Before a hearing held by Environment Southland

Under the Resource Management Act and the Proposed Southland Water and Land Plan

in the matter of

An application by Meridian Energy to excavate a channel in the bed of the Waiau Arm of Lake Manapouri/Lower Waiau River. Application AP 20233670.

Statement of Additional Evidence of the Waiau Working Party.

INTRODUCTION

My full name is Susan Mary Bennett and my preferred name is Sue.

I hold a BSc (Hons) in Horticulture and a PhD in Plant Science, both from the University of Bath, UK, and since 1992 I have enjoyed a career as a self-employed contract botanist here in New Zealand. I am now retired.

I have been a member of the Waiau Working Party since 1992. I served on the Southland Conservation Board from 1993 to 1999 and have been a member of the Guardians of Lakes Manapouri, Monowai and Te Anau from 1999 to 2013 and from 2017 to present.

I appear at this hearing in my capacity as a member of the Waiau Working Party.

WWP SUBMISSION

It is our submission that the evidence presented on behalf of the Applicant greatly overstates the extent to which the additional Lower Waiau flushing flows attributable to this project will mitigate the increased risks of phytoplankton blooms associated with the construction and operation of an additional Waiau Arm channel.

To illustrate this concern I wish to address certain matters raised in the evidence of Dr Kristy Hogsden of NIWA.

That the predicted increased risk of phytoplankton blooms is expected to be mitigated by the improved conveyance and reliability of flushing flows is raised in Dr Hogsden's paragraphs 25, 54, 62 and 105.

The flow protocol itself is detailed in Paragraph 84 and it is noted that, whilst the protocol provides for the release of four flushing flows per season (November to May, with provision for a fifth flow release in May subject to specific periphyton and operational conditions), on average, fewer than 1.5 flushing flows per season have been released during the seven seasons from November 2016 to May 2023.

Elsewhere in the Applicant's evidence, it is stated that the current provision of flushing flows equates to just 30% of the target number of releases foreseen in the protocol, and that the proposed additional channel should allow provision of up to 70% of the seasonal allowance of flushing flows.

This increase in flushing flow reliability from 30% (currently 1.5 flows per season) to 70%, which equates to an average of 3.5 flows per season ((1.5 / 0.3) x 0.7 = 3.5), yields an increase of only two flushing flows per season (3.5 – 1.5 = 2.0) over and above the 1.5 flows per season currently achieved.

We note that this calculation is slightly different from the one presented in Dr Hogsden's evidence in Paragraph 118(b), where "The assumption was made that this would increase the number of flushing flows released per season to four (i.e., 70% of up to five allowed for under the current protocol)."

Dr Hogsden goes on to state, in paragraph 118(c), that "If four flushing flows could be released each summer, the average period of high-risk conditions for phytoplankton blooms would decrease by 25 days or more, assuming a 5 – 7 day residual effect after each flow …"

Dr Hogsden appears to be referring here to the effects of the full (70+%) provision of these flows, whereas the WWP would prefer that the evidence be expressed in terms of the incremental increase in flushing flow provisions, i.e. the two additional flushing flows that make up the increase from 30% to 70% of the potential maximum of flows.

In paragraph 118(d), Dr Hogsden adds that "Flushing flows will be a component of the managed flow regime with monthly recreational flows, which can also reduce phytoplankton biomass and re-set bloom risk."

Here, it appears to us that the witness intends that the monthly recreational flows will also be an incremental component of the future flow regime, but we note that monthly recreational flows of 35 – 45 m3/s (cumecs – at MLC) for 24 hours are already provided via the existing consents held by the Applicant, so they will not be an additional part of any future flow regime.

Paragraph 85 of Dr Hogsden's evidence refers to these monthly recreational flows and suggests that "If the entire recreational flow is provided from Lake Manapouri … this would reduce phytoplankton biomass and reduce the blooms to very low."

Again, we note that these recreational flows are already being provided, using whatever water source is available (i.e., Mararoa River or Lake Manapouri), so there are no additional flows here.

Further, we understand that electricity industry and Electricity Authority (EA) reporting requirements mean that Meridian can only spill Lake Water for specifically consented purposes; otherwise there will be a "Please Explain." There is no simply allowance for the entire recreational flow to be provided from the lake, unless the Mararoa River runs dry.

Without a specific, long-term water quality consent condition requiring the release of Lake Manapouri waters to maintain Waiau Arm water quality, Meridian could be in breach of EA and electricity industry requirements.

Specific, long-term water quality consent conditions are thus required to assure submitters that the new configuration of the channels upstream of the MLC will not result in compromised water quality and the predicted "substantially increased risk" of elevated phytoplankton levels going unaddressed (Paragraph 100).

The increase in flushing flow reliability from 30% to 70% (i.e. the provision of just two additional flushing flows per season) is not in our submission sufficient to mitigate the increased risk of phytoplankton blooms.

The quantitative increased risk of phytoplankton blooms in the proposed reconfigured channels is detailed in Dr Hogsden's Paragraph 100, such that "when excavation work is completed there will be a substantially increased risk of phytoplankton exceeding 2 mg/m3 in the new and existing channels (main and south) compared to the existing channels. Specifically, there is a predicted increase of three to five times the number of days under high risk conditions in the channels following excavation over the risk in existing channels (see Table 1)."

Paragraph 101 further acknowledges that "The shallow depths in the new and existing channels may further increase the risk of blooms because of warmer temperatures at times when water velocities are low."

However, Paragraph 105 maintains that, "It is expected that the increased risk of phytoplankton will largely be offset by the release of more effective (i.e., improved conveyance and reliability) flushing flows … These additional flow releases, in combination with the releases currently possible, will provide a core set of flow events that will, in most cases, reduce and/or delay the risk of phytoplankton blooms developing in the channels just upstream of the MLC following completion of the Project."

The WWP disagree. We submit that there are already existing monthly flow releases for recreational purposes, and an average of 1.5 flushing flows per season, so the average number of additional flow releases will be limited to some number between two (our calculation) and 2.5 (NIWA calculation) depending whether the long-term provision of flushing flows settles at 3.5 or four.

We submit that these additional flow releases are insufficient to "reduce and/or delay the risk of phytoplankton blooms developing in the channels just upstream of the MLC following completion of the Project" without a set of specific, long term consent conditions being included to ensure such a result.

That "A proposed water quality monitoring programme has been recommended … for a defined period following completion of the Project" (Paragraph 106) is insufficient in our view, and we seek that the proposed conditions relating to Waiau Arm water quality will endure for the full life of the consent.

Finally, the WWP wish to address the issue of the chlorophyll *a* trigger level for the proposed water quality monitoring rogramme.

At Paragraph 123, Dr Hogsden states that "A chlorophyll *a* trigger level (> 5mg/m3) is specified and directive for a flow release. This trigger level represents eutrophic conditions". We note that 5 mg/m3 corresponds to the threshold between mesotrophic and eutrophic water quality states (see Table A-2 in Appendix A to Dr Hogsden's evidence).

However, the WWP would not like to see the Waiau Arm approaching a eutrophic state and would prefer to see the chlorophyll *a* trigger level set at 2 mg/m3, which is the threshold between oligotrophic and mesotrophic water quality states and is more appropriate to this water body.

Indeed, we note at Paragraph 100 that Dr Hogsden cites the "substantially increased risk of phytoplankton exceeding 2 mg/m3 in the new and existing channels", with Table 1 predicated on this 2 mg/m3 threshold for assessing the "predicted increase of three to five times the number of days under high risk conditions in the channels following excavation over the risk in existing channels."

We submit that 2 mg/m3 is the appropriate chlorophyll *a* trigger level for the Waiau Arm, especially since this water may be conveyed into Lake Manapouri from time to time, and we reiterate again that a specific, long term water quality monitoring programme is required as a condition of consent for the proposed activity.

Respectfully, our suggested condition for the proposed water quality monitoring programme (Condition 11) is reproduced below.

Sue Bennett (PhD)

10th September 2024

Condition 11 of Schedule 1 – General Conditions Water Quality Monitoring Programme.

a. The Consent Holder will prepare a water quality monitoring programme (WQMP) for the detection of phytoplankton blooms in the parallel channel and existing channels (adjacent to the parallel channel). This WQMP shall be prepared by a suitably qualified person and be to the satisfaction of the consent authority prior to its implementation. Sampling methods shall be consistent with the existing methods for monitoring water quality in the Waiau Arm under Appendix 1 of the Manapouri Tailrace Amended Discharge consent entitled Water quality monitoring protocol for the Waiau Arm. Donna Sutherland NIWA September 2010).

b. *Between 1 September and 1 May, when the water temperature in the arm is more than 10 degrees Celsius and the mean flow in the Waiau Arm has been less than 0.04m/sec towards the MLC for the previous 5 days, the WQMP will require measurement of water temperature, dissolved oxygen, water clarity, pH and chlorophyll a at three Representative Sites. Notwithstanding conditions 11 c-e, further measurements are required every two weeks while these temperature and flow conditions continue.*

c. *For the purposes of clause (b), 'Representative Sites' means one site in the parallel channel and two sites in the existing channels. The location of the Representative Sites shall be agreed in writing with the Consent Authority prior to the implementation of the WQMP.*

d. *Within three working days of receiving notice that chlorophyll a has been detected in a sample at or above 2 mg/m^3, the Consent Holder will release a flow of 35–45 cumecs for 24 hours across the Manapōuri Lake Control Structure into the Lower Waiau River, after which the monitoring programme shall resume.*

e. *If two or more chlorophyll a readings are detected at levels at or above 2 mg/m^3, a review (in the form of a written report) will be undertaken by a Suitably Qualified Person to consider whether the flow release management response specified in clause [d] needs to be amended. The Consent Holder will provide the report to the Consent Authority within 6 months of the last fortnightly measurement in the WQMP being taken.*

f. *A turbidity monitoring site shall be established in the new channel as close as is reasonably practical to the Mararoa River channel to ensure turbid water from the Mararoa does not enter the new channel or the Waiau Arm. If turbid water > 30 NTU is detected in the new channel or the Waiau Arm the consent holder shall immediately increase the flow of the Waiau Arm to ensure this is flushed out and report any such incident to the Consent Authority.*