BEFORE THE MACKENZIE DISTRICT COUNCIL

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	Proposed Plan Change 18 to the Mackenzie District Plan.

STATEMENT OF EVIDENCE OF CATHERINE LOUISE JEFFRIES BRYANT

FOR

MERIDIAN ENERGY LIMITED

12 FEBRUARY 2021

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1 QUALIFICATIONS AND EXPERIENCE

1.1 My name is Catherine Bryant.

1.2 I hold the qualification of a Bachelor of Resource and Environmental Planning from Massey University. I have approximately 6 years of experience in planning and resource management matters.

1.3 I have been employed at Meridian Energy Limited (Meridian) for two and a half years. In my current role as an Environmental Specialist I am responsible for providing resource management advice and expertise to Meridians Assets and Project teams. In addition to this, I assist in ensuring environmental compliance is monitored and records are maintained.

1.4 Prior to joining Meridian, I was employed by Landmark Lile Ltd, a private consultancy firm in Nelson where I prepared a range of resource consent applications for clients. I have worked as a Consent Officer at Environment Canterbury for two years in South Canterbury and made recommendations on resource consent applications. I have also worked in England at Merton Council (South London borough) processing Planning Permissions.

1.5 I have read the Environment Court of New Zealand Practice Note 2014 and confirm I have complied with it when preparing and presenting my evidence in relation to Meridian's company evidence. However please note this is not a statement of evidence as a planning expert, rather this statement is made in the context of my position with Meridian and is factual rather than opinion. That is, the primary purpose of my statement is to assist the Panel in understanding the operational consequences of Plan Change 18 in the context of the operations of the Waitaki Power Scheme (WPS).

1.6 Independent expert planning evidence for Meridian is prepared by Ms Sue Ruston and expert ecological evidence is prepared by Dr Michael Thorsen who are both attending the hearing. I have read both briefs of evidence.

1.7 I am authorised to present this evidence as a representative of Meridian and on behalf of the Company.

2 PURPOSE & SCOPE OF THIS EVIDENCE

2.1 The purpose of my statement is to assist the Commissioners in understanding the following:

a) Meridian Energy Limited as a business.

b) Meridian's approach to Plan Change 18 (PC18).

c) The Waitaki Power Scheme (WPS).

d) The importance of the Waitaki Power Scheme's contribution to New Zealand

e) Waitaki Power Scheme core land and operating easements and land modification.

f) The implications of the proposed Plan Change 18 on the operations of the nationally significant Waitaki Power Scheme.

3 INTRODUCING MERIDIAN

3.1 Meridian is a mixed ownership model company, that is dual-listed on the New Zealand Stock Exchange and the Australian Securities Exchange, with 51% owned by the New Zealand Government, and generates electricity exclusively from renewable sources.

3.2 Meridian's core business is the generation, marketing, trading and retailing of electricity and the management of associated assets and ancillary structures in New Zealand. As well as being New Zealand's largest generator of electricity, Meridian is also the country's largest generator of renewable energy.

3.3 Within the Mackenzie District Meridian owns part of the WPS which is more fully described in section 5 of my evidence.

4 MERIDIAN'S APPROACH TO PLAN CHANGE 18

4.1 Fundamentally, for the reasons I will now set out in this evidence, Meridian is seeking to ensure the provisions and changes promoted through Plan Change 18 recognise and ensure the retention of the WPS's existing renewable energy generation and appropriately enables the works and activities associated with the Scheme.

4.2 As stated by the s42A officer, Mackenzie District Council has made the choice of reviewing its District Plan in parts[1]. For Meridian, this creates some difficulties as how the individual parts integrate and the overall effect of the District Plan on the operational, maintenance and refurbishment needs of the WPS.

4.3 While not wanting to labour this point what this means for PC18 is as follows:

a) In each part of the reviewed District Plan that regulate the activities that affect the WPS, Meridian must treat each reviewed chapter as a standalone set of provisions. It is for this reason, Meridian sought comprehensive provisions for the WPS that otherwise may have been found in aligned chapters of the District Plan.

b) Meridian has not been able to fully understand how regulation of SONS will affect the scheme, particularly as the final identification of SONS is yet to occur. While Mr Harding outlines that he has undertaken a SONS review, the outcomes from this

[1] Evidence of Liz White, paragraph 23

are yet to be tested in a First Schedule plan process. This is important to MEL as the number, location and accompanying rules applying to any new SONS that Mr Harding may recommend as appropriate, will have implications for the ongoing operation and maintenance of the WPS.

5 THE WAITAKI POWER SCHEME (WPS)

5.1 In this section I will more fully describe the WPS, focusing on the scheme which lies in the Mackenzie District.

5.2 The WPS is divided into two parts: the first part includes the Tekapo A and Tekapo B hydro-generation assets and associated canal network which are owned and operated by Genesis Energy Limited. This is now referred to as the Tekapo Power Scheme; the balance of the WPS is owned and operated by Meridian, which I refer to as the Waitaki Power Scheme. When I am referring to both, I use the term Combined Waitaki Power Scheme.

5.3 Appendix 1 provides a schematic of the whole operation of the Combined WPS (Meridian and Genesis) showing its operational parts, associated storage and operational output.

5.4 The Scheme is designed as a generation chain, with water from the top of the catchment passing through multiple Power Stations. All inflows to the catchment above the Waitaki Dam, unless otherwise abstracted, pass through one or more power stations and hence are available to generate electricity.

5.5 The Combined WPS is the largest hydro-electric power scheme in New Zealand, with controllable and flexible generating capacity of 1,723MW and hydro storage capacity of approximately 2,530 GWh, primarily in Lakes Tekapo (approximately 780 GWh) and Pukaki (approximately 1,750 GWh).

5.6 The WPS owned and operated by Meridian and located within the Mackenzie District consists of:

- Pūkaki high dam
- The Pūkaki and Ōhau and Ōhau A Canals
- Lake Ōhau Gate Control Structure (Gate 20)
- Lake Ōhau Weir, Northern Side
- The Ōhau A Power Station
- Lake Ruataniwha, Northern Side (excluding the Ruataniwha Control Gate Structure (Gate 22)).

5.7 The WPS influences the following waterbodies either wholly or in part within Mackenzie District under the operating easements from Land Information New Zealand (LINZ) and includes the entire margins:

- Lake Pūkaki
- The Pūkaki River
- Lake Ōhau (Waitaki District Council).
- The Northern Side of the Upper Ōhau River
- Lake Ruataniwha
- The Northern Side of the Lower Ōhau River
- The Northern Half of Lake Benmore

5.8 Appendix 2 provides a visual aid on the geographic location of some of the features listed in the bullet points above.

6 THE IMPORTANCE OF THE WPS'S CONTRIBUTION TO NEW ZEALAND

6.1 The Combined WPS is fundamental to achieving the Government's aspirations for renewable electricity generation and climate change. It can only provide these services to New Zealand if there is the ability to appropriately operate, maintain and refurbish the scheme.

6.2 The Combined WPS provides on average around 18% of NZ's annual electricity generation requirements and plays an important role in national electricity supply by being able to alter its generation output as national demand changes daily, weekly and within the seasons, at times contributing significantly more (around 30% of total generation) to help meet peak demand.

6.3 The scheme can respond quickly to changes in supply, a function that will become increasingly more important in enabling greater levels of inflexible and/or intermittent renewable generation (e.g. solar and wind generation) when added to the electricity system over time.

6.4 The Combined WPS holds around 60% of national hydro storage capacity, all located within Mackenzie District. This storage is critical to enabling the traditionally higher summer inflows (from snow melt) into these lakes to be retained so that hydroelectricity can be reliably generated during winter when consumer demand is higher.

6.5 There is no readily available alternative generation in New Zealand that could substitute the volume of electricity produced by the Scheme.

6.6 The WPS is recognised as being nationally significant due to its national contribution to electricity generation and supply and its hydro-storage capabilities. Statutory documentation corroborates this view with the Canterbury Regional Policy and the National Policy Statement for Freshwater Management using the term 'nationally

significant' for the WPS. Ms Ruston's evidence provides further commentary on these two documents and this term.

6.7 Meridian acknowledges that New Zealand's energy demand has been growing steadily and is forecast to continue to grow. Increased energy demand is seen in recent announcements relating to the electrification of industries and transportation. The WPS is recognised as vital infrastructure in New Zealand's toolkit for decarbonising the New Zealand economy. The Climate Change Commission 2021 Draft Advice for Consultation dated 31 January 2021 suggests that responding to climate change by decarbonising our economy is a key national policy objective and a priority area for action including increasing our total renewable energy. Accordingly, maintaining and increasing generation of electricity from renewable sources is an important aspect of meeting national objectives relating to climate change.

7 WPS CORE LAND AND OPERATING EASEMENTS AND LAND MODIFICATIONS

7.1 From an indigenous vegetation perspective, much of the land Meridian manages as its core land and through its operating easements is highly modified from the construction and the ongoing operation of the WPS. As such, there is very little, if any, original vegetation remaining. What is present is vegetation that has re-established since construction which essentially should not be there and could be removed from operational, maintenance and refurbishment activities.

7.2 Further explanation regarding Core Land and Operating Easements and the modifications to these areas from the WPS is set out below.

Core Land

7.3 Core Land is land owned by Meridian and is managed for hydro-generation purposes. These are existing areas Meridian holds ownership over, generally tightly sited around Meridian's assets. These areas have been extensively modified to provide for the construction, operation, maintenance, and the refurbishment needs of the scheme.

7.4 Core land provides Meridian the land tenure rights to operate, maintain, and refurbish its assets. This can include the day-to-day activities such as surveillance, asset maintenance and long-term actions such as providing water overflow paths, protecting source of civil construction material and allowing storage and management of such materials.

7.5 By way of example, the core land at Pūkaki High dam provides a source of material for the operational and refurbishment needs of the canals. This includes being a source of canal lining material if this is needed in the future. Further, as can be seen from visiting the site, this land is used to stockpile rock and other material necessary for the ongoing

maintenance or refurbishment of the Pūkaki High Dam and for erosion protection around the shoreline of Lake Pūkaki.

7.6 The supporting functionalities of the core land is the purpose for Meridian's ownership of these areas.

7.7 The photos provided in Appendix 3 are provided to give a visual understanding of the modifications undertaken. Each photo is labelled with its location and approximate date. In summary:

a) Photograph 1 shows the extent of the working of the Core Land at the Pūkaki High Dam, when the High Dam was constructed in the 1970s. As can be seen, most of the land surface was modified.

b) Photo 2 shows the effect of the single overland flow from the Pūkaki Canal through the 'topple blocks' to the Pūkaki River in 1979. As can be seen, the flow significantly changed the land surface in this overflow channel.

c) Photo 3 is an example photo of the extent of work within the canal corridors, with this photo capturing the earthworks at the Pūkaki, Ōhau and Ōhau A canal intersection during 1975. As can be seen, all the land in these corridors was effectively modified.

d) Photo 4 shows the workings associated with the construction of Ōhau A Power Station during 1974.

e) Photo 5 shows the workings associated with the creation of the Lake Ruataniwha Dam and Control structures during 1977.

<u>Operating Easements</u>

7.8 The operating easements are areas of land which Meridian has an operation easement over. This is Crown owned land where the Crown has provided an easement over and the aim is to enable the use of that land for renewable energy generation. The purpose of the easement is to provide for activities undertaken as part of the operation and management of the hydro facilities associated with the scheme.

7.9 For example, it enables Meridian to do anything to the land which it needs to do for electricity generation purposes. It provides for Meridian to manage water over such land, submerge land, control flooding, erode the land above the water level and the ability to undertake works and surveillance, and to control public assess when it is unsafe for such assess to occur.

7.10 Further, it authorises Meridian to store water and install and operate hydroelectricity water works and provides ancillary rights to facilitate that. The functions of the operating easements was considered and described in the High Court Decision between The Crown, Guide Hill and Meridian Energy.[2] The High Court Decision outlines the purpose of the operating easement and states:

> *"[3] The target land is subject to an all-encompassing easement registered in favour of the second defendant, Meridian Energy Ltd. It enables Meridian to do anything to the land which it needs to do for electricity generation purposes, including entry and if necessary, controlling flooding. It may also do any necessary erosion work[3]."*

7.11 Furthermore, that the operating easement is:

> *"…plainly a component of the hydroelectric scheme and that it performs a role unchanged from the date of acquisition.[4]"*

7.12 Operating easements are held over the WPS lakes all or partly within Mackenzie District - Lake Pūkaki, Lake Ruataniwha, Lake Benmore[5] and Lake Ōhau.

7.13 The operation and construction of the WPS has resulted in the raising of Lake Pūkaki. Initially the lake was raised by 9m in the 1950s and by a further 37m in the 1970s, enabling this lake to become the battery of New Zealand's electricity supply. Lakes Ruataniwha, Benmore, Aviemore and Waitaki are all man-made lakes that have been formed as a result of the WPS construction and play important roles in the operation of the scheme.

7.14 As with the raising of Lake Pūkaki, all the lake levels are modified and regularly move up and down (in accordance with Meridians operating consents) to facilitate the generation of electricity at the power stations and in response to hydrological conditions. The operating easement over the lakes preserves the capacity for renewable energy generation.

7.15 Lake Ōhau is captured within the operating easements and is located within the jurisdiction of Waitaki District Council and this lake is managed within its natural operating range.

7.16 In addition to the operating easements over the lakes, Meridian holds operating easements over certain rivers within the Mackenzie District, this includes the Pūkaki River, Upper Ōhau River and the Lower Ōhau River.

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[2] *GUIDE HILL STATION LIMITED v ATTORNEY-GENERAL & MERIDIAN ENERGY LIMITED* [2019] NZHC 3216 [6 December 2019]

[3] *GUIDE HILL STATION LIMITED v ATTORNEY-GENERAL & MERIDIAN ENERGY LIMITED* [2019] NZHC 3216 [6 December 2019], Paragraph [3]).

[4] *GUIDE HILL STATION LIMITED v ATTORNEY-GENERAL & MERIDIAN ENERGY LIMITED* [2019] NZHC 3216 [6 December 2019], Paragraph [16]

[5] For completion, I note that the Operating Easement over Lake Benmore is fully in place within Mackenzie District, but has yet to be fully completed within Waitaki District.

7.17 The Pūkaki River is predominately fully diverted by the upstream Pūkaki Dam and gate structures and is hence dry. During spill or flood events water flows back down these channels occasionally. This river has been significantly modified as a consequence of the construction and operation of the WPS. The ability to manage spills and floods via the Pūkaki River is essential to ensuring lake levels do not overtop the safe operational limits of the infrastructure.

7.18 The Upper Ōhau River and Lower Ōhau River is the boundary for the Mackenzie / Waitaki jurisdiction with half of the river falling within each District. The Upper Ōhau River receives constant flow between approximately 8 and 12 cumecs from the siphon located at the weir at Lake Ōhau in accordance with the requirements of the Waitaki Catchment Water Allocation Regional Plan.

7.19 The Lower Ōhau River is predominately fully diverted by the upstream Ruataniwha Dam and gate structures but has a small base flows (in the order of one or a few cumecs) as a result of the emergence of groundwater, before receiving flow from the Twizel River. The geomorphology of the Lower Ōhau River was significantly modified by the Ōhau A power station flows in the 1980s before Ōhau B and C power stations were commissioned.

7.20 The operating easement over the rivers provides overflow, spill and flood paths for water and provides the ability to undertake works and surveillance, and to control public assess when it is unsafe for such assess to occur.

7.21 The photos provided in Appendix 3 provide a visual understanding of the modifications undertaken. At paragraph 7.8 I describe the level of modification associated with the photos provided.

8 THE IMPLICATIONS OF PROPOSED PLAN CHANGE 18 ON THE OPERATIONS OF THE NATIONALLY SIGNIFICANT WPS

8.1 Meridian is concerned that PC18 may prevent, or frustrate, the necessary ongoing operation, maintenance and refurbishment of the WPS by imposing undue regulatory hurdles and increasing inefficiencies.

8.2 There are two types of practical implications for Meridian and these include Meridians ability to (i) maintain and refurbish (i.e. upgrading existing infrastructure) the WPS and (ii) operate and spill water. In particular Meridian must also strictly adhere to health and safety obligations and requirements.

i. <u>Maintain and refurbish the WPS</u>

8.3 Consistent with the scale and age of the infrastructure, Meridian operates an active and comprehensive Asset Management Programme (AMP) to ensure the efficient and effective operation of the WPS. This results in a constant and ongoing requirement for maintenance and refurbishment activities appropriate for the WPS.

8.4 Central to the AMP is Meridian's well established and comprehensive Dam Safety Assurance Programme (DSAP).

8.5 Both the AMP and DSAP programmes seek to, manage, upgrade and mitigate the risk associated with dams and canals and ensure the efficient and effective operation of the scheme.

8.6 Operations and tasks under these programmes can be periodic, infrequent and not predictable, such as managing significant floods, a canal safety event, or supporting specific civil engineering works. It also includes regular dam safety surveys, inspections, testing and engineering works to monitor, test, improve or upgrade the existing assets. Between such events and works, it is necessary for Meridian to manage the land to ensure it is capable of supporting these operations.

8.7 To illustrate, I will now discuss examples of how this may occur.

8.8 In the context of Plan Change 18, dam safety maintenance activities involve the removal of indigenous and exotic vegetation from the lines of sights for deformation surveys.

8.9 The deformation surveys require clear lines of sight, in the form of a 10m corridor between the two survey points. Vegetation within the lines of sight can compromise the survey and as a result any vegetation within the sight corridor is cleared (either exotic or native). Earth movement of millimetres can have impacts on the hydro infrastructure so the surveys have to be highly accurate and reputable.

8.10 The ability to clear vegetation from the lines of sight without regulatory intervention is critical to Meridians ability to operate, maintain and enhance the operations of the hydroelectricity scheme.

8.11 As a second example, vegetation is required to be cleared from dam faces and canal embankments (exotic and native) for dam safety purposes. Vegetation root systems gravitate to water, on canal embankments this means that the root systems can penetrate the lining of the canals seeking that water source. The penetration of the root systems results in cracks to the linings (once they have made their way in), which then provides a route for water to get in. Water moving through a canal structure can be a serious risk to the integrity of the structure. Compromising the linings over time can cause a structure to fail.

8.12 Thirdly, vegetation on dam faces can hinder the visual observations of the structures. Vegetation can hide small holes and depressions. If small holes and depressions are left undetected this can hide an emergent issue that can lead to a larger problem. It is important that visual inspections and surveys can be easily observed and any changes to the landform around the WPS infrastructure be acted on appropriately and without unnecessary delay.

8.13 Other maintenance activities that involve vegetation clearance includes, but is not limited to:

- Aerial spraying.
- Mechanical removal of pest species (predominately wilding pines).
- Hand spraying of all vegetation from canal embankments and dam faces.
- Clearance around culverts and monitoring equipment (to prevent vegetation from impeding flow or blocking access to monitoring gear).
- Stockpiling and clearance of area for stockpiling.

8.14 Finally, I note that the above are 'normal' maintenance activities. In addition there are larger one-off activities that may be required in the future to respond to the need to reform, reline, or undertake major repairs of any of Meridian's civil structures, including canals, dams, weirs, stilling basins and the like.

i. Refurbishment

8.15 In reference to refurbishment, Meridian has a number of buildings and smaller infrastructure located with the WPS. At some point in time, these smaller outbuildings may need to be refurbished.

8.16 As way of example, Meridian is currently investigating the upgrade of the building holding the electronical and monitoring equipment at Pūkaki Spill gates (Gate 19). The upgrade will support technological improvements and ease of access for staff monitoring and using the equipment and will require a new building to house the equipment.

8.17 In this circumstance the building is likely to be placed on the existing hardstand area, but it could arise that refurbishment or new building platforms are established on vegetated ground and ground that may have indigenous vegetation within it.

8.18 In such instances Meridian seeks that PC18 provides for refurbishment activities (on areas that do not contain significant indigenous vegetation and significant habitats of indigenous fauna) as a permitted activity and there is a consenting pathway as described in Ms Ruston's evidence in an area that contains significant indigenous vegetation and significant habitats of indigenous fauna.

ii. Operate and Spill

8.19 Meridian needs to operate the WPS to pass water when it needs to in order to generate electricity and to ensure the safety and integrity of the WPS.

8.20 This can include fluctuations in lake levels, gate-spill testing and spill to manage flood events.

8.21 Meridian supports the inclusions of a specific set of rules for indigenous vegetation clearance associated with the WPS and supports the permitted activity status for clearance associated with emergency, operational and maintenance needs.

8.22 A frequent example of managing water within the scheme is the management of floods and large weather events in the catchments. The operational activity for such events includes the spilling of water from the control gates.

8.23 A very less frequent example of managing water is the management during an emergency and this includes the use of the Pūkaki topple blocks. To provide further context to this, the WPS has been constructed to include design features within the infrastructure which allows water to be managed and released in the case of an emergency. A clear example of such a design feature is the toppling blocks along the Pūkaki Canal and located downstream of Gate 18. In the event of an emergency, water can be released from the canal via the toppling blocks and channelled into the Pūkaki River.

8.24 Indigenous vegetation within the release channel during operational flood events or emergencies would be stripped clear. Therefore, the permitted activity status for indigenous vegetation clearance from operational, maintenance and emergency activities is important to Meridian's ability to operate and manage the hydroelectricity scheme and is important to the safe operation of the WPS.

8.25 The photos in Appendix 4 provides a visual context to the potential volumes of water released through the Pūkaki spill gates and into the Pūkaki River in a flood event that can clear vegetation.

8.26 Two matters worth connecting in this example and Appendix 4 is the operational and spill needs of the WPS and the regulation of SONS and vegetation clearance within the WPS.

8.27 It is acknowledged that the Pūkaki River is a listed SONS (45) in the operative District Plan. This SON is geographically mapped from the Pūkaki Spill Gate and Diversion Culvert to the Tekapō River and directly in the flow path of the Pūkaki High Dam. Meridian has consistency expressed that the operation, maintenance and refurbishment needs of the WPS shall be provided for by the regulatory framework. Meridian maintains that position.

8.28 Appendix 5, Photo 1 and Photo 2 illustrates the use of the topple blocks and the land condition following the flow in 1979 when flow from the canals caused the use of the topple blocks.

9 CONCLUSIONS

9.1 The WPS is nationally important infrastructure and makes a significant contribution to New Zealand in meeting its climate change obligations.

9.2 The scheme can respond quickly to changes in supply whilst still providing a battery for the country's energy needs. A robust and reliable renewable energy infrastructure is vital to meeting the climate change obligations and the countries increased electrification. The National Policy Statement for Renewable Electricity Generation provides overarching guidance's for regulatory frameworks highlighting that Regional and District plans shall provide for the development, operation, maintenance and upgrading of renewable electricity generations activities throughout New Zealand.

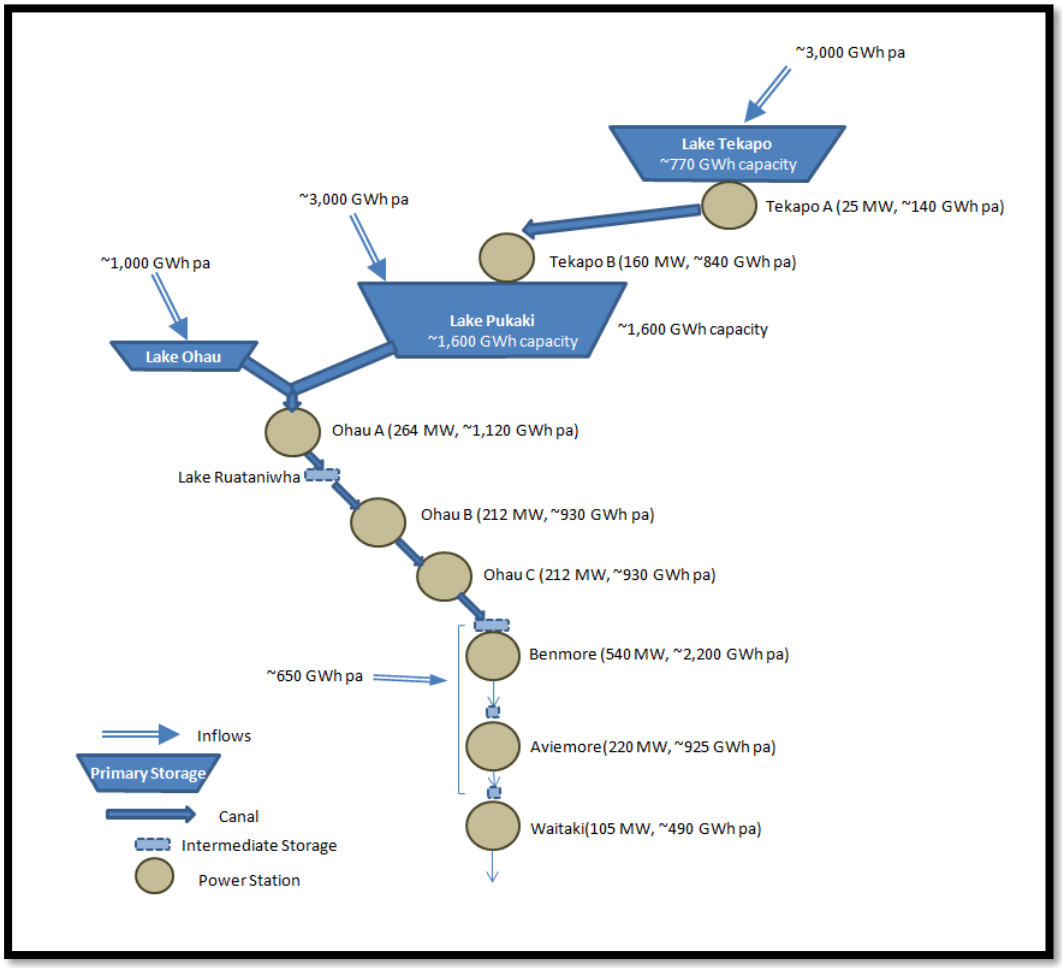
9.3 Meridian is seeking to ensure the provisions and changes promoted through Plan Change 18 are appropriate in providing for a regulatory environment that ensures the retention of the WPS's existing renewable energy generation and does not foreclose the ability to increase generation capacity. It also needs to appropriately enable the works and activities associated with the Scheme maintenance, operation and refurbishment. Examples of works undertaken by Meridian are fully explored in section 8 of my evidence.

9.4 Meridian seeks the relief provided by Ms Ruston's drafting solutions in her evidence which is recommended to the Panel through appropriate amendments to the objectives, policies and rules of Plan Change 18.

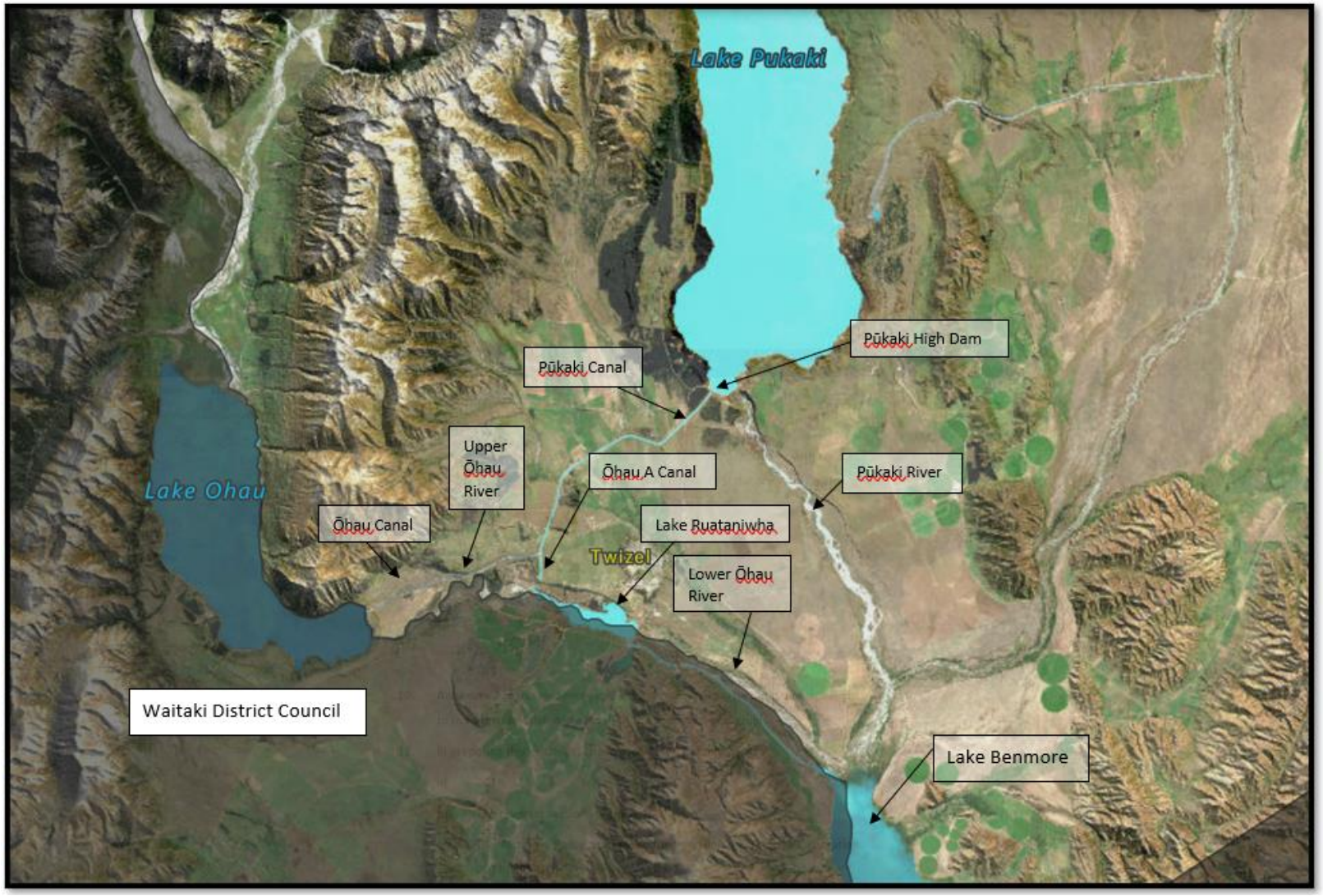
C L Bryant

12th February 2021
Catherine Bryant

Appendix 1 – Schematic Diagram of the Combine Waitaki Power Scheme.



Appendix 2 – Map of the WPS in MDC



Appendix 3 – Core Land Modifications

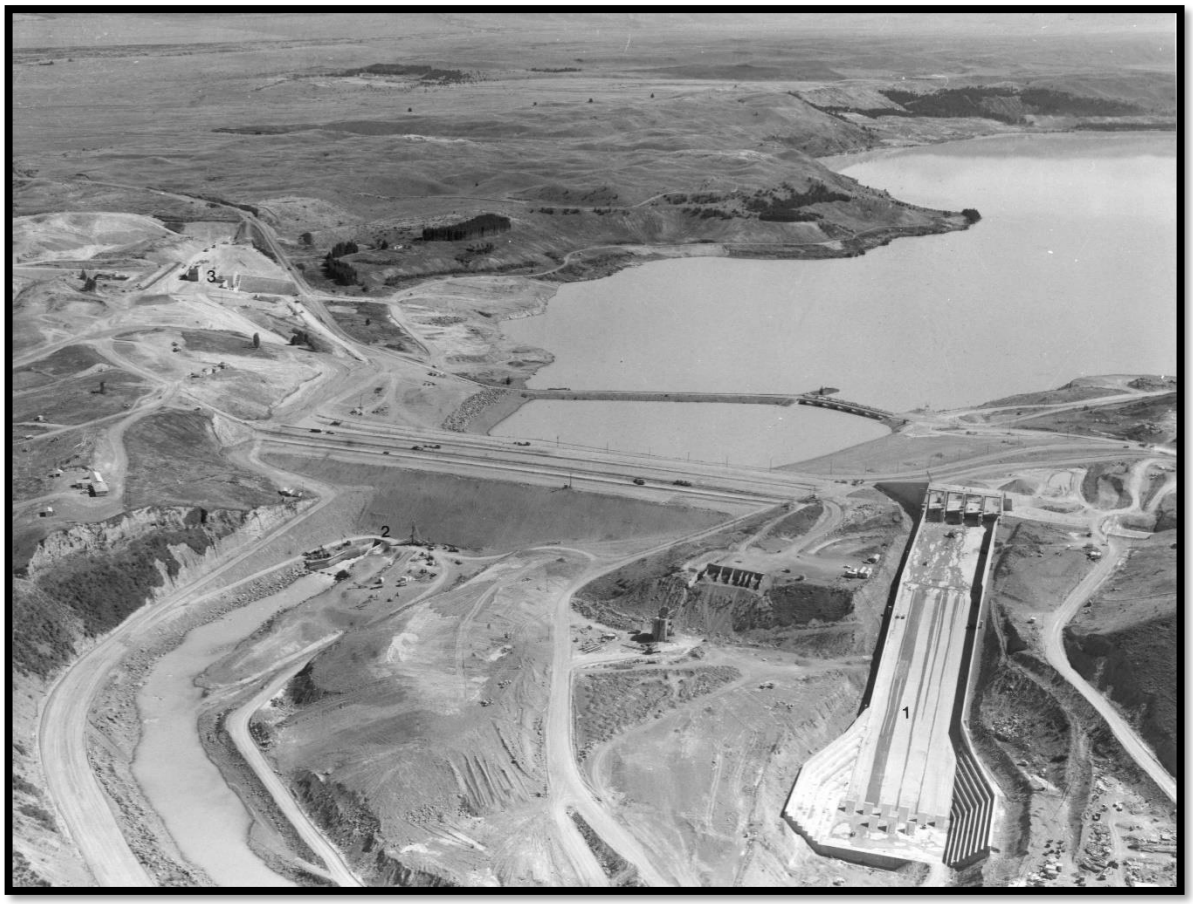


Photo 1: The working of the Core Land at the Pūkaki High Dam, when the High Dam was constructed in the 1970s

Photo 2: Land condition following the flow from the Pūkaki Canal through the 'topple blocks' to the Pūkaki River in 1979.

Photo 3: Work within the canal corridors, Pūkaki, Ōhau and Ōhau A canal junction. Photo taken looking upstream from the now Ōhau A Power Station during 1976.

Photo 4: workings associated with the construction of Ōhau A Power Station – 1974.

Photo 5: workings associated with the creation of the Lake Ruataniwha Dam and Control Structures - 1977

Appendix 4 – Helicopter View of December 2010 floods of the Pūkaki River

Photo 1: Helicopter view of the December 2010 flood looking down at the Pūkaki River.

Photo 2: Helicopter view of the Pūkaki River (nearing lake Benmore) during the December 2010 floods.

Appendix 5 – The use and condition of the land following the flow from the toppling blocks in 1979

Photo 1: Pūkaki Canal topple blocks during 1979

Photo 2: Land condition from the Pūkaki Canal through the 'topple blocks' to the Pūkaki River in 1979.