

Briefing for Incoming Minister for Media and Communications

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HANGA NGĀTAHI | BUILDING TOGETHER

New Zealand is a world leader in telecommunication infrastructure. Following the Government's investment in the Ultra-Fast Broadband (UFB) Programme, which was implemented by Crown Infrastructure Partners (CIP), 87% of the total population in 412 towns can connect to fibre.

There has also been substantial investment in rural broadband and mobile coverage.

CIP is a Schedule 4A company under the Public Finance Act 1989 and has been funding and overseeing the Government's investment in connectivity infrastructure since 2010. CIP is currently delivering the following programmes with partners across the technology sector:

- **Rural Broadband** (including the Rural Broadband Initiative (RBI2), Remote Rural Users Scheme (RUS) and Rural Broadband Capacity Upgrades (RCU) programmes)
- **Rural Mobile** (including the Mobile Black Spots (MBS) and 5G Spectrum funded programmes)
- **Marae** Digital Connectivity Programme

CIP recently completed the UFB programme and three regional fibre links on the West Coast and Southland.

CIP has also partnered with NZ Police's Next Generation Critical Communications (NGCC) to deliver the **Public Safety Network (PSN)** programme; a new communications network for frontline emergency services.

A key priority area is the resilience of telecommunication infrastructure during national and regional emergencies. This is especially critical for mobile networks which members of the public rely on for access to emergency services and receiving civil defence alerts.

Earlier this year, Cyclone Gabrielle resulted in 600 mobile towers losing service and Gisborne lost connectivity for five days.

Connectivity infrastructure requires a regular source of Government funding and ongoing support to continue to deliver non-commercial infrastructure in rural and remote areas, improve the resilience of infrastructure, reduce the digital divide across the country, and meet future operational costs.

We look forward to working with you to implement your telecommunication policies and infrastructure in the years ahead.

Crown Infrastructure Partners (CIP) Overview

VISION

"To partner with the private sector, iwi and local government to deliver infrastructure to improve the lives of New Zealanders"

Hanga Ngātahi – Building Together

Core Focuses

➤ Connectivity Infrastructure ~ \$2 billion



- Rural Broadband, Mobile and Marae Digital
- Rural Fibre to farm/home
- Public Safety Network (PSN).

➤ Infrastructure Funds ~ \$4.2 billion



- Infrastructure Reference Group Fund
- Various water infrastructure funds (Rural Drinking Water, BoF)
- Cyclone Recovery.

➤ Infrastructure Funding and Financing \$0.71 billion



- City/region-wide and public infrastructure
- Greenfields – commercial and residential.

➤ Infrastructure Investment and Oversight



- FY24 ~\$416 million to March 2024, forecast year-end of \$1.1 billion
- To date \$3.8 billion, co-funding of \$4.3 billion resulting in \$7.5 billion.

**Co-funding is provided by local authorities, the private sector, and NGOs.*



The Neck, Lake Wanaka



Auckland University B201 27,500m²



Queenstown Arterial Bypass

Summary of Connectivity Infrastructure Programmes

Rural Broadband - ~\$332 million

- **Rural Broadband Initiative - ~\$220 million:** This programme of work provides fast broadband to under-served rural homes and businesses.
- **Rural Broadband Capacity Upgrade - ~\$102 million:** This programme is upgrading infrastructure to enable around 80,000 rural homes and businesses to access improved broadband.
- **Remote Users Scheme - \$10 million:** This programme is focused on increasing the availability of broadband connectivity in remote rural areas by extending existing networks and providing grants to households for suitable broadband connections.

Rural Mobile - ~\$184 million

- **Mobile blackspot fund - ~\$112 million:** This programme improves the availability of mobile services on state highways and key tourist destinations.
- **5G Spectrum Funded Rural Mobile - \$72 million:** This programme provides coverage for the remaining mobile blackspots on state highways, regional council roads with high accident rates, great walks, cycleways, track-ends, and settlements without mobile coverage.

Marae - ~\$29 million

- **Marae Digital Connectivity - ~\$29 million:** This programme is providing grant-funded broadband connections and associated hardware to marae to support whānau and hapū to undertake economic activity and enhance their digital capabilities.

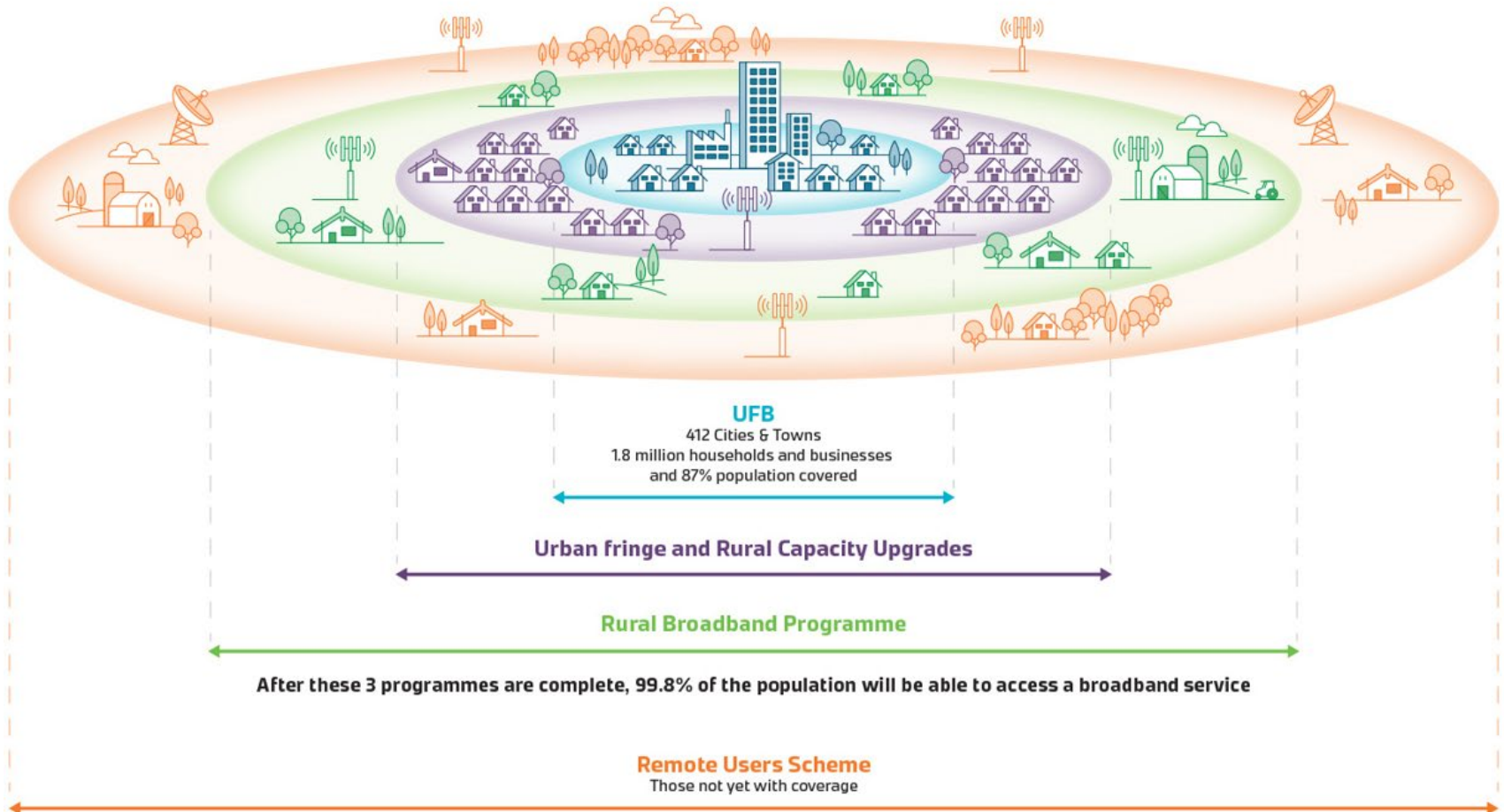
PSN

- **Public Safety Network - ~\$1.4 billion:** This programme is providing emergency services with a single, nationwide, secure, digital radio service and multi-network priority cellular broadband capability in urban, state highway, and rural areas commonly accessed by first responders in partnership with NZ Police.



Existing Broadband Programmes

EXISTING DIGITAL CONNECTIVITY PROGRAMMES



*Chorus is commercially funding and building fibre-to-the-premise (FTTP) to an additional 10,000 homes and businesses; and 6,500 premises are being covered as part of the rural broadband programmes.

Population Coverage for Broadband Programmes

Fibre Links (Complete)

Marae Digital Connectivity

UFB programme



UFB – Fibre-to-the Premise (complete)



Marae digital connectivity programme



West Coast/Southland fibre links (Complete)

Rural broadband programmes:

- Rural Capacity Upgrades
- Rural Broadband Coverage
- Remote User Scheme



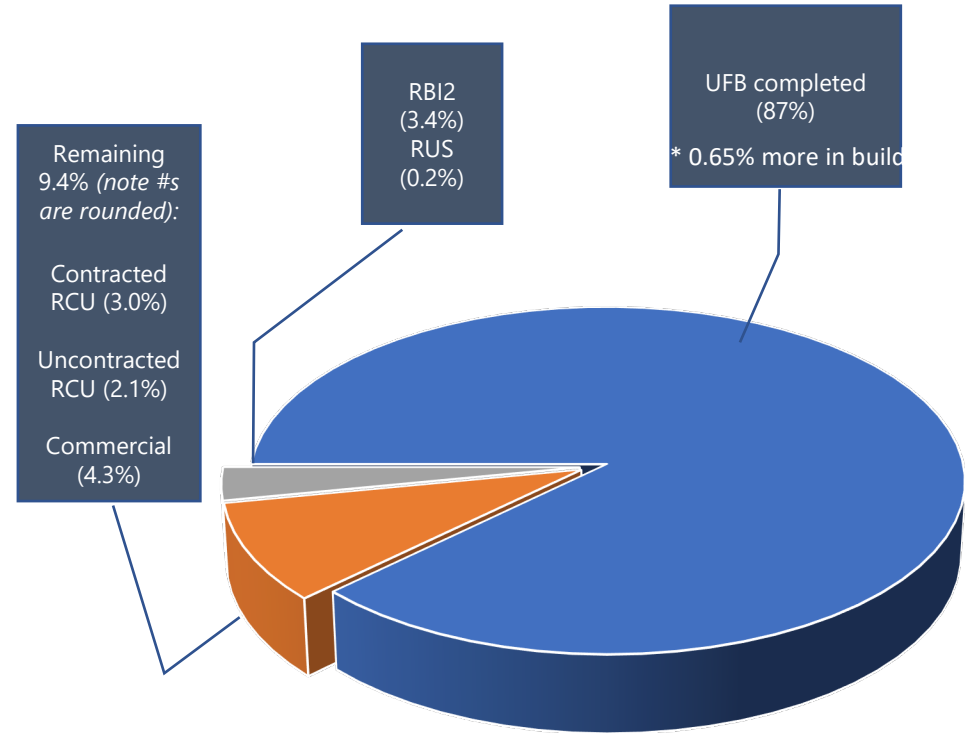
Rural capacity upgrades (RCU)



Rural broadband coverage (RBI2)



Remote User Scheme (RUS)



Mobile Blackspots

- Highways
- Points of interest




Rural Connectivity Partners

CIP works with a range of connectivity partners including Wireless Internet Service Providers ('WISPs') the Rural Connectivity Group, mobile network operators, and satellite and fibre providers:



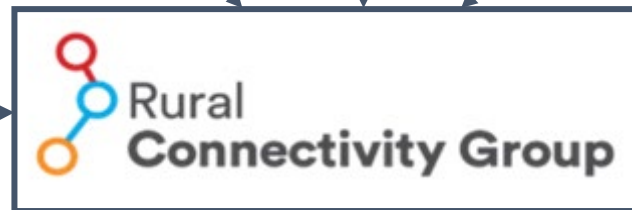
Rural Connectivity Group (RCG)

- The Rural Connectivity Group (**RCG**) is a joint venture subsidiary of the three mobile network operators.
- Investing alongside Government, the RCG target is to build ~580 mobile towers at the lowest possible cost in areas where commercial service cannot be justified.
- The partners share infrastructure including towers, radios, antennae, and spectrum.
- The Multi-Operator Core Network was a world first implementation.
- RCG has started using satellite backhaul at its most remote sites.



Grant Funding:

- Rural Broadband and Mobile Black Spot Coverage: ~\$260 million
- MNO spectrum investment grant funding: \$72 million
- Capacity Enhancements: ~\$1.8 million
- TOTAL: \$334 million



- Customers of all three mobile operators can use all towers
- Mobile network operators and their wholesale partners compete at retail for customers

Rural Broadband

Rural Capacity Upgrades (RCU): \$102m

- The RCU programme addresses the problem of low broadband capacity in many rural areas, where coverage is available, but broadband is very slow and unreliable, or the local mobile tower is on 'stop sell' meaning no new connections.
- The programme addresses rural households and businesses in areas uneconomic for commercial operators to upgrade.
- Spark, One NZ, and 2Degrees are deploying mobile broadband.
- 19 WISPs and local fibre companies (LFCs) provide fixed broadband, fibre to the home, and copper broadband (VDSL) to off-load congested mobile towers.

RCU key metrics (March 2024)

End Users
46,600
 66%
 Contract: 70,305

Stop Sell
11,039
 80%
 Contract: 13,836

Premises
3,986
 64%
 Contract: 6,202

Non-EUL Premises
2,347
 57%
 Contract: 4,108

Sites Handed Over
654
 56%
 Contract: 1,171



End users: Households, farms, marae and businesses

Stop Sell: No new connections available

Premises: Sites that have received rural capacity upgrades

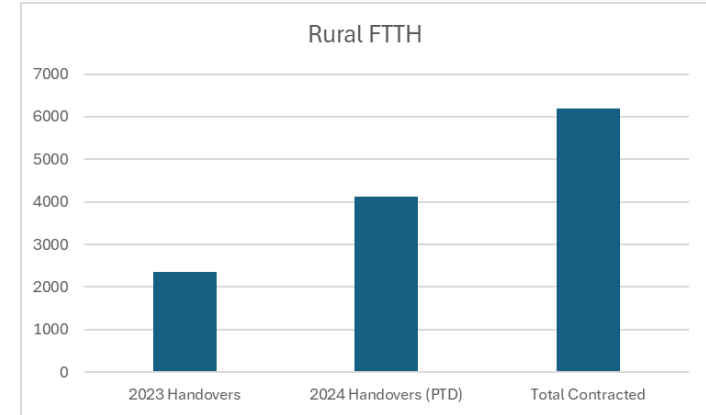
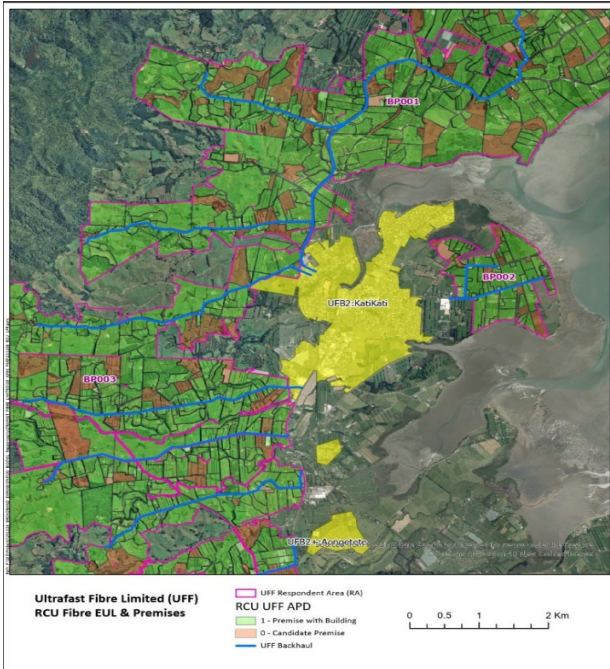
Non-EUL Premises: Premises covered incidentally by fibre

Sites Handed Over: Sites handed over by partners to CIP (WISPs + RCG)

Rural Broadband – Fibre to the farm

Rural Capacity Upgrades (RCU) continued

- As part of the RCU programme, rural fibre to the home/farm/orchard is being deployed for the first time and around 6,500 homes will receive fibre.
- Where Chorus is deploying new cable to upgrade copper services, it will also allow for farmgate fibre connections.



Rural Broadband

Remote Users Scheme (RUS): \$10m

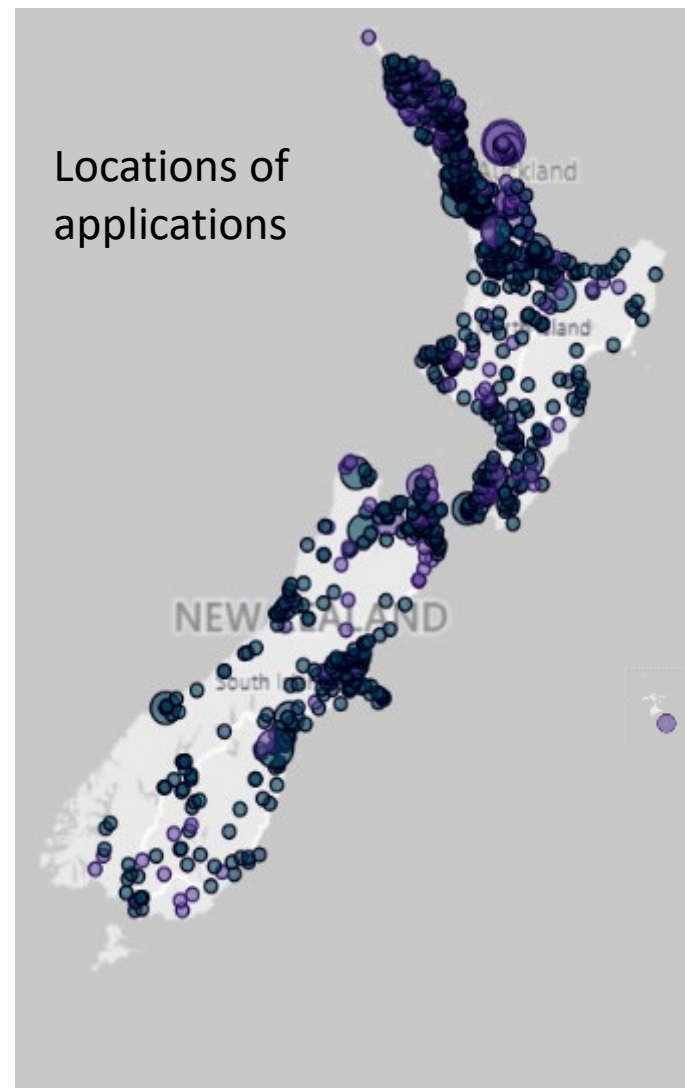
- The RUS was announced in November 2022 to provide broadband connections for remote households outside of the 99.8% coverage.
- The scheme targets around 3,800 of remote rural residences without connectivity, or with less than 10 Mbps service with densest clusters in the Marlborough Sounds, the Far North, and Great Barrier Island.
- The scheme is being delivered in two phases:
 - Extend terrestrial networks to eligible users with four potential partners following an RFP.
 - Users not covered by the RFP contracts may apply for a one-off grant up to \$2,000 for connection costs (likely satellite).
- The original \$15 million fund was reduced to \$10 million due to the smaller than anticipated applications for grants. The remaining \$5 million has been reallocated to marae connectivity renewals*.



RUS Key Metrics (March 24)

Applications	Service Available	Service Unavailable	Voucher Scheme Payments Made	RFP Rural households Covered
1,356	1,107	249	55	107

* \$1m of the residual could be allocated to marae technology licensing.



● COVERAGE ● NO COVERAGE

Rural broadband

LEO Satellite Services – a gamechanger for rural connectivity

Low earth orbiting (LEO) satellites are a disruptive force which will reduce the need for government to address gaps in rural telco infrastructure. Starlink is the first commercial example.

Broadband Services (Starlink)

- Broadband at an average peak of 142Mbps download*.
- Entry plan: \$79/month compared to:
 - WISP (~\$139/month, 50Mbps) or
 - 4G mobile broadband (~\$141/month, 25Mbps).

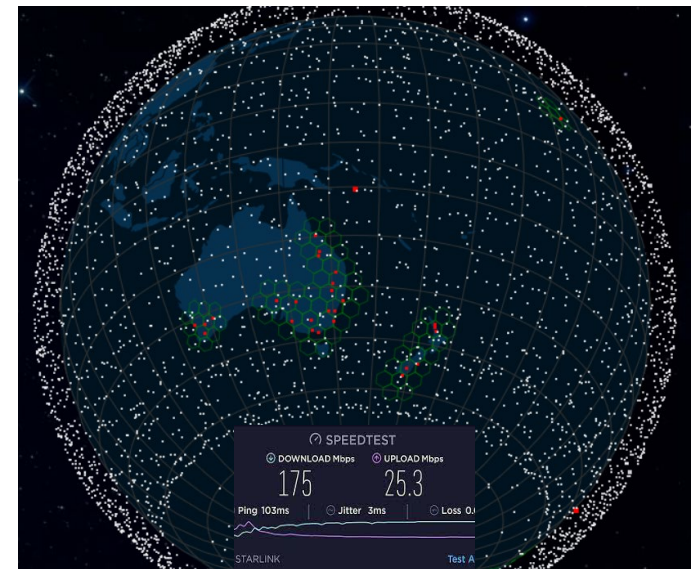
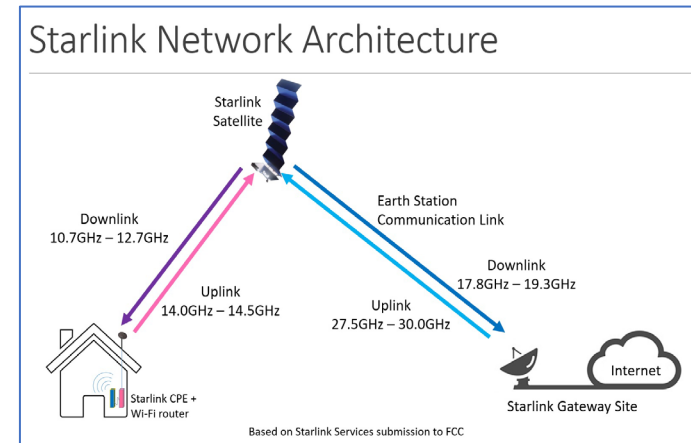
There is benefit in focusing on fibre in rural settlements and urban fringes as density makes areas less suitable for LEOs. This can also help to grow resilience in the backhaul network.

Voice and Text

- One NZ, Spark, and 2 Degrees have announced plans to offer cellular services over LEO satellites.
- Starting with text services in late 2024, voice call services will follow as the number of LEO satellites increases.

These have the potential to provide outdoor voice coverage to mobile phones over most of New Zealand but will not provide broadband to mobile phones or voice call services in a building due to low signal strength.

* This is only exceeded by fibre and Hybrid Fibre Coax (HFC). Starlink latency is 42ms versus 6ms for fibre.



Rural Mobile

Mobile Black Spots – Phase 1

- Improving mobile coverage on state highways and key tourism spots. Areas of priority are:
 - Length of highway blackspot
 - High accident areas
 - Areas with high tourism traffic
 - Providing service to track ends to support safety, search and rescue, and convenience for users
- Mobile towers built by RCG. Customers of each operator (including inbound roaming tourists) can access:
 - Mobile voice calling with emergency caller location
 - Emergency cell broadcast (for example during earthquakes or pandemics)
- This programme will support the Public Safety Network.



Rural Mobile

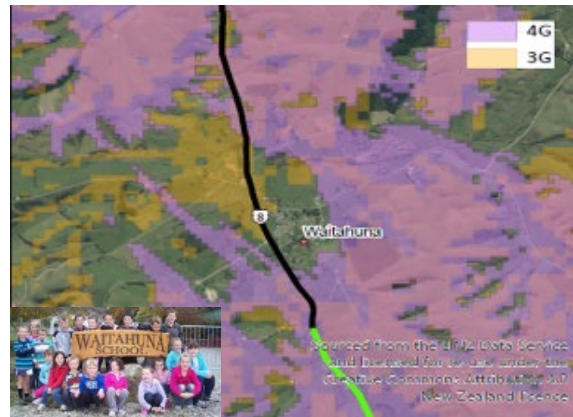
Mobile Black Spots – Phase 2 (5G Spectrum-funded)

As part of their agreement with MBIE, the mobile network operators are contributing \$24 million each to the RCG (total \$72 million) to further expand mobile services into rural areas, including roads and towns that do not have mobile coverage:

- A contract has been executed between the mobile network operators, MBIE, and CIP.
- MBIE has identified and prioritised areas that do not yet have mobile coverage and fit the following criteria:
 - **First priority:** Improve coverage on largest black spots along state highways with equal or greater than 10km in length, commencing with those having highest crash rate per kilometre.
 - **Second priority:** Provide mobile coverage to areas that are not state highways based on blackspot length greater than 10km, and tourist locations, state highway blackspots between 5km and 10km, and communities of 15 or more end users which have requested coverage.
- Three sites have gone live, and 37 Business Cases have been approved for build.



Gentle Annie – 74km black spot.



Waitahuna, South Otago.



Jerusalem, Whanganui River.

Marae Digital Connectivity Programme: \$29m



694

MARAE
APPLICATIONS
RECEIVED



656

MARAE
BROADBAND
CONNECTED

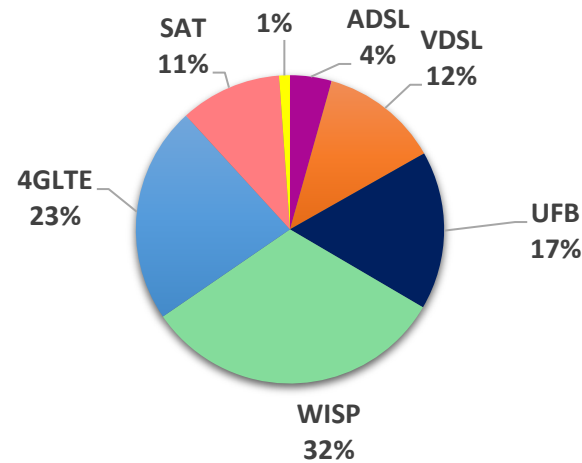


647

MARAE
HARDWARE
INSTALLED

**As at March 2024*

Total Marae Connections by type



9(2)(a)



9(2)(a)

- This Programme initially funded broadband connectivity to marae for 5 years.
- This included the installation Audio Visual equipment, security cameras, internet distribution and Fire Alarms.

9(2)(f)(iv)

Public Safety Network (PSN): \$1.4bn

CIP is assisting NZ Police's Next Generation Communications Unit (NGCC) with the oversight and contract management of the build phase of the Public Safety Network (PSN) emergency services communications for Police, Fire and Emergency NZ, and Ambulance services

~48,000 first responders
~6k vehicles
~1.4k stations



Confirmed Programme Scope:

- Appropriation \$1.4 billion over 10 years (capital & operating):
 - Land Mobile Radio (LMR) upgrade for encrypted mission critical voice.
 - Mobile roaming for resilience and priority cellular for mission critical services.
 - Paging/messaging services.

Commercial Contracts:

- Land Mobile Radio (LMR): Tait/Kordia joint venture has been executed.
- Mobile contract with Hourua (One NZ/Spark Joint Venture) has also been executed.

CIP's Ongoing Role in PSN:

- CIP, in partnership with NGCC, is responsible for assisting with contract management for the delivery of network infrastructure.

Oversight Ministers (you are one of the oversight Ministers)

- Ministers of Finance, Infrastructure, Police, Media and Communications, and NEMA.

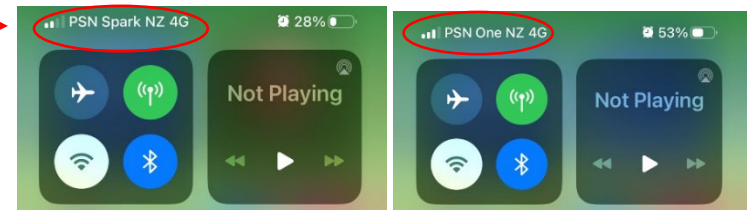


PSN (continued)

Mobile Roaming and Priority Cellular

- Roaming between Spark and One NZ delivered, and emergency services are migrating to the service – this is a global first with unique SIM cards for officers (33,000 in total). To March 2024 ~7,700 agents have migrated.
- Prioritisation and pre-emption in design phase – on track for Q4-2024.
- Work has also commenced on deployable solutions to provide mobile coverage in emergencies, and CIP is assisting with getting access to spectrum.

9(2)(g)(i)



Land Mobile Radio Network (LMR)

- Programme is to deploy across ~500 sites nationwide to provide a high availability mission critical LMR network for all four emergency services.
- The new LMR network will replace multiple networks used by emergency services and provide a secure, resilient, single network for all four agencies.
- The LMR network has a completion target of Q3-CY2026.

9(2)(g)(i)



New LMR tower on left beside existing tower on right in Timaru Pilot

Network Resilience during Cyclone Gabrielle

Impacts

- ~600 mobile towers were put out of service (including ~135 RCG towers).
- Towers had no structural damage but were exposed to power outages and broken backhaul fibre.
- Members of the public could not call 111, receive Civil Defence alerts, call family, or use EFTPOS in outages that lasted for days (5.5 days in Gisborne).

Power

- RCG batteries lasted for ~8 hour off-grid operation.
- Commercial mobile operators are not incentivised to add more batteries to increase power resilience, leaving restoration dependent on local electricity lines companies.

Backhaul

- Many RCG sites have dependencies on commercial mobile towers for backhaul – some of which have shorter battery life, hence RCG towers were prematurely lost.
- The Chorus Fibre outage impacting Gisborne and Hawkes Bay showed resilience is poor.

Mitigation

- CIP is working with RCG to lift power resilience at remote and key hub sites in East Coast cyclone-impacted regions.

Australian Federal Government has a two-stage programme to improve mobile network resilience following bush fires and floods:

- funding to extend battery life on 1,011 mobile towers
- 220 of above (hub sites) will have generators installed
- 320 mobile towers receive backhaul resilience
- 40 towers hardened for bush fires
- \$24.1m Federal Govt. funding contribution

MBIE is planning to provide advice to Ministers on this matter



Australian Government
Department of Infrastructure, Transport,
Regional Development, Communications and the Arts



Connectivity Opportunities

CIP's observations of the sector has identified the following opportunities:

Resiliency

- Given the recent climate events, resilience is increasingly important:
 - Increase fibre backbone diversity (for example, the East Cape lost service twice within 2 months).
 - Increase power and backhaul resilience for rural mobile sites for natural disasters (Australia has invested \$50 million as part of Telecommunications Disaster Resilience Innovation initiative and has announced a further \$15 million to this fund aimed at providing a minimum of 12 hours battery backup at mobile sites).
 - Turn marae with good drinking water (upgraded as part of the Rural Drinking Water project) and good connectivity (delivered as part of the Marae Digital Connectivity project) into resilient community disaster hubs by adding standby generators and Starlink satellite services.
 - Create a fleet of stand-alone, rapidly deployable cell sites to provide localised coverage in a disaster, for deployment by local emergency services agencies.

Rural Communications

Low Earth Orbit satellites such as Starlink are a game-changer for rural communications and need to be considered as a good broadband solution in underserved areas with a low density. However, there are areas, particularly in the urban fringe and underserved towns which already have a fibre backhaul, where it may still make sense to invest in fibre.

• 9(2)(g)(i)

- Increase **mobile voice coverage** to small settlements where it will never be commercially economic to build mobile infrastructure. These customer may be left behind as copper becomes unsupported. Typically, RCG will receive 2 – 3 requests for mobile services per month.



• 9(2)(g)(i)

Fibre – Better connectivity by far

Fibre is the best option when it is available...

- Fibre networks provide the best options to end users in terms of bandwidth and cost. The roll-out of UFB has seen fibre delivered to ~87% of all households in New Zealand.
- Fibre is the fastest, especially in peak traffic periods, delivering up to ~850Mbps compared to Wireless 4G Mobile broadband delivering 54Mbps in non-fibred areas and 76Mbps in fibred areas, and LEO satellites (Starlink) delivering 142Mbps.
- Fibre is the cheapest, with a fibre plan from One NZ listed at \$89 per month compared to \$159 per month for a Starlink Service.
- Starlink suffers from ‘micro-outages’ where satellite moves out of range and a new satellite takes over the connection. These are generally short and are expected to reduce over time as more satellites become available but is anecdotally noticeable and annoying.

...And New Zealand has had a successful roll-out:

New Zealand		Measure	Australia
	87%	Able to connect to fibre	68.5% ¹
	459 Mbps	Average NBN/UFB speeds²	63 Mbps
	75.2%	Subscription to fibre³	24.61%
	\$1.5bn	Government Cost	A\$51bn
	0.5 per week	Outages⁴	0.9 per week
	24th	Global speed rankings⁵	94th
			

1 Houses and Businesses passed by Fibre to the Home (FTTH) connections (ACCC Market Report Dec 2022)

2 CIP Connectivity Report, ACCC (Australia) Connection Report

3 Subscriptions as a percentage of houses/businesses that have fibre available (OECD Report for 2022, published in 2023)

4 From Measuring Broadband Trans-Tasman report June 2022, released by ACCC and Commerce Commission

5 speedtest.net Global Broadband Speed Ranking, May 2024

CIP Board & Leadership team for Connectivity



Mark Binns, Chair

Mark has been involved in many of New Zealand's largest infrastructure projects, including the Wiri Prison public-private partnership and the Waterview Connection. He is a qualified lawyer and was previously CEO of the Infrastructure Division of Fletcher Building and Meridian.



Alan Dent

Alan has provided advice across the public and private sectors, including mergers and acquisitions and State-Owned Enterprise/Crown entity establishment. He led Deloitte's Corporate Finance Wellington practice and the firm's Financial Advisory Services until 2020.



Bella Takiari-Brame

Bella is a chartered accountant who has worked in the oil, gas and utilities industries. She has a wealth of global market understanding and governance expertise, and holds governance positions in Crown, private and iwi entities.



Chris Gudgeon

Chris has been involved in property investment, development and construction in New Zealand for more than 25 years. He was previously Chief Executive of Kiwi Property Group and Capital Properties NZ.



Mei Fern Johnson

Mei Fern is a partner at law firm Russell McVeagh, advising on mergers and acquisitions and complex commercial contracting. Mei Fern has particular expertise in investments in the infrastructure, technology, transport and energy sectors.



Graham Mitchell
CEO



John Greenhough
CTO



Kathryn Mitchell
Chief Legal &
Corporate Officer

Appendices

- Completed Programmes
 - West Coast & Southland Fibre Links
 - Chatham & Pitt Islands Network
 - Ultra-Fast Broadband
- Rural vs Urban Government Connectivity Investment Per Capita
- Rural Broadband Coverage
- NZ Mobile Voice Coverage – Current & Projected
- New mobile towers
- Rural Broadband Capacity Upgrades
- RCG Mobile & WISP Towers
- Technology Examples:
 - UFB Architecture
 - How Does 'Fixed Wireless' Work?
 - Wireless Technologies
 - Move To Efficient, Shared Rural Mobile Infrastructure



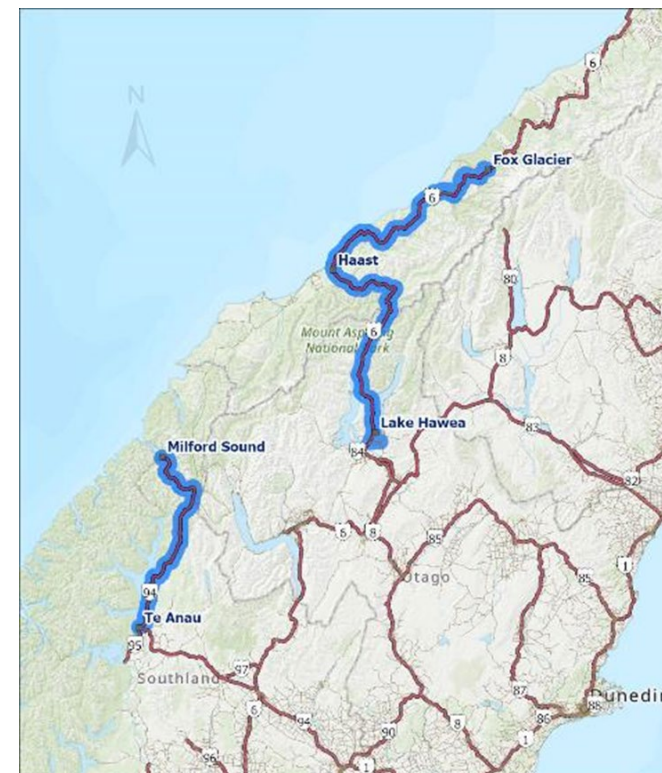
West Coast & Southland Fibre Links (completed)

Fibre links built to improve coverage and resilience for lower west South Island:

- Fox to Hawea (complete) 247km
- Te Anau to Milford (complete) 118km
- Te Anau ring (complete) 32km

Te Anau Ring

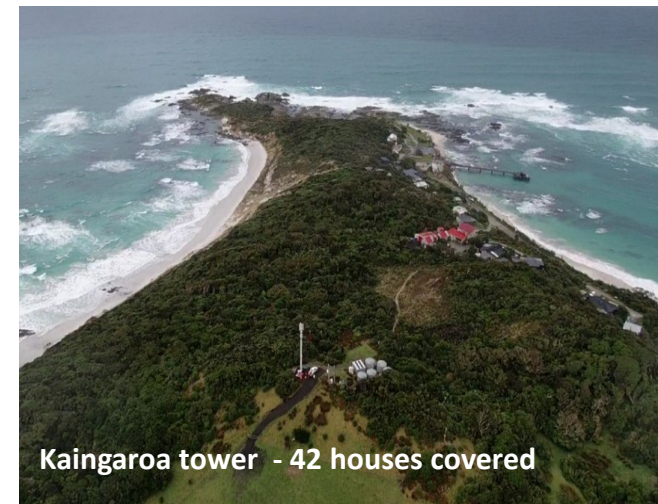
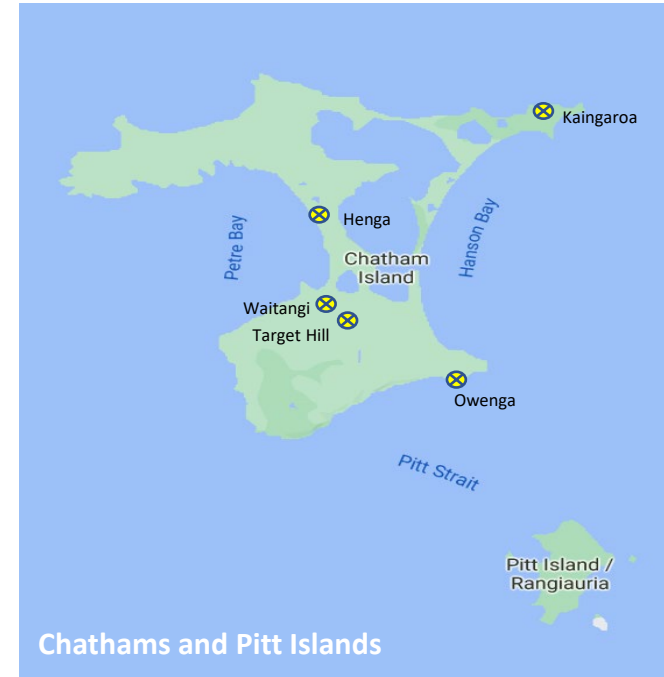
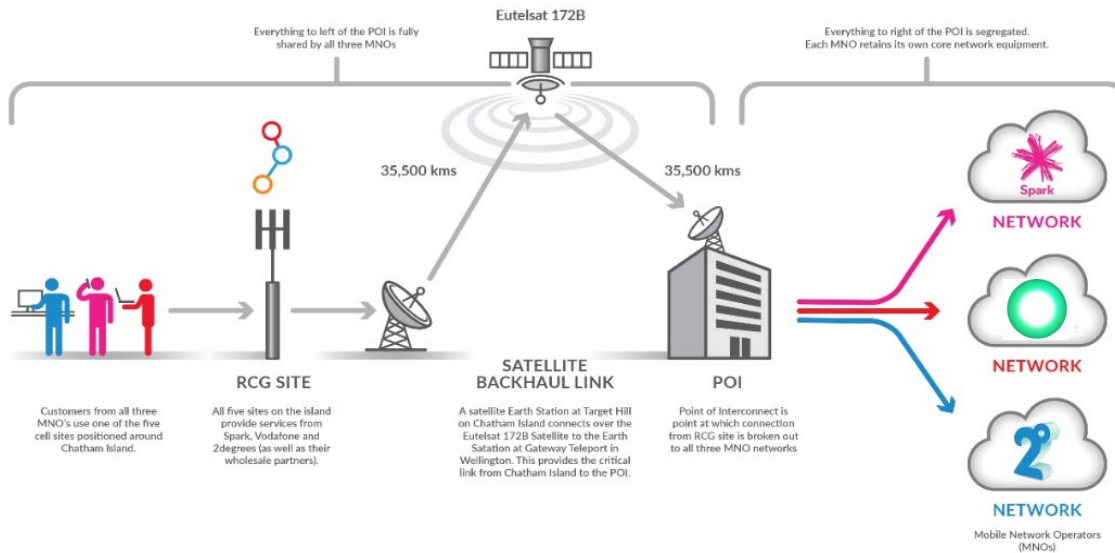
- CIP and Chorus contracted for Te Anau Ring project in January 2023 for 32km of fibre laid between Blackmount and Manapouri to protect 7 UFB towns and 120km of Milford Fibre route.
- Chorus began work prior to contract signing and has completed civil work.
- Crew were diverted to flood recovery work and the Milford project, delaying completion.



Chatham & Pitt Islands Network (RCG - completed)

- Network went live in December 2021.
- Broadband service to 366 of the 397 homes and businesses on the two main islands (92%).
- Three schools (Te One, Kaingaroa, Pitt Island), two marae, hospital and airport also served.
- Mobile services to large proportion of roads and significant coastal marine areas.
- Backhaul link increases from 29Mbps to 240Mbps (+830%).
- Funding: ~\$12m from TDL, PGF, CIP direct and RCG).
- First in world MOCN (multi-carrier) over satellite – currently peaking at ~80%.

RCG Chatham Islands Network



Ultra-Fast Broadband (completed)

OVERALL PROGRESS ULTRA FAST BROADBAND (UFB)



412
UFB TOWNS
AND CITIES
complete



1,844,353
HOMES AND
BUSINESSES
with UFB
available (100%)



1,387,460
HOMES AND
BUSINESSES
connected to UFB



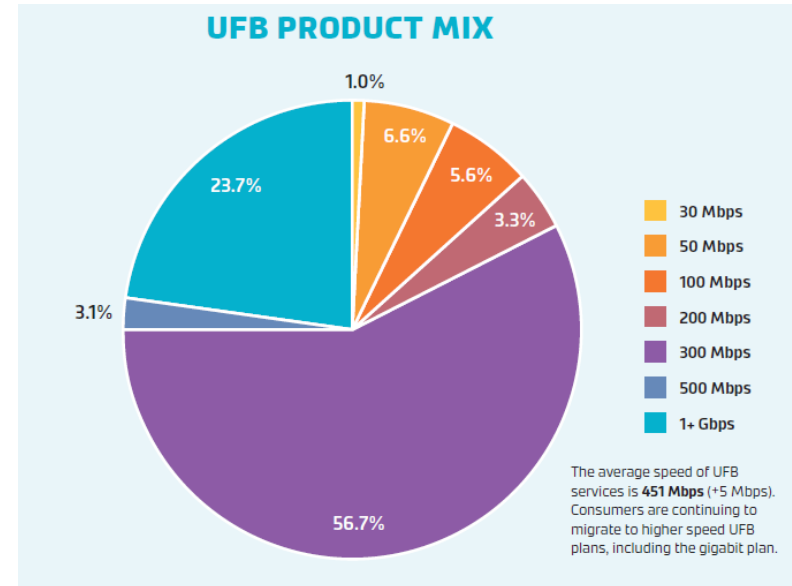
75%
UPTAKE



87%
OF NEW ZEALANDERS
CAN NOW ACCESS UFB



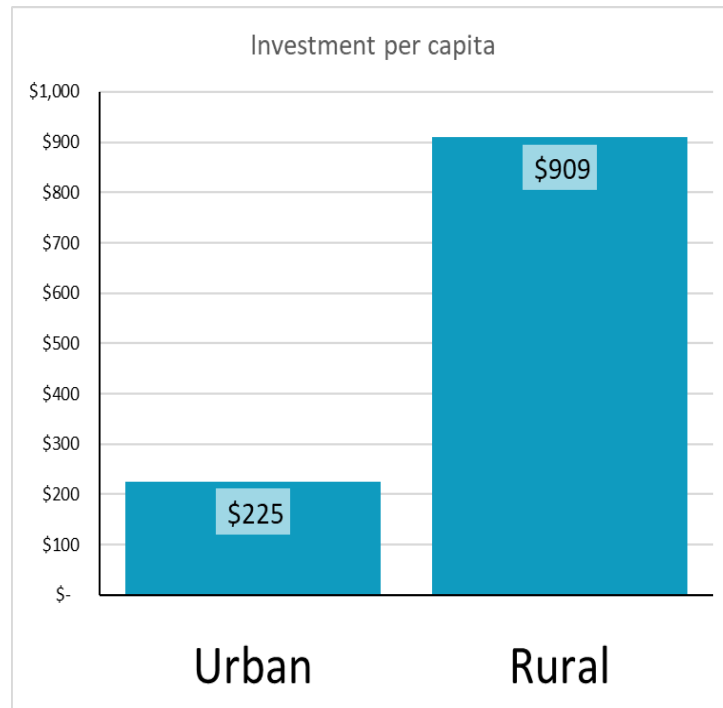
**INVESTED
PTD***
\$2.1b
Total Investment



459 Mbps
Average UFB Speed

575 Gb
Monthly Average Download

Rural vs Urban Government Investment Per Capita



\$378m
invested to date



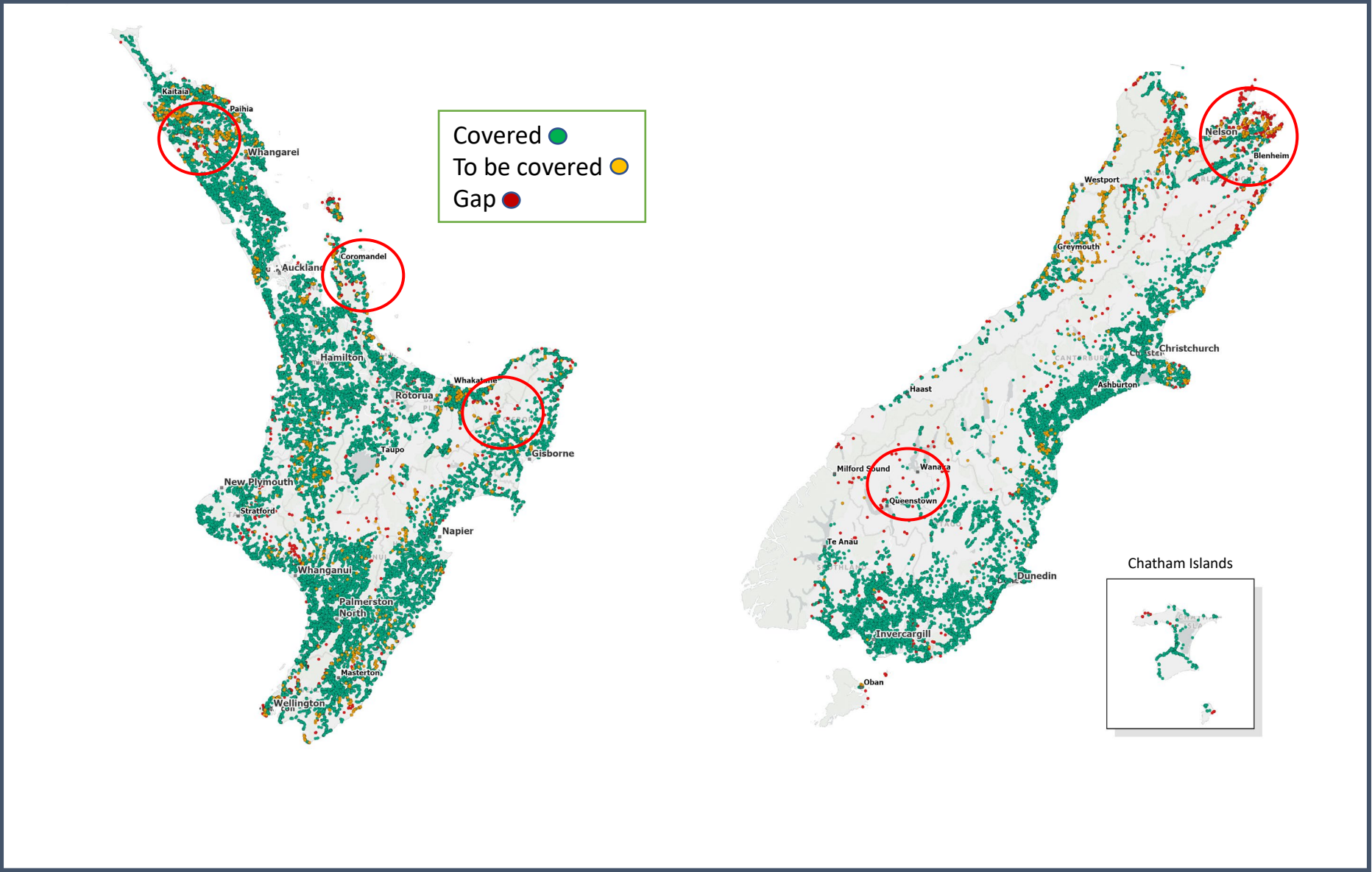
\$215m
total committed



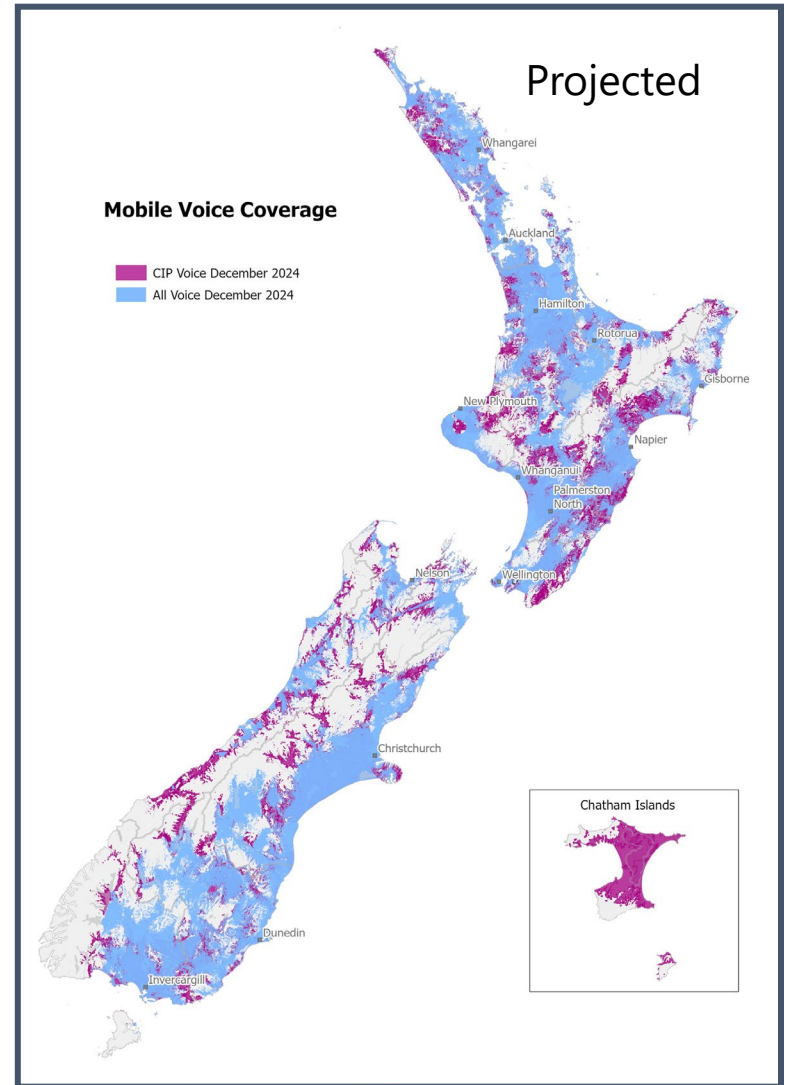
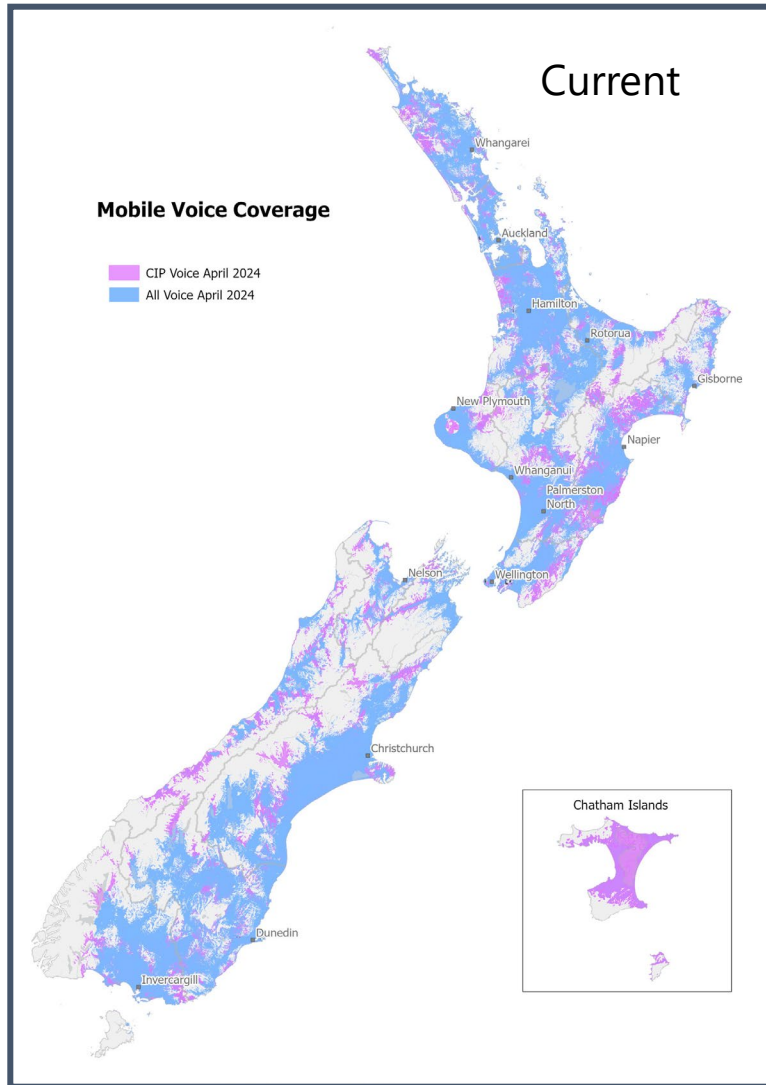
\$593m
total spend*

* excludes RBI1 \$300m

Rural Broadband Coverage



NZ Mobile Voice Coverage – Current & Projected

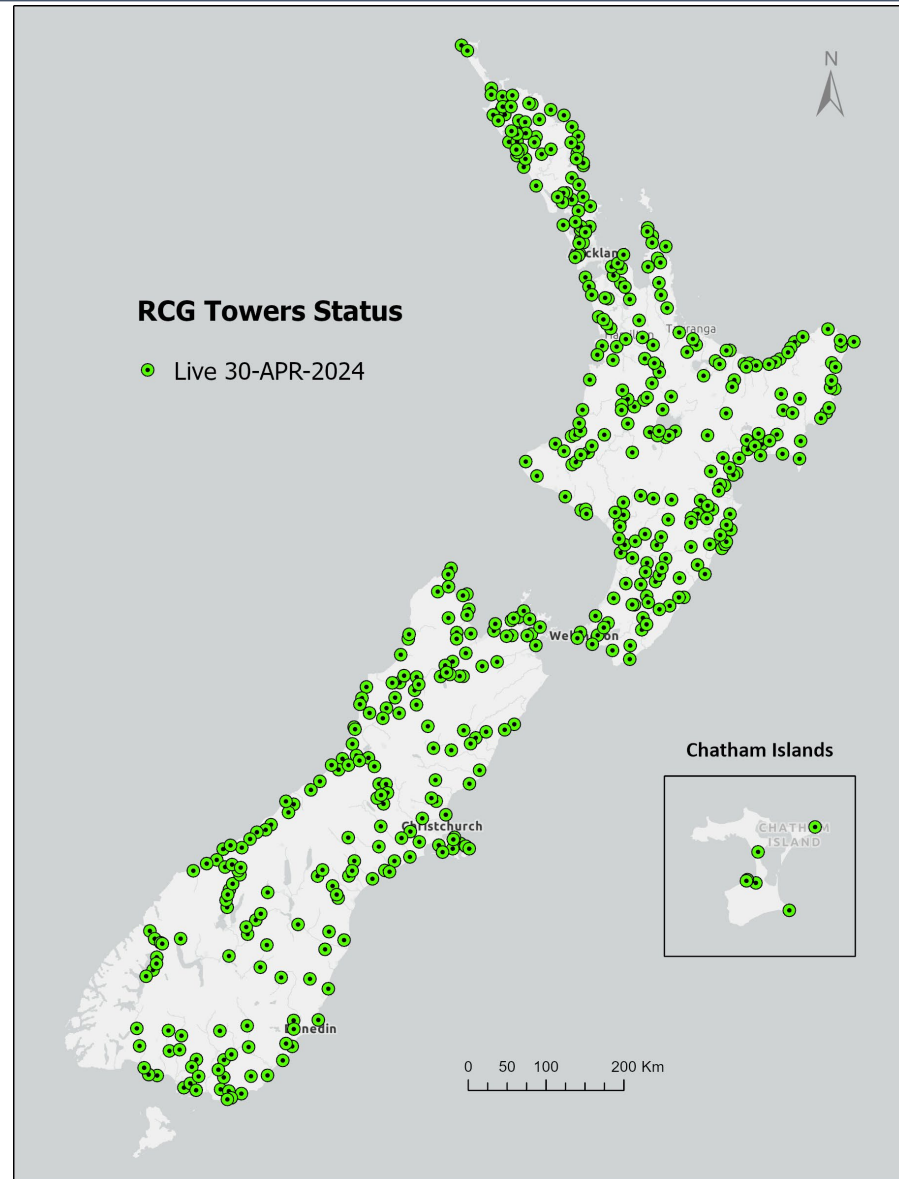


New Mobile Towers Built/To Be Built (~580)

On air
487

To be built
~90

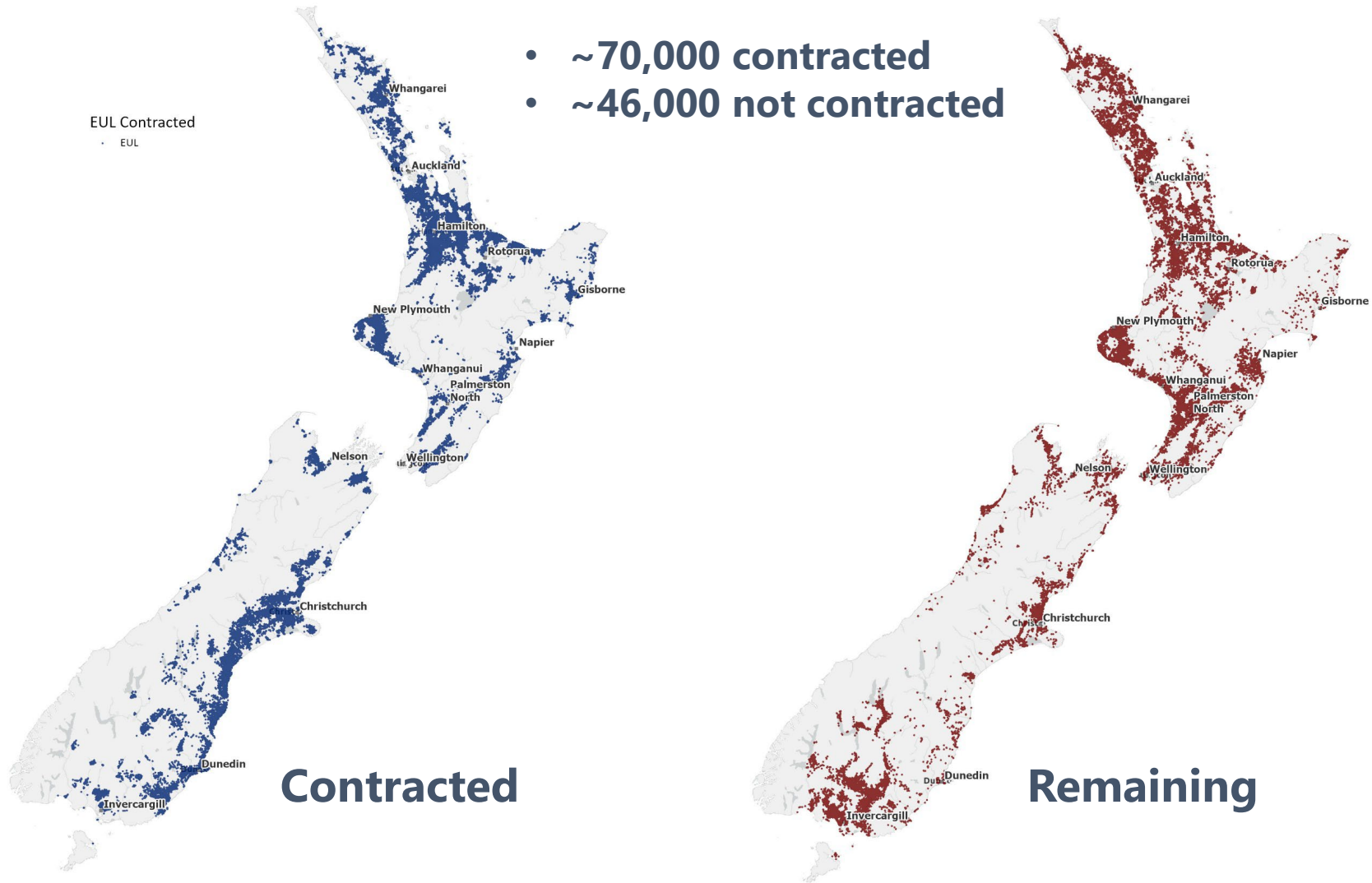
All three mobile
network
operators
involved



Rural broadband – Capacity Upgrades

EUL Contracted
• EUL

- ~70,000 contracted
- ~46,000 not contracted



Contracted

Remaining

RCG Mobile & WISP Towers



Windy Ridge RCG Tower



Amuri.Net Tower, Mt Grey



Parekura Bay RCG Tower



Milford RCG Tower



Lightwire Tower, Morrinsville

UFB Architecture

1. Duct containing multiple tubes which fibre is “blown” through.
2. Residential house. UFB terminates in an Optical Network Terminal (ONT), which converts fibre light signal to Ethernet and end-user’s Wi-Fi router, which distributes internet around home.
3. Multi-dwelling unit (MDU) – fibre built to each apartment.
4. Street cabinet or fibre access point where fibre is split 24:1 (at least) to provide service to multiple premises.
5. School: all schools have UFB available in urban areas.
6. Central Office or Telephone exchange where UFB network commences and connects to retail service providers.
7. Chorus technician van.

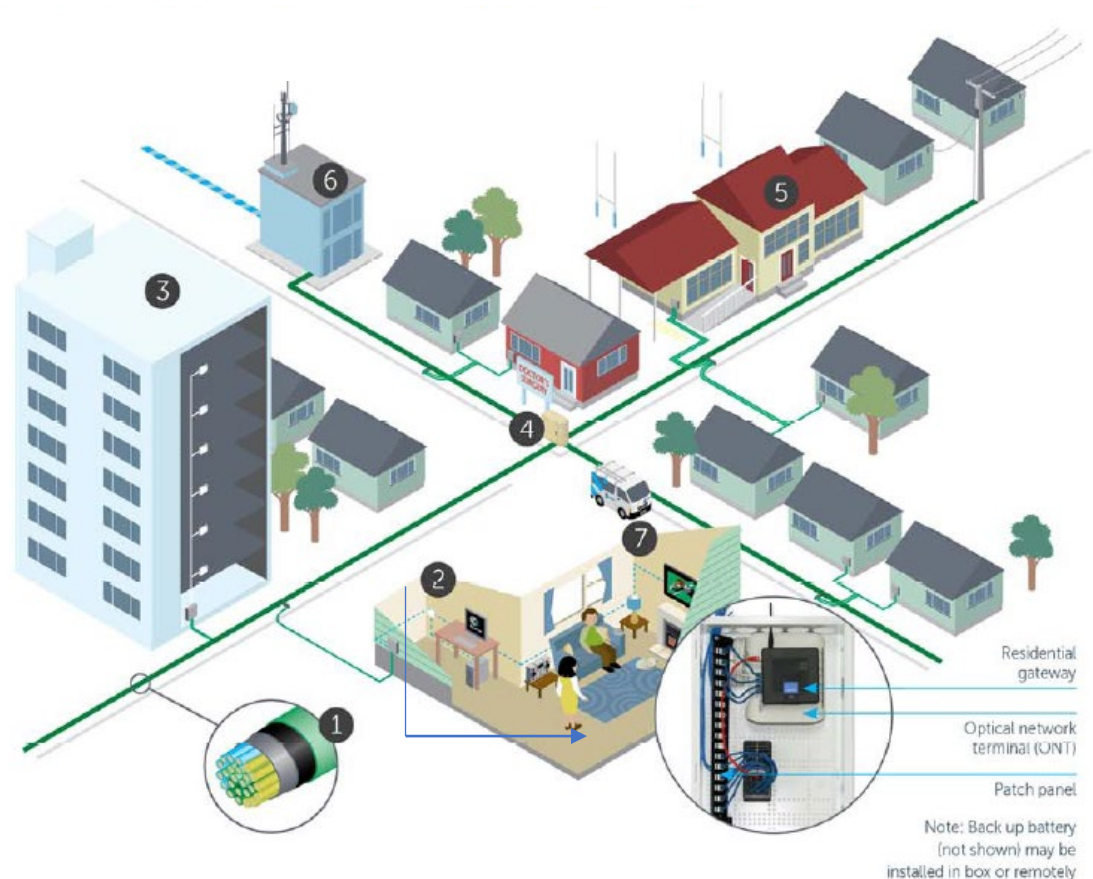
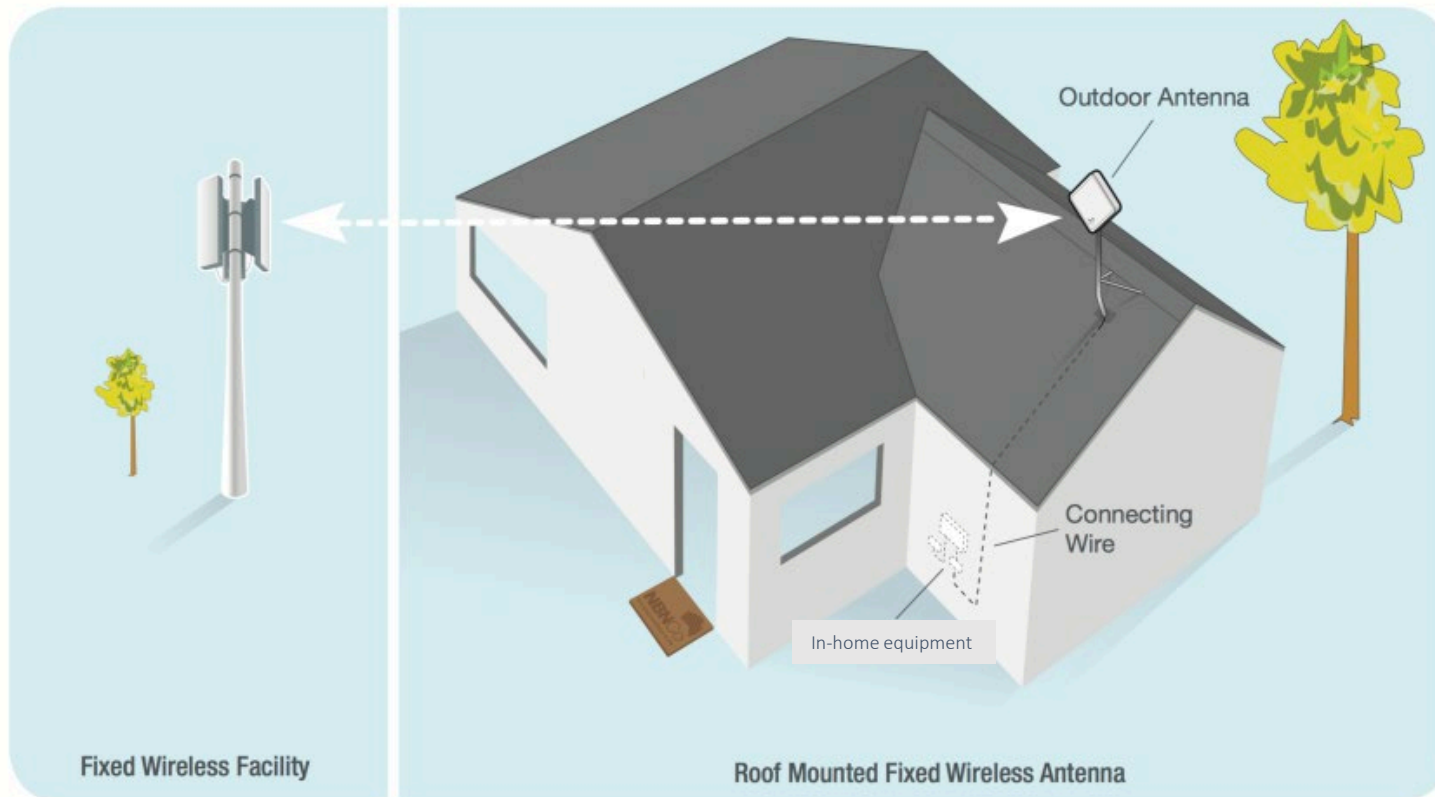


Image credit: Chorus

How Does 'Fixed Wireless' Work?

- 'Fixed wireless' provides an in-home broadband and phone connection, using an outdoor antenna placed on the roof of the home.
- This antenna connects to the mobile network, just like a mobile phone does, but in the home it replicates the landline/landline connection to the modem/Wi-Fi router.
- Obstacles, including trees (for example, shelter belts), can degrade the signal.



Wireless and Satellite technologies are best suited for broadband in areas where the population density is low.

Fixed Wireless / Cellular Mobile – RCG and Mobile

- Traditional mobile cell towers with radio antennae.
- Data transmission using radio waves.
- Capacity is shared and is a function of spectrum, radio technology (number of send and receive transmitters), radio 'segments' per site (typically three), mobile generation used (currently 4G and 3G but upgradeable to 5G) and amount of 'backhaul' to tower.

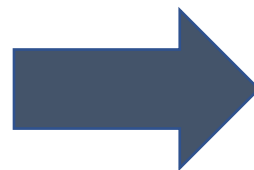


Fixed Wireless Only – Wireless Internet Service Providers

- Towers with radio antennae (but use different technology to the mobile cell towers) – radio paths are more directional allowing more assured throughput speeds from customer to the tower.
- Data transmission using radio waves.
- Capacity depends line of sight to tower, wireless technology used, spectrum available ('shared' spectrum is less useful) and amount of 'backhaul' to tower.



Move To Efficient, Shared Rural Mobile Infrastructure



RBI1: Co-location tower – 3 mobile network operators

- Multi-antennae – one set for each carrier (9+)
- Vodafone 4G spectrum 80 MHz & co-location
- Older radios - less capacity
- Max capacity 1,465 Mbps 488/244 connections
- Coverage addresses/Towers : ~490/tower
- Co-location capacity can be added i.e. Spark

RBI2/MBSF: MOCN tower – 3 MNOs

- Single-antennae/sector – shared by all carriers (3)
- Up to 160MHz available at latest 4x4 Radios
- Software upgradeable to 5G in future
- Max capacity 2.65Gbps/4.2Gbps
- Max connections: 884/442
- Coverage addresses/Towers : ~90/tower