

Before the Hutt City Proposed District Plan Hearings Panel

Under the Resource Management Act 1991 (the Act)

In the matter of the Proposed Lower Hutt District Plan –
**Hearing Stream 6 –
Infrastructure
Protection of Infrastructure**

Between **Hutt City District Council**
Local authority

And **Transpower New Zealand Limited**
Submitter 504 and Further Submitter FS12

**Statement of evidence of Sarah Louise Shand for Transpower
New Zealand Limited**

Dated 4 September 2026

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 direct-connect customers. Transpower owns and operates a number of assets within the Lower Hutt.
- 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 wishes to see appropriate planning provisions that give effect to the National Policy Statement for Electricity Networks 2008 (amended December 2025) ("**NPS-EN**") are included in the Proposed Lower Hutt District Plan ("**PDP**") 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 Lower Hutt and nationally. Within this policy context, the National Grid corridor provisions as recommended by the S42A author for the PDP generally accord with the model approach sought by Transpower for the National Grid throughout New Zealand.
- 1.4. **Ms Whitney** (Transpower's independent planning expert) largely agrees with the S42a report conclusions with only eight recommended amendments for the purpose of: achieving consistency with and giving effect to (as appropriate), higher order provisions; improving the efficiency, clarity and usability of the PDP and achieving the purpose of the RMA. I concur with the amendments supported by **Ms Whitney**, acknowledging the very confined nature of the outstanding points.

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2 Qualifications and Experience

- 2.1. My full name is Sarah Louise Shand. I am employed by Transpower New Zealand Limited as a Senior Environmental Planner within the Environment Group. My relevant experience, qualifications, and commitment to comply with the code of conduct for expert witnesses are included in **Appendix A**.
- 2.2. 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:
- 3.1.1. Transpower and the National Grid;
 - 3.1.2. Transpower's assets and projects within Lower Hutt;
 - 3.1.3. The National Grid's role in Aotearoa New Zealand's energy future;
 - 3.1.4. Transpower's approach to implementing the NPS-EN; and
 - 3.1.5. Conclusions.

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 (or "**the Grid**"). The 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 Zealand¹. Each year, \$6 billion worth of electricity is traded on the wholesale electricity market². 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.

¹ [Energy statistics | Ministry of Business, Innovation & Employment \(mbie.govt.nz\)](https://www.mbie.govt.nz/energy-statistics)

² [Clearing manager | Electricity Authority](https://www.electricityauthority.govt.nz/clearing-manager)

- 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., Wellington Electricity and PowerCo) 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. In its role 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.
- 4.5. 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.

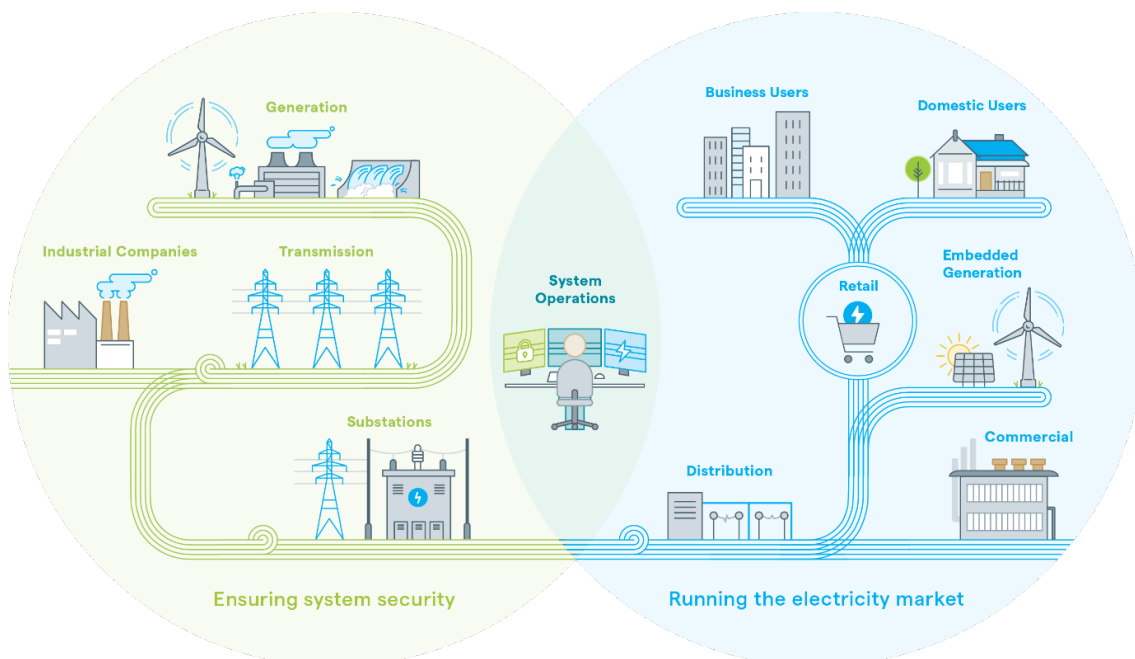


Figure 1. Electricity Industry in New Zealand.

- 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. 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.
- 4.8. 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 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 km of transmission lines and approximately 175 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 Grid comprises a high voltage backbone that 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 the main cities (e.g., Auckland, Wellington and Christchurch) as well as the regions. The bulk of the Grid backbone was built around 60 years ago and comprises most of the 220kV lines throughout New Zealand, along with the High Voltage Direct Current (HVDC) link between Benmore Substation in the South Island and Haywards substation in the North Island.
- 4.11. The 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 Transmission Assets, the Wellington Region, and Projects within Lower Hutt

Transpower's Assets in Lower Hutt

- 5.1. Transpower's assets within and traversing Lower Hutt comprise the following:
- 5.1.1. Bunnythorpe – Haywards A 220 kV line (BPE-HAY A)

- 5.1.2. Bunnythorpe – Haywards B 220 kV line (BPE-HAY B)
- 5.1.3. Haywards – Melling A 110 kV line (HAY-MLG A)
- 5.1.4. Haywards – Melling B 110 kV line (HAY-MLG B)
- 5.1.5. Haywards – Takapu Road A 110 kV line (HAY-TKR A)
- 5.1.6. Haywards – Upper Hutt A 110 kV line (HAY-UHT A)
- 5.1.7. Oteranga Bay - Haywards A 350 kV line (OTB-HAY A)
- 5.1.8. Gracefields – Haywards A 110 kV line (GFD-HAY A)
- 5.1.9. Haywards – Judgeford 220 kV line (HAY-JFD A)
- 5.1.10. Haywards substation (both AC and DC switchyards)
- 5.1.11. Melling substation
- 5.1.12. Gracefield substation
- 5.2. All transmission lines within Lower Hutt are on towers. No Transpower transmission lines are on pole support structures.
- 5.3. Of note within the City is the Haywards substation, which is the northern terminal of the High Voltage Direct Current (HVDC) link which transfers electricity between the South and North Islands. Haywards substation is one of Transpower's most strategic substations, as it hosts the convertor station changing electricity between Direct Current to Alternating Current. This allows power generated in the South Island (particularly hydro generation) to be transmitted north to meet demand. On occasion, power generated in the North Island is transmitted south. Forming part of this critical HVDC link, is the Oteranga Bay – Haywards A 350 kV transmission line which connects to Haywards substation and traverses Lower Hutt.
- 5.4. Haywards substation also serves much of the Wellington region, including a 220 kV connection to Bunnythorpe and 110 kV connection to the Wairarapa and Tararua. Haywards substation is becoming even more important as electricity demand grows. In 2024 Transpower approved investment in new voltage stability equipment (STATCOM) to increase the ability of the HVDC link to operate near full capacity and move more electricity between islands. This supports growing demand and increasing renewable generation.
- 5.5. **Appendix A** of Transpower's submission included a map showing the location and extent of the National Grid assets within the Lower Hutt District and a copy is also

attached to this evidence at **Appendix B**.

Wellington region and transmission planning

- 5.6. For Transpower's transmission planning purposes, Lower Hutt is within the Wellington region. The existing transmission network for the Wellington region is set out graphically in Figure 3.

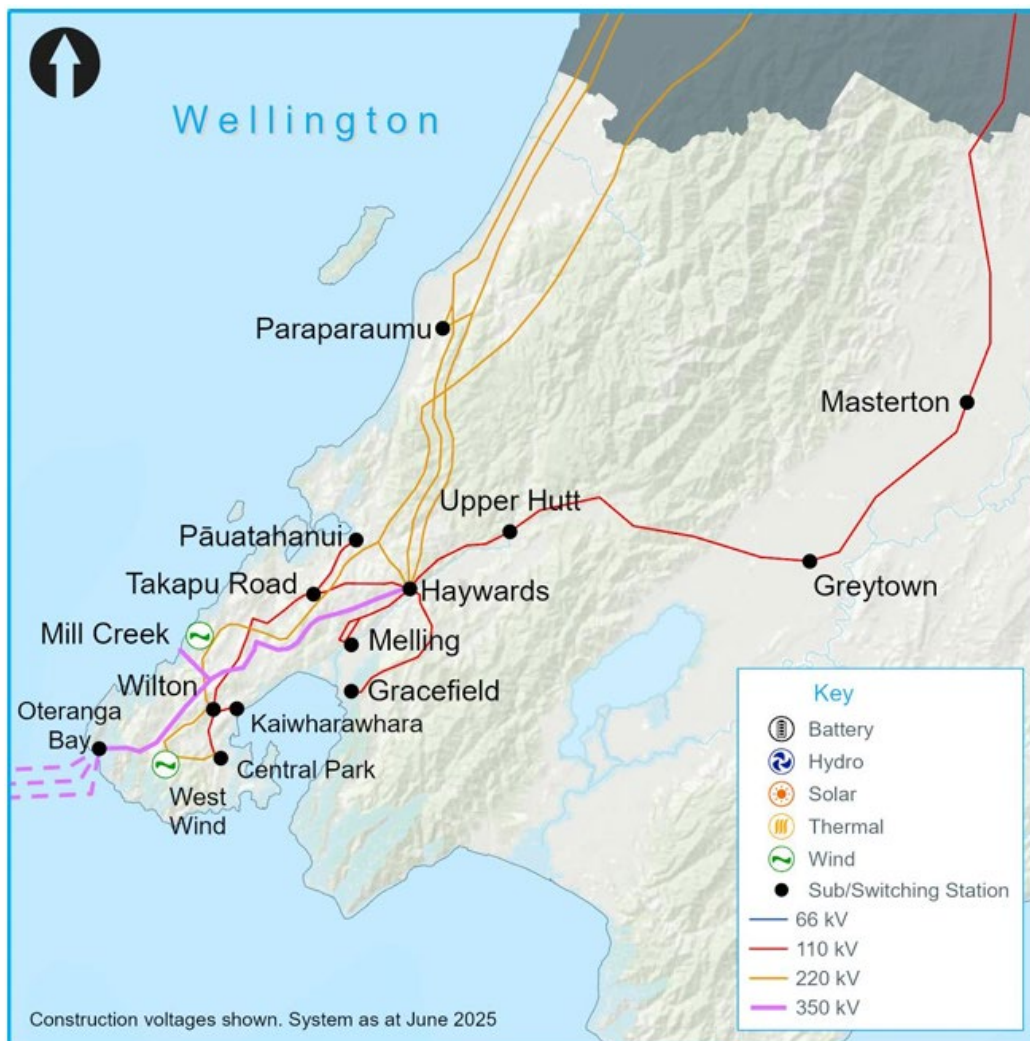


Figure 3. Wellington region transmission. Source: Transpower Transmission Planning Report 2025)

- 5.7. The wider Wellington region is the major load centre of the southern North Island. It comprises both rural and residential loads, including Wellington City Central Business District (CBD), three other cities (Hutt City, Upper Hutt City and Porirua City) and smaller urban areas (Kāpiti, South Wairarapa and Carterton). The region comprises three distinct transmission networks, 110 kV and 220 kV, of which the 220 kV network forms part of the grid backbone, and the 350 kV HVDC link.

- 5.8. The Wellington region's generation capacity is currently 225 MW. This excludes embedded solar (PV) generation, which was approximately 42 MW in the Wellington region at the time of publication of the 2025 Transpower Transmission Planning

Report. Most of the region's generation is from wind generation stations, the largest being West Wind at 143 MW.

- 5.9. The Wellington regional peak demand is forecast to grow by an average 1.5 per cent per annum over the next 15 years, from 706 MW in 2025 to 889 MW by 2040. This is lower than the national average growth rate of 2.6 per cent per annum.³
- 5.10. 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.

Transpower's Projects in Lower Hutt

- 5.11. Over the next ten years the main project work planned for National Grid assets in Lower Hutt includes transformer replacements at the Gracefield and Melling substations, and reconductoring of the Haywards – Upper Hutt A 110 kV transmission line, and part of the Haywards – Melling B 110 kV transmission line.
- 5.12. Other works to the transmission lines in the district include routine insulator replacements, tower painting and vegetation clearance.
- 5.13. While Transpower currently has no specific plans for new transmission assets in the district, that could change at any stage. For example, where new National Grid transmission lines are needed to connect new renewable energy generation sources to the network. This is discussed further below.

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

- 6.1. The National Grid has a central role to play in the decarbonisation of New Zealand's economy and a highly electrified energy future. Over the past 10 years, Transpower has undertaken a series of workstreams to understand this role in the decades to come. The resulting publications are set out in **Appendix C**.
- 6.2. Transpower's latest publication, Te Kanapu (2025) is Transpower's long-term initiative to develop a Future Grid Blueprint that will guide investment in New Zealand's national electricity transmission network out to 2050 and beyond. Its objective is to identify the strategic transmission infrastructure, technologies, and network enhancements needed to support Aotearoa's transition to a highly electrified, low-emissions economy

³ Transpower Transmission Planning Report, 2025, page 262
Lower Hutt Proposed District Plan: Statement of Evidence of Sarah Shand for Transpower Zealand Ltd September 2026

while maintaining affordability, reliability, and resilience.

- 6.3. Through scenario modelling, research, and extensive engagement with communities, iwi, industry, government, and customers, Te Kanapu will provide an evidence-based roadmap for the grid investments required to enable economic growth, connect new renewable generation, meet increasing electricity demand, and ensure the transmission system remains fit for New Zealand's future energy needs.
- 6.4. In summary, Te Kanapu and Transpower's previous work in this area confirms that there will be an enduring role for existing National Grid assets into the future, as well as a need for significant investment in new National Grid assets. Transpower estimates that around 70 new grid scale connections, each requiring new lines and potentially new substations, will be required in the next 15 years, with this trend continuing through to at least 2050. This trend is reflected in the significant increase in customer connection enquiries that Transpower has received annually since 2016. A maximum of five enquiries per year were received between 2016 and 2019. By 2025, this figure had jumped to 102. The protection of existing National Grid assets is therefore a critical component of enabling the decarbonisation of the economy.
- 6.5. In terms of a summary, the National Grid:
 - a. transports electricity across the country (connecting generation to consumers);
 - b. supports New Zealand's national and regional economic growth;
 - c. plays an essential role in maintaining reliability and security of supply of energy;
 - d. provides a basis for investment decisions to be made by both suppliers and consumers of electricity;
 - e. enables competition among suppliers and retailers of electricity, thereby providing the basis for competitively priced electricity;
 - f. assists the development of new electricity generation technologies, including renewable energy, by providing access to markets;
 - g. 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
 - h. is predicted to play a key role in the decarbonisation of the economy.

- 6.6. The following section is included to provide context for Transpower's submission points on the PDP.

7 Transpower's approach to giving effect to the NPS-EN

- 7.1. As outlined in the evidence of Ms Whitney, of particular relevance to the PDP and Transpower's submission is the National Policy Statement for Electricity Networks 2008 ("**NPS-EN**") (Amended December 2025) (previously named National Policy Statement on Electricity Transmission 2008 ("**NPSET**"). The framework of the former NPS-ET is largely retained in that the NPS-EN contains one single objective relating to the national significance of the electricity transmission network, with a series of policies. Without denigrating from the detailed policy framework provided in the NPS, as summarised in the evidence of Ms Whitney, there are three broad aspects to the NPS-EN which must be given effect to in local authority plans:

- a. **Enabling the National Grid:** Provide for the effective operation, maintenance, upgrading and development of the National Grid.
- b. **Managing the effects of the National Grid:** Take into account the characteristics of the National Grid, its technical and operational constraints, and the route, site and method selection process when considering the adverse effects of new National Grid infrastructure on the environment.
- c. **Managing the effects on the National Grid:** Manage inappropriate development, land use and subdivision in close proximity to the National Grid, which can compromise its operation, maintenance, development and upgrade. This is achieved through a National Grid Corridor management approach.

- 7.2. These three matters are addressed in turn.

Enabling the Grid and managing the effects of the National Grid

- 7.3. As outlined in the evidence of Ms Whitney, policies and plans must provide for the effective operation, maintenance, upgrading and development of the National Grid. Ms Whitney has well canvassed the policy directive within the NPS-EN.
- 7.4. Section 6 of my evidence explains that as the economy electrifies in pursuit of the most cost efficient and renewable energy sources, electricity demand is likely to more than double by 2050. This will necessitate significant and frequent investment in New Zealand's electricity generation portfolio over that period, including the National Grid. While there are no current plans for new National Grid assets in Lower Hutt at this time, that situation could change within the life of the PDP. This means that the extent to

which the PDP objectives, policies and rules regulate both existing and new National Grid transmission infrastructure is critical to Transpower.

- 7.5. The NESETA⁴ does not apply to National Grid substations or transmission lines constructed after 14 January 2010. This means that Transpower relies on the consenting and/or designation process under the RMA to gain approval for any new National Grid assets constructed after this date.
- 7.6. As part of the process of securing RMA approvals for new National Grid infrastructure, Transpower uses various tools to select the route of any new transmission line or the site of any new substation. A key methodology is the ACRE process. Transpower developed the ACRE model to identify and secure the most suitable location for transmission infrastructure. It 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 route or site.
- 7.7. The key stages of the ACRE process are summarised below (these can be modified or combined, depending on the scale and nature of the project):
- a. A – Area (identification of the wider study area within which the project might occur; undertaking constraints and opportunities mapping);
 - b. C – Corridor (identification and confirmation of alternative corridors, ranking and selection of preferred corridor);
 - c. R – Route (selection and evaluation of a route, or alternative routes, within the preferred corridor, consultation on one or more routes and confirmation of preferred route, following public consultation); and
 - d. E – Easement/Designation (identification and confirmation of the easement and designation centreline). There are two further process steps, referred to as “D” and “S”.
 - i D – Documentation (preparation of full documentation for lodgement with councils); and
 - ii S – Statutory Process (lodgement of documents for statutory approvals under the RMA, board of inquiry/council hearings, Environment Court appeal process where relevant).

⁴ Resource Management (National Environmental Standard for Electricity Transmission and Electric Vehicle Charging Infrastructure Activities) Regulations 2009

- 7.8. During the Area, Corridor, Route and Easement/Designation stages, consideration is given to the location of the proposed infrastructure, with negative scoring being given to any special areas, such as Sites and Areas of Significance to Māori, historic heritage sites, Significant Natural Areas or Outstanding Natural Landscapes (ONL).
- 7.9. The ACRE process allows for a trade-off between several factors, with the intent of finding a preferred solution:
- a. It takes into account technical and operational requirements, such as the need to connect to existing assets, or maintain safety clearances;
 - b. It demonstrates that adverse effects have been avoided through the site, route and method selection – although it will not always be possible to avoid all adverse effects;
 - c. Sensitive activities such as residential areas can be mapped, so that options which avoid effects on sensitive activities are known and appropriately factored in; and
 - d. Town centres and other valued locations such as areas of high recreational value, ONLs, ecological areas and areas of high natural character are also mapped.
- 7.10. Often it is not practicable to avoid adverse effects on all identified values. For example:
- a. Avoidance of urban areas and sensitive activities can often deflect assets towards areas with greater landscape, natural character or recreational value (i.e., non-urban locations);
 - b. Avoiding particular locations can also mean a National Grid transmission line must take a longer route, impacting a greater number of people and values along that longer route, and costing more to develop, operate and maintain (that cost being borne by electricity users);
 - c. Reducing the height of lines (to reduce their visibility) can mean that a greater number of support structures (towers or poles) are required to maintain safe ground-to-conductor clearances. Lower conductors can require greater vegetation clearance, and more extensive access tracks for the greater number of support structures; and
 - d. Undergrounding lines is often prohibitively expensive, still requires earthworks, a clear corridor (including clear of vegetation and above-ground structures) and

can complicate maintenance and repairs.

- 7.11. The ACRE process reflects NPS-EN policies (noting Transpower is embarking on a review of how ACRE will be applied under the new RM legislation) in terms of seeking to avoid some areas while taking in to account the technical and operational requirements of the Grid in the route, site and method selection process.

Mechanisms available to manage the effects on the National Grid

- 7.12. Most National Grid transmission lines and substations were originally built in the early to mid-twentieth century in (what were then) rural areas over open land. These areas posed little to no constraint on the ability to operate, maintain, upgrade and develop the National Grid.
- 7.13. Over time, urban boundaries have expanded and both urban and rural development has occurred under, and in close proximity to, National Grid assets. There are a range of regulatory tools that variously provide for the National Grid, each with different pros and cons. Nationwide, only a small proportion of transmission lines are designated.
- 7.14. Under the Electricity Act 1992, Transpower is able to access, maintain and upgrade its lines on private property. However, Transpower has little direct control over activities that have been constructed under, and in close proximity to, the National Grid without Transpower's knowledge or consent.
- 7.15. The NESETA regulations enable many of Transpower's activities on existing National Grid transmission lines. However, they do not include any provisions to regulate subdivision, land use or development carried out by third parties near the National Grid.
- 7.16. The NPS-ET was developed (in part) as a mechanism to provide better management controls for National Grid activities and third-party activities that impact the Grid. This directive has continued under the NPS-EN with Policies 11 and 12 providing direction to protect the National Grid from inappropriate subdivision, land use and development.
- 7.17. While these policies are not prescriptive in the form of rules or definitions, the mandatory language used in these policies means that councils must ensure that appropriate protections are in place. Ms Whitney's evidence includes further comments on Policies 11 and 12 of the NPS-EN.

National Grid Corridor Approach

- 7.18. The nature of the assets across New Zealand and their operational and technical

requirements are very similar. The challenges Transpower faces maintaining and upgrading existing assets in urban environments are also very similar. Accordingly, Transpower considers that it follows that the National Grid corridor should be treated consistently across the different councils. For this reason, Transpower participates in every plan review and plan change in the districts the National Grid is located in and seeks a consistent National Grid corridor approach. This corridor framework and formula is applied nationwide.

7.19. The National Grid corridor approach supported by Transpower has eight important purposes, namely:

1. **To ensure that sensitive activities, such as residential development, are generally not provided for near National Grid structures and lines:** Sensitive activities include the establishment of dwellings, schools and papakāinga close to the Grid. The purpose of Policy 11 and of the NPS-EN is to prevent sensitive activities (including the expansion of existing sensitive activities) such as these from being established near the National Grid;
2. **To manage reverse sensitivity effects:** These effects occur when people undertake activities close to an existing line or structure. For example, National Grid lines can cause noise (especially in damp weather), reduced visual amenity, radio and television interference, perceived effects of electric and magnetic fields from the lines, and interference with landowners' business activities beneath the lines. These effects often lead to neighbouring landowners/occupiers wanting to constrain operation or alter the existing lines. Landowner complaints can ultimately lead to constraints on the operation, maintenance and upgrade of existing National Grid assets;
3. **To protect the integrity of the National Grid (structures and lines):** Structures, earthworks and other land use activities that are too close to a transmission line and support structures can affect the stability of that line and contribute to electricity outages. The presence of these structures and activities can also increase the need for, and thereby the risk associated with, mobile plant (such as cranes, forestry haulers and excavators) and other equipment. Transpower wishes to ensure that safe distances are maintained so the risk of coming into contact with the lines is minimised;
4. **To enable efficient and safe operation, maintenance and potential upgrade operations:** National Grid Yards/Corridors provide a relatively clear area for line workers to gain access to the line and structures in order to conduct operational maintenance on high voltage equipment, sometimes at great

heights. The National Grid corridors also limit the need for costly workarounds (for example, bypass lines), when maintaining and operating the Grid. In addition to this, corridors can also preserve the ability to undertake upgrades in the future, rather than potentially having to construct a new asset;

5. **Reliable and secure electricity supply:** To provide the residential, rural, commercial and industrial electricity users in Lower Hutt with a reliable and secure supply of electricity;
6. **To provide the community, Council and Transpower with the knowledge and confidence that the lines are being managed in a safe and sustainable manner:** To provide certainty as to how that management is being achieved in response to the policy framework established by the NPS-EN; and
7. **To minimise safety hazards:** Electricity transported at high voltages can cause serious, or even fatal, injuries to people who come in close contact with the lines. Corridor management is therefore of paramount importance as it provides for the wellbeing, health and safety of people.

- 7.20. The current corridor approach supported by Transpower has been relatively settled since 2012 following Environment Court appeal, Board of Inquiry, Independent Hearings Panel processes and ongoing engagement with Transpower's key stakeholders. To date, more than 90% of councils with National Grid assets in their districts have included provisions to give effect in relation to Policies 11 and 12 of the NPS-EN (i.e. by including National Grid corridor provisions in their plans).

8 Conclusions

- 8.1 The National Grid is critical to the social and economic wellbeing of Lower Hutt and the nation generally. It will also play a critical role in 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 NPS-EN requires that the National Grid be protected and provided for in the PDP.
- 8.2 Transpower's relief 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 Lower Hutt and New Zealand.

Sarah Louise Shand

4 September 2026

Appendix A: Relevant Experience and Qualifications

1. I am a Senior 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 including with government officials, councils, iwi, industry stakeholders, developers and customers.
2. I have been employed by Transpower for over 11 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 11 years' experience working as an environmental planner, and I am a member (Intermediate) of the New Zealand Planning Institute.

4. Although this matter is not before the Environment Court, 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 in Lower Hutt District

Transpower Assets

Lower Hutt City

Legend

Territorial Land Authority

Boundary

NZ Roads

Highways

Transpower Assets

• Cable Protection Zone

— Overhead Fibre Cable

--- Underground Fibre Cables

Site

■ ACSTN

▲ COMMS

● HVDC

■ TEE

Transmission Line

— 0kV Overhead

— 11, 66kV Underground

— 11, 33, 66 kV Overhead

--- 110kV Underground

--- 110 kV Overhead

--- 220kV Underground

--- 220 kV Overhead

--- 350 kV Overhead

--- 350kV Submarine

--- 400kV Overhead



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Appendix C: Transpower publications

1. Transpower's 2016 publication "Transmission Tomorrow" set out Transpower's strategy for the future development of the Grid for the next 30 years and beyond. Transmission Tomorrow was updated in 2018 and 2023. The 2023 revision identifies optimising Transpower's existing infrastructure as a cost-efficient way to deliver value to New Zealand now and in the future, as well as building new connections.
2. In 2018, Transpower published its white paper "Te Mauri Hiko – Energy Futures". 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 and the Climate Change Response (Zero Carbon) Amendment Act 2019.
3. In 2020, Transpower released "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. As the economy electrifies in pursuit of the most cost efficient and renewable sources, the Whakamana i Te Mauri Hiko base case forecasts that electricity demand will increase by 68% by 2050.
4. In 2025, Transpower published Te Kanapu – Future Grid Blueprint which describes the changed context since Whakamana i Te Mauri Hiko, and introduces the initiative to develop and deliver a 'Grid Blueprint'. Through engagement with key stakeholders Transpower is mapping out the possible strategic investments needed for our transmission network to deliver an optimal future Grid for all New Zealanders.