

To: Elyse Neville, Otago Regional Council

From: Richard Allibone, Water Ways Consulting Ltd

Date: 22 April 2020

Subject: OceanGold Deepdell North Stage III mine extension RM19.440

Dear Elyse

I have reviewed the additional aquatic ecological information provided by the applicant for the Deepdell North Stage III mine extension in the consent application.

Cumulative stream loss assessment

The applicant has provided an assessment of the cumulative loss of streams for the mine site since its initial development. This assessment notes that stream loss has not been tracked through the mine development and the assessment has to be based on the stream network provided by topographic maps. Therefore, the full stream loss cannot be accurately quantified. This difficulty has to be accepted as at this time the pre-mine site stream network cannot be mapped retrospectively. Therefore, cumulative stream loss will be difficult to assess from a baseline of the pre-mine state, but the existing stream network present around the present mine can be assessed in any future development and cumulative loss can be tracked from the assessment provided as part of this S92 request. Future assessment of effects should require the cumulative loss to be reported and assessed against the background of the present stream network in the Deepdell Stream catchment.

The assessment also notes that stream loss is only considered important where it is permanent streams that support the threatened species, Taieri flathead galaxias and koura. The draft NPS-FW (2019) includes a compulsory value (Appendix 1A Compulsory Values) for threatened species. This compulsory value is not, at present, restricted in any way and could include threatened plants, algae, invertebrates and fish. Ephemeral streams such as those to be lost in this development will support a range of invertebrates and plants, that are as of the moment unknown. Whether this includes threatened species is also unknown and for many less well known species the threat status and geographic spread are uncertain. Therefore, while the current assessment considered the two well known threatened species present in the vicinity of the mine there may well be a need to consider a broader range of species in the future. Given the limited knowledge on the distribution of many invertebrate taxa tracking the cumulative loss of habitat types will be an important method for assessing possible habitat loss impacts.

Therefore, I would recommend a consent condition that requires the applicant to check and confirm the cumulative stream loss analysis provided in the S92 reply and to provide a categorised assessment of habitat loss for permanent and ephemeral streams and wetlands. This can be used by the applicant and Council for the purpose of assessing any further aquatic habitat loss as in any future mine expansion applications.

Water quality

With respect to water quality issues that will arise from the waste rock stack for Deepdell Creek and the downstream Shag River the applicant has provided an analysis of the water quality data collected by the Otago Regional Council at two sites in the Shag River and for Deepdell Creek where

the applicant monitors water quality. The key part of this assessment is that nitrogen levels will rise and this was stated in the original application document. To reduce the risk of the algal blooms in the Shag River the applicant proposes that phosphorus is the nutrient that is limiting algal (and macrophyte) growth. The analysis supports this and shows that phosphorus levels are low and limiting in the Shag River. An assessment of the Redfield ratio (nitrogen to phosphorus ratio) does show phosphorus is the limiting nutrient in the Shag River. However, the trend analysis shows that phosphorus has becoming more limiting as the nitrogen levels have been rising, but the phosphorus levels have been stable. Therefore, to maintain a control on algal and macrophyte growth in the Shag River the phosphorus level from **all sources** has to be controlled. The applicant has proposed this is the best control for minimising algal blooms, but it must be accepted that this cannot be controlled by the applicant alone. However, the addition of further nitrogen to the catchment from the waste rock stack will not drive algal growth, but may allow more algal growth if phosphorus levels increase significantly. Therefore, minimising the risk of algal blooms will rely on the Regional Council's water quality rules and all parties in the catchment managing phosphorus.

Camp Creek dam flushing flow.

The applicant provides an assessment of the flushing flows possibly needed and notes some uncertainty with respect to the required flows as there is limited knowledge on the flow that is required to flush Deepdell Creek. It is also noted that there are already flushing flows consent conditions in place for the dam. The assessment does note further work and monitoring will be required to determine if the flushing flows work as desired under the existing consent condition. It has been my experience that flushing flows from some dams have been unable to achieve the management objective as there are limitations, due to the dam design, on the size of the flushing flow that can be released. Therefore, I do not recommend a particular flushing flow or frequency of flushing flows as the current consent specify flushing conditions as long as these are linked to proposed monitoring and trigger points provided in the S92 reply. In addition, if possible, a consent condition should be set so that the applicant installs a water release system at the Camp Creek dam that has be capacity to release up to 100 L/s (approximately twice the consent required flow) or have the ability to modify the dam flow release structure to increase the flow releases if monitoring should larger flushing flows are required. This would reduce the risk that the dam will be unable to release suitable flushing flows.

If you have queries regarding this assessment please contact Richard Allibone by phone 03-4544849, 021 904950 or by email at waterwayscon@gmail.com.

Regards



Richard Allibone