APP- RM22.434, RC220255 and RM220834
Summary of evidence by Mark Hamer 4/07/2023

1. Please take my evidence as read. However, I will summarise the main points of my ecological review and respond to recent issues raised.

2. Through points 9 to 15 I discuss why the presence of fish near the suction dredge is unlikely due to various reasons such as not being present or not their preferred habitat and that if any happen to be present the effects would be minimal with only very juvenile trout (egg sacks still attached) potentially effected if present.

3. Point 16 of my evidence reiterates it is my opinion that it is very unlikely that fish spawning, juveniles and adults will be present within the suction dredge footprint and if they are present, the mitigations, natural avoidance behaviour, measures outlined and proposed consent conditions will minimise adverse effects on fish values.

4. Deposited sediment is a known issue in New Zealand rivers, the suction dredge will displace fine sediment from its current location and deposit it a short distance downstream. Redistributing existing sediment rather than introducing a new sediment source. This will result in an area of "cleaned" substrate and areas with small amounts of fine sediment on top.

5. As the fine sediment is falling back to the stream bed there will be a sediment plume downstream of the dredge that fish will largely avoid. The turbidity levels measured in the plume downstream of the dredge are lower than levels known to adversely impact the fish present.

6. As discussed in point 19 of my evidence there are 3 main options to measure water clarity onsite to provide immediate water clarity information for an adaptive management approach. Black disk, Secchi disk and turbidity. The use of a black disk to measure water clarity is not practical in this clear water from a small boat. The weighted Secchi disk method, while being a more robust measure of clarity through the water column in deeper areas, will come with difficulties in shallow and flowing water also. Use of a regularly validated and serviced turbidity meter is likely to be the most practical option for measuring the sediment plume upstream and downstream of the suction dredge outfall.

7. With regard to avifauna, in point 21, I have suggested some locations that could be assessed for endemic river nesting birds and avoided.

8. Point 31 outlines that any potential effects are localised and of short duration.

9. In response to the evidence of Dr Roger Young - Dr Young point 24, the mismatch between TSS and Turbidity – this is likely due to larger particle size (sands as opposed to silts) being responsible for the plume. Sediment monitoring across the country is moving from using TSS (Total Suspended Sediment) to SSC (Suspended Sediment Concentration) which is deemed more accurate when larger particles are present.

10. Dr Young Point 30 - Potential impacts on juvenile trout (alevins) will be minimised by avoiding shallow areas. As explained previously, shallow areas less than 1 m in depth will be avoided during the spawning season and less than 0.8m the rest of the year.

11. Dr Young Point 34 – Adequacy of macroinvertebrate sampling, due to limited opportunities to safely access this section of the Clutha River three representative sites were chosen. These three sites provided similar MCI scores (ranging from 85-100) to the Clutha River at Luggate bridge site (ranging from 85-96 over the last 5 years) suggesting the samples collected during the original assessment were typical of the safely accessible invertebrate community present in the river and therefore appropriate. However in saying that I believe utilising the fish community present to assign the ecological value of the waterway is likely to be a better approach in this river reach.

12. In response to the evidence of Korako Edwards – Mr Edwards Point 30, Sound from the suction dredge is most likely to lead to “behavioural responses” such as avoidance and movement away from the sound.