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| <b>Date</b>                        | 10 February 2026  |
| <b>To</b>                          | Jon Bright, Project Director – Waitaha Hydro Scheme Westpower Ltd   |
| <b>From</b>                        | Jeremy Kent-Johnston  |
| <b>Project advice provided for</b> | <i>Waitaha Hydro Scheme</i>   |
| <b>Qualifications</b>              | BE (Civil) <b>Appendix A</b>  |
| <b>Code of Conduct</b>             | <b>Appendix B</b>   |
| <b>Documents referred to</b>       | Waitaha Hydro Scheme Substantive Application Appendix 3 Project Overview Report, <sup>1</sup> Appendix 19: Sediment Report, Appendix 42: Conceptual Scheme Design Drawings <sup>2</sup> |
| <b>Signature</b>                   |   |

1. I have been asked by the Applicant to explain my involvement and the engineering design process followed for the Project in response to the issues raised in the Panel's peer review reports (the "**Review reports**"):
  - (a) Waitaha Hydro Power Review of Intake Engineering and Fish Passage (26 January 2026) prepared by Paul Morgan (the "**Morgan report**"); and
  - (b) Statement of Evidence of Jon Francis Tunnicliffe on River Geomorphology (23 January 2026) (the "**Tunnicliffe report**").
2. I am a hydropower engineer and managing director of AusHydro. AusHydro specialises in hydropower design, owners engineering and prospecting. My experience is in hydropower design, operation and development in hydropower projects.
3. Recent small hydropower work requiring specific sediment management that I have worked on include McCulloughs Creek Hydro (West Coast NZ), Mangima (Philippines), Gold River (British Columbia), and Baime and Gurokor-Timini in Papua New Guinea. Recent projects I have worked on where fish passage and screening were important are Snowy 2.0 Pumped Energy Hydro Storage (PHES), and intake fish exclusion screens, Borumba PHES (QLD) Reference Design and work intake screens / SDAP 18 guidelines, Oven Mountain PHES and river intake screen design (NIWA / NSW guidelines). I have also undertaken hydropower work for Genesis Energy and was

<sup>1</sup> [Appendix 3 project overview report part1.](#)

<sup>2</sup> [Appendix-42-conceptual-scheme-design-drawings.pdf](#)

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involved in the original consent application for the Ruataniwha Dam in Central Hawkes Bay. My qualifications and experience are detailed in **Appendix A**.

### **Engagement by Westpower**

4. I became involved with the Waitaha Hydro Project in January 2024, when AusHydro were commissioned to continue the development of the concept headworks design for Westpower. Engineering work had been led by Mr Ian McCahon since 2012 – 2013, including reports drawings and memos regarding the design. Building on Mr McCahon's work, I reassessed the concept designs and prepared a detailed options assessment report, which covered assessment by various experts (Dr Murray Hicks, James Bentley, Shelley McMurtrie, David Leong, Fred Overmaars and Martin Doyle), commentary by NZ approval agencies (Westland District, West Coast Regional Council, DOC, etc) and documented updates to requirements.
5. The Application includes the Concept Scheme Design Drawings<sup>3</sup> but did not include the level of detail that sits behind the work AusHydro has prepared to date and that will be used to inform detailed design. That further work was completed to ensure my confidence in being able to achieve a detailed design that is consistent with the Concept Scheme Design Drawings and environmental outcomes sought by Westpower.
6. To clarify, the Concept Scheme Design Drawings show typical engineering views and the Project's maximum footprint, based on the 3D CAD model. As an example of the detail sitting behind the Application see the below **Figure 1**, a *3D view of the downstream parts of the main weir, overflow weir, sluice, and environmental flow*. The Concept Scheme Design Drawings are created from this 3D model and the view is consistent with the Application Design. The view (looking upstream) shows the radial sluice gate, environmental flow gate (left) and the spillway section of the weir (EL 238.00 m) to the right (true-left of river).

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<sup>3</sup> [Appendix-42-conceptual-scheme-design-drawings.pdf](#).

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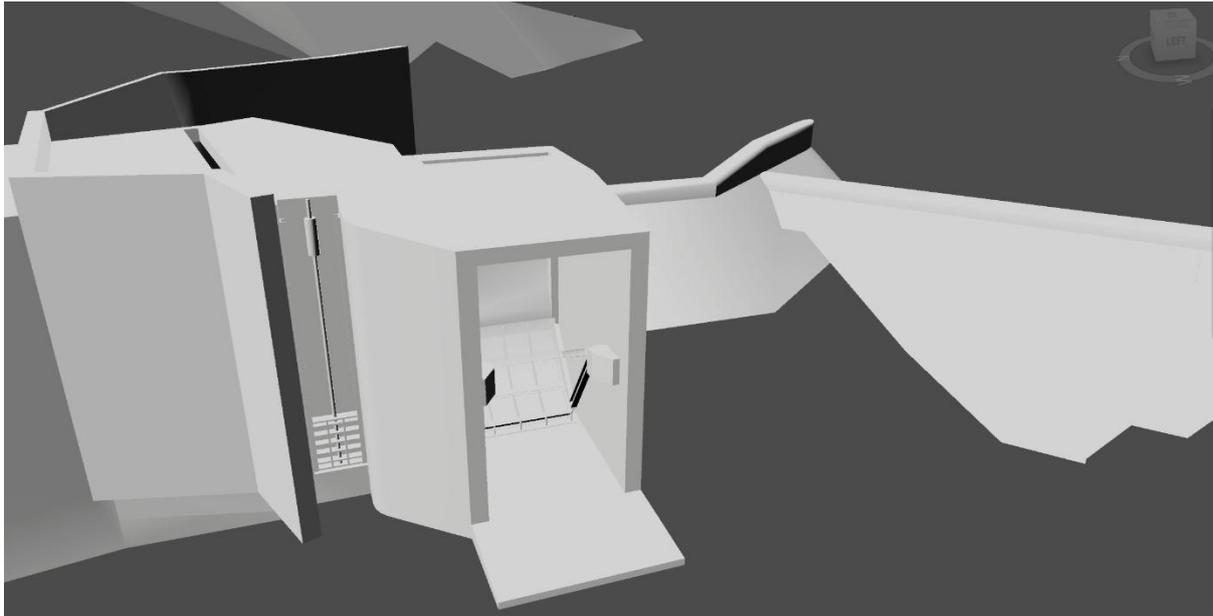


Figure 1: a 3D view of the downstream parts of the main weir, overflow weir, sluice, and environmental flow

### **Engineering Design Background**

7. When engaged in 2024, I systematically catalogued key objectives, requirements, conditions and concerns from experts and stakeholders. This register (Key Design Requirements from experts) allowed Westpower and its environmental experts and tunnelling expert to discuss possible more detailed design approaches. This contributed to the engineering design parameters Westpower issued for the concept design for the present approval process. Contributing experts included Dr Murray Hicks, James Bentley, Shelley McMurtrie, Fred Overmaars and Martin Doyle.
  8. To ensure a smooth handover, Mr Ian McCahon and I undertook a site visit together on 29 February 2024 and subsequently discussed the Project at length over the following days. During those conversations, I became aware of the uniqueness of the site in respect of high bedload, sediment and frequent flooding and the engineering challenges it would create.
  9. Engineering work began in earnest with AusHydro considering all viable project arrangements, and myriad options for components. It important to note that key parameters, (such as weir crest elevation, design and residual flow rates, etc) are consistent with Westpower's and Mr Macmahon's 2013 design.
  10. Dr Clunie and I collaborated with experts on the headworks arrangement, to explore desander design, assess keys risks, and to develop requirements for future detailed work such as Computational Fluid Dynamics (CFD), transient analysis and sediment
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modelling. The detailed activities were not undertaken during the Concept Design stage, but information was gathered to prepare for the next phase, such as reviewing sediment grading, options/cases for CFD and load cases for transient modelling. These activities are key activities during the next Reference Design Stage. Experts who provided input at the Options Assessment stage included:

- a) Stefan Martin (AFRY) advised on desander design and hydraulics;
- b) Knut Sioikski (AFRY) advising on layout;
- c) Freddie Takhtemina (SMEC) on hydraulics / transients / CFD;
- d) Sabrina Kost (Pini/ARX) tunnels and caverns; and
- e) Craig Wiltshire (Wiltshire Consulting) on weirs, diversion and construction.

11. The concept design phase focussed on consolidating the preferred options, requirements, constraints and objectives into a working design for Fast-track approval. Dr Tom Jacobsen, a global sediment expert was engaged to provide review and specialist design advice for the headworks, intake approach, desander and the downstream sediment flushing outlet. I travelled to Trondheim in 2024 for meetings with Dr Jacobsen regarding the intake design. Dr Jacobsen has provided specialist technical advice to me since that visit. While in Trondheim, I also took the opportunity to meet with SWECO, an international hydro power consultancy based there, and we discussed specific issues around sediment management and approach flows, following their earlier review of the concept design.
  12. Additionally, Mr Bryan Leyland was engaged by Westpower to undertake a comprehensive review of the design in 2024. That led to a series of meetings and email exchanges, with Mr McCahon also involved, where project layout, options, and rationale were discussed in detail. Following that review, the concept design approach was confirmed.
  13. In my opinion, when assessed against the criteria of the Association for the Advancement of Cost Engineering (AACE International 69-R12 stage-gate criteria), the level of engineering definition is well in advance of being “conceptual” and, in my opinion, is consistent with early feasibility (Class 4) given the body of prior engineering work, site-specific data, and ability to utilise operational experience with comparable West Coast intakes. The weir crest elevation and power station location are consistent with the design conclusions in 2013. The key detailed design issues, natural environment characteristics, and technical viability of the Project are well understood. In particular, I am confident that the engineering design parameters that Westpower requires, many informed by the environmental effects assessments, can be met by the
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detailed design process and within the footprint and key environmental parameters of the concept design as presented to the Panel in the Application. In overall summary, I consider that the concept design for the Waitaha Hydro Scheme is more advanced than would typically be undertaken at the consenting stage and, more importantly, I believe that it provides a reliable basis on which to base the detailed design, and, subsequently, the operation of the scheme.

**Jeremy Kent-Johnston**

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## **Appendix A – Relevant Hydropower Experience**

### Queensland Hydro (QH), Borumba Pumped Hydro, QLD, (2021, ongoing)

Over the past three years, Jeremy led a series of concept development phases, resulting in a Reference Design for the 2,000 MW Borumba project in 2021/22. He is currently QH's Hydropower Advisor providing technical support, review of tenders, deliverables, and proposals, and disseminates information to the TRP, Government, environmental specialists, and stakeholders.

### OMPS, Oven Mountain Pumped Hydro project, NSW, Aus (2021, ongoing).

Jeremy was originally design manager for the Feasibility Study (after successfully delivering the Concept Study in 2020), leading the delivery of the Feasibility and geotechnical investigations for the Oven Mountain project near Armidale. The project is an underground pumped storage project which is 600 MW to 900 MW with up to 12 hours of storage in generation mode.

### AGL Bells Mountain Pumped Storage Feasibility, (2019 - ongoing)

Jeremy was the design manager for the Feasibility Development of the 250 MW Bells Mountain pumped hydro project. This project continues from the concept development undertaken in 2018 and 2019. The project comprises a significant geotechnical and geophysics campaign, interfacing closely with design disciplines and environmental specialists. Additionally, there is an interface with existing coal mining operations, creating a unique working environment.

### Snowy 2.0 Fish Exclusion Devices, NSW, Australia (2019 – ongoing)

Jeremy's role on this project is to oversee the design and eventual construction of fish exclusion devices on Tantangara reservoir and upstream creeks. The goal of the project is to prevent downstream migration of Red Perch, and upstream migration of trout and galaxiids. Downstream migration is prevented by large wedge-wire exclusion

### Kanmantoo Pumped Storage Project Owners Engineer (2019-2020)

Kanmantoo Pumped Hydropower project was a 250 MW pumped storage concept at the Hillgrove owned Kanmantoo mine site. Jeremy's role was design manager and lead hydropower engineer for the project. Tasks undertaken on the project were coordination of the owners engineering team, project optimisation, costing, and assisting with concept layouts.

### Seqwater Pumped Storage and Hydropower Assessment, QLD, Australia (2019-2020)

Seqwater undertook a pre-feasibility study to determine whether hydroelectric power, including pumped storage schemes, will be a viable option for renewable power generation at Seqwater dam sites. Jeremy's role was lead hydropower engineer and responsible for determining what options were available and developing them to concept level design. The preferred options were identified and earmarked for future development.

### Bells Mountain Pumped Storage Project Concept Study, NSW, Australia (2018-2019)

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Bells Mountain Pumped Storage Project is in the Hunter Valley, NSW and proposes to use an existing coal mine pit as the lower reservoir. The team identified a range of options for upper reservoir on Bells Mountain and associated surface and underground concept layouts, undertook costing of the options, made recommendations on preferred options and next steps. Jeremy was the design manager and lead hydropower engineer responsible for overseeing and guiding the concept development process.

#### Borumba Pumped Storage Project, QLD, Australia 2018-present

Queensland Treasury Corporation undertook an advanced concept study for the project, undertaking engineering design, costing and other analysis for a large scale, long storage duration, multi staged hydro-electric pumped storage concept. The work built off the options and concept development work to identify the preferred arrangement. The multi-stage approach facilitates a later expansion of either power (capacity) or energy via enlargement or linking of reservoirs, in combination with dam raising. Jeremy was lead hydropower engineer for the project. Now Jeremy is lead Technical Advisor for Queensland Hydro, the project owner.

#### Mangima Feasibility, Mindanao, Philippines (2018 – 2020)

Mangima is a 12 MW run-of-river project in Mindanao province of Philippines. A large part of the feasibility study was optimisation of capacity (vis a vis flow rate), general arrangement and weir location. The project arrangement settled on a 6.4 km penstock, surge shaft immediately upstream of the powerhouse, 2 x vertical axis 4 jet Pelton turbines. The project had rated gross head of 190 m and flow of 8 m<sup>3</sup>/s. Jeremy was project manager and lead hydropower specialist for the project.

#### Snowy 2.0 Pumped Storage Project, NSW Australia (2017 - present)

Snowy 2.0 is a pumped hydro project that will increase the project's generation capacity by up to 2,000 megawatts and will provide approximately 350 gigawatt hours of energy storage. Jeremy's role on the project was to assist with project layout options, undertake tunnel size optimisation, develop options for early works and construction camps during feasibility and detailed design. Jeremy has recently been involved with developing options for the next phase of Snowy 2.0 and leads the team to deliver various studies and concept development for future projects.

#### Cardstone Pumped Storage Project, Queensland Australia (2018)

This study investigated using Lake Koombooloomba and a new lower 8-hour storage dam in the Cardstone Valley for a 1000 MW to 2000 MW pumped storage project with 700 m gross head available. Jeremy was project manager and lead hydropower engineer and was responsible for layout, design, costing and economic analysis.

#### Awoonga Pumped Storage Project, Queensland, Australia (2017-2018)

The purpose of this project was to investigate options and undertake a feasibility study for preferred option for a 95 MW pumped storage hydroelectric power station. Jeremy was lead hydropower engineer and layout, design, costing and economic analysis.

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Lakeland Irrigations Scheme – Hydropower Options, Queensland, Australia (2018 to ongoing)

Jeremy was responsible for layout, design, costing and economics for several hydropower options which utilise excess head in the water reticulation network on the Lakeland Irrigation Scheme. Benefits from installation of a hydropower station include removal of high pressures, generation of positive cashflow, strengthening of the electrical grid, and savings high pressure pipeline.

Dorrigo Plateau Hydropower Review - NSW, Australia (2017)

As hydropower specialist, Jeremy was responsible for the review of a governmental hydropower development process. Jeremy used his experience with private hydropower development in mature markets around the world, such as British Columbia and Asia to help put forward a process which would allow flexibility for developers, while maintaining objectives of the state government.

Icon Water Hydropower Options Assessment, Canberra, Australia (2017)

Jeremy assessed the viability of hydropower options at existing Icon Water facilities to assess energy, benefit and levelized cost of energy to allow a comparison between the options. The work also aimed to identify fatal flaws that would make the projects non-viable along with equipment sizing and establishing a capex estimate. Five sites were assessed, with one site having two options with different turbines. Jeremy was also project manager for the project.

Centennial Coal Pumped Storage Assessment (2017)

The purpose of this report was to undertake an assessment on the viability of using the Newstan Mine Site for a pumped storage facility. This assessment focussed on two options, using different parts of the mine workings to develop head and water storage. Jeremy was lead hydropower engineer and was responsible for layout, design, costing and economic analysis.

Ruataniwha Irrigation Scheme, Hawkes Bay, NZ (2014 – 2017)

As technical advisors project manager, Jeremy was responsible for supporting the project team on all technical aspects on the project and to support the client to procure the design and construction services.

Wairarapa Water Use Project, Wairarapa, NZ (2014)

This work focused on providing the Greater Wellington Regional Council (GWRC) and Wairarapa Water Use Project (WWUP) with an independent review of work completed by other consultants. The work allowed a like-for-like comparison of a number of pumped options and gravity fed options by the determination of the value of water in the reservoirs based on the costs of required infrastructure and operation. The output for the study was a ranking of the options based on the water price and a recommendation of which options warrant being progressed to a more detailed level of investigation – feasibility studies.

Rangitaiki Spillway – Edgecumbe, New Zealand (2014)

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Jeremy's role was project manager and hydraulic specialist. This project comprised a Feasibility Study on floodway and gated spillway options for the Bay of Plenty Regional Council. Options included rubber dams, concrete tipping blocks and over-flow weirs, with differing operational profiles to ensure downstream safety from flooding.

Wawa Pumped Storage Feasibility, Luzon, Philippines (2015 – 2017)

Feasibility study of a 600 MW pumped storage scheme near Metro Manila. Reservoir and water release optimization played a large role in the sizing and design of the project. Working out of Kuala Lumpur, Jeremy was NZ's project manager for the feasibility study. Besides project management duties, responsibilities included economic analysis and scheme optimization, energy estimation and civil hydraulic design.

Canberra, ACT, Australia, Isabella Weir Upgrade (2014 – ongoing)

Hydraulic design and planning for the detailed design of an existing labyrinth weir spillway upgrade. The upgrade was required for dam safety to increase the Flood Capacity whilst not flooding upstream bridges and properties. Jeremy undertook hydraulic design and planning for the labyrinth weir spillway upgrade.

Nam Leng Hydropower Scheme Laos (2016)

Nam Leng is a 60 MW dam scheme in Northern Laos with challenging hydrology and topography. At the beginning of the project, Jeremy completed options analysis and optimization to identify the optimal scheme location and size early in the project. Later, Jeremy was responsible for undertaking hydrological and hydraulic calculations, energy modelling, financial and economic analyses.

Grand Inga (39,000 MW), Congo River, Congo (2012)

Role: Jeremy undertook economic and financial analysis for dozens of different options and scheme arrangements in collaboration with Électricité du France and World Bank. He also assisted with technical hydropower specific French – English translations. The scheme is currently the world's largest proposed hydro scheme.

Kiri Dam, Kiri, Nigeria (2012)

Feasibility level design for modification of an existing irrigation dam for a 25 MW hydropower scheme. This project was challenging due to critical irrigation needing to stay available during construction. Jeremy assisted with the feasibility level design and tasks included hydraulic design, hydrology, financial analysis, energy modelling and option analysis.

Manouane SIPI, Quebec, Canada (2012)

Role: Jeremy assisted with the feasibility study focussing on financial and economic analyses, in addition to energy estimation. Jeremy performed analysis of operational and financial scenarios unique to the project and cascade operation. Additional tasks included assistance with financing negotiations with the municipality and financier groups.

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Parks Canada Dam Safety Reviews - Ontario, Canada (2012)

As AECOM's Technical Coordinator, Jeremy was responsible for inter-disciplinary coordination for dam safety reviews of Parks Canada (PCA) dams on the Trent-Severn Waterway in Ontario. This work involves coordination of hydraulic, structural, geotechnical, mechanical, electrical, public and operator safety disciplines. In addition to the technical coordination role, Jeremy was responsible for dam safety analyses, including dam classification, IDF selection, freeboard and impoundment review, assessing risk under Canadian Dam Association (CDA) guidelines

Project Manager for Hydropower Feasibility Studies (20 - 100MW). (2007 – 2009)

Jeremy led the development of new greenfield hydropower opportunities. Myriad new sites were identified, and feasibility studies were initiated on preferred arrangements.

Cascade Heritage (28MW ROR Hydro), Grand Forks, British Columbia (2006 – 2008)

As project manager for the Client, Jeremy oversaw the project design, energy and financial modelling, scheme arrangement options including rubber dam design, procurement, and managed consultation with project stakeholders. Responded to due diligence requests, provided site tours, supplied project detail and requests for information. Led the submission of Cascade to the BC Hydro 2008 Clean Power Call (RFP)

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## **Appendix B Code of Conduct**

As an expert witness or peer reviewer, I have read, and I am familiar with the Environment Court's Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023.

I have prepared my, or provided input into, an assessment of effects for the Waitaha Hydro Scheme in compliance with the Code of Conduct and will continue to comply with it in this Fast-track Approvals Act process. In particular:

- my overriding duty is to assist the decision-maker impartially on matters within my expertise;
  - unless I state otherwise, my assessment is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express; and
  - I have not, and will not behave as, an advocate for the Applicants.
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