

Submission on a Notified Application for a Resource Consent from the Waiau Working Party.

To The Chief Executive
Environment Southland
Private Bag 90166
Invercargill

I, Maurice Allan Rodway, 48 Ruru Ave, RD 9, Invercargill (maurice.rodway@gmail.com) on behalf of the **Waiau Working Party**,

Wish to support (with conditions) the application of Meridian Energy to remove bed material and create a channel in the bed of the Waiau River (Waiau Arm) immediately upstream of the Manapouri Lake Control Structure (Reference AP 20233670) to enable more reliable flushing flows to the Lower Waiau River to maintain the health of the Lower Waiau River.

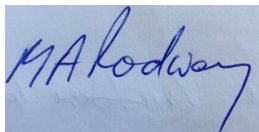
The reasons for my submission and the conditions I wish to see imposed are set out in the following pages.

I am not a trade competitor of the Applicant (for the purposes of s308B of the Resource Management Act.

I do wish to be heard in support of my submission.

I do wish to be involved in any pre-hearing meeting that may be held for this application.

I have served a copy of my submission on the applicant

A rectangular box containing a handwritten signature in blue ink that reads "MA Rodway".

Signed 17 April 2024

Submission of the Waiau Working Party

1 Introduction

This submission of the Waiau Working Party (WWP) responds to application APP-20233670 from Meridian Energy Ltd for activities associated with construction of a new channel to enable a permanent diversion of part of the flow of the Waiau Arm.

Thank you for the opportunity to submit on this application. The WWP acknowledges Meridian's consultation prior to application and supports the public notification of this (and any similar) applications for resource consent. While this application is relatively narrow in scope, it provides an opportunity to address the ongoing concerns of the WWP, as has been the case in previous resource consent applications by Meridian. Taking such opportunities is consistent with an adaptive management approach to managing the wide-reaching and interrelated impacts associated with the scheme.

The WWP was established in 1990 as a community consultative group by the Southland Regional Council (ES) and the operator of the Manapouri Power Scheme (now Meridian Energy Ltd) as a means of identifying, researching and resolving issues associated with the significant adverse effects of the Manapouri Power Scheme on the Lower Waiau River and wider catchment. The WWP has a long history of engagement with Meridian's consent applications in relation to the Waiau Catchment, as well as regulatory processes which directly concern the Manapouri Power Scheme.

Additionally, the WWP has a formally mandated role in reviewing consent compliance monitoring reports from Meridian Energy providing recommendations to the regulator (ES) on these reports and any alterations required to the existing monitoring and effects management regime.

The WWP understands that APP-20233670 is intended to improve flow conveyance and the reliability of flushing flows through the Manapouri Lake Control (MLC) structure, and is anticipated to result in better outcomes for river health in the Lower Waiau River. The WWP is generally supportive of this intent.

That said the WWP has a number of questions and suggestions that it believes are important to address prior to consent being granted.

The purpose of the consent is to allow the construction of a new channel in the bed of the "Waiau Arm" of Lake Manapouri immediately upstream of the MLC. The Waiau Arm was the bed of the Lower Waiau River before its water was diverted into Deep Cove for the Manapouri hydro-electricity power scheme (MPS). The MLC controls the flow of the Lower Waiau River. The Lower Waiau River has a minimum flow regime as a condition of Meridian's main consents in this catchment.

Meridian is obliged to avoid, remedy or mitigate the adverse effects of its activities in the Waiau Catchment. The minimum flow regime delivers a range of flows to the lower Waiau River throughout the year. However because these flows do not vary sufficiently enough to prevent excessive periphyton growth Meridian delivers flushing flows from time to time to try to reduce the adverse effects of the MPS on the river.

Members of the WWP believe a better solution to deliver more reliable flushing flows would be to lower the gate(s) of the MLC but Meridian believe that creating a new channel as described in this consent application is the best solution.

"Flushing flows" are flows with a mean of about 10 times the normal flow for a period of 48 hours. These have been scientifically shown over a period of 20 years to remove accumulated periphyton in the Lower Waiau so that natural character and river biota are protected within the limits of the consented minimum flow regime. It is very important that these flushing flows are delivered when needed according to the current monitoring programme, so the WWP supports this consent as it is intended to help do this.

2 Summary

In summary the WWP:

1. Generally supports the application because it will increase the reliability of flushing flows to control periphyton in the Lower Waiau River.
2. Supports the recommendations in the AEE for the control and monitoring of suspended and deposited fine sediment as set out in the report by Dr Hoyle with minor amendments.
3. Notes the risk of increased phytoplankton blooms as set out in the report by Dr Kilroy and expects that conditions will be included to avoid phytoplankton blooms in the new channel and the existing channels. This will ideally involve real time monitoring of dissolved oxygen, and fluorometry complimented by regular validation monitoring at vulnerable times (low flow, high temperatures and high sunlight hours) complimented by a proactive flushing flow regime to prevent blooms occurring or remove any blooms (further detail on proposed monitoring and mitigation programme provided in section 3.1.2.2).
4. Requests a condition requiring preconstruction inspection of areas that will be disturbed for freshwater fauna including but not limited to: mussel (kakahī) and relocation of these to suitable safe areas.
5. Requests a condition requiring any fish, including eels that are accidentally removed from the river be returned to the water of the Waiau arm. Methods must be in place to ensure this happens.
6. Requests a condition requiring any Buchanan' sedge plants that are in the working area are to be protected or relocated alongside a seed collection and propagation programme.

7. Requests a condition to ensure that stonecrop, an invasive weed, is not spread from the site and that machinery and material is cleaned and checked before leaving the site.
8. Supports the recommendation in the AEE in relation to landscape that "The final form of any exposed islands created within the Waiau Arm shall be finished to avoid linear engineered forms and ensure sinuous organic shapes which reflect natural patterns subjected to natural elements and processes." The final form could be agreed prior to construction.
9. Further to the above, requests a condition that requires any exposed islands be made suitable for use by black billed gulls for nesting (such as levels, final form, substrate etc).
10. Requests that the term of the consent align with the expiry of the main consents in 2031 that Meridian hold in relation to taking and discharging water for hydroelectricity power generation purposes. Particularly because we don't know what the conditions of the new consents will be and there may be opportunities to protect the environment further when this occurs.
11. Would like to see the expansion of the flushing flow protocol to respond to other environmental concerns that may become apparent as a result of the monitoring programme. For example, in the past 1-2 years cyanobacteria blooms, (*Microcoleus*), which are potentially toxic to humans and dogs at least, have become more common and flushing flows at different times and volumes may be needed to control this. This approach would be similar to the way the existing flushing flow regime was inserted into conditions through Meridian's 2010 consent application to increase the discharge into Deep Cove (referred to as MTAD¹).

3 Submission

Further detail on the above points is provided in the remainder of this submission. These points fall into the broad categories of water quality, both sediment and phytoplankton blooms, the impacts on and of biota, the voluntary flushing flow regime, compensation for the lack of the delivery of a flush and consent duration.

3.1 Water Quality

3.1.1 Turbidity during construction, and associated issues

The WWP generally supports the nesting of turbidity thresholds and durations, as outlined by Dr Hoyle in the NIWA Freshwater Ecology AEE (Appendix D, page 7, Executive Summary).

The WWP understands that this approach would work as follows. The turbidity threshold of 12.4 FNU will have a total exceedance allowance of 945 hours (+/- 39 days) with a maximum consecutive exceedance allowance of 315 hours (+/- 13 days), and for increasing thresholds

¹ Manapouri Tailrace Amended Discharge.

of turbidity there are progressively shorter duration allowances for exceedance - both "total" and "consecutive" exceedance hours.

There is part of the approach to managing turbidity the WWP wishes to see altered. Rather than specifying that only three exceedances of maximum consecutive duration will be allowed within the total exceedance allowance at each turbidity level, the WWP suggests that a minimum permitted interval between exceedance events be specified instead.

By way of explanation, an exceedance of 13 days at 12.4 FNU for example, followed by an interval of just one day, or two or three, before a further exceedance event, would not allow much respite for ecosystem recovery. An ecologically-referenced minimum interval between these exceedance events provides an alternative that would allow for ecosystem recovery.

Preferably, this minimum interval should be a ratio, so that it could be scaled down from 13 days to apply proportionately to a consecutive exceedance of a shorter period (e.g. 12 days, 10 days etc).

The WWP requests that a minimum interval between the consecutive turbidity exceedances be added to the conditions. A good model for this Minimum Interval Ratio may be the Specified Ratio approach which occurs for High Operating Range (HOR) lake level thresholds in the gazetted Operating Guidelines for Levels of Lakes Manapouri and Te Anau – where there is a maximum duration, minimum interval, and Specified Ratio for each band of the HOR.

In relation to Deposited Fine Sediment (DFS), it appears that the proposed threshold of 20% cover on the baseline value, could be reached after only 37 hours at a turbidity of 30 FNU. This is well below the proposed turbidity maximum consecutive exceedance for 30 FNU of 168 hours. **The WWP requests clarity on how this will be addressed in practice, such as a flushing flow to move DFS through the system.**

The WWP does not support the suggestion that the DFS monitoring site be shifted to downstream of Excelsior Creek for the duration of the project for the reasons provided on p28 of Appendix D of the AEE². This would introduce the Excelsior Creek as a potentially confounding source of sediment and variability in the record. A better approach would be to coordinate monitoring of DFS to suitable flows i.e. post deposition rather than during active sediment transport or use an alternative method to wading i.e. a kayak with a camera mounted to post process DFS levels. A new site could be used for the construction monitoring provided it has a pre-construction baseline established.

² About 20% of DFS surveys have been missed at the current site due to elevated river levels, where high flows cause a lack of access due to channel geometry.

3.1.2 Potential for phytoplankton blooms - both during and after the construction works.

Dr Kilroy's report on phytoplankton indicates there will be a greater risk of the development of blooms in the Lower Waiau River upstream of the MLC³ (referred to as the Waiau Arm) both during the project and following completion of the new channel⁴.

3.1.2.1 During the project

At p55 of Appendix D, Dr Kilroy suggests that "directing all Mararoa water flow down the LWR during the excavation activities may increase the phytoplankton blooms farther upstream in the arm [due to reduced water velocity]," although "the increased risk is likely to be small compared to the risk under typical summer conditions."

Dr Kilroy goes on to say that "In any event, Meridian's usual summer monitoring in the Waiau Arm is designed to pick up warning signs of developing blooms. If blooms are detected, mitigation **could be** implemented (e.g. a flushing flow)" (emphasis added).

The WWP wishes to advise that Meridian's "usual summer monitoring" is currently under review, due to concerns raised by stakeholders (WWP and Lakes Guardians) that there were instances during both the 2021 / 22 and 2022 / 23 monitoring seasons where warning signs of reduced water clarity and increasing chlorophyll a levels were detected and no mitigation actions (i.e. flushing flows) were implemented. To date the Waiau Arm water quality results of the 2023 / 24 monitoring season are not available to stakeholders, as the reporting does not occur in real time.

A review of the Waiau Arm water quality monitoring plan has been requested, seeking increased integration of Waiau Arm flows (direction and magnitude / intensity) in anticipating poor water quality events, as well as more clarity over threshold trigger levels, including an appropriate chlorophyll a trigger level, and development of a clearer decision-making matrix to ensure that where "mitigation **could be** implemented (e.g. a flushing flow)," such mitigation **will be** implemented, as appropriate.

The WWP considers the existing summer monitoring programme for Waiau Arm water quality unsatisfactory, and requests that a consent condition be added requiring an update and enhancement of the water quality monitoring programme along the lines just outlined above, to the satisfaction of all stakeholders involved. This could include real-time monitoring of water quality of slow flow (<10 m³/s) in the Waiau Arm, with a requirement to provide flushing flows when exceedances occur both during the project and following completion.

3.1.2.2 Post construction risks of phytoplankton blooms

Dr Kilroy suggests that "once the breakout excavations are completed, water velocities are expected to be lower in the Waiau Arm just upstream of MLC than those experienced in the current channels," such that "Decreased water velocity in the channels following the Project

³ Manapouri Lake Control Structure.

⁴ AEE Appendix D, p55 and Appendix E.

could increase the risk of development of high levels of phytoplankton in this part of the Waiau Arm."

This is a particular concern because it appears that the post-project plan is to rely on the current Waiau Arm water quality monitoring programme, which has already been identified by stakeholders as deficient in its provisions and unfit for present purposes, let alone the increased risk of phytoplankton blooms developing in this part of the Waiau Arm post-project. Suggested amendments to the existing monitoring programme are provided at the end of this section.

It is unclear on what basis the assertion is made at p 55 of Appendix D that the increased risk of phytoplankton blooms in the Waiau Arm in the vicinity of the MLC "is likely to be offset by the release of more effective flushing flows during summer than are possible at present". **The WWP requests the analysis that supports this assertion.**

Appendix E⁵ focuses mainly on velocity changes (reductions) in the existing (main and south) channels following the excavation of a new parallel channel, and reports that velocities will likely be reduced across a range of lake levels, leading to increasing risk of elevated chlorophyll a levels and associated phytoplankton blooms, with three to five times the number of days under high risk conditions expected (Appendix E, p 5).

Temperature effects, temperature stratification and expected shallower water in the three channels vs two channels are mentioned on p 18 of Appendix E, with reference also made to s3.3.1 on p 12 and Figure 3.1 on p 13 regarding temperature effects on chlorophyll a levels. Although not subjected to any detailed analysis in the report, these factors are expected to exacerbate the effects of reduced flow velocities and to increase even further the risk of elevated chlorophyll a levels and associated phytoplankton blooms. Further potential effects on chlorophyll a levels, due to increasing light penetration in shallower water, are not considered.

Note that Table 4.1 on p 18 indicates the increased risk of elevated chlorophyll a levels based on water velocities only - and it is on this basis that three to five times the number of days under high risk conditions are expected - without considering the possible exacerbating effects of increased water temperatures, increased light penetration and shallower depth of channels. **The WWP wishes to understand how these exacerbating effects would impact the number of days under high-risk conditions.**

A summary of the effects assessment is given on p 19 of Appendix E, and this reiterates that "the chlorophyll a - velocity relationship suggests substantial increased risk of phytoplankton blooms over the risk in the existing channels. The predicted number of days per year under high risk of phytoplankton blooms in the post-excavation main and south channels was three to five times higher than that predicted for the existing main and south channels."

⁵ NIWA's Assessment of risk of phytoplankton blooms in the Waiau Arm immediately upstream of the MLC following excavation of a new parallel channel

"Modelled water depth (averaged across the channels) is less than 2.5m in the parallel channel option. The shallow depths ... could increase the risk to more than that suggested by water velocity alone, because of the risk of warmer temperatures at times. While the existing channels are even shallower [than <2.5m], the effect of temperature would enhance phytoplankton growth only when velocities are low: if phytoplankton is **continuously washed downstream** it cannot accumulate to form blooms" (emphasis added).

Dr Kilroy then assesses the effect of the proposed enhanced flow releases as follows -
"Following excavation of the proposed parallel channel the increased risk of phytoplankton blooms in all three channels will be reduced by managed flow releases that are part of current flow management in the LWR. Potentially useful flow releases are the larger flushing flows for periphyton management [a total of up to 70% of just 4 - 5 flows per year will be provided, vs 30% at the moment, i.e. an increase of just 40%], and the smaller [monthly] recreational flow releases⁶."

There appears to be no analysis of whether this actual number of flushing flows - which are infrequent, of intermittent timing (benthic periphyton flows), and for purposes other than removing phytoplankton (recreational flows to enable jet boat passage and benthic periphyton flushing flows) - will be sufficient to ensure the frequency of "downstream washing" of phytoplankton necessary to avoid the build-up of blooms in the Waiau Arm. **The WWP requests that this analysis be provided.**

The WWP requests a fully revised, updated, upgraded and appropriately tailored Waiau Arm water quality monitoring and mitigation plan be provided as a condition of consent incorporating the concerns and suggestions made in the above sections.

This would consist of a proactive programme of 'continuous downstream washing' designed to avoid the build-up of blooms both during and post channel construction, supported by an amended Waiau Arm monitoring regime which triggers flushing flows if triggers are exceeded.

The existing monitoring regime should be amended to include:

- **At least one additional water quality monitoring site be added to the current suite of monitoring sites, and this should be set up in the vicinity of the new/existing channels, and closer to the MLC than is the case for the current monitoring sites.**
- **A predictive model for poor Waiau Arm water quality which incorporates Waiau Arm flow data; with clearer water quality trigger levels, particularly the incorporation of chlorophyll a and phytoplankton trigger thresholds with associated mitigation (flushing flows).**
- **A more proactive decision-making matrix to enable flushing flows to be delivered in a timely manner when mitigation is triggered.**

⁶ P21 Appendix E.

- **Real time monitoring of water quality of slow flow (<10 m³/s) in the Waiau Arm, with a requirement to provide flushing flows when exceedances occur both during the project and following completion.**

3.2 Biota

3.2.1 Migratory species

The WWP supports the recommendation on p 9 (Executive Summary) and p 60 of Appendix D of "ensuring the instream excavation phase of the Project does not commence until after mid-March to avoid effects on upstream migrating juvenile eels (elvers)." The WWP also supports the suggestion that any longfin eels removed during excavation be returned to the Waiau Arm (p 8 (Executive Summary) and p60 / 61 of Appendix D). **The WWP requests corresponding consent conditions to ensure the above mitigation measures for all fish species are implemented.**

3.2.2 Kakahi (Freshwater mussel)

The WWP requests a condition requiring divers to check for kakahi (At Risk – Declining) in the areas of the bed that will be disturbed and move them to places where the bed won't be disturbed (p 61, Appendix D).

3.2.3 Buchanan's sedge

Several plants of Buchanan's sedge (At Risk - Declining) were identified in the artificially constructed, former eastern channel of the Mararoa delta (Appendix F, p23), also in Wetland 8 and some lake margin areas (Appendix F, p 24) where they are under threat from the excavation work.

Pages 50 / 51 recommend that <10 of these plants will need to be removed and transplanted to "a suitable area of lacustrine habitat within the Project site, as well as follow-up monitoring of survival and replacement planting (if required)."

Given their threat status and limited number of plants identified for transplanting, the WWP suggests that in addition to transplanting the existing plants, that a condition be included which requires collection of seed from these plants prior to disturbance and that these seeds be germinated and plants raised in an off-site nursery area for later rehabilitation of the site.

3.2.4 Stonecrop / *Sedum acre*

The species list in Appendix A of Appendix F records the presence of the dicot. herb, stonecrop (*Sedum acre*).

This exotic species can regenerate from very small fragments and has been the subject of an intensive eradication programme from the roadside gravels of the Te Anau basin lead by DOC.

DOC and ES will likely be very interested to know of its presence in the proposed work site, and may prefer to initiate an eradication plan prior to works commencing - especially as there

is an intention of setting some gravel material aside for use by local contractors (a potential source of further spread).

The WWP requests a condition to ensure that any stonecrop is not spread from the site, machinery is cleaned and checked before leaving the site.

3.2.5 Black Billed Gull habitat

Page 15 of the Landscape Effects Assessment (Appendix H) recommends that "The final form of any exposed islands created within the Waiau Arm shall be finished to avoid linear engineered forms and ensure sinuous organic shapes which reflect natural patterns subjected to natural elements and processes."

The WWP requests a condition that requires any exposed islands be made suitable for use by black billed gulls for nesting (such as levels, final form, substrate etc).

3.3 The flushing flow regime

While the WWP appreciates that this application has a narrow scope, but the purpose of the new channel is to improve the effectiveness of the flushing flow programme, so the WWP requests that the flushing flow regime is able to be expanded to respond to other environmental concerns that may be discovered from the ongoing monitoring programme.

This approach would be similar to the way the existing flushing flow regime was inserted into conditions through Meridian's 2010 consent application to increase the discharge into Deep Cove (referred to as MTAD). Through the MTAD consent, the existing voluntary flushing flow protocol, with a focus on nuisance periphyton, and in particular didymo, was included to address unanticipated environmental effects associated with the Manapouri Power Scheme, despite arguably being only tangentially relevant to the activity consent was sought for.

An expansion of the voluntary flushing flow regime at this juncture would harness adaptive management to drive collaborative enhancement of the existing regime to address these additional issues ahead of the reconsenting of the Scheme as a whole in 2031.

Either separately or together with the expansion of the flushing flow regime, the WWP would like to see a condition on this consent that requires Meridian to make a financial contribution to offset the associated effects on habitat, recreation, and cultural values if a flushing flow is triggered but not provided. The WWP considers this approach appropriate given that the non-provision of flushing flows earmarked for river health has a direct financial benefit to Meridian Energy Limited. Meridian has agreed to provide 15 GWh of water each year for the flushing flows. (Approximately 5 flushing flows.) If this amount of water is not delivered the value of that water, in dollar terms, should be available to the catchment. The value of the financial contribution could be determined using the electricity spot price at the time the flushing flow is triggered and the amount of water that should have been released in the flushing flow.

The WWP requests that if a flushing flow is triggered and not delivered, that Meridian Energy be required to provide a financial contribution to offset the associated effects on habitat, recreation, and cultural values. The recipients be the trusts set up under the original consent (Waiau Fisheries and Habitat Enhancement, Mahika Kai, and

Tuatapere amenities trusts) plus ES, through the Waiau Catchment Liaison Committee, who would be required to spend their portion in the catchment to assist with erosion control and river management. If the funds were shared equally amongst these parties this would be fair compensation for the lack of a flushing flow when one was required.

The WWP requests that the voluntary flushing flow regime be expanded to address cyanobacteria blooms, and any other adverse effect that is discovered, as well as the existing periphyton biomass removal goals. The WWP envisages that the collaborative process with stakeholders used to develop a new regime would continue.

3.4 Consent duration

A consent duration of 35 years has been requested by the applicant. The WWP acknowledges that this application is relatively narrow in scope. However, it is designed to have a direct (and largely positive) impact on the flow regime of the Lower Waiau River. On that basis, the WWP considers it appropriate to align the consent duration with that of the rest of the Manapouri Power Scheme operational consents, which expire in 2031.

Aligning the expiry dates will support a holistic and integrated approach to managing the effects associated with the Manapouri Power Scheme, and specifically the flow regime of the Lower Waiau River into the future. The WWP considers that such an approach is critically important in the journey towards a state of Hauora for the Lower Waiau River. The WWP anticipates being meaningfully involved in that future process, supporting ES with the WWP's extensive institutional knowledge in relation to the Manapouri Power Scheme and the Lower Waiau River.

The WWP requests a consent expiry date which aligns with the operational consents for the Manapouri Power Scheme, in 2031.