
MEMORANDUM

From: Dr Greg Ryder, Greg Ryder Consulting

To: Cheryl Low, Environment Manager, Santana Minerals / Matakanui Gold

Subject: **ORC Request For Further Information – Matakanui Gold Limited fast-track application for the Bendigo-Ophir Gold Project**

Date: 27 January 2026

Background

Otago Regional Council (ORC) has requested from Matakanui Gold, via an RFI¹, responses to a series of questions generated from a technical review of the water quality and aquatic ecology components of its substantive application.

This memo responds to Question 1 of the RFI, which states:

The proposed consent limits put forward by Ryder 2025 and adopted in D.03 – Schedule One - Central Otago District Council and Otago Regional Council Common Conditions allow for contaminant concentrations far beyond what the proposed activity as described in the application is expected to generate. It is the opinion of Dr Greer that full implementation of these limits would result in the degradation of water quality such that significant adverse effects on aquatic life could occur. Accordingly, please reassess the appropriateness of the proposed surface water compliance limits in both Shepherds Creek and Rise and Shine Creek catchments. Your answer should include, but not be limited to:

- a. Ammoniacal nitrogen and nitrate-nitrogen limits that more appropriately constrain concentrations of these contaminants to levels that the proposed mining activities are expected to generate.*
- b. Explanation of how the toxicant limits for other contaminants are to be assessed, specifically whether the intention is to apply these limits as medians or maximums. If the 90% species protection ANZG DGVs are to be applied as medians, it is the opinion of Dr Greer that the limits are inappropriately high, being at least three times higher than the modelling suggests is necessary to provide for the mining activities.*
- c. A specific turbidity performance standard when the silt pond is discharging to*

¹ ORC reference: RMFT25.007. Request for further information – Matakanui Gold Limited fast-track application for the Bendigo-Ophir Gold Project.

Shepherds Creek via the decant.

Response

Question 1a.

The ammoniacal-N and nitrate-N compliance limits proposed were to protect aquatic species from the toxic effects of these compounds, and this is clearly identified in section 3.4.3 of the Ryder 2025 report. The proposed limits are consistent with band B of the National Policy Statement for Freshwater Management 2020 (NPS-FM 2020). For ammonia toxicity, this is described as “95% species protection level: Starts impacting occasionally on the 5% most sensitive species.”. For nitrate toxicity, this is described as “Some growth effect on up to 5% of species.”. I consider that these limits are appropriate for the surface waters potentially affected by the Bendigo-Ophir Gold Project. The use of an annual median concentration and an annual 95th percentile concentration to determine compliance is also consistent with the NPS-FM 2020 and appropriate for these toxicity limits.

The technical review comments that ammonia and nitrate (bioavailable) forms of nitrogen are capable of causing nuisance algal blooms under the proposed compliance limits for managing toxic effects. This is correct, although there would also need to be sufficient bioavailable phosphorus present for nuisance growths to occur (ignoring other environmental factors that can affect the development of nuisance growths, such as sufficient reasonable water clarity, sufficient sunlight, warm temperatures and a lack of freshes).

Monitoring data indicates that the bioavailable phosphorus (DRP) concentrations in the local receiving waters are relatively low, as summarised below for the proposed monitoring sites:

RS03 DRP median 0.004 mg/L (range 0.001–0.007, n=26)

SC01 DRP median 0.004 mg/L (range 0.001–0.011, n=26)

There are no proposed activities associated with the mine that would potentially increase DRP concentrations. Therefore, I consider that the risk of elevated bioavailable forms of nitrogen resulting in nuisance algae and plant growths developing is low, provided bioavailable phosphorus does not increase.

Notwithstanding that assessment, monitoring of benthic algae in the receiving environments is a reasonable requirement in order to monitor the effects of mining on surface waters, and is typically a requirement for activities that may potentially affect this aspect of the stream ecosystem. Therefore, rather than a compliance limit on nutrients concentrations for managing nuisance algae and plant growths, I recommend that monitoring of benthic algae be undertaken as a part of routine monitoring that would fall under conditions proposed in the substantive application. This is expanded on below.

Proposed condition C12 requires the consent holder to, each year, provide in writing to the Councils an Annual Monitoring and Compliance Report which must include (amongst others):

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- Instream Works Aquatic Ecology monitoring as required by Condition 23 of the ORC General Conditions (Schedule Two).

Proposed condition 20 in Schedule Two of the ORC General Conditions requires the consent holder to implement a Freshwater Ecology Management and Monitoring Plan (“FEMMP”). Proposed condition 21 states that the FEMMP must include (amongst others):

- A summary of the aquatic ecological values within water bodies affected by the project and the potential effects of the project on these values;
- Details of the approach to be taken to manage adverse effects on aquatic ecology values within the affected water bodies including in riparian zones;
- Details of monitoring and reporting to the Otago Regional Council prior to, during, and post construction and operation to determine if the FEMMPP objectives are being met.

In terms of determining what an adverse effect constitute with respect to nuisance algal growth as a result of nutrient enrichment, which the consent conditions requires an approach to manage these, I suggest that a periphyton threshold be included in the FEMMP that, if met, would require the consent holder to investigate and implement an appropriate management response, and report on these actions to the Regional Council. A possible periphyton threshold is:

- when filamentous algae greater the 2 cm long exceeds 30 % of the stream bed; or
- when diatoms or cyanobacteria more than 0.3 centimetres thick exceed 60 % of the stream bed.

I note that the Freshwater Ecology Management and Monitoring Plan prepared for Matakanui Gold by Boffa Miskell (see G.13-Freshwater-Ecological-Management-Plan_Redacted of the AEE) includes monitoring of periphyton cover in diversion channels.

Question 1b.

The technical review states that ANZG² default guideline values (DGVs) should generally apply as medians. My understanding of how the ANZ DG should be implemented (and in stating this, I consider that their narrative around this is extremely complex and not user friendly) is that median DGVs should be used when there is suitable reference-site data to compare against. However, that approach has not been used here and no reference sites have been identified or monitored in a manner consistent with the ANZG approach.

ANZG (2018) goes on to state:

*In practical terms, the method for comparing toxicant-test data with DGVs should be similar to the approach recommended for PC stressors. However, we recommend you apply a more conservative approach to the comparison of toxicant monitoring data with DGVs. **Specifically, we recommend that a toxicant DGV is***

² Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).

deemed to be exceeded if the 95th percentile of the test distribution exceeds the DGV (or stated differently, there has been no exceedance of the DGV if 95% of the values fall below the DGV).

The above approach could be used for metal species listed in the proposed surface water compliance parameters and limits table (see Attachment 2 of D.04. Schedule Two, General conditions which apply to all of the resource consents within the jurisdiction of the ORC), however I suggest to make the compliance limits more straight forward and easier to assess, I recommend that the recommended compliance limits for metals be a hard limit.

Question 1c.

I'm not sure of the rationale behind specifying a turbidity performance for the silt pond discharge as it doesn't provide any useful indication of what the turbidity in the receiving water would be after the discharge mixes with the stream flow. The receiving water turbidity limit proposed in Attachment 2 of D.04 (Surface Water Compliance Parameters and Limits) is based on the ORC's Regional Plan: Water for Otago (Schedule of characteristics and numerical limits and targets for good quality water in Otago lakes and rivers), so it would seem appropriate to use in this instance. Monitoring of suspended sediment and turbidity at the proposed compliance monitoring sites (SC01 and RS03) indicates that a turbidity of 5 NTU is equivalent to a suspended sediment concentration of about 2 mg/L, which is very low. In my opinion, the proposed turbidity limit is sufficiently conservative and would protect the stream ecology.

The Erosion and Sediment Control Management Plan (G.14-Erosion-and-Sediment-Control-Management-Plan of the AEE) recommends turbidity monitoring of silt pond inflows and outflows during rainfall trigger events. This requirement is also identified in the Water Management Plan (G.01-Water-Management-Pan of the AEE). These plans contain provisions that review the effectiveness of sediment retention and turbidity levels.