

Before the Proposed Porirua District Plan Hearings Panel In Porirua

Under the Resource Management Act 1991 (the Act)

In the matter of the Proposed Porirua District Plan - Hearing Stream 4: Strategic Directions, Energy, Infrastructure and Transport, General District-Wide Matters

Between **Porirua District Council**
Local Authority

And **Transpower New Zealand Limited**
Submitter 60 and Further Submitter FS04

Summary of evidence of Benjamin Roy Cartwright for Transpower New Zealand Limited

Dated 14 February 2022

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1 Introduction

- 1.1 My name is Benjamin Roy Cartwright. I am employed by Transpower as an Engineer – Lines within the Tactical Engineering Team. I will proceed to summarise the key points from my statement of evidence dated 21 January 2022.

2 Activities undertaken by Transpower

Transmission lines

- 2.1 Overhead transmission lines include five basic components: conductors (wires); structures (poles or towers); insulator sets; foundations; and earthwires. These are described in **Appendix A** of my main statement of evidence.
- 2.2 These components are designed to perform specific functions, and it is often difficult to change their look, location, or size to minimise adverse effects without compromising that function.
- 2.3 Transmission line components require ongoing inspection and routine maintenance, to address aging, wilful damage, corrosion and degradation. The most frequent maintenance activities are:
- a foundation and tower refurbishment,
 - b tower, conductor and insulator maintenance or replacement;
 - c vegetation and tree control; and
 - d earth potential rise mitigation
- 2.4 Physical access to transmission lines is required for all maintenance and project work, including for staff, vehicles, helicopters and large construction equipment. A regulated transmission corridor is essential for providing adequate access and working space at the poles, towers and mid-span.

Access and under-build

- 2.5 Under-build can delay, restrict or compromise the ability of Transpower to undertake maintenance or project work. In order to undertake vital maintenance works, and upgrades if required, appropriate access to the National Grid must be maintained. Access to the National Grid is particularly important to consider when consent authorities are assessing proposals by third parties to change land use or to subdivide land.

- 2.6 When a system fault occurs, the Grid needs to be restored quickly to reduce impacts on businesses and communities throughout the Porirua District, and beyond. Mid-span under-build, particularly dwellings and buildings forming part of intensive developments, creates significant additional costs and delays for Transpower when restoring the Grid
- 2.7 Prudently designing buildings, structures or activities with the transmission line in mind ensures vital National Grid infrastructure is protected and can be maintained and upgraded.

3 Regulating third party activities around the National Grid

- 3.1 The transmission network gives rise to specific risks, such as lethal electric shocks. These risks increase if there are inappropriate activities located under the transmission lines, or in close proximity to them.

Risks arising from the National Grid

- 3.2 Transpower operates its assets as safely as possible, but there are risks due to the high voltages being carried on the network. Lethal electric shocks can be caused by earth potential rise, conductor drop and flashovers. Hazards can also be caused by trees, mobile plant and other materials coming into contact with, or close to, overhead lines.
- 3.3 Transmission lines can also cause concern or annoyance, because of how they look, their mechanical or electrical noise, electrical interference, and perceived health effects. These effects can lead to requests for Transpower to underground lines, relocate lines, or to raise or lower conductors.

Earthworks

- 3.4 Earthworks also need to be managed to take the lines into account in all areas. Earthworks can prevent physical access to transmission lines or reduce ground clearances to unsafe levels. Further, earthworks adjacent to towers or poles can undermine the stability of the structure foundations, causing the structure to lean or, worse, collapse. My evidence contains examples of the problems created by earthworks.¹

¹ Cartwright, 21 January 2022, Figure 22; Appendix B, Figures 1-4.

- 3.5 Transpower seeks to manage earthworks undertaken by third parties to mitigate, or at least significantly reduce, the safety risks described above. However, Transpower is comfortable with provisions that align with NZECP34:2001.

Sensitive activities

- 3.6 Sensitive activities, commercial buildings and intensive development (including some farm buildings) should be avoided beneath transmission lines because of electrical risk, annoyance caused by the transmission lines, and the challenges presented by these activities when Transpower needs to access, maintain, upgrade and develop the lines.

- 3.7 Hazardous substances, in particular, should be managed carefully near transmission lines. Poor management of these substances can lead to unacceptable risks to the wider public. For example, the establishment of a service station, with associated underground tanks, causes concerns from a risk perspective due to the potential ignition of fuel from EPR, transferred voltage or capacitive coupling induced sparking. However, if these issues are presented early on, they can be mitigated through simple design measures, reducing the risk to acceptable levels.

- 3.8 Transpower should be given the opportunity to comment on applications for subdivision in the vicinity of the corridor and lines, as these issues are best addressed early. For example, proposals for large-scale development can be designed to ensure that only appropriate activities, such as carparks, roads, stormwater infrastructure or open space, occur under the lines, as shown by the examples in Ms Eng's evidence.²

4 The National Grid Yard/ Corridor

- 4.1 The 12m National Grid Yard (either side of the centreline) is the area (measured horizontally) beneath the conductors in "everyday" wind conditions. A 12m setback around each tower or support structure is also required for access, maintenance and safety purposes. The wider National Grid Subdivision Corridor is the area sought for subdivision which extends to the width defined by the swing of the conductors in high wind conditions. These areas are the bare minimum to ensure that Transpower's maintenance, repair, upgrade and operation activities are not compromised.

Ben Cartwright

² Eng, 21 January 2022, paras 8.5-8.10.

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