Before the Proposed Timaru District Plan Hearings Panel

Under	the Resource Management Act 1991 (the Act)
In the matter of	The Proposed Timaru District Plan – Hearing A, Part 1: • **Introduction, General Provisions, General Definitions and High-Level Strategic Directions**
Between	**Timaru District Council**
And	**Transpower New Zealand Limited** Submitter 159 and Further Submitter 159FS

Statement of evidence of Sarah Shand for Transpower New Zealand Limited

Dated 22 April 2024

1. Executive Summary

1.1. Transpower New Zealand Limited ("Transpower") owns and operates the National Grid, which transmits electricity throughout New Zealand from energy generation sources to distribution networks and large direct-connect customers. Transpower has a variety of assets within the Timaru District comprising nine transmission lines and two substations.

1.2. While a resilient National Grid remains at the heart of New Zealand's energy future, climate change has become a central issue for governments globally and hence for Transpower as a responsible owner and operator of the National Grid on behalf of New Zealanders. In this role, Transpower will play a critical role for New Zealand in meeting its zero carbon aspirations, by both investing in its existing National Grid assets and enabling connections to new sources of renewable energy.

1.3. Transpower's submission seeks that appropriate planning provisions are included in the Timaru District Plan to ensure that Transpower is able to develop, upgrade, operate and maintain the National Grid to enable a sustainable, secure and reliable supply of electricity to the Timaru District, the Canterbury Region and beyond.

1.4. **Ms McLeod's** evidence addresses recommendations in the s42a reports for Hearing A "Part 1 and Overarching Matters; and Strategic Directions & Urban Form Development". **Ms McLeod** largely agrees with the s42a report conclusions and recommends that some further amendments are necessary and the most appropriate (in terms of the requirements of section 32 of the Resource Management Act 1991 ("**RMA**") to achieve consistency with, and give effect to (as appropriate), higher order provisions; to improve the efficiency, clarity and usability of the Proposed District Plan and achieve the purpose of the RMA. I concur with the amendments sought in Ms McLeod evidence.

Table of Contents

2. Qualifications and Experience

2.1. My full name is Sarah Lousie Shand.

2.2. I am employed by Transpower New Zealand Limited ('Transpower') as an Environmental Planner (part of the Environment Group). My relevant experience, qualifications, and commitment to comply with the code of conduct for expert witnesses are included in **Appendix A**.

2.3. I confirm that I am authorised to give this evidence on behalf of Transpower.

3. Scope of Evidence

3.1. My evidence will address the following:

a. Transpower and the National Grid;

b. Transpower's assets and projects within the Timaru district;

c. The National Grid's role in Aotearoa New Zealand's energy future; and

d. Conclusions.

3.2. The focus of my evidence for this hearing is to provide contextual information on Transpower and the role and importance of the National Grid. Further evidence of a more specific nature is expected to follow at subsequent hearings.

4. Transpower and the National Grid

4.1. Transpower is a State-Owned Enterprise that plans, builds, maintains, owns, and operates New Zealand's high voltage electricity transmission network – the National Grid. The National Grid links generators to distribution companies and major industrial users. It extends from Kaikohe in the North Island to Tiwai in the South Island and carries electricity throughout New Zealand.

4.2. New Zealand has become increasingly dependent on electricity. It is an intrinsic part of living and working in the 21st century. Electricity now accounts for approximately 26% of all energy used in New Zealand.[1] Each year, $6 billion worth of electricity is

[1] Energy statistics | Ministry of Business, Innovation & Employment (mbie.govt.nz)

traded on the wholesale electricity market.[2] Transpower, whose main role is to ensure the delivery of a reliable and secure supply of electricity to New Zealand, has a fundamental role in the industry and in New Zealand's economy.

4.3. Transpower is not a generator of electricity and has no retail sales of electricity. It can be considered a 'freight company' for electricity, in that it carries bulk electrical energy from where it is generated by companies such as Contact Energy, Meridian and Genesis to the local lines distribution companies (e.g. Alpine Energy for the South Canterbury Region, including Timaru) and some major users of electricity (e.g. Tiwai Point Aluminium Smelter and NZ Steel at Glenbrook).

4.4. Transpower also manages New Zealand's power system in real time. This role is known as the 'System Operator', and it's one carried out by Transpower under contract to the Electricity Authority[3]. As System Operator, Transpower operates the electricity market to ensure electricity transmitted through the National Grid is delivered whenever and wherever it is needed, 24 hours a day, seven days a week. This requires balancing electricity supply and demand in real time.

4.5. Transpower's main role is to ensure the reliable supply of electricity to the country. Transpower plays a significant part in New Zealand's economy, with all major industries, cities and communities being reliant on a secure and reliable supply of electricity. Figure 1 is a schematic of the electricity industry in New Zealand, with the National Grid assets being represented as '*Transmission*' and '*Substations*'.

[2] Clearing manager | Electricity Authority

[3] The Electricity Authority is an independent Crown entity responsible for the governance and regulation of New Zealand's electricity industry.

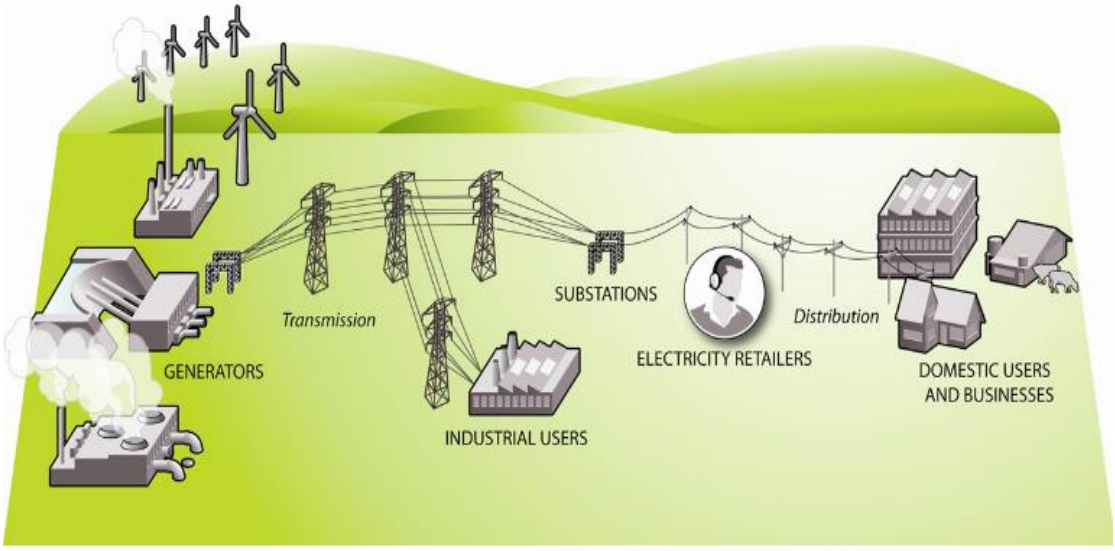

Figure 1. Electricity Industry in New Zealand (Source: MBIE).

4.6. As a State-Owned Enterprise, Transpower's principal objective is to operate as a successful business. It must operate within certain legislative constraints and report regularly to its shareholding Ministers (of which there are two: the Minister for State-Owned Enterprises and the Minister of Finance). Transpower is required to deliver and operate a National Grid that meets the needs of users now and into the future.

4.7. One of Transpower's key objectives therefore is to maintain and develop the National Grid, which contributes to New Zealand's economic and social aspirations. This objective is reflected in the single objective in the National Policy Statement on Electricity Transmission 2008 (NPSET), which is a national policy statement prepared under the Resource Management Act 1991 (RMA).

4.8. Prudent investment in the National Grid, long term transmission planning strategies, and developing technologies are crucial to ensure the most can be made from existing infrastructure. Proper maintenance and access to the National Grid is essential to defer the need for new lines and substations and to create better options for when new build is required. This will, in turn, help to limit the cost and environmental footprint of the National Grid for future generations. This is more critical than ever in the context of the Climate Change Response (Zero Carbon) Amendment Act 2019, which I expand on later in this evidence.

The National Grid Network

4.9. The National Grid comprises some 11,000 kilometres of transmission lines supported by towers and poles, and over 170 substations across the country. This is supported

by a network of some 300 telecommunication sites, which help link together and communicate with the components that make up the National Grid.

4.10. The National Grid comprises a high voltage backbone which runs the length of the country and links major generation (such as the South Island hydro lakes and central North Island hydro and thermal generation sources) to major loads in New Zealand's main urban centres. The bulk of the National Grid backbone was built around 60 years ago and comprises most of the 220 kilovolt (kV) lines throughout New Zealand, along with the High Voltage Direct Current (HVDC) link which connects the North and South Islands.

4.11. The National Grid provides connectivity between all sources of generation and consumers. Without the National Grid, consumers across New Zealand would be dependent on locally generated electricity which would be more expensive and less reliable. As such, the National Grid plays a significant role in the sustainable management of natural and physical resources (including the National Grid as a nationally significant physical resource).

5. Transpower's Assets and Projects within the Timaru District

National Grid Assets in the Timaru District

5.1. There are nine National Grid transmission lines that traverse the Timaru District, and two substations within it. Full details of these assets are provided in **Appendix B** of my evidence (and are listed on **page 4** of Transpower's original submission). In relation to this list of assets, I would like to note an error in Transpower's original submission, which I identified when preparing this evidence. In the list of assets owned and operated by Transpower within the Timaru District (on page 4 of its submission) we include '*Orari Substations (and associated designated transmission lines)*': although the necessary designations and resource consents have been obtained for them, construction (and by default, operation) of those substations has not commenced.

5.2. I have included a map showing National Grid substations and transmission lines in the Timaru District as **Appendix C** of my evidence.

5.3. The National Grid is an interlinked network. Electricity flows along transmission lines via lines supported by towers, poles or pi poles and can vary in any instant, depending on actual generation at power stations and the demand for electricity across New Zealand. In operating the electricity market as System Operator, Transpower uses

real-time information about electricity use by consumers and electricity generation available from generators to balance electricity demand and supply, ensuring optimum performance of the network.

5.4. For Transpower's transmission planning purposes, the Timaru District is located within the South Canterbury region as set out geographically in Figure 2.

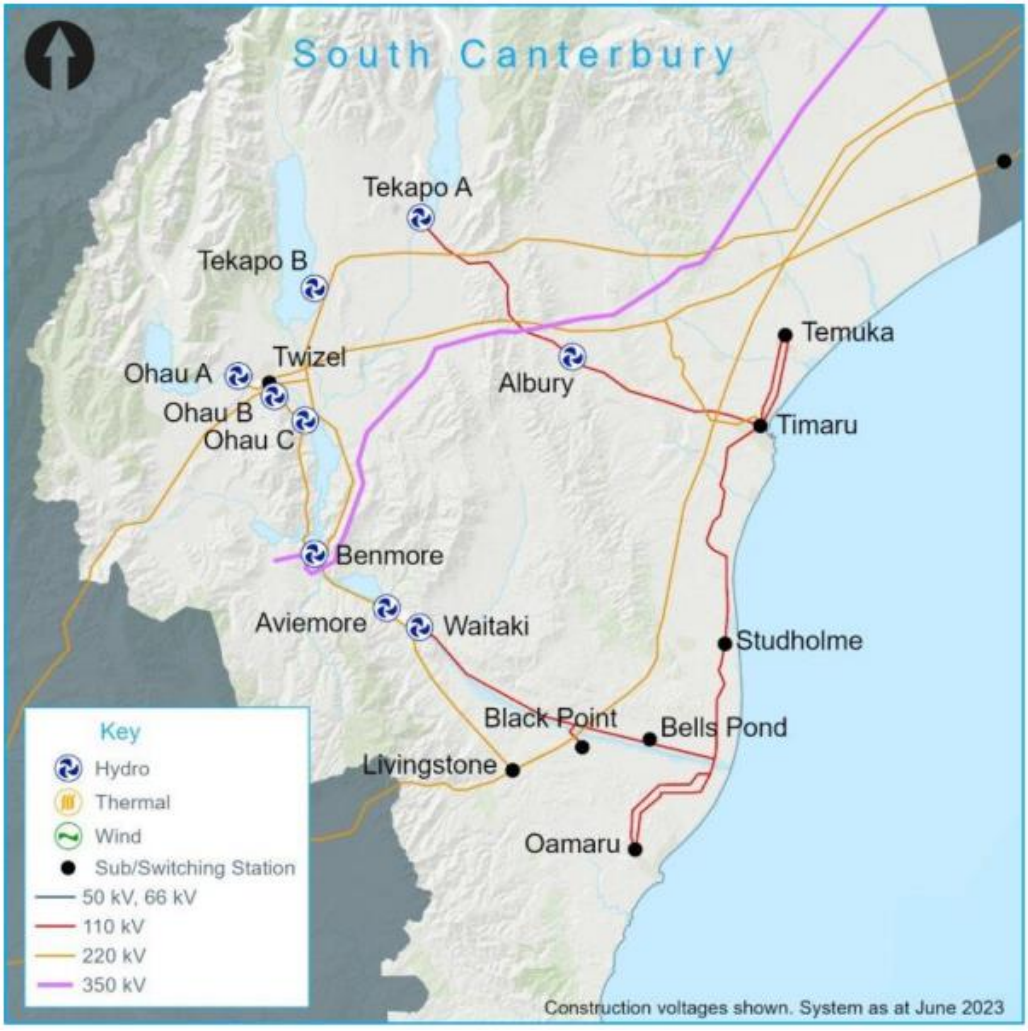

Figure 2: South Canterbury Region transmission (Source: Transpower Transmission Planning Report 2023)

5.5. The South Canterbury region includes a mix of significant provincial towns (Timaru and Oamaru) and smaller rural localities. The region supports a diverse range of primary based industries and Transpower expects significant electricity demand growth from initiatives to decarbonise these industries. The region also hosts the bulk of the South Island's hydro generation and the southern end of the High Voltage Direct Current ("HVDC") inter-island link.

5.6. Transmission within the South Canterbury region primarily comprises 220 kV and 110 kV transmission circuits, with interconnecting transformers at Timaru and Waitaki. Almost all loads in the South Canterbury region are supplied via the 110 kV transmission network, which runs up the east coast from Oamaru to Temuka. The 220 kV transmission circuits form part of the grid backbone.

5.7. The South Canterbury regional peak demand is forecast to grow by an average of 2.7 per cent per annum over the next 15 years, from 231 megawatts (MW) in 2023 to 347 MW by 2038. This rate of growth exceeds the national average growth rate of 2.0 per cent per annum. Within the Timaru District peak demand is also forecast to steadily increase at both the Temuka and Timaru substation over the next 15 years (from ~70-73MW in 2023, to 114/112MW in 2038).

5.8. Much of the 110 kV transmission network is at capacity, mainly as a result of increased load associated with the dairy industry, including dairy processing and irrigation. Supplying existing and committed new load via the 110 kV network is currently achievable but will become increasingly difficult to manage if potential new load centres are developed in the area.

Transpower's Projects in the Timaru District

5.9. There are several "customer connection" projects within the Timaru District in the early concept or investigation stages.[4] These projects include upgrades at both the Timaru and Temuka Substations, a solar generation project and upgrade/development required to accommodate the electrification of process heat.

5.10. Earlier in my evidence I mentioned the yet-to-be-constructed Orari substations – Transpower has obtained the necessary resource consents and designations for these and, based on current estimates, expects to construct them within the next 5-10 years. One of their main functions will be to reduce the effect of a circuit outage between the Waitaki Valley and Christchurch[5] and support any new load in the area.

5.11. Transpower is also carrying out business as usual maintenance and upgrade works on its assets within the District. There are projects in the delivery stage for both the Temuka and Timaru substations. Timaru has a transformer replacement underway at site and upgrades to the stormwater network. At Temuka, the outdoor 33kV switchyard

[4] Projects initiated to address a third-party request, such as National Grid connections to new sources of electricity generation or new substations to supply increased local electricity demand.

[5] By essentially cutting the circuits between the Waitaki Valley and Christchurch in half, the Orari substations would mean there was a reduced effect on voltage when there was an outage.

is being replaced with an indoor 33 kV switchgear building and upgrades to the stormwater network. Both sites have flood concerns and a project is underway to investigate mitigation options for Temuka, which has a greater flood risk. Regular maintenance works will continue to occur on transmission lines such as pole replacements, vegetation maintenance, access track works, foundation strengthening, tower painting and flood protection works.

6. The National Grid's Role in Aotearoa New Zealand's Energy Future

Transmission Tomorrow (2016)

6.1. Transpower's 2016 publication "*Transmission Tomorrow*"[6] set out Transpower's strategy for the future development of the National Grid for the next 30 years and beyond. Transmission Tomorrow documents Transpower's view that there is an enduring role for the National Grid. Transpower's lines and substations will be required for many years into the future to power the economy while enabling New Zealand's continued reliance on renewable forms of electricity generation, including from the South Island hydro lakes.

Te Mauri Hiko – Energy Futures (2018)

6.2. Greenhouse gas emission reduction targets were agreed by New Zealand at the 2016 Paris Climate Accord and have been translated into domestic climate policy via the Climate Change Response (Zero Carbon) Amendment Act 2019. In early 2018 Transpower published its white paper "*Te Mauri Hiko – Energy Futures*" ('Te Mauri Hiko')[7]. This project closely examined a range of electricity supply, demand and future technology scenarios and began exploring what will be required for New Zealand to maximise the potential of the energy opportunity it is facing, including meeting its Paris Climate Accord commitments.

6.3. Transmission Tomorrow was updated in 2018 and underlined the need to decarbonise New Zealand's economy. Transmission Tomorrow sets out how Transpower will go about planning and the developing the transmission system as demand for electricity increases following electrification of the transport and process heat sectors, and as new renewable generation is added to the system.

[6] Transpower - Transmission Tomorrow26052016_0.pdf
[7] TP Energy Futures - Te Mauri Hiko 11 June'18.pdf (transpower.co.nz)

Whakamana I Te Mauri Hiko – Empowering our Energy Future (2020)

6.4. In 2020, Transpower published a further document, "*Whakamana i Te Mauri Hiko – Empowering our Energy Future*" (2020)[8] which sets out a blueprint for how New Zealand might get to a zero-carbon future. It is consistent with the findings of both the Interim Climate Change Committee and the Productivity Commission that the greatest opportunities for emissions reductions outside of agriculture lie in the energy sector; specifically, around increasing the proportion of renewable electricity in the system and the electrification of emissions-intensive transport and process heat sectors.

6.5. As the economy electrifies in pursuit of the most cost efficient and renewable sources, the Whakamana i Te Mauri Hiko base case predicts that electricity demand is likely to more than double by 2050. Whakamana i Te Mauri Hiko suggests that meeting this projected demand will require significant and frequent investment in New Zealand's electricity generation portfolio over the coming 30 years, including new sources of resilient and reliable grid connected renewable generation. In addition, new connections and capacity increases will be required across the transmission system to support demand growth driven by the electrification of transport and process heat. Transpower's current estimation is that around 70 new National Grid connections will be required in the next 15 years, with this trend continuing through to at least 2050. Simply put, the National Grid is the infrastructure on which our zero-carbon future will be built. This work supports Transpower's view that there will be an enduring role for existing National Grid assets in the future, and the need to build new National Grid lines and substations to connect new, renewable generation sources to the electricity network.

7. Conclusions

7.1. Arguably, there has never been a greater need for the operation, maintenance, upgrade and development of the National Grid to be adequately enabled under the RMA framework. The National Grid is critical to the social and economic wellbeing of the Timaru District and our nation generally. It will also play a critical role in Aotearoa New Zealand's carbon zero commitment and mitigating the effects of climate change. This will necessitate the upgrade of existing, and construction of new, National Grid assets in the future. As an infrastructure asset of national significance, the NPSET

[8] Whakamana i Te Mauri Hiko - Empowering our Energy Future | Transpower

requires that the National Grid be recognised, provided for and protected in the proposed Timaru District Plan.

7.2. Transpower's relief sought through the Timaru District Plan hearing process will ensure integrated management of activities through the District Plan to provide for sustainable development of both the National Grid infrastructure and other natural and physical resources, both of which are critical for the future development of the Timaru District and New Zealand. Transpower will provide further evidence on matters of detail to support its relief on the Proposed District Plan in later hearing topics.

Sarah Shand

22 April 2024

Appendix A: Relevant Experience and Qualifications

1. I am an Environmental Planner and part of Transpower's Environment Group, whose responsibilities include:

    a) Strategic planning. This planning is achieved through the development and implementation of Transpower's corridor management programme at a national level and local level.

    b) Delivering Transpower's strategic policy approach on environmental regulations, legislation and council planning documents.

    c) Ensuring that all environmental approvals are obtained for Transpower's physical works, and internal staff, consultants and service providers are aware of, and able to comply with, their environmental obligations.

    d) Internal/external stakeholder engagement with Councils, iwi, developers and customers.

2. I have been employed by Transpower for over 9 years, and during this time my responsibilities have included:

    a) preparing environmental planning assessments, developing strategy and policies, and processes to deliver and monitor all the necessary environmental approvals for numerous major capex projects concerning both transmission lines and substations across the country.

    b) working with customers to secure the necessary environmental approvals to enable new generation and local electricity distribution connections to the National Grid.

    c) responding to landowners and developers to ensure that reverse sensitivity effects of any development are managed, and the National Grid is not compromised, and more importantly people are not harmed.

    d) partnering and working with stakeholders, ensuring that key relationships are informed, risks are identified, and reputations are enhanced.

3. I have a Master of Environmental Planning and Resource Management from Massey University and a Bachelor of Arts in English and Geography from Victoria University. I have over 9 years' experience working as an environmental planner, and I am a member (Intermediate) of the New Zealand Planning Institute.

4. I confirm I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. As I am employed by Transpower, I acknowledge I am not independent; however, I have sought to comply with the Code of Conduct. In particular, unless I state otherwise, this evidence is within my sphere of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Appendix B: National Grid Assets within Timaru District

Transmission Lines:

The following National Grid transmission line assets are within the Timaru District:

- Ashburton – Timaru A 110kV transmission line;
- Ashburton – Timaru B 110kV transmission line;
- Benmore – Haywards A 350kV HVDC transmission line;
- Benmore – Islington A 220kV transmission line;
- Christchurch – Twizel A 220kV transmission line;
- Glenavy - Timaru A 110kV transmission line;
- Roxburgh – Islington A 220kV transmission line;
- Timaru Deviation A 220kV transmission line; and
- Tekapo A - Timaru A 110kV transmission line.

Substations:

There are two National Grid substations within the Timaru District:

- Timaru Substation; and
- Temuka Substation.

Appendix C: Map of Transpower assets in the Timaru District