MEMORANDUM

TO:	Otago Regional Council	Date:	16 November 2023
COPY TO:	Josie Burrows (BECA)	Job No:	64189#BEE24.02
FROM:	Treffery Barnett		

OTAGO REGIONAL COUNCIL - COLD GOLD RESOURCE CONSENT APPLICATION. REQUEST FOR SUMMARY OF RESPONSES TO COMMISSIONERS FROM TREFFERY BARNETT

Cold Gold Clutha Ltd (the applicant) has applied to Otago Regional Council (ORC) to for a new permit to operate a suction dredge on the Clutha River.

During the hearing process the Hearing Commissioners questioned the ORC ecological reviewer, Treffery Barnett, and asked for the responses to be written.

The Hearing Commissioners asked :

Is there any element of Dr Youngs evidence that you disagree with?

Yes, as itemised below.

1. Over emphasis on water source to the river being Lake Wanaka, without consideration of other sources.

The proposed works are over a 30km stretch of the Upper Clutha, but Dr Young's evidence and responses to questions from the commissioner's emphasise the clear, stable, lake fed nature of the river. This does not consider the significant inputs of over 30km of pastural catchments and the numerous tributaries flowing to the river; the additional 16 km of catchment of the Hawea River after it flows from Lake Hawea; and the 40 km of the Cardrona River(catchment area almost 347 km^2), which in not a lake fed river, that flows into the Upper Clutha near Albert Town.

These are all significant inputs which would result in large pulses of sediment into the Upper Clutha river, fluctuations in flow, and therefore disturbance (Figure 1 and Figure 2).

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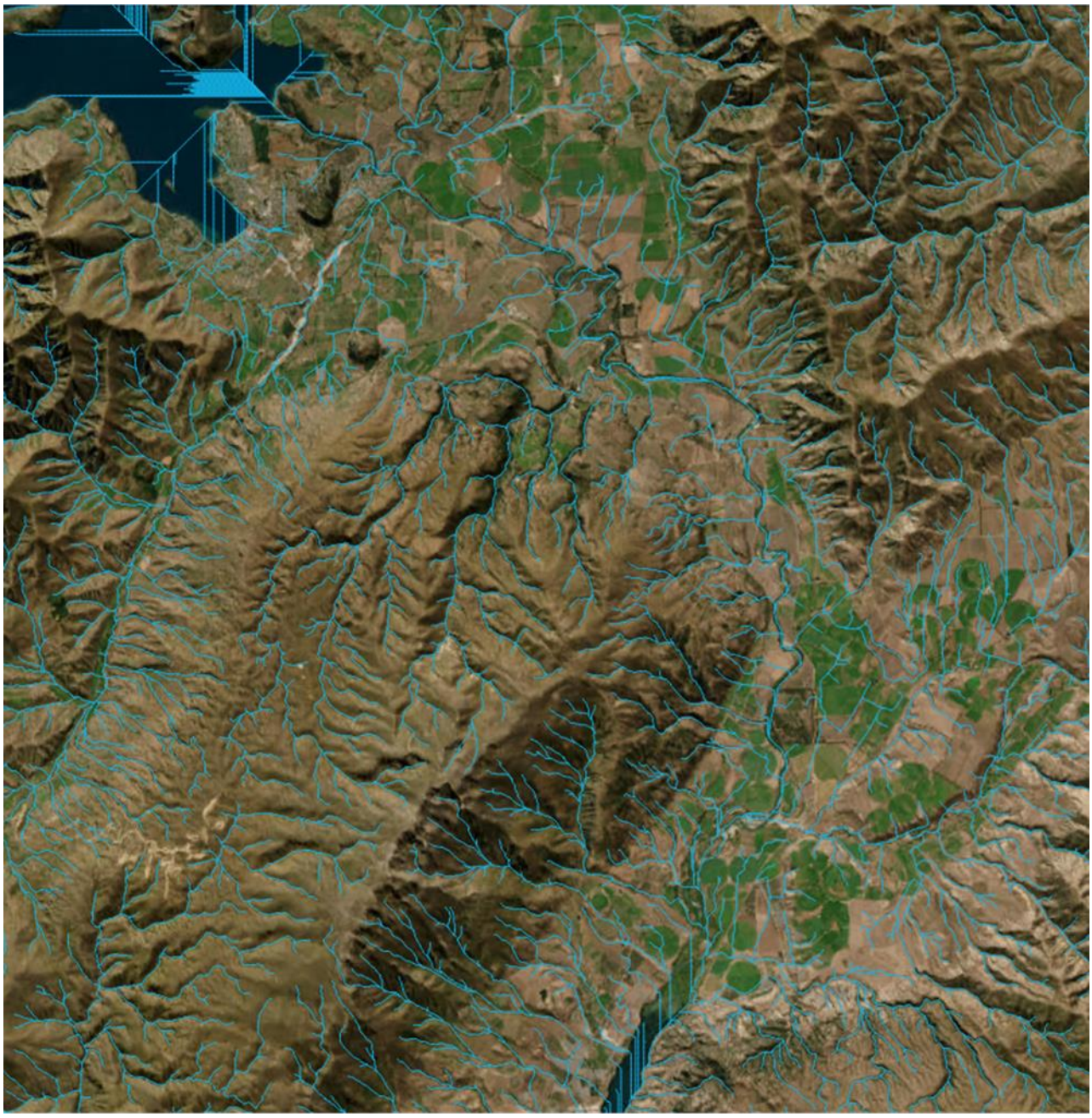

Figure 1. Catchment from River Environment Classification layer

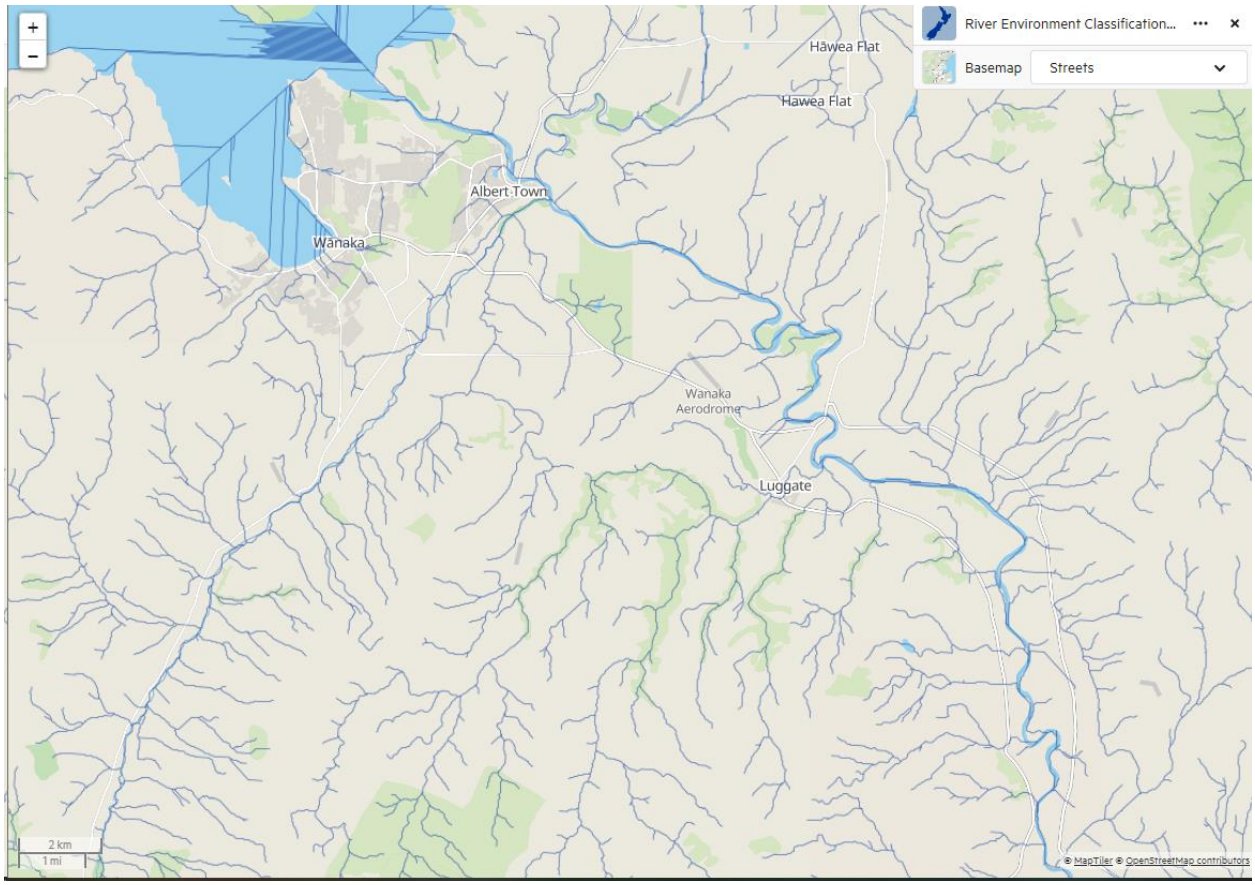

Figure 2. Upper Clutha River contributing tributaries and catchments.

2. Dr Young stated that the MCI was low because of the prevalence of caddis flies with low MCI scores. This is incorrect.

Caddis flies have a very high MCI, and a high diversity and number of caddis flies should produce a very high MCI score.

The only caddis flies with very low MCI scores are specifically excluded from the MCI calculations (as they proliferate in degraded conditions). The majority of caddis flies have very high MCI scores:

INSECTA: Trichoptera	Caddisflies		
	Helicopsychidae	*Helicopsyche poutini*	10
		H. albescens	10
		H. zelandica	10
	Oeconesidae	*Oeconesus similis*	9
		Oeconesus sp.	9
	Helicophidae	*Zelolessica cheira*	10
		Alloecentrella magnicornis	9
	Leptoceridae	*Hudsonema amabile*	6
		H. alienum	6
		Triplectidina oreolimnetes	5
		Triplectides obsoleta	5
	Pycnocentrellidae	*Pycnocentrella eruensis*	9
	Conoesucidae	Conoesucidae	*
		Pycnocentrodes sp.	5
		Beraeoptera roria	8
		Olinga feredayi	9
		O. jeanae	9
		Pycnocentria evecta	7
		Pycnocentria funerea	7
		Confluens hamiltoni	5

Without seeing the actual data, the MCI score clearly indicates low scoring taxa.

The MCI score in the Clutha at Luggate Bridge from the LAWA website also shows the ecology results are not indicative of a pristine ecosystem with all attributes: Macroinvertebrate Community Index (MCI), Quantitative Macroinvertebrate Community Index (QMCI) and Macroinvertebrate Average Score Per Metric (ASPM), which is used as an indicator of stream ecological health, are all poor and in **Attribute band D** (Figure 3).

It is important to note that macroinvertebrate samples are collected typically from wadeable streams, not deep in rivers. Sampling macroinvertebrates in large rivers is hampered by the physical difficulties and dangers associated with accessing deep-flowing water, and communities are poorly-studied (see Collier & Lill 2008).

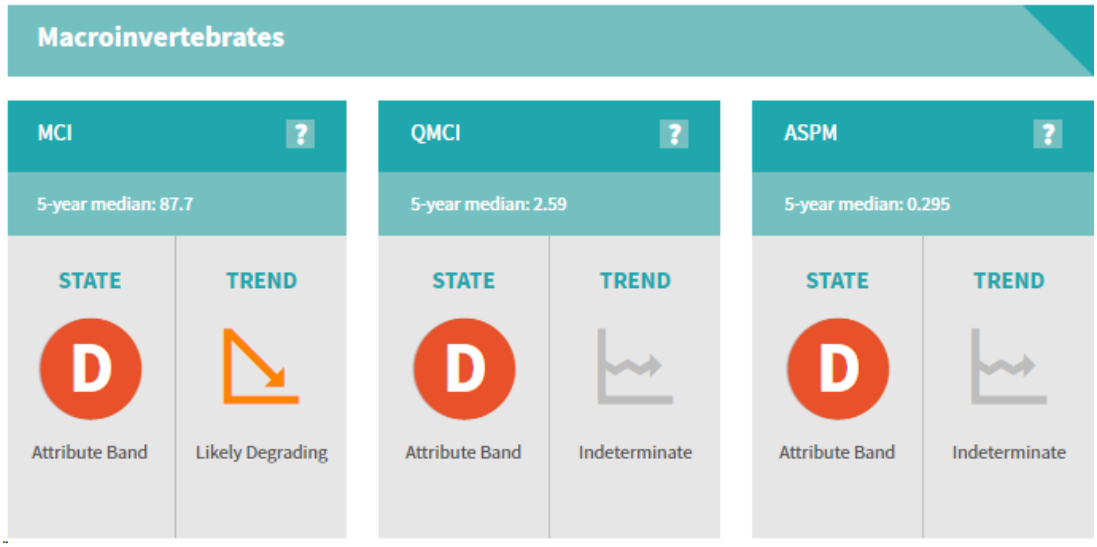

Figure 3. Ecological Data for Clutha River at Luggate Bridge. NIWA LAWA website.

All rivers and streams in New Zealand have periodic (mostly frequent) inputs of fine sediments and our macrofauna is robust to these changes. That said, a high degree of disturbance can destroy or smother the macroinvertebrates, but it is important to understand that most of the macroinvertebrate community are the larval stages of flying insects (i.e. may**flies**, caddis**flies**, stone**flies**) and are transitory in the aquatic environment anyway.

3. Water clarity is variable in the Clutha River.

Although the mean/median water clarity is 5 m, this means half the time the clarity is more than 5m but importantly for this hearing, half the time it is less than 5m.

Figure 4, snipped from the LAWA website shows good clarity, but also with high variability. Although the overall clarity is in Attribute Band A, it is not 'excellent' all the time, as inferred by Dr Young's evidence, with low water clarity,and very low water clarity recorded on one occasion last year (0.1 m).

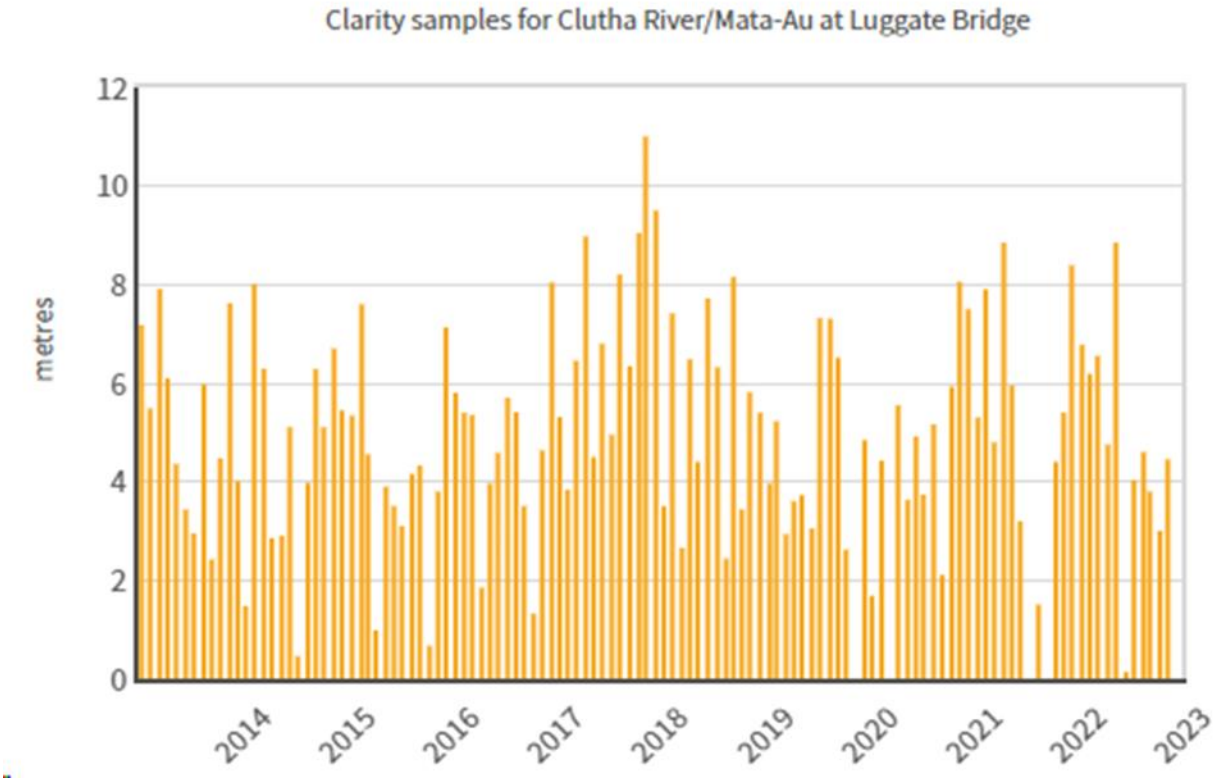

Figure 4. Water clarity samples (black disc) 2014 -2022 at Luggate Bridge, Clutha River. NIWA LAWA website.

4. The use of a turbidity meter

I agree with the conclusion drawn by Mr Hamer regarding the turbidity meter and I find it's use appropriate for the proposed works. It is a quick, efficient tool that can been used easily, increasing the likelihood of

compliance, and will provide accurate information on the sediment plume. The use of the turbidity meter is an appropriate solution.

In response to Dr Young's presentation of evidence and questioning by the Commissioners, he stated that turbidity meters are insensitive at the clear end of the spectrum (such as the Clutha River), and that recommend clarity (secchi disc, black disc) as a measure.

It is important to note that water clarity methods involve a secchi disc or tube. They are often quick and inexpensive, but are only as accurate as the person using them . Secchi discs are either lowered vertically into the lake or slow flowing stream; or measured horizontally in *wadable water* on the side of the stream/ river. Neither technique can be accurately applied in the middle of a large volume river with strong flow, where the proposed works are to occur.

There is a large number of different meters and options on the market, and they are not subject to the accuracy problems of different operators using the secchi disc / tube.

Depending upon the meter used, turbidity meters can be highly accurate, as *Instruments in compliance with the EPA Method 180.1 are suitable for measuring turbidity levels between 0-40 NTU (nephelometric turbidity units). These turbidity meters should have a resolution of 0.02 NTU or better in water with a turbidity of less than 1 NTU.*

This is well within the measurable range of 0.8 -1.0 discussed by Dr Young.

5. Trigger levels

Consent Condition 5 is workable but is very subjective, and will probably need to be backed up by a well thought out condition of consent using a turbidity meter. The trigger levels should relate to the clarity above the works compared to below the works at various distances. I have no problem with the 100 and 200 m mixing zone requirements. The trigger values should also relate to the ANZECC Guidelines, the more recent Australian and New Zealand guidelines for fresh and marine water quality (ANZG), or the Otago Regional Plan.

6. Spawning location of trout

I agree Mr Hamer's assessment of the preferred spawning location of trout, and although there may be some loss in the deeper areas of the river, as discussed by Dr Young, this is not the preferred spawning habitat, and when assessed against the scale of the effect on the trout populations, I assess this as very low.

I agree with Mr Hamer's assessment that scale is important, and the scale of the suction dredging will be localised and the effects will be disturbance, not removal or reclamation, within the Upper Clutha. My assessment is the time scale is an important consideration, in that any effects will be short term (EIANZ Ecological Assessment Guidelines refer to this as up to 5 years), and the magnitude of effects on the

habitat will be negligible i.e. a very slight change for the existing baseline conditions; and having a negligible effect on the known population range or feature.

What is your overall conclusion on the potential adverse effects on aquatic ecology and water quality?

That the effects will be localised, that the effects will be temporary. That there will be no significant adverse effects on native fauna. I think the applicant has made a considered effort to avoid the more sensitive areas where at risk fauna would be present, as those would be primarily in and near the shallower water (less than a metre deep near the banks), around the confluences of the tributaries, or where there is braiding or the river is showing a really high degree of diversity.

I agree with Mr Hamer's assessment that scale is important, and the scale of the suction dredging will be localised and the effects will be disturbance, not removal or reclamation, within the Upper Clutha. My assessment is the time scale is an important consideration, in that adverse effects on river will be short term (EIANZ Ecological Assessment Guidelines refer to this as up to 5 years), and the magnitude of effects on the habitat will be negligible i.e. a very slight change for the existing baseline conditions; and having a negligible effect on the known population range or feature.

Do you think the ORC condition of consent for birds to onerous?

Yes, and no. The 250 m exclusion zone is very large. NZTA and Auckland International Airport use a 50m zone, and Northport has a 45m zone based on the considerable literature on the highest mean flight initiation distance for Threatened or At Risk NZ birds.

The conditions of consent for birds have been very different every time that we have seen them, and refer to different types of birds. We would like the consent to refer to native or indigenous birds, not 'water fowl' or 'bird nesting colonies' or 'endemic' birds.

Our teams' final comments and recommended condition of consent in our August (email from Chris Wedding to Josie Burrows, 31/08/2023) review was:

As discussed, I agree with Treff's comments regarding the wider seasonal component for potential bird breeding, and the ambiguity around the 250 m exclusion- though I consider that 250 m is good buffer, given that potential bird breeding areas will have a wide surrounding view, where such habitats would be open areas in and around the braided channels. Having reviewed Treff's and Annabelle's comments, I think the following condition should be sufficient:

1. Within 24 hours prior to any works on the Clutha River between 1 July and 31 March, a suitably qualified and experienced ecologist must undertake a survey for native nesting birds, from 250 m upstream to 250 m downstream of the proposed works area. The report must identify and map:
    a. All potential river bank and braid bars (river islands) that may be used for breeding by native birds
    b. Any river banks and braid bars that support nesting native birds

   c. Where repeat surveys may be required to coincide with timing or staging of works along the river
2. Following the breeding native bird survey(s), a suitably qualified and experienced ecologist must report that either:
   a. no breeding native birds are identified from the survey and works may proceed; or
   b. breeding native birds are identified, and therefore a 250 m works exclusion zone shall apply, within which no works are to occur until such time that a suitably qualified and experienced ecologist has confirmed that any nests have failed, or chicks have naturally fledged the natal site.

This identified that we recommended native bird surveys to be carried out, and the results should be reported and mapped.

Yours sincerely,

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