

**Before the Panel of Commissioners – Manawatu District Plan –
Proposed Plan Change 65: Outstanding Natural Features and
Landscapes**

Under The Resource Management Act 1991 (the Act)

In the matter of Proposed Plan Change 65

Between Manawatu District Council

Local Authority

And Transpower New Zealand Limited

Submitter S12 and Further Submitter FS02

Statement of evidence of Sarah McLean

Dated 13 November 2020

Executive Summary

1. Transpower New Zealand Limited (Transpower) operates the National Grid, which transmits electricity throughout New Zealand. The National Policy Statement on Electricity Transmission 2008 (NPSET) requires the National Grid to be appropriately recognised in the Manawatu District Plan. As such, Proposed Plan Change 65 (PPC65) to the operative Manawatu District Plan must give effect to the NPSET.
2. This means that PC65 must include provisions to recognise and provide for the national significance of the National Grid and manage the effects of the National Grid. The management of effects of land use and development on the National Grid is not of specific relevance to PC65.
3. Transpower adopts a thorough and systematic approach to planning for and establishing new National Grid assets. 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.
4. Transpower wishes to see appropriate planning provisions included in PC65 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 Manawatu District and nationally.
5. Transpower considers that the amendments set out in **Ms Whitney's** evidence (relating to activity status for new National Grid assets) will best give effect to the objective and policies of the NPSET and the RPS. I concur with the amendments sought in **Ms Whitney's** evidence.
6. The provisions Transpower seeks (specifically discretionary activity status and policy framework) in the Manawatu District under PC65 are generally consistent with the provisions Transpower seeks elsewhere around New Zealand to give effect to the NPSET.

Introduction

7. My full name is Sarah Louise Constance Olive McLean. I am a Technical Lead in the Environmental Policy and Planning Group at Transpower. My relevant experience, qualifications, and commitment to comply with the code of conduct for expert witnesses are included in **Appendix A**.

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

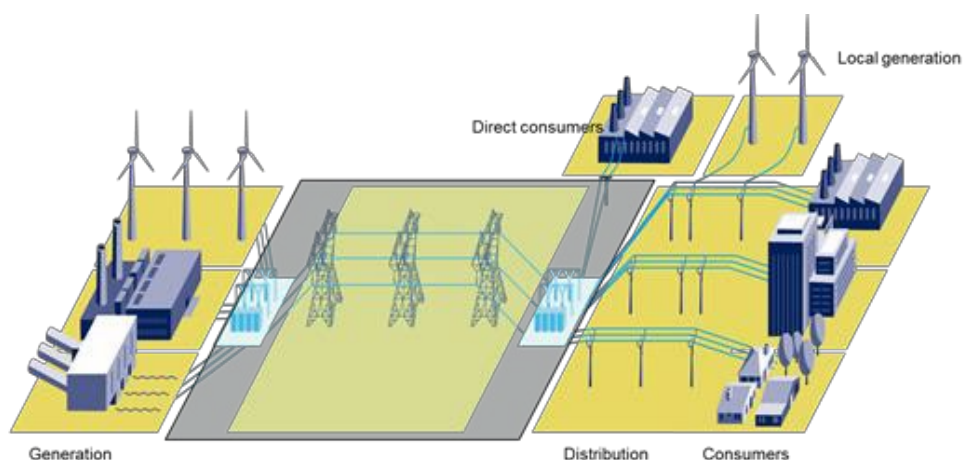
Scope of Evidence

9. My evidence will address the following:
 - i. Transpower and the National Grid;
 - ii. Transpower's assets within the Manawatu District;
 - iii. Transpower's process for establishing new National Grid assets;
 - iv. Conclusions.

Transpower and the National Grid

10. Transpower is a State-Owned Enterprise that plans, builds, maintains, owns and operates New Zealand's high voltage electricity transmission network – the National Grid (or "The Grid"). The Grid links generators to distribution companies and major industrial users. It extends from Kaikohe in the North Island down to Tiwai in the South Island and carries electricity throughout New Zealand.
11. 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 about 25% of all energy used in New Zealand. Each year, \$5 billion worth of electricity is traded on the wholesale electricity market. 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.
12. Transpower is not a generator of electricity and has no retail sales of electricity. It can be considered to be a 'freight company' for electricity, in that it carries bulk electrical energy from where it is generated by companies such as Contact Energy, Mighty River Power and Genesis to the local lines distribution companies (e.g. Powerco) and some major users of electricity (e.g. Marsden Point Oil Refinery, NZ Steel at Glenbrook and Tiwai Point Aluminium Smelter).
13. Transpower also manages New Zealand's power system in real time. In its role as System Operator, Transpower operates the electricity market to ensure electricity transmitted through the Grid is delivered whenever and wherever it is needed, 24 hours a day, seven days a week.
14. 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.



Source: Electricity Commission, *Electricity in New Zealand*, 2009

Figure 1. *Electricity industry in New Zealand.*

15. 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.
16. Transpower is required to deliver and operate a National Grid that meets the needs of users now and into the future.
17. 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 NPSET.
18. Prudent investment in the 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 Grid is essential in order 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.

The National Grid

19. The National Grid comprises some 12,000 km of transmission lines and around 166 substations across the country. This is supported by a telecommunications network of some 300 telecommunication sites, which help link together and communicate with the components that make up the National Grid.

20. The Grid comprises a high voltage backbone which runs the length of the country and links major generation (such as the geothermal power stations near Taupō) to major loads in the main cities. The bulk of the 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 between the North and South Islands.
21. Connected to this Grid backbone are regional Grid lines (also owned or operated by Transpower), which connect smaller generation stations and supply regional communities.
22. The Grid is an interlinked network. Electricity flows along transmission lines via lines supported by towers (pylons) or poles and can vary in any instant, depending on actual generation at power stations and the demand for electricity across New Zealand. As System Operator, in operating the electricity market, 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.
23. 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 an important role in the sustainable management of natural and physical resources.

Transmission Tomorrow

24. Transpower's 2016 publication "Transmission Tomorrow" (updated in 2018) sets out Transpower's strategy for the future development of the 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 local wind generation, power stations along the Waikato River, and the new geothermal stations commissioned near Taupō.

New Zealand's Paris Commitment and Decarbonisation

25. In early 2018 Transpower published its white paper "Te Mauri Hiko – Energy Futures" (Te Mauri Hiko). 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. 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 an important role in the sustainable management of natural and physical resources.

26. An updated strategy underlining the need to decarbonise New Zealand's economy, *Transmission Tomorrow*, was published in 2018. *Transmission Tomorrow* sets out how Transpower will go about planning and the developing the transmission system as demand for electricity increases as the transport and process heat sectors are electrified, and as new renewable generation is added to the system.
27. Since then Transpower has released a further document "Whakamana i Te Mauri Hiko – Empowering our Energy Future", 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.
28. 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 Transpower as a responsible owner and operator of the National Grid on behalf of New Zealanders. Technology continues to advance rapidly. Electricity is increasingly positioned as an energy source for whole economies, rather than just homes and some business processes.
29. 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 increase around 55% 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. Simply put, New Zealand's electricity transmission system is the infrastructure on which our zero-carbon future will be built.
30. This work supports Transpower's view that there will be an enduring role for the

National Grid in the future, and the need to build new National Grid lines and substations to connect new, renewable generation sources to the electricity network.

31. In terms of a brief summary, the National Grid:

- Transports electricity across the country (connecting generation to consumers);
- Supports New Zealand's national and regional economic growth;
- Plays an essential role in maintaining reliability and security of supply of energy;
- Provides a basis for investment decisions to be made by both suppliers and consumers of electricity;
- Enables competition among suppliers and retailers of electricity, thereby providing the basis for competitively priced electricity;
- Assists the development of new electricity generation technologies, including renewable energy, by providing access to markets;
- Enables the electrification of transport and process heat, without which there is no way in which our Paris Agreement and net-zero carbon economy commitments can be met; and
- Is predicted to play a key role in the decarbonisation of the economy.

Transpower's assets within Manawatu District

32. The National Grid lines that traverse the Manawatu District are:

- Bunnythorpe-Haywards A single circuit on steel towers (220kV)
- Bunnythorpe-Haywards B single circuit on steel towers (220kV)
- Bunnythorpe-Ongarue A single circuit on steel towers (110kV)
- Bunnythorpe-Mangahao A single circuit on poles (110kV)
- Bunnythorpe-Mangahao B single circuit on poles (110kV)
- Bunnythorpe-Woodville B single circuit on steel towers (110kV)
- Bunnythorpe-Wilton A double circuit on steel towers (220kV)
- Bunnythorpe-Wanganui B single circuit on steel towers (110kV)
- Bunnythorpe-Whakamaru A single circuit on steel towers (220kV)
- Bunnythorpe-Whakamaru B single circuit on steel towers (220kV)
- Bunnythorpe-Wairakei A single circuit on steel towers (220kV)

- Brunswick-Bunnythorpe A single circuit on steel towers (220kV)
33. A district map showing National Grid transmission lines is included in **Appendix A** to Transpower's submission and a copy is attached to this evidence.
 34. The Manawatu District is somewhat unique in that while there are no substations in the district, the Bunnythorpe substation immediately adjoins. The substation is a key Transpower asset, being the main connection between the HVDC link and the upper North Island. Without this substation there would be no through transmission to the upper North Island.

Transpower's projects in the Manawatu District

35. Given its location within the central North Island and proximity to the Bunnythorpe Substation, the Manawatu acts as a key transmission corridor. The focus of Transpower's activities in the Manawatu in the past has been on maintenance works, including reconductoring.
36. At this stage Transpower has no planned new transmission lines. However, the need for any new lines is dependent on new generation activities with Transpower required to provide the transmission connections between generation and distribution. For example, any new wind farms within the southern Hawkes Bay or within the Wairarapa may require new transmission lines across the Ruahine Ranges.

Establishing new National Grid assets

37. Since approximately 2005, when faced with the need to determine an appropriate route for the 400kV National Grid line between Whakamaru in the centre of the North Island and south Auckland, Transpower has applied a systematic methodology known as the "ACRE" process for route identification for major new lines/stations projects. This methodology was developed, taking into account international best practice and the need for the method to be able to demonstrate that Transpower had given "*adequate consideration to alternative sites, routes or methods of undertaking*" the work proposed when seeking to designate land. It also provided a means of progressively assessing and seeking to limit adverse effects on the environment, consistent with the RMA.
38. The ACRE model is based on a progressive filtering approach, where increasing and more specialised detail is provided on environmental, property and engineering constraints throughout the process to enable the identification of a preferred easement/site. Following identification of the easement centreline and

substation sites, Notices of Requirement (NoR) or resource consents would then be lodged with the respective Council(s) under the RMA for the purposes of securing designations both for the transmission lines and substations.

39. The generic ACRE process:

- highlights the stages of the NoR process and high-level principles derived from the RMA;
- outlines the objectives and outputs for each stage; and
- identifies process (actions to achieve output), internal deliverables (in-house functions), and external deliverables (consultants).

40. The key stages of the ACRE process are summarised as follows (note – these can be modified or combined, depending on the scale and nature of the project):

A – Area (identification of the wider study area within which the project might occur; undertaking constraints and opportunities mapping);

C – Corridor (identification and confirmation of alternative corridors, ranking and selection of preferred corridor);

Ri – Route i (selection and evaluation of a route, or alternative routes, within the preferred corridor, and consultation on one or more routes);

Rii – Route ii (confirmation of the preferred route, following public consultation);
and

E – Easement (identification and confirmation of the easement centerline – approximately 100m wide).

41. There are two further process steps, referred to as “D” and “S”:

D – Documentation (preparation of full documentation for lodgment with councils);

S – Statutory Process (Lodgment of documents for statutory approvals under the RMA, Council Hearings, Environment Court appeal process where relevant).

42. At the end of each stage, the model highlights estimated timeframes to complete each stage of the model process and perceived risk to complete each stage. Taking all the above factors into account, it is often the case that Transpower cannot avoid all effects from operation, maintenance, upgrade and development of its assets. In some cases, lines need to locate in areas which have special values due to functional needs, technical requirements and operational constraints.

Conclusions

43. The National Grid is critical to the social and economic wellbeing of the Manawatu District and our nation generally. The NPSET requires that the National Grid be recognised and provided for in the proposed plan change.
44. For the reasons set out above, Transpower requests that the Proposed Plan include the amendments outlined in **Ms Whitney's** evidence.
45. This relief will provide for sustainable development of the National Grid infrastructure whilst providing a robust policy and consenting framework that gives due consideration to the natural and physical environment.

Sarah McLean 13 November 2020

Appendix A – Relevant Experience and Qualifications

1. I am a Technical Lead in the Environmental Policy and Planning Group at Transpower. The Group's responsibilities include:
 - a) Strategic planning. This planning is achieved through the development and implementation of Transpower's approach to the NPSET at a national level and local level.
 - b) Delivering Transpower's policy approach on environmental regulations, legislation and council planning documents.
 - c) Ensuring the on-going and future protection of Transpower's network.
 - d) Ensuring that all environmental approvals are obtained for Transpower's physical works.
 - e) Managing third party interactions to ensure that Transpower's interests are appropriately maintained.

2. I have been employed by Transpower for 10 years, and during this time I have had experience working in various roles; including:
 - a) As an Environmental Advisor. This role involved preparing Transpower's carbon footprint report and leading initiatives to improve Transpower's sustainability.
 - b) As an Environmental Policy Advisor. This role involved providing input to and making submissions on central government policy to ensure the protection of National Grid assets. A key focus area was leading Transpower's response to the review of the National Environmental Standards for Electricity Transmission Activities (the NESETA).
 - c) As a Compliance Advisor. This role within Transpower's System

Operations division, involved ensuring compliance with the Electricity Industry Participation Code (the Code), and liaison with the Electricity Authority, who administer and enforce the Code.

- d) As the Team Leader – Environmental Consents and Compliance. This role involved leading the team that secures environmental approvals for the maintenance and replacement of all Transpower assets.
- e) As a Technical Lead. This role involves providing expert advice technical areas such as contaminated land, NESETA interpretation and Emissions Trading Scheme legislation, as well as leading Transpower’s environmental stewardship sustainability focus areas, encompassing biodiversity, waste management and discharges.

3. I have a Masters of Science with Honors in Plant Ecology and Bachelor of Commerce and Administration from Victoria University. I have 18 years’ experience working in environmental policy and planning..
4. I confirm I have read the 'Code of Conduct for Expert Witnesses contained in the Environment Court Consolidated Practice Note 2014. 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 the Manawatu District

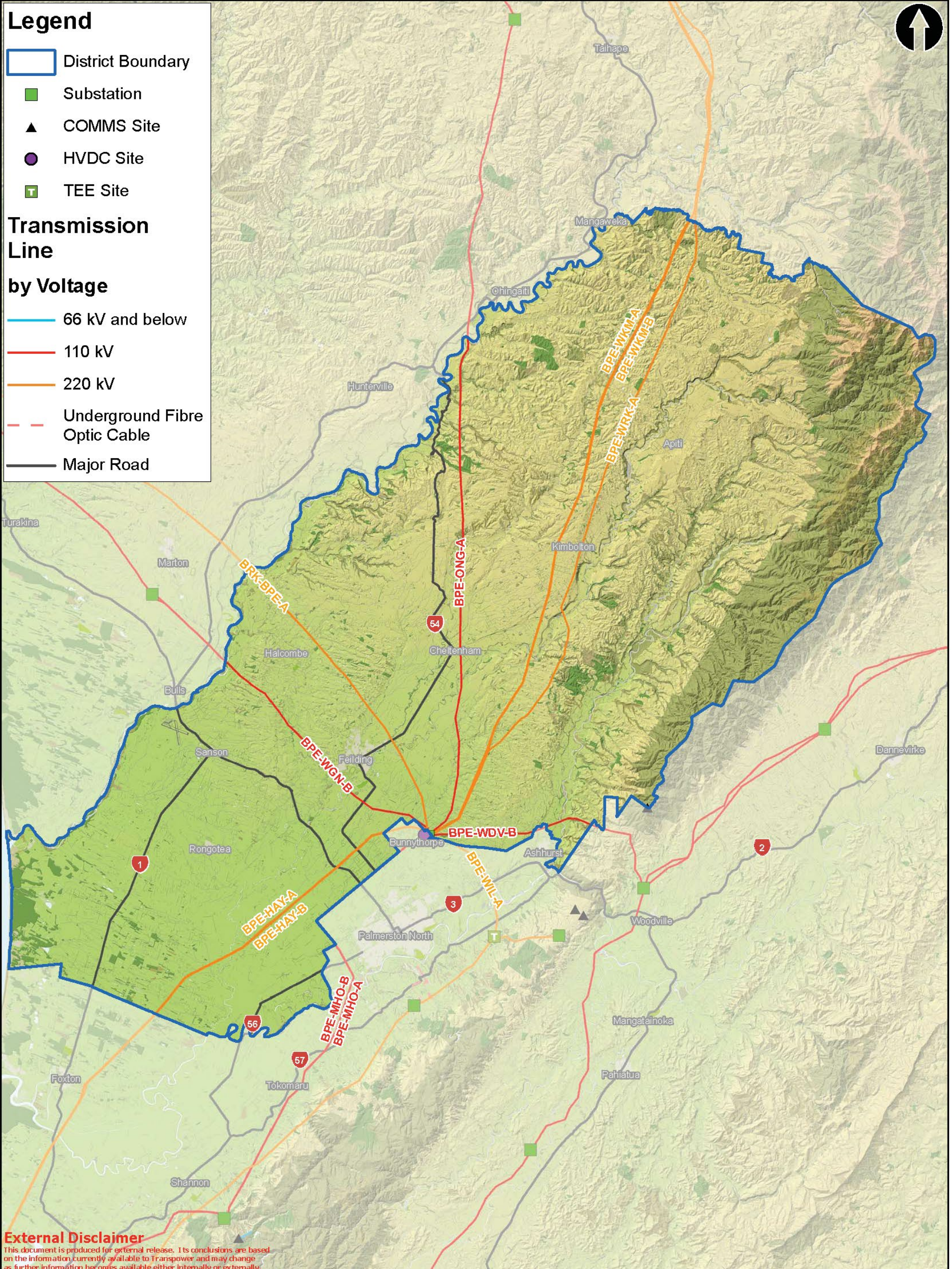
Legend

- District Boundary
- Substation
- COMMS Site
- HVDC Site
- TEE Site

Transmission Line

by Voltage

- 66 kV and below
- 110 kV
- 220 kV
- Underground Fibre Optic Cable
- Major Road

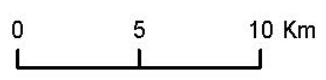


External Disclaimer
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Transpower Assets, Manawatu District

Projection: NZTM 2000 Scale: 1:285,000 Plan Size: A3P



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