Network Overhead Line Design Standard

EEA Overhead Line Designers Forum

Mitch Graham

May 2026

Agenda

- Why do we need it?
- Background on standard formation
- Proposed approach
- What we want from you?

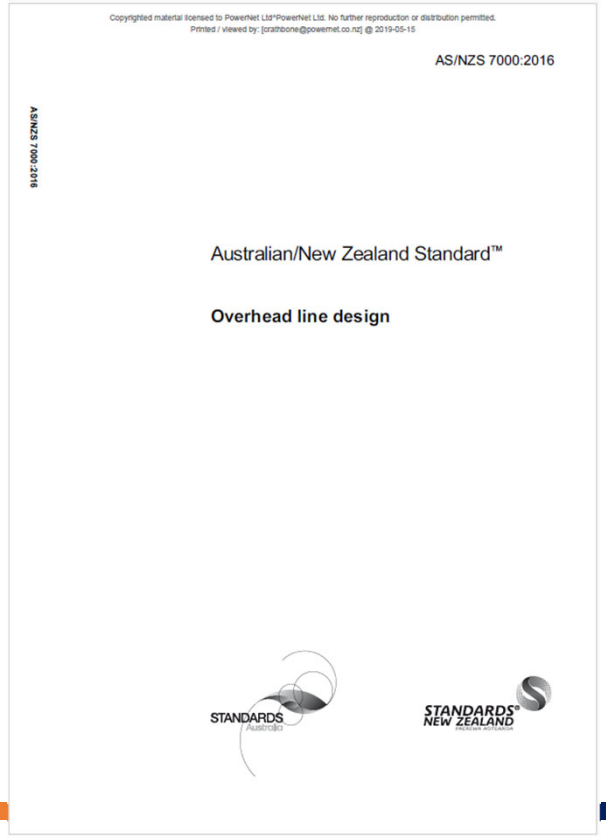
Why do we want it?

- We want a design standard that results in things being built that are safe, reliable, and cost effective

- In a pinch, ability to borrow people, resources, and materials from other EDBs to keep the power flowing

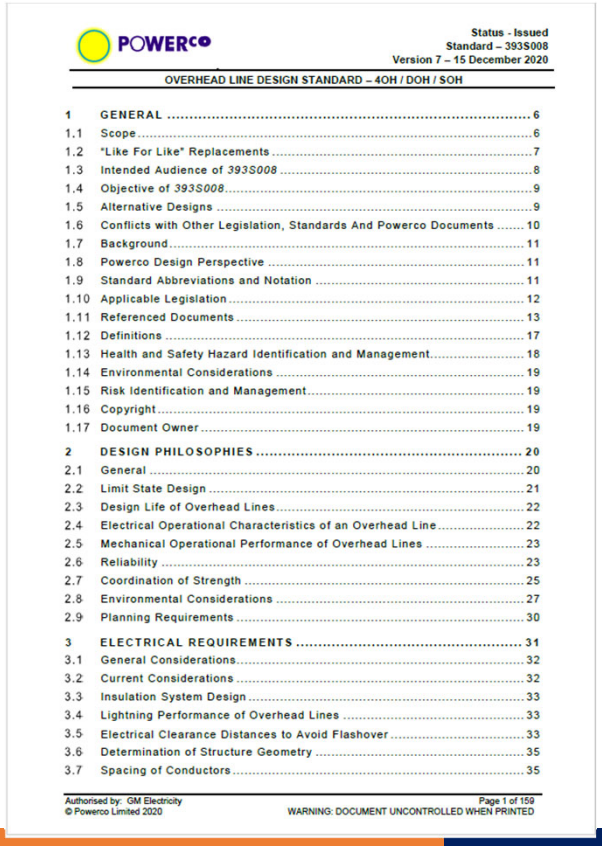
- Simple documentation and processes to ensure consistency and avoid mis-interpretation of requirements

AS/NZS7000



- Based on limit state design, the modern engineering method which calibrates design to represent uncertainty levels, instead of using static and inefficient, factors of safety
- Is actively being improved – Its third revision is currently underway

Powerco standard - 3935008



POWERCO

Status - Issued
Standard – 393S008
Version 7 – 15 December 2020

OVERHEAD LINE DESIGN STANDARD – 4OH / DOH / SOH

Authorised by: GM Electricity

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WARNING: DOCUMENT UNCONTROLLED WHEN PRINTED

Widely referenced within the industry and forms the basis of several EDB standards. Obstacles preventing broader adoption include:

- Optimised for Powerco's specific network and asset strategies
- Extensive cross-referencing between documents increases complexity
- Large document size (159 pages) reduces usability
- Controlled by a single network, limiting external governance

Hon Simon Watts

Minister of Climate Change
Minister for Energy
Minister of Local Government
Minister of Revenue

6 October 2025

To:
Electricity Distribution Business Chief Executives
Chief Executive, Electricity Networks Aotearoa

Dear Chief Executives,

I am writing to EDBs and the ENA to outline my expec
distribution and seek your views on how we can work
for New Zealanders.

The Government has considered the Review of New
Performance and has noted the findings that our dis
fragmented. Frontier found that there are too many
below efficient scale, limiting their ability to operate
innovate to deliver services more efficiently to cust
of large new supplies and loads.

The Government does not intend to pursue forced
this time. However, the distribution sector must d
risk of fragmentation. Greater and faster collabor
realise efficiencies and build collective capability
electrification.

My bottom line is simple: the energy sector mu
security of energy for households and business
EDBs are central to achieving this.

The stakes are high for consumers, with li
approximately 25 percent of the average h

The Government is firmly committed to elect
climate goals and enhance economic resilie
and operational expenditure is anticipated t
and integrate new generation sources.[1] I ar
challenge and that New Zealand must com
skills and equipment.

At the same time there is the opportunity t
that can empower consumers and busine
how they produce and use electricity. ED

[1] The future is electric, Boston Consulting Group
assets.bcg.com/b3/79/19665b7f40c8ba52d5b3
2022.pdf

Private Bag 18041, Parliament Buildings, Wellingt

transformation by supporting innovation, decentralised energy solutions, and demand-side participation.

While most EDBs are subject to price-quality regulation, not all EDBs fall under this regulatory framework. I am keen for your feedback on whether this is the optimal framework for the future.

Most of those EDBs subject to price-quality regulation have historically met quality standards, but the increasing frequency and severity of weather events pose a growing risk of outages. This highlights the need for ongoing investment in network resilience and planning for climate adaptation in a changing climate.

EDBs are best placed to identify opportunities for greater collaboration, efficiency and standardisation.

I am concerned that the current structure and practices of the distribution sector may limit efficiency and hinder the innovation needed for a more flexible, lower-cost electricity system.

Despite challenges in measuring EDB productivity, the CEPA report (commissioned by the Commerce Commission) found a 1.3 percent decline in total factor productivity from 2008 to 2023. I believe there is strong potential for improvement, with real benefits for households and businesses.

I note that some EDBs are already collaborating effectively, for example by providing management and operational support to other EDBs. And there are good examples of innovation emerging — such as the use of distributed energy resources to defer more expensive network upgrades.

However, I'm seeking faster, deeper collaboration and standardisation across the sector.

I intend to set out a clear set out actions that your EDB, and the sector as a whole, must take to accelerate collaboration and standardisation. In particular, I am seeking your views on:

- existing collaborative initiatives you are involved in, especially those that show promise for broader application or scaling. This should include insights on what has worked well, what challenges have been encountered, and how these efforts might be expanded and shared across the sector
- new actions that can be taken around matters including network planning, procurement of common infrastructure, network operations and maintenance, or deployment of distributed/flexible energy solutions (or any other relevant topics that you may wish to raise)
- how network utilisation can be improved to avoid the need for expensive upgrades and lower the cost of services.

I expect your response by 30 January 2026 - outlining actions and proposed next steps for implementation.

I will also be considering:

- indi
ndent advice on opportunities for greater standardisation and
ration across the sector. I will be using this independent advice to gauge
or's response, and
y and legislative options to improve the sector's performance if I
here are further opportunities for improvement. For example, this
ide looking at any useful models from the Government's water
form programme.

sed on enabling customer participation through fairer
export practices.

sistent connection processes are needed to enable customer
e electricity system. The Electricity Authority is already taking steps
package of changes scheduled to come into effect in the second

king to the sector to lead the development of processes and
nection turn-around times and queue management. Industry
ardised and robust approach to these changes that
xperience.

noved to expand the permitted voltage range on electricity
afety standards for products like inverters to the latest
s are expected to be Gazetted before the end of the

arger number of kiwi homes adopt rooftop solar and
wn bills and support system resilience. Connection
currently one barrier that reduces the attractiveness of
ds. Therefore, I expect EDBs to:

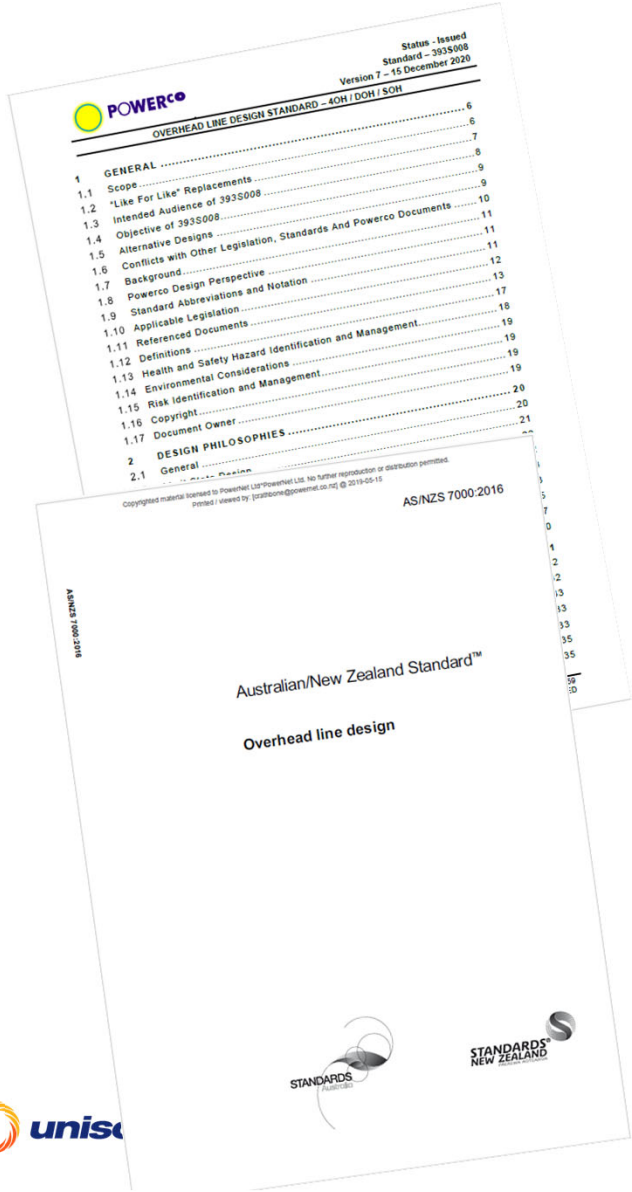
tery systems that meet safety regulations are connected
ode sets some timeframes already, I consider EDBs
industry standard solar and battery systems
y faster than current mandatory timeframes.

nge, voluntarily permit at least 10kW of consumer
works, unless there are justified safety or technical
mount.

ss this letter further and will keep me informed. I
m directly, including on the process for

NOLDS – Network Overhead Line Design Standard

- Developed by Carl Rathbone and I to be suitable for common adoption by other EDBs, it minimises barriers to adoption by design
- Based on 3935008, but streamlined and modernised
- Follows the section structure of AS/NZS 7000, improving traceability but avoiding duplicating material
- Formed in two parts:
  - Main Document – Standardised industry settings
  - NNA (Network Normative Appendix) – Network-specific parameters



Clever design enables networks to rationalise solutions to common issues, while accommodating the necessary differences.

b. Joint Australian and New Zealand Standards Association (AS/NZS) Standards
c. Relevant standards issued by The International Electrotechnical Commission (IEC)
d. British Standards Association (BS) Standards
e. The Institute of Electrical and Electronic Engineers (IEEE).
f. Any other standard that is deemed as being appropriate by the Network Asset Management Engineer.

In any instances where requirements expressed in the NOLDS conflict with other Network technical standards, as they relate to electricity network design, the requirements of the NOLDS shall then be deemed as being the dominant design requirement.

In any circumstances where information or requirements contained in the NOLDS differ from those contained in any superseded versions, then the contents of the latest version of the NOLDS issued in the Network's Business Management System (BMS) shall be deemed as being the dominant design requirement.

1.6 Background

Throughout the NOLDS reference to "AS/NZS 7000" means AS/NZS 7000:2016 Overhead Line Design.

The layout and section headings in the NOLDS are intended to approximately align with the equivalent sections and sub-sections of AS/NZS 7000. The section numbering aligns with AS/NZS7000, however while an effort was made to align the order in which topics are addressed, no attempt was made to align the subsection numbering.

1.7 Design and Engineering Requirements

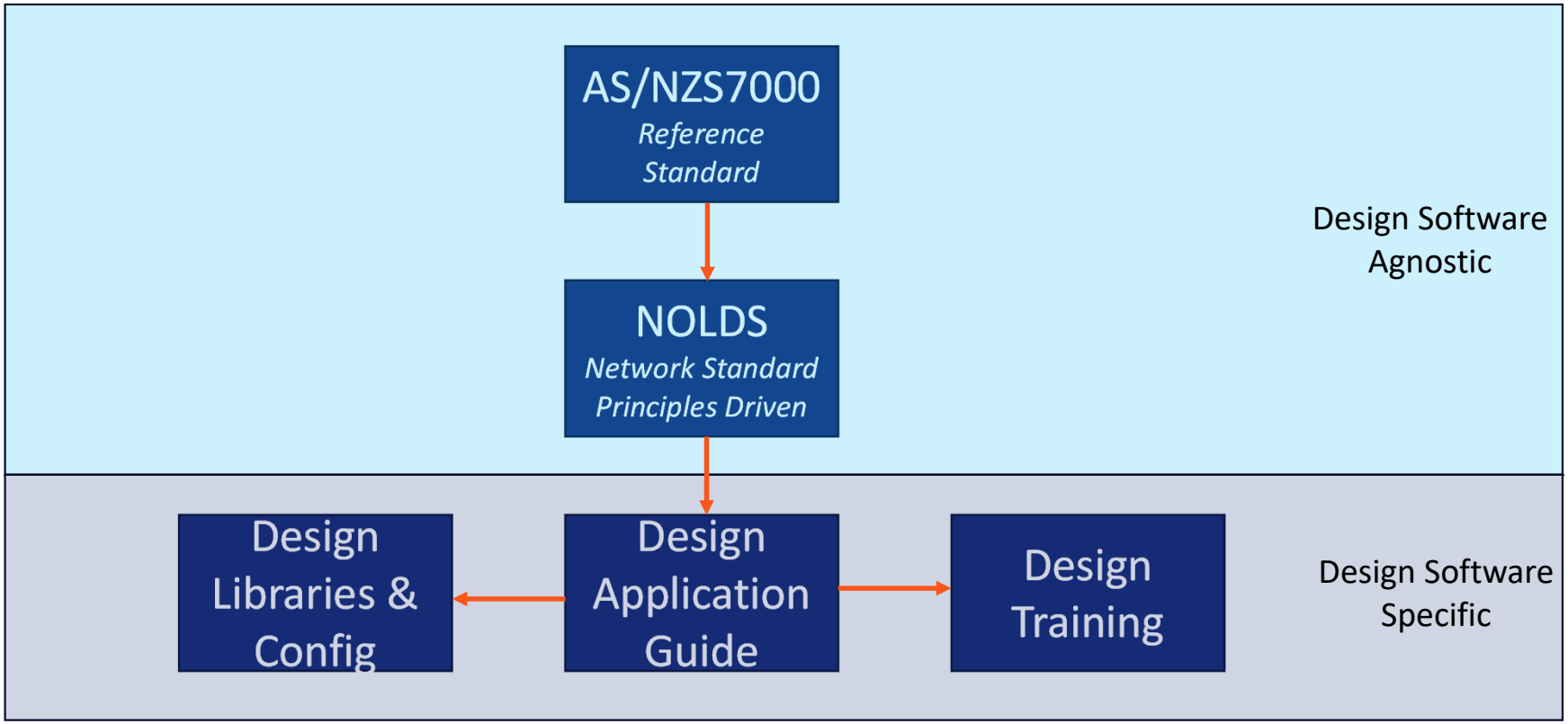
1.7.1 Line Design Software

All designers, including internal staff, consultants, and contractors undertaking software-based design of overhead l… …work, shall use software approved by the Network.
Use of… …by-case basis subject to written…
…NA specifies overhead line…
…nalysis of Network assets.

…by the Network.
…d.
…, designs should be…
…nt or profile.

…ts undertaking software-based
…pproved by the Network.
…ject to written

Proposed Line Design System Hierarchy



Benefits to Unison (by doing this alone)

- Alignment with industry best practice (AS/NZS 7000)
- Improved balance of safety, reliability, and cost
- Transitions Unison from lagging to leading practice

Benefits to Unison (by doing this together)

- Viable model for future collaborative standards
- Enables central participation in industry-wide standardisation
- Catalyst for wider EDB collaboration and support

Acknowledgement of Gaps

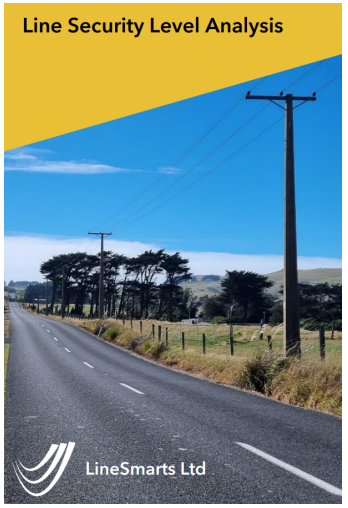
- We haven't included the nth level of detail
- We are working out which gaps NEED filling, and what the relative risk is
- Intentionally structured the document for:
  - Compatibility with other organisations
  - A consistent approach to standards

Proposed Changes

- Risk based approach to avoiding cascade failures – Carl to cover this
- New guidance on:
  - Line Security Levels
  - Wind loads – aligned with AS/NZS 1170.2:2021
  - Seismic loads
- Proposing a new more practical foundation calculation method

Line Security Level

- Aligned with LineSmarts Report
- Proposed to be considered on a structure by structure basis
- Different for new vs. existing assets



Existing Assets

	Urban	Semi Urban	Rural	Remote
LV Intermediate	LSL1	LSL1	LSL1	LSL1
LV Strain	LSL1	LSL1	LSL1	LSL1
11kV Intermediate	LSL1	LSL1	LSL1	LSL1
11kV Strain	LSL1	LSL1	LSL1	LSL1
11kV Transformer	LSL1	LSL1	LSL1	LSL1
11kV Regulator	LSL1	LSL1	LSL1	LSL1
11kV Switch	LSL1	LSL1	LSL1	LSL1
33kV Intermediate	LSL2	LSL1	LSL1	LSL1
33kV Strain	LSL2	LSL1	LSL1	LSL1
33kV Transformer	LSL2	LSL1	LSL1	LSL1
33kV Switch	LSL2	LSL1	LSL1	LSL1

New Assets

	Urban	Semi Urban	Rural	Remote
LV Intermediate	LSL1	LSL1	LSL1	LSL1
LV Strain	LSL1	LSL1	LSL1	LSL1
11kV Intermediate	LSL2	LSL2	LSL2	LSL2
11kV Strain	LSL2	LSL2	LSL2	LSL2
11kV Transformer	LSL3	LSL3	LSL2	LSL2
11kV Regulator	LSL3	LSL3	LSL3	LSL3
11kV Switch	LSL3	LSL3	LSL2	LSL2
33kV Intermediate	LSL3	LSL3	LSL3	LSL2
33kV Strain	LSL3	LSL3	LSL3	LSL2
33kV Transformer	LSL3	LSL3	LSL3	LSL2
33kV Switch	LSL3	LSL3	LSL3	LSL2

What input are we looking for?

- Indication of interest in collaborating
- Feedback on the structure and overall approach
- Contributions of knowledge to specific areas
- Collaboration to standardise as much as we can – ideally as little in the NNA as practical

Any Questions?

Mitch Graham

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