Appendix 8: Hydrology technical expert advice

Fast Track Approvals Act 2024 (FTAA) Technical Advice

Date	24/02/2026
To	Jeremy Ecker, Consent Planner
From	Dan Clark, Environment Canterbury Senior Scientist- Surface Water Resources.
Project advice provided for	RMA253705 - Meridian Energy Limited - Lake Pūkaki Hydro Storage and Dam Resilience Works
Documents referred to	Lake Pūkaki Fast track Consent -Draft Groundwater. GHD. 16 September 2025 Lake Pūkaki Fast-Track Consent - Draft. Lake Processes and Geomorphology. GHD 19 September 2025 Overview of analytical approach. Meridian. December 2025. Catchment forecast data. Modelled outcomes 2026-2029. Meridian. December 2025.
Qualifications and Experience	Bachelor of Science (Environmental Science) and a Post-graduate Diploma (Water Resource Management), from Lincoln University and Master of Water Resource Management from University of Canterbury. With 19 years of experience in the Hydrology field.
Code of Conduct	I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This technical report has been prepared in accordance with that Code. In particular, unless I state otherwise, the opinions I express are within my area of expertise, and I have not omitted to consider material facts that might alter or detract from the opinions that I express.

Executive summary/overview

1. A brief overview of this advice is provided in Table 1:

Table 1: outstanding areas of contention		
Outstanding area of contention	**Reason for significance**	**Solution**
Potential changes in flow to the Pūkaki River are not addressed.	If Lake Pūkaki is at a lower level at a time of heavy rainfall, the likelihood of spill to the Pūkaki River is reduced.	Provide an assessment of the change in spill events to the Pūkaki River likely to result from the lower lake level.

Agreement with the applicant

2. I have not provided further discussion for where I agree with conclusions of the applicant.
3. While I agree with the applicant's conclusions regarding their description of the environment and the operation of Lake Pūkaki, I do wish to make the following comments:
    a. The applicant has not provided a hydrological assessment which considers how spill to the Pūkaki River may change as a result of operating Lake Pūkaki at lower levels.
    b. Both the Lake Processes and Geomorphology[1], and Groundwater[2] reports present modelling supplied to them by Meridian. This modelling is referred to as "Meridan (2025)", further details of this modelling has been provided in the summary document "Overview of analytical approach".
    c. The ability to utilise storage below 518m allows Meridian to utilise the lake storage within their normal operating range differently to what has occurred in recent years. Modelling shows greater variability in the mean storage than what was seen in the 2012-2024 period, this increases with the eased storge, particularly with storage being predicted to be much lower between July and January.

Benefits of the project

4. There may be some increased potential for buffering floods into the Pūkaki River. If heavy rain occurs at times of lower lake levels a greater volume can be stored prior to water being spilled to the Pūkaki River.

5. I have not considered any further benefits to hydrology (my area of expertise). I acknowledge there are significant regional and national benefits from an energy production point of view.

Outstanding areas of contention and significance of these.

Discussions with applicant

6. I attended the online presentation by the applicant on the 7th of October 2025 which provided an overview of the proposal.

7. I met online with Kate Berkett and Grant Telfar of Meridian Energy Limited on the 9th of December 2025 to discuss the hydrological modelling used in the application. Following this meeting Ms Berkett provided additional documentation of the modelling[3] and an updated set of modelling results[4]

8. The additional information on the modelling, provided by Ms Berkett, clarified that 91 years of climate data was detrended and used to simulate a wide range of hydrological variability possible within the current climate. This resolved my concerns about how the changing

[1] GHD. 2025 Lake Pūkaki Fast-Track Consent - Draft. Lake Processes and Geomorphology.
[2] GHD. 2025 Lake Pūkaki Fast-track Consent - Draft. Groundwater.
[3] Meridian. 2025. Overview of analytical approach.
[4] Meridian. 2025. Catchment forecast data. Modelled outcomes 2026-2029.

climate has been considered within the modelling and provides more certainty around the validity of the model simulations for 2026 to 2029.

9. In the discussion with Meridian staff, it was confirmed that the relationship between lake storage and level are close to linear. This confirmation and the updated modelling results resolved my concerns regarding the results originally being presented in GWh. The updated model plots clearly show the changes to lake level.

Outstanding areas of contention

10. The application does not include a hydrological assessment of the reduction in spills to the Pūkaki River which would result due to lower lake levels. In our discussion, Ms Berkett indicated that changes in spills to the Pūkaki River are addressed narratively in the ecological assessment and as there was not ecological concern regarding the change in spills, hydrological modelling and assessments were not necessary.

Significance of these matters

11. The lack of hydrological assessment of the change in spills to the Pūkaki River means that the magnitude and frequency of the changes is unknown and unable to be fully considered by other technical experts' assessments.

Solutions and/or Conditions sought

12. If this consent includes any monitoring conditions for lake level, these should align with those which apply to Meridan's suite of other consents for the Operation of Lake Pūkaki. Specifically, this consent should not specify less stringent monitoring conditions than those which apply for Meridians operation within their normal range.