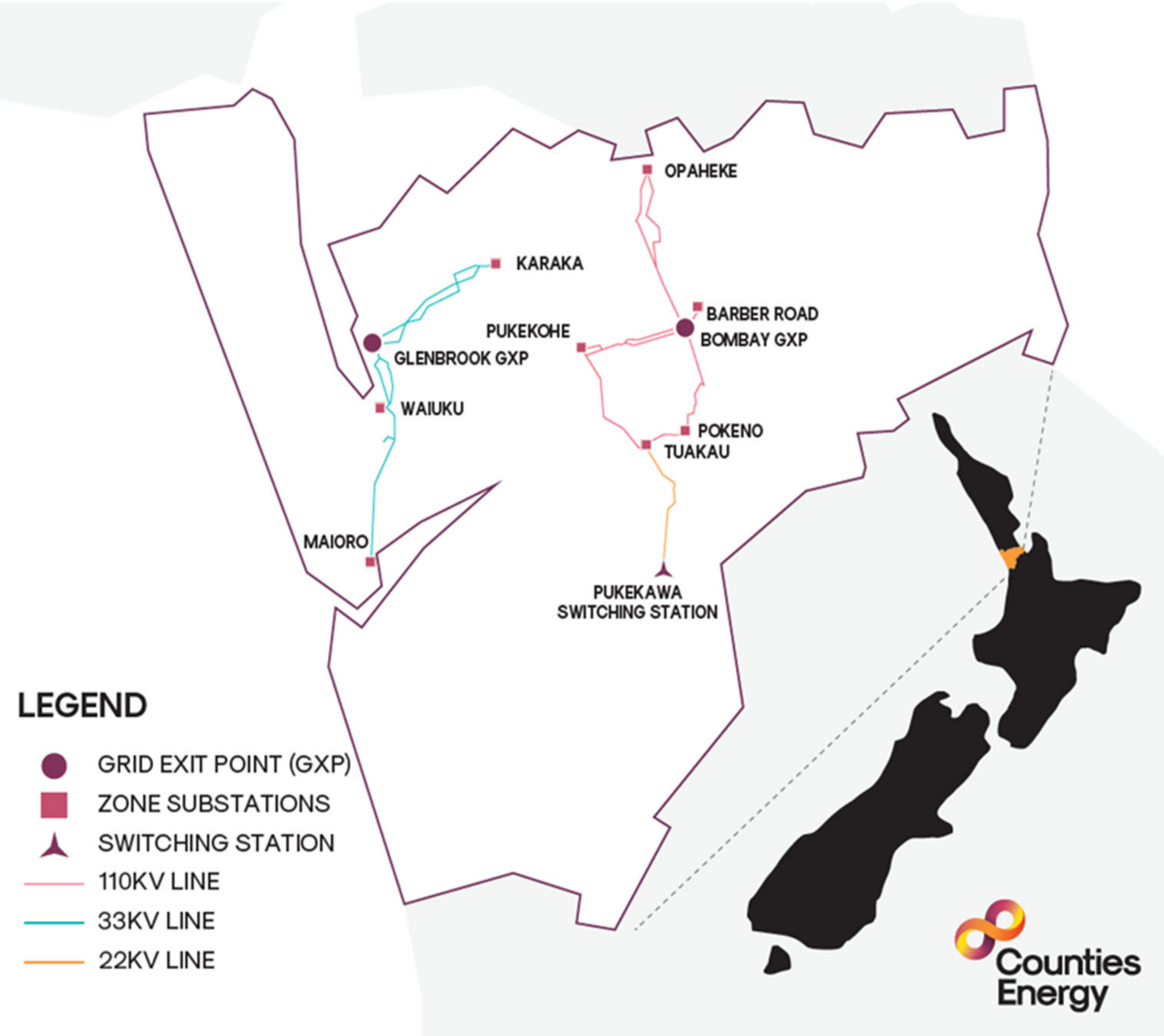
Historical Long Spans Investigation

By: Kavish Lal – Network Reliability Engineer

Sarah Song – Design Engineer

Energy Reimagined

INTERNAL



Counties Energy Network:

- Based in Pukekohe.
- Counties Energy supplies more than 50,000 customers.
- Bombay GXP – 110kV.
- Glenbrook GXP – 33kV.
- Energising our region since 1924.
- 100% customer-owned.

About Kavish Lal:

GRADUATED WITH A BACHELOR OF ELECTRICAL ENGINEERING DEGREE.

STARTED AS A GRADUATE DESIGN ENGINEER IN THE CUSTOMER WORKS TEAM.

BEEN IN THE ELECTRICAL INDUSTRY FOR NEARLY 3 YEARS.

DESIGN ENGINEER TO NETWORK RELIABILITY ENGINEER IN THE NETWORK TEAM.

About Sarah Song:

GRADUATED WITH A BACHELOR OF MECHANICAL ENGINEERING DEGREE.

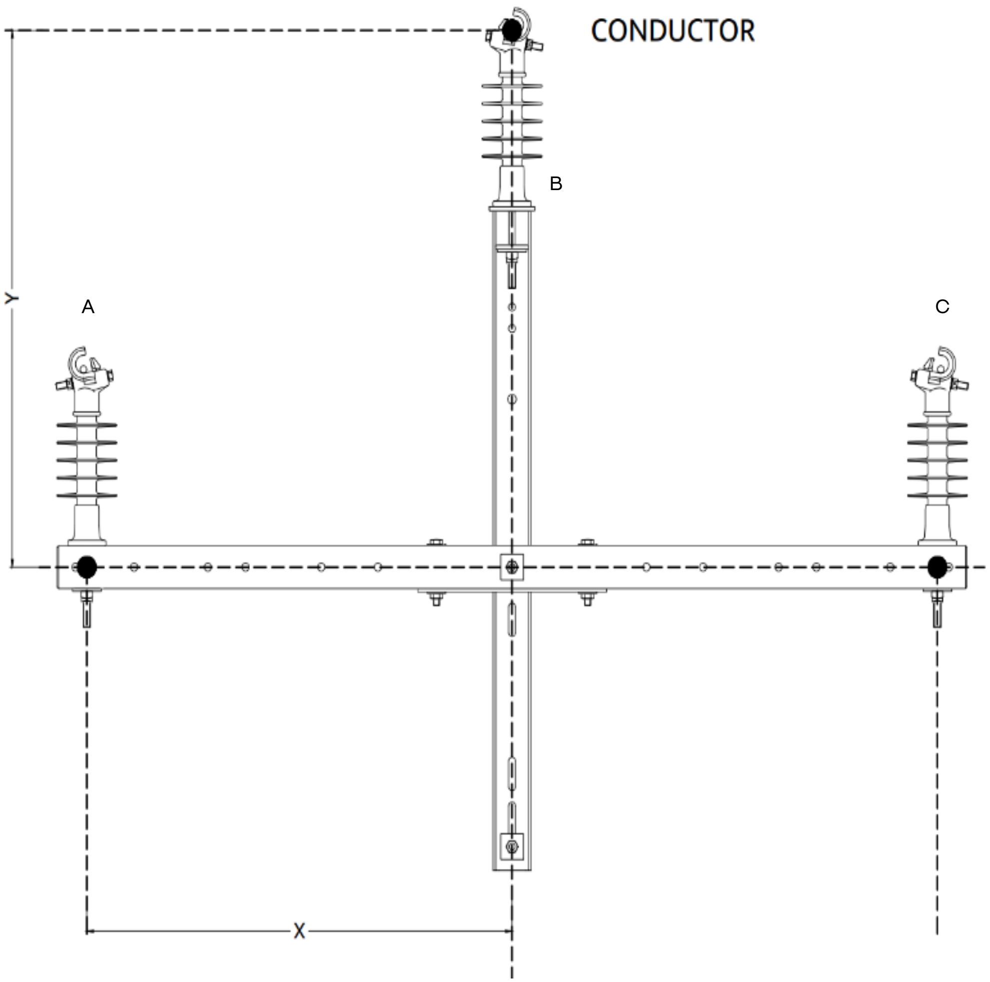
CAD DRAFTSPERSON TO CAPITAL DESIGN ENGINEER UNDER THE NETWORK TEAM.

BEEN IN THE ELECTRICAL INDUSTRY FOR 5 YEARS.

Historical Long Spans:

- Long spans across our network.
- Multiple customers on our backbone High-Voltage (HV) network.
- Sag and ground level clearance.
- AS/NZS7000:2016.
- How can this investigation lead to better outcomes for our network?



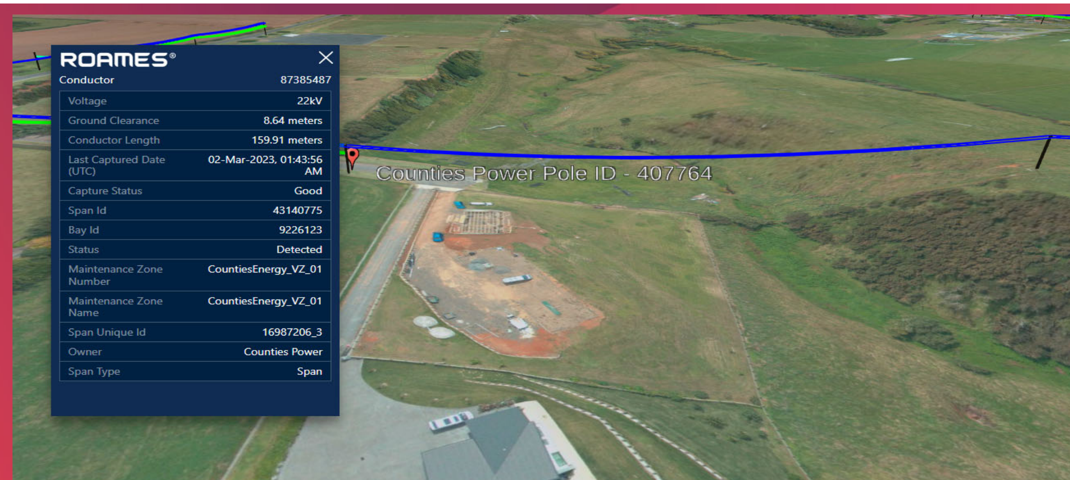
Conductor Separation at Mid-Span (One Circuit)

$$\sqrt{x^2 + (1.2Y)^2 \geq \frac{U}{150} + k\sqrt{D + l_i}}$$

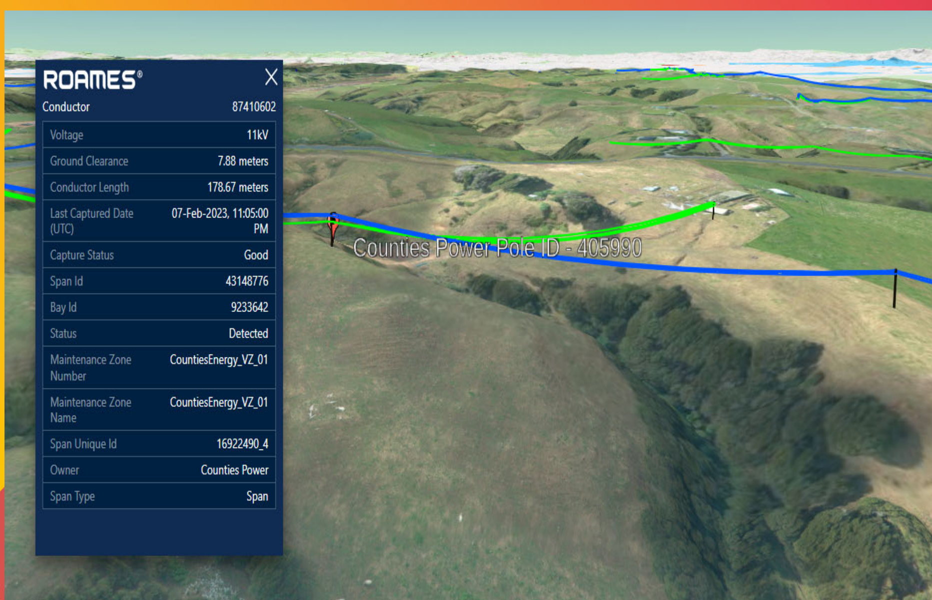
Math's:

- AS/NZS7000:2016 – Page 32.
- Data provided by Roames & LiDAR.
- Attachment point 1 coordinates for all conductors in a bay ID (i.e., 3 wires for a three-phase line).
- Attachment point 2 coordinates for all conductors in a bay ID.
- Coordinates require X, Y, Z.
- Span length between 2 attachment points.
- Sag of conductors.


ROAMES®
Conductor 87365857
Voltage 11kV
Ground Clearance 9.1 meters
Conductor Length 155.94 meters
Last Captured Date (UTC) 22-Feb-2023, 02:08:18 AM
Capture Status Insufficient Points - Correctly Modelled
Span Id 43134421
Bay Id 9227995
Status Detected
Maintenance Zone Number CountiesEnergy_VZ_01
Maintenance Zone Name CountiesEnergy_VZ_01
Span Unique Id 16922596_5
Owner Counties Power
Span Type Span
Counties Power Pole ID - 407407


ROAMES®
Conductor 87385487
Voltage 22kV
Ground Clearance 8.64 meters
Conductor Length 159.91 meters
Last Captured Date (UTC) 02-Mar-2023, 01:43:56 AM
Capture Status Good
Span Id 43140775
Bay Id 9226123
Status Detected
Maintenance Zone Number CountiesEnergy_VZ_01
Maintenance Zone Name CountiesEnergy_VZ_01
Span Unique Id 16987206_3
Owner Counties Power
Span Type Span
Counties Power Pole ID - 407764

Roames Data:


ROAMES®
Conductor 87410602
Voltage 11kV
Ground Clearance 7.88 meters
Conductor Length 178.67 meters
Last Captured Date (UTC) 07-Feb-2023, 11:05:00 PM
Capture Status Good
Span Id 43148776
Bay Id 9233642
Status Detected
Maintenance Zone Number CountiesEnergy_VZ_01
Maintenance Zone Name CountiesEnergy_VZ_01
Span Unique Id 16922490_4
Owner Counties Power
Span Type Span
Counties Power Pole ID - 405990


ROAMES®
Conductor 87344458
Voltage 11kV
Ground Clearance 6.76 meters
Conductor Length 177.04 meters
Last Captured Date (UTC) 09-Feb-2023, 10:54:23 PM
Capture Status Good
Span Id 43127438
Bay Id 9219355
Status Detected
Maintenance Zone Number CountiesEnergy_VZ_01
Maintenance Zone Name CountiesEnergy_VZ_01
Span Unique Id Missing
Owner
Span Type Not Matched
Counties Power Pole ID - 402667

Investigation Outcome & Design:

- Multi-year project.
- 1,920 spans > 150m or more.
- Each site has its own challenges (i.e., access, private land, large gullies).
- Third-Party investigations.
- Customer priority.
- Many are located on our backbone network, leading to potentially high SAIDI impact.

Long spans often look fine: upright poles, wires in the air.

Over the years, the belly sag within the span starts to lower due to the tension and weight of the conductor.

The longer you leave it, the risk increases.

This programme tackles those risks before they become critical hazards.

Why This Work Matters:

- Reduced clearance risks of vegetation, line clashes, and vehicles.
- Extra tension and stress on poles and stay wires.
- Environmental, less safe conditions for crews.

- Goal: Identify risks early, fix them proactively.

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Scope of Work:

- 40 rural/urban sites targeted.
- Replacing timber poles with 12.5–13.65 m concrete poles.
- Installing H-structures >110 m.
- Re-tensioning conductors where viable.
- Upgrading crossarms, isolators, stays (20–30 years life).

Investment:

~$560K INVESTED ANNUALLY.

COVERS POLES, WIRES, DESIGN, EXCAVATION, TRAFFIC MANAGEMENT.

SITE-SPECIFIC PLANNING FOR SAFE, PRACTICAL DELIVERY.

Outcomes:

Restored clearances to ECP34 standards.

Reduced outage probability and SAIDI impact.

Safer, more manageable working conditions for crews.

Strengthened network for 20–30 years ahead.

Future Outlook:

- Preparing the network for electrification and demand growth.
- Resilience against severe weather.
- Safer, standardised worksites for future crews.
- Long-term reliability for customers.

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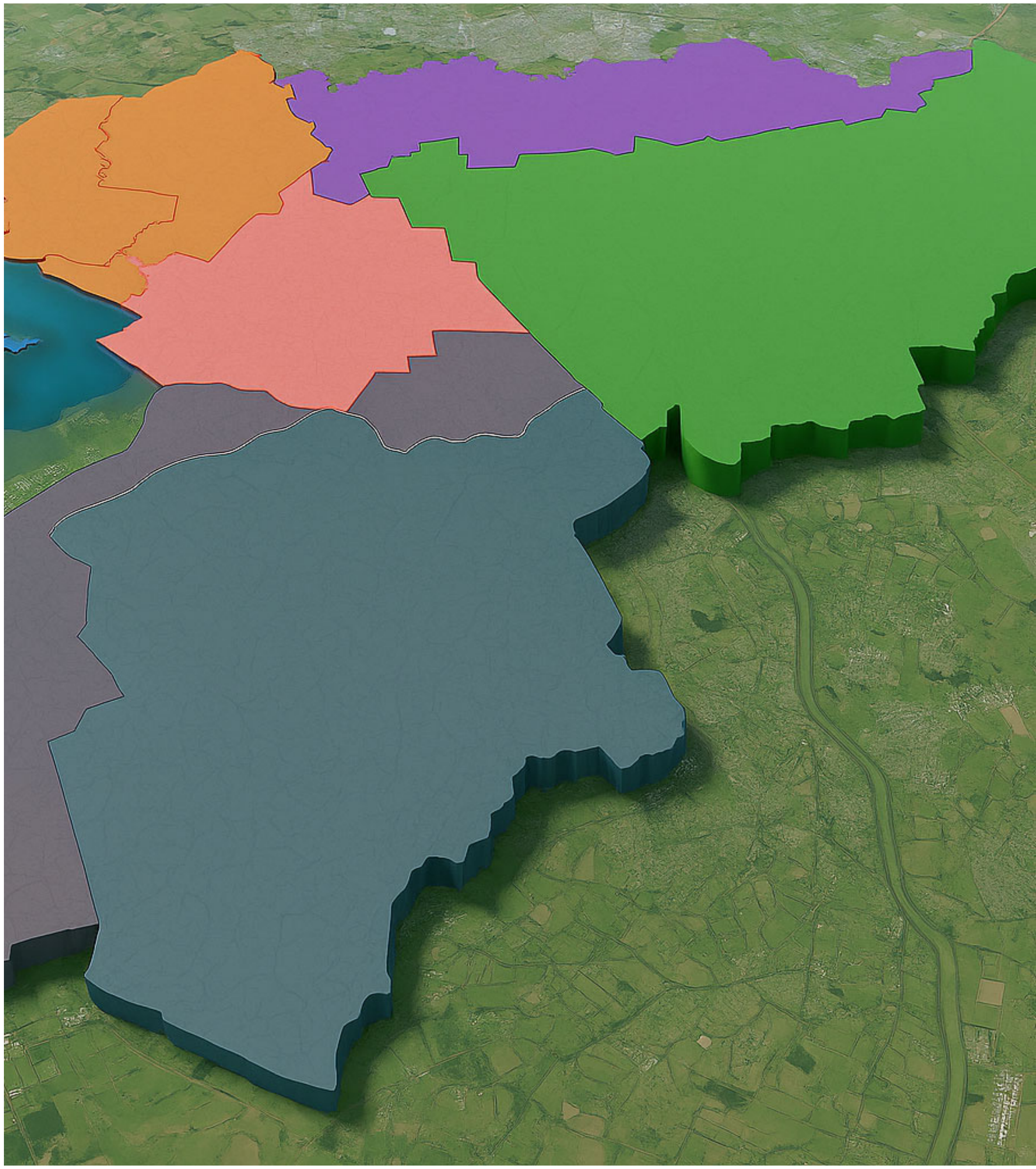
This is targeted remediation:

- ✓ Data-driven
- ✓ Safety-focused
- ✓ Future-ready

Strengthening the network for decades ahead.



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Ngā mihi nui

Thank you