5.19 The IMP provides detail on the objectives of the tussockland offset and I agree monitoring of both tussock cover and intertussock indigeneity do appear to be well considered in order to document the progress toward achieving the tussockland offset objectives.

5.20 With respect to the shrubland offset, I consider further detail on planting density and plant numbers along with the performance metrics, monitoring and adaptive management is required to assist with monitoring the shrubland offset performance.

5.21 In addition, I note that the applicant does not appear to have completed a detailed ecological characterisation of the offset site. Without establishing baseline

ecological conditions using a repeatable methodology it will not be possible to accurately monitor the performance of the offset/compensation site. Given this information has not been included in the consent application the consent conditions will need to be drafted to ensure this work is completed prior to commencing the project and prior to receiving salvaged lizards. This will need to be completed to accurately set out the baseline ecological values that the offset (and compensation) monitoring will be assessed against. This will need to be incorporated into the consent conditions and should be subject to council review.

5.22 Construction of ephemeral wetlands are proposed to offset the effects on ephemeral wetlands associated with the expansion of Coronation Pit 6. The offset proposal is to create 0.3 ha of ephemeral wetlands on a flat sloping exotic grassland dominated spur on the Taieri Ridge, approximately 3.5 km west of the Coronation Pit. No evidence that sets out case studies of ephemeral wetland construction is provided in the application and I am not aware of any examples of ephemeral wetlands being construction in New Zealand. The Whirika IMP sets out a process for the construction of ephemeral wetlands however I consider this approach to be experimental given the proposal to infill excavated areas with excavated peat. The hydrology of excavated peat is likely to be very different to insitu peat that has established over a long time period (hundreds of years). I therefore consider ephemeral wetland construction is experimental, and I have concerns that it will be difficult to achieve an outcome that adequately offsets the effect of the wetland loss.

5.23 An alternative to construction of ephemeral wetlands could be to enhance degraded wetlands that may be present in the nearby landscape. This could involve the mapping ephemeral wetlands on OGL land, completion of botanical assessments to assess ecological condition and identify 0.3 ha of degraded wetlands that a restoration plan could be developed for.

5.24 Two wetlands within the Innes Mills Stage 10 buffer are expected to be dewatered as a result of the mine expansion. Little detail on the process for establishing the wetland is provided. It may be possible to achieve the wetland offset however, the process for achieving this is not well documented in the application or in the consent conditions. In my view, it may be better to find degraded wetlands of a similar area and enhance the wetlands with ecologically appropriate species rather than creating a new wetland.

5.25 In summary I generally support the offsets proposed with the exceptions discussed above, particularly with respect to the ephemeral wetland offset. I note the IMP sets out the framework for the Ecological Enhancement Area Management Plan (EEAMP) and includes all of the elements that I would expect to see in a document that directed the project implementation. I am of the view that for a project of this

scale this document should have been part of the consent application package as it will include critical information to assist with the assessment of effects and provide council with confidence that the objective of the offsets can be achieved. I note that I have requested this information from OGL through the s92 process, however this was not provided. Without this information, drafting of consent conditions becomes very important and very difficult to ensure the project commitments and performance objectives are captured accurately and monitored effectively over the life of the project which is likely to extend beyond the life of the mine.

Compensation

5.26 The Whirika Consulting IMP sets out a number of ecological effects that cannot be offset given the difficulties in determining lizard and invertebrate populations Without this understanding it is very difficult to meet the principles of offsetting especially with respect to understanding baseline populations but also gathering accurate population data to monitor if the objectives of the compensation are being achieved.

5.27 With respect to the expected significant loss of lizards due to the mine expansion, OGL proposes to establish a predator proof fence around part of the MEEA to support the existing population and provide habitat for lizards captured during lizard salvage efforts prior to commencement of mine expansion activities. The Whirika Consulting IMP proposed a 45 ha predator proof fence compensation measure to exclude mammalian predators and support lizards and birds within the predator exclusion zone. I note this was not consistent with information in Table 9.1 of Appendix II of the Bioresearches LMP where it was estimated that a 71.1 ha area would need to be established to eradicate target pest species and for this area to be maintained at zero.

5.28 Based on the consent conditions proposed by OGL I understand OGL has reduced the scale of the predator proof fence and may also be contemplating alternative predator control rather than the installation of the predator proof fence. The wording of the consent conditions also indicates the predator proof fence or predator control work will be undertaken in stages and it may also occur in various locations.

5.29 With respect to the method of predator control, I consider the installation of a predator proof fence is required to adequately compensate for the high number of lizards that could be affected by the MP4 project. I do not consider there are any credible alternatives to achieving the required uplift in lizard populations necessary.

5.30 The proposed consent conditions indicates that compensation for the loss of lizards is proposed to be staged based on the progression of the mine expansion. Providing the predator exclusion program achieves an uplift in lizard numbers commensurate with the number of lizards lost, staging of the work appears a reasonable approach.

5.31 In my opinion the installation of a predator proof fence is the most secure approach to achieving uplift in lizard numbers to compensate for the lizards lost. In light of the difficulty in accurately monitoring lizard populations a predator proof fence provides more confidence that a positive outcome can be achieved. It also meets most of the principles of the biodiversity compensation principles under the NPS-IB. Regarding the biodiversity compensation principles, I am of the opinion that lizards that are listed as 'at risk – declining' are not irreplaceable or vulnerable under clause (2) (a) of the NPS IB and the PORPS. A definition of vulnerable is not provided in either policy document. However, according to the Conservation status of New Zealand reptiles (Hitchmough et. al, 2021) the at risk – declining lizard species have very large populations and a low to high ongoing or predicted decline. Based on the current large populations of the at risk - declining species, I do not consider these species are vulnerable for the purpose of assessment against the compensation principles in the PORPS or the NPS-IB.

5.32 Notwithstanding the above commentary regarding the compensation gained through installation of a predator proof fence, I do not consider the level of information supplied in the application is sufficient to provide the council with confidence that long term outcomes will be achieved. I am particularly interested in understanding OGLs proposal for the long-term governance and funding to ensure an uplift in lizard numbers is maintained over the long term and preferably in perpetuity. This is a core matter that needs to be addressed under the NPS-IB and the PORPS and the application is lacking the necessary detail to understand how the compensation measure will be managed over the long term.

5.33 In addition, I note that the compensation does not appear to meet all of the principles in the NPS-IB particularly with respect to mātauranga maori or engagement with tangata whenua and other stakeholders.

5.34 Rock tor replacement is proposed as a compensation measure to further support lizards and invertebrates in the MEEA as compensation for the loss of 12 rock tors in the MP4 mine expansion. As stated in the Whirika report, the effectiveness of the rock tors are unknown and the loss of the 12 rock tors irreversible or irreplaceable as stated in section 4.4 of the Bioresearches herpetofauna survey report. I therefore do not consider the replacement of rock tors as proposed meets principle (2) (b) of the NPS-IB i.e effects of compensation on indigenous

biodiversity are uncertain, unknown, or little understood, but potential effects are significantly adverse or irreversible. Notwithstanding the lack of evidence supporting rock tor replacement, in principle I support the measure in an attempt to provide additional habitat for lizard species.

5.35 Installation of the predator proof fence is likely to reduce predators of NZ Pipit and other birds present within the enclosure and may lead to an uplift in the population. I agree that this is a positive outcome and may compensate for the loss of habitat, particularly within the Golden Bar WRS and mine expansion areas.

5.36 The compensation package also includes a research element with respect to the threatened invertebrate Orocrambus sophistes. I support the proposed research work set out in the Whirika report as this would contribute important information to the conservation of this rare species. However, the use of compensation to mitigate effects on threatened species is not consistent with the compensation provisions in the Proposed Otago Regional Policy Statement (PORPS) or the NPS-IB assuming threatened species are considered 'vulnerable' under Principle 4(2)(a). Given the policy setting, mitigation or remedial efforts appear to be the only approach available to minimise effects on a threatened species. I am of the view that it may be possible to mitigate or remediate the effects on the threatened moth species however the information supplied in the consent application is not sufficient to develop a mitigation or remedial strategy. Information regarding the presence, distribution and biology of the moth will all be required to enable a mitigation package to be considered further.

5.37 In summary, OGL has developed an extensive suite of measures to mitigate, remediate, offset and compensate the ecological effects associated with the MP4 mine expansion. I support the intent of the measures however I consider there is a lack of detail in the application to give council confidence that the ecological effect minimisation objectives will be achieved and there is also concern that compensation measures are not consistent with policy settings in the PORPS and NPS-IB. Furthermore, mitigation measures will require long-term management that will most likely extend past the life of the mine. The governance and funding mechanisms required to support long term management needs greater certainty to provide confidence the mitigation package as a whole can be delivered effectively over the long-term.

6. REVIEW OF SUBMISSIONS

6.1 I have reviewed the submissions received on the application. My comments on points relevant to terrestrial ecology are below.

6.2 The submission from **Ka Runaka** raises the following concerns:

(a) The application lacks a long-term environmental management backed by appropriate consent conditions.

(b) Concern regarding who will be responsible for implementation of the long term environmental management post mine site closure.

6.3 I have the same concerns and I have highlighted the lack of long term management of the MEEA as a central issue that is currently not well addressed by the applicant. This issue is a challenge as the mitigation package will require ongoing management post mine closure.

6.4 The submission from the **Department of Conservation** raises the following concerns:

(a) Cumulative effects of the development should be considered with respect to the existing mine site development.

(b) There should be a bottom line of not increasing risk to threatened species.

(c) The approach taken to managing ecological effects relies on conditions of consent and management plans that were not drafted at the time of DOC preparing its submission.

(d) The consent conditions and management plans need to account for the direct effects of the development and the cumulative effects that arise in conjunction with the existing mine operation.

6.5 I agree with the matters raised in the DOC submission as set out in my evidence above. In particular I don't consider cumulative effects of the mine site are well addressed.

6.6 The submission from **Forest and Bird** raises the following concerns:

(a) Effects on indigenous vegetation and habitat is significant and therefore inappropriate;

(b) Effects on wetland values are unacceptable;

(c) Inappropriate use of biodiversity compensation given the presence of the nationally threatened invertebrate *Orocrambus sophistes*

(d) Cumulative effects not well addressed.

6.7 I agree with most of the matters raised in the Forest and Bird submission, especially with respect to wetland values and compensation associated with a threatened species. I do not consider the proposed approach to offset effects on ephemeral wetlands is appropriate on the basis that it is unproven. Compensation is also not available to address residual effects on threatened species in accordance with policy settings in the PORPS.

6.8 I am of the opinion that it is appropriate to consider the offset and compensation package proposed to mitigate effects on tussock grasslands, shrubland, riparian vegetation and lizards as I consider it is more likely that a positive outcome can be achieved.

7. REVIEW OF CONSENT CONDITIONS

7.1 I have completed a review of the proposed consent conditions alongside representatives for the Waitaki District Council, Dunedin City Council and Otago Regional Council. Notwithstanding the reservations I have with the mitigation suite set out in section 6 of my evidence, I support the proposed amendments that seek to strengthen the conditions such that the applicant and councils have clarity on the work programme required to implement the proposed suite of mitigation measures. Notwithstanding the proposed amendments to the consent conditions, I have a number of concerns and provide the following comments.

7.2 The consent conditions provide a framework for implementing the extensive range of mitigation, remediation, offset and compensation measures proposed to mitigate the ecological effects of the MP4 mine expansion. Details associated with specific project objectives, programme schedules, implementation measures, performance metrics, monitoring methodologies and monitoring frequency are not set out in the consent conditions, rather it is the intention for this information to be provided in an Ecological Management Plan should the consent be granted. These matters are important as they assist with understanding the effort required to achieve the project objectives while also providing council with an understanding of the level of council monitoring required. Under the application these matters will need to be addressed through detailed liaison with council should consent be granted.

7.3 Under the proposed consent conditions there is currently no requirement to complete detailed ecological baseline surveys to characterise the offset and compensation sites. This work is necessary to enable accurate monitoring of offset and compensation measures against performance objectives. This requirement has been included in the amended consent conditions.

7.4 The OGL consent conditions provide flexibility regarding the control of predators in offset and compensation areas. As set out in my evidence I consider a predator proof fence will be required to achieve the uplift in lizard numbers necessary to compensate for the predicted loss of lizards.

7.5 Consent condition 23.1 is a placeholder condition to allow the applicant time to arrange a covenant over land subject to the offset and compensation measures set out in conditions 22.1 – 22.3. This is a fundamental element of the consent to ensure that the objectives of the offset and compensation measures are achieved in the long term and ideally in perpetuity. Understanding the governance and funding arrangements for the covenant should be understood to give the council confidence gains in perpetuity can be achieved long past the mine closure. My view is supported by the Guidance on Good Practice Offsetting in New Zealand (DOC, August 2014):

"It is good practice to develop and submit with a resource consent application a BOMP that clearly communicates objectives and methods, key roles and responsibilities, adaptive management and monitoring processes and provisions for stakeholder participation. The success of the offset depends on ensuring that an effective institutional structure is in place, that financial flows are sufficient and that systems are in place to ensure that the offset objectives are achieved".

7.6 I consider the applicant should provide at the very least some credible options for who is likely to be responsible for governance and funding the management of the MEEA post mine closure.

Glenn Davis

29 May 2025