IN THE MATTER **of the Resource Management Act 1991**

AND

IN THE MATTER **of Wellington City Proposed District Plan**

HEARING STREAM 9: **Infrastructure**

JOINT STATEMENT OF EVIDENCE OF

GRAEME MCCARRISON FOR

SPARK TRADING NEW ZEALAND LTD

AND

ANDREW KANTOR FOR

CHORUS NEW ZEALAND LTD

AND

COLIN CLUNE FOR

ONE NZ GROUP LTD AND

FORTYSOUTH

24 MAY 2024

1. EXECUTIVE SUMMARY

1.1 Spark, Chorus, One NZ (formerly Vodafone), and FortySouth welcome the opportunity to provide this evidence. FortySouth is responsible for, building, owning, operating, and maintaining the mobile tower infrastructure which One NZ and other operators attach their network equipment. Connexa owns and provides passive (pole/structure) for Spark and 2degrees to attach active network equipment. Spark and One NZ remain telecommunication network operators providing customers the opportunity for digital connectivity. The core of Chorus' business is the nationwide network of fibre optic and copper cables connecting homes and business together. The diagrams in Appendix 1 give a general understanding of what each organisation is responsible for and highlights the split between passive structures owned by Connexa and Forty South and the active components of the Spark and One NZ wireless networks.

1.2 Telecommunications infrastructure is nationally, regionally and locally critical. It is fundamental to digital transformation of private and public (both social and network) infrastructure. The challenge that we face is increasing the density of the network and ensuring that rural and remote locations, including our roads, have network coverage and capacity. Our networks are a critical part of enabling New Zealand to successfully respond to climate change, monitor and enhance the environments that New Zealander's love.

1.3 Spark and One NZ are currently rolling out new 5G mobile networks, deploying over 1,000 new mobile sites and extending network coverage to regional communities. Work has started on planning for the 6G network. Chorus continues to expand its fibre network in urban and small rural settlements. The continuous technology upgrades are needed to keep up with the increasing demand from consumers and businesses – exponential growth in the use of data is continuing and each year the amount of data handled by telecommunications networks roughly doubles[1]. Chorus, Spark, One NZ, and FortySouth, along with other telecommunication providers, invest significantly every year in our networks to ensure New Zealanders have access to world class digital services.

1.4 New and fast evolving satellite services and Internet of Things ("IoT") solutions are being developed and deployed to gather data to inform decision making, development

[1] The New Zealand Commerce Commission, *Annual Telecommunications Monitoring Report – 2021 Key Facts*, 17 March 2022

of solutions and compliance. The telecommunications network enables the gathering and generation of data to better understand and respond to changes, especially environmental changes which are occurring at pace.

1.5 To enable this, we rely on regulatory frameworks both nationally, via the National Environmental Standards for Telecommunications Facilities 2016 ("NESTF"), and locally, via the planning frameworks such as the proposed district plan, to appropriately enable the upgrading of existing networks and construction of new networks. The NESTF has limited scope insofar as it facilitates the construction of new networks in rural and urban areas within and through sensitive overlay environments. It is therefore critical that the planning frameworks promulgated under the Resource Management Act 1991 ("RMA") appropriately recognise the importance of telecommunication infrastructure and enable the construction of this infrastructure through sensitive natural and built environments.

1.6 The telecommunications infrastructure sector is currently challenged by a number of regulatory frameworks that are out of date and which fail to recognise the critical nature of the telecommunications network and also the opportunities the network provides to support and protect both the natural and built environments.

1.7 New Zealand businesses completely depend on efficient and reliable Telecommunications networks. This was emphasised by the recent COVID-19 pandemic in New Zealand, which saw a large proportion of New Zealanders working from home during the lockdowns. New Zealand businesses relied on staff having access to reliable and efficient digital services to stay connected and work during this time. Access to the global markets, whānau, friends and colleagues in real-time is made instant by our Telecommunication networks. Telecommunications makes the world small with the opportunity to digitally connect ensuring New Zealand's very remote geography is no barrier to international success.

1.8 Telecommunications also plays an important role in national resilience, demonstrated most recently through our national response to COVID-19 and as recognised by the Te Waihanga/Infrastructure Commission.

1.9 The key focus of this evidence is:

a) To provide an overview of the modern telecommunications industry and how it enables New Zealand to compete in the global economy, connect socially, support working from home, understand and face up to the challenges of climate

change, enable research and monitor and develop solutions to various problems.

b) To detail the complexity related to the operation and construction of telecommunication networks.

c) To outline the challenges of ensuring network resilience for connectivity in areas subject to natural hazards and climate change.

d) To provide an overview of the NESTF framework in relation to natural hazards that telecommunications depend on.

e) To explain why it is critical to recognise telecommunications infrastructure as nationally and/or regionally significant infrastructure and enable the provision of such infrastructure in sensitive natural, hazard and built environments.

2. INTRODUCTION

Graeme McCarrison

2.1 My full name is Graeme Ian McCarrison. I am the Environment & Planning Manager at Spark, a position I have held since February 2015. I am authorised to give this evidence on Spark's behalf.

2.2 I hold the qualification of Bachelor of Regional Planning (Honours) from Massey University. I am a Fellow member of the New Zealand Planning Institute and have 40 years' experience in New Zealand and overseas. I was on the board of the New Zealand Planning Institute ("NZPI") between April 2018 and April 2022. Between 2012 and April 2015 I was the chairperson of the Auckland branch of the New Zealand Planning Institute. In 2024 I was honoured made a Fellow of NZPI. In 2016 I received a NZPI Distinguished Service Award, and I part of the team that received a best practice award for iwi engagement by NZPI in 2015.

2.3 I have worked in the public sector in Auckland including as Director of Regulatory Services at Papakura District Council, Planning Manager for Waitakere City Council and in the private sector as a self-employed consultant and as a consultant at Murray North Partners. I have worked the last eight years in the telecommunications sector. Prior to Spark I held the equivalent position at Chorus (November 2011 to January 2015), where I advised both Chorus and Spark on resource management and government matters. I am involved in the review of all regional and district plans plus any related local government documents that have the potential to enable or impact the telecommunications industry. During the proposed Unitary Plan process, I led and facilitated the combined approach of the Auckland Utility Operators Group (Spark, Chorus, Vodafone, Counties Power and Vector) over the four years of our involvement.

2.4 I continue to co-ordinate a wider group of network utility organisations with interests in Auckland and nationally. I organise a shared approach and resources that enables Spark, FortySouth, One NZ, and Chorus to be involved at a national level in every relevant Plan reviews, including: Horizons, Gore, Wairarapa, Wellington City & Region, Dunedin, Timaru, Selwyn, Waitomo, Whangarei, Waimakariri, Timaru, Waitaki, Waikato Region, Porirua, Far North, Napier and Nelson. In addition, we are engaged with the Future Development Strategies across NZ.

2.5 I represented the telecommunications industry on the MfE established project and working group to draft a potential draft National Planning Standards for Network

Utilities, which first met on the 12 October 2016. Post February 2018, I co-ordinated the project working group of experts and specialist knowledge from in-house and external professionals representing a range of network utilities including telecommunications, rail, electricity distribution, gas transmission, 3 waters, road transportation which continued to fund and develop as draft provisions until early 2020. The work was in part been adapted into the Transitional National Planning Framework under Chapter 13.2.

2.6 I represent the Telecommunications Forum (TCF) on the Technical Advisory Group for the NESTF alongside my colleagues Andrew Kantor – Chorus, Colin Clune – FortySouth, and Fiona Matthews Connexa. Since the NESTF 2016 amendments, the group made up of representatives from the Ministry of Business, Innovation and Employment, Ministry for the Environment ("MfE"), and Local Government New Zealand meet at least annually to discuss and review the effectiveness of the National Environmental Standards for Telecommunication Facilities Regulations 2016 (NESTF). The NESTF was integrated to the draft Transitional National Planning Framework (dTNPF) under the now reappealed Natural and Built Environments Act. Chapter 13.2 of the dTNPF contains standards for telecommunications facilities. We are currently working toward either amended NESTF standards being integrated in a new Infrastructure National Direction or a updated NESTF.

2.7 I have submitted on behalf of Spark and/or combined with Chorus (Andrew Kantor) and/or One NZ/Vodafone (Colin Clune) on a wide range of Resource Management Act and Resource Management reform documents including:

a. Spark Trading New Zealand Limited submission – Fast Track Approvals Bill, April 2024.
b. Spark Trading New Zealand Limited and Vodafone New Zealand Limited Submission - Resource Management (Enabling Housing Supply and other matters) Amendment Bill, November 2021.
c. Spark Trading New Zealand Limited and Vodafone New Zealand Limited Submission - Urban Development Bill, February 2020.
d. Spark Trading New Zealand Limited Submission - Proposed National Policy Statement Urban Development, October 2019.
e. Spark Trading New Zealand Limited - Submission National Policy Statement for Highly Productive Land, October 2019.
f. Spark Trading New Zealand Limited Submission – Te Waihanga/Infrastructure Commission Infrastructure for a Better Future, July 2021.

Colin Clune

2.8 My full name is Colin William Clune. I am the Resource Management Manager at FortySouth, previously I held a similar a position at One NZ/Vodafone since October 2014. I was an in-house contractor for Vodafone (September 2010 to September 2014). I advise FortySouth and One NZ on resource management and government matters. I am authorised to give this evidence on FortySouth and One NZ behalf.

2.9 I hold the qualifications of Bachelor of Urban Planning and Master of Planning from the University of Auckland.

2.10 I am currently on the Technical Advisory Group for the NESTF amendments. I am also a participating member of the New Zealand Telecommunications Forum, working to efficiently resolve regulatory, technical and policy issues associated with network telecommunications.

Andrew Kantor

2.11 My full name is Andrew Robert Kantor. I am Environmental Planning and Engagement Manager at Chorus, where I been employed since 2015. I am authorised to give this evidence on Chorus' behalf.

2.12 I hold the qualification of Master of Science (Environmental Science) from the University of Auckland and am an associate member of the New Zealand Planning Institute. I am also a participating member of the New Zealand Telecommunications Forum's local government working group.

2.13 I have 15 years of resource management experience, comprising of roles for various infrastructure providers in New Zealand and overseas.

2.14 I am currently on the Technical Advisory Group for the NESTF amendments. I am also a participating member of the New Zealand Telecommunications Forum, working to efficiently resolve regulatory, technical and policy issues associated with network telecommunications.

3. TELECOMMUNICATION IN NEW ZEALAND

3.1 Modern telecommunication networks are about enabling the opportunity to create and connect data and provide digital services such as being able to communicate with family, friends and businesses or other services.

3.2 Every day, it is estimated that roughly 2.5 quintillion bytes of data are created globally. By 2025, the amount of data generated globally each day is expected to reach 463 exabytes. In 2019 the World Economic Forum estimated that the amount of data globally was 44 zettabytes in 2020. A zettabyte is 1,000 bytes to the seventh power (one zettabyte has 21 zeros). By 2025 the global amount of data is predicted to be 175 zettabytes. Some examples of the way data is generated or consumed include social media sites, financial institutions, medical facilities, shopping platforms, vehicles, and mobile calls, gaming, video conferencing, streaming films/series including via Netflix or YouTube and smart technology machine to machine.

3.3 The critical and essential nature of the telecommunications network infrastructure to a modern economy was only highlighted during the COVID-19 pandemic where a significant portion of people's businesses, working ability and life transitioned to an at home online set up. Overnight COVID-19 disrupted and changed the way we work, where we work, live and human interaction. Face to face meetings, travel (overseas and domestic), or meetings at a restaurant just stopped. Video conferencing via Zoom and Microsoft Teams gained critical importance even though neither was a new tool for digital communication. Long periods of time working and learning from home made the realities of living in a 'digital world' very real. Connectivity to those 'invisible' telecommunication networks that deliver the calls, digital services, internet to our devices, were no longer a "nice to have" but essential and critical to economic activity and daily life wherever you were. Access to and awareness of the quality/speed of your connection became and remains today a topic of conversation and need especially for communities in rural or more remote locations.

3.4 The COVID-19 pandemic demonstrated just how much we rely on access to 'public digital infrastructure'. A lack of, or limited access, to telecommunications for whatever reason is referred to as digital inequity. The consequences of digital inequity are explored in later sections of this evidence.

3.5 Public digital infrastructure, even though privately owned and funded, is commonly used to describe telecommunication technologies, equipment and systems/networks that connect people, communities, businesses and public infrastructure (including transport, social education, health) with data, products and services. Our physical networks/infrastructure include fibre, satellites, IoT devices, high-powered computing facilities and data centres, to support telecommunication services such as the mobile network, fixed phone and broadband services and location-based services that enable the digital economy with access to data. This public digital infrastructure is

critical and is fundamental to digital transformation of private and public (social and network) infrastructure if New Zealand is going to remain competitive internationally and face up to challenges such as climate change.

3.6 Telecommunication connectivity appears simple. For example, via my device I dial a phone number and I am connected. I can ask Siri or Google a question, and in a fraction of a second, I have an information response. The telecommunications network provides an invisible connectivity that the user does not need to understand. However, the invisible infrastructure is a complex, ever changing and expensive technology that has a lot of dependencies and components including cell towers, cabinets, cables, antennas, buildings with a variety of functions (ie switch software technology) and data centres for cloud services cooling systems. These components are connected as a global network which all come together to provide a seemly instant digital service for most users wherever they are. New Zealand's networks are part of the global networks of connectivity on which we depend on a few international submarine telecommunication cables. 98% of our digital traffic travels via these submarine cables.

Digital connectivity underpins a number of services

3.7 Digital connectivity and services, provided by Spark, One NZ and Chorus, underpin and transform a range of services delivered by Central Government and businesses alike, including (to name a few):

(a) Remote environmental sensing for early fire detection network in forests or areas at risk from fire. The 360-degree cameras and IoT sensors are continuously monitoring conditions, supported by Artificial Intelligence ("**AI**") analytics providing valuable real-time data on statistics such as air quality and ground temperature. Warning data is transmitted to Fire and Emergency New Zealand who can then take action if appropriate.

(b) Smart pay apps on your device and other payment services including payWave.

(c) Infrastructure management ie monitoring movement and traffic flow, monitoring and managing water, electricity and other utility services including waste management providing customers real-time information.

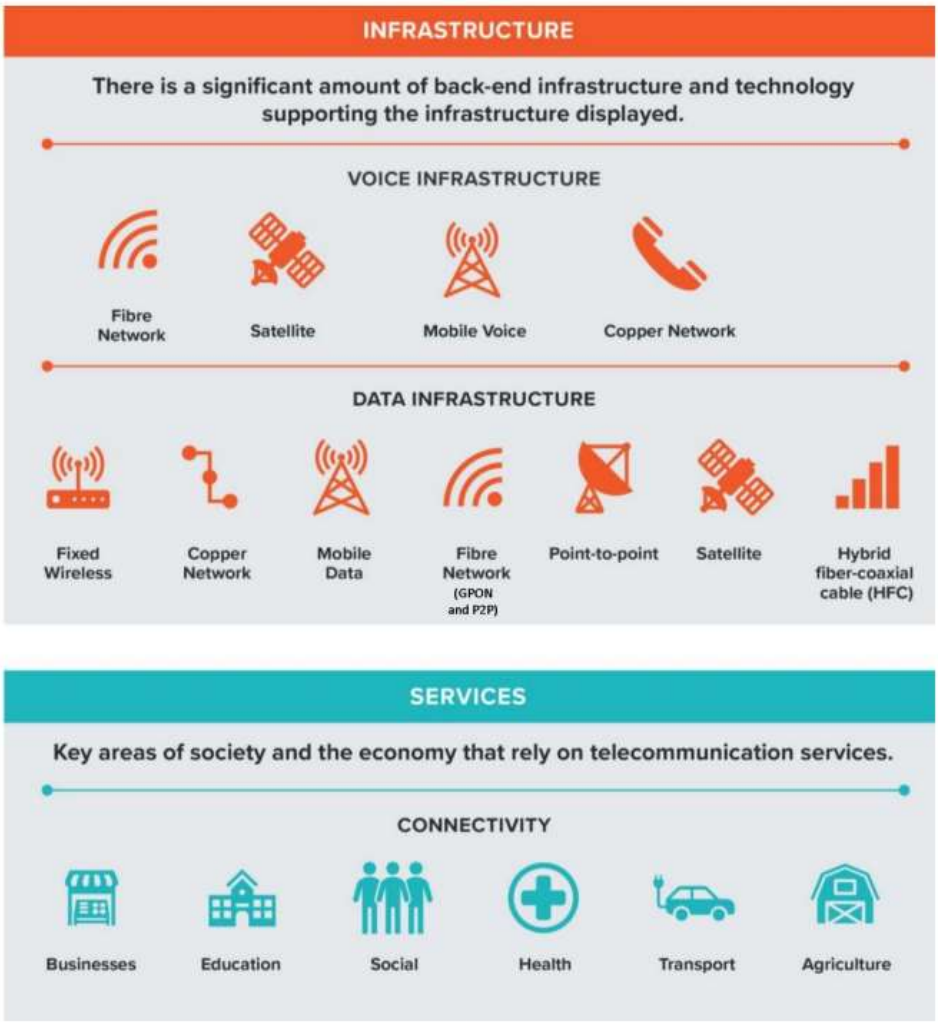
(d) Monitoring and real-time reporting of air flow and quality; or water quality for swim ability or drinking; flood warning accompanied with real-time mapping and predictions.

(e) Drones for monitoring especially in high hazard environments e.g. during a forest fire or a flood event when it is unsafe to fly other aircraft; reporting fires and managing search and rescue situations; mapping for hazards or size of forests for carbon credit assessments.

(f) Health and safety monitoring, for example GPS tracking sensors.

(g) Communication in all its forms from calling, text, social media, Microsoft Teams or Zoom to evolving VR meeting and collaboration interaction services in 3D platforms such as MeetinVR.

3.8 The telecommunications services that are relied on by many areas of society and the economy are provided via several different types of infrastructure and technologies, as illustrated in the diagram below by New Zealand Infrastructure Commission, State of Play: Telecommunications discussion document December 2020.[2]



Source: New Zealand Infrastructure Commission, Te Waihanga and TCF

[2] New Zealand Infrastructure Commission / Te Waihanga *State of Play: Telecommunications Discussion Document*, (December 2020) www.tewaihanga.govt.nz at page 9.

Our Telecommunication Networks

3.9 Rapid advances in technology are driving transformational changes as our products and services become increasingly important in the daily lives and businesses of New Zealanders. These advances have seen the telecommunications industry collectively investing on average $1.6 billion each year to deliver new services and network technology. The latest Commerce Commission industry monitoring report[3] shows the industry has invested $15.7 billion over the past decade. At the same time, fierce competition is delivering more value to consumers at lower prices, meaning New Zealand is now in the enviable position of having world-class networks and services, at below OECD average prices, for both fixed and mobile communications.

3.10 In mobile services, Spark, One NZ and 2degrees are the three major mobile network operators who each compete for customers over their own network of cell sites, utilising radio spectrum licensed from Central Government. Sometimes we are able to co-locate our electronic equipment on another operator's facility to save the cost of building a separate facility. Additionally, Spark, One NZ and 2degrees established and jointly own Rural Connectivity Group ("**RCG**"), a wireless network that is extending mobile and wireless broadband coverage to remote areas of rural New Zealand as part of the Government's Rural Broadband Initiative.

3.11 The local line networks (sometimes referred to as the "last mile") are owned by wholesale companies such Chorus, Enable and Tuatahi First Fibre (previously Ultra-Fast Fibre). This is separate from retailers like Spark, and One NZ that provide services to customers.

3.12 Chorus owns the national copper line network, and most of the fibre network built in cities and towns, under the Government-sponsored ultra-fast broadband ("**UFB**") programmes UFB 1 & 2.

Ultrafast Broadband

3.13 The Ultrafast Broadband (UFB) network comprises cable, duct and cabinet or exchange based electronics, to provide GPON (Gigabit Passive Optical Network) equipment and routing equipment, between the end customer the Point of Interconnect ("**POI**"). Multiple cables emanate from GPON locations to clusters of end users within a geographic area.

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[3] Commerce Commission New Zealand / Te Komihana Tauhokohoko *Annual Telecommunications Monitoring Report 2021* (17 March 2022). **Error! Hyperlink reference not valid.**

3.14 The UFB network is an open access network, which allows a variety of internet service providers and resellers to operate off the fibre network infrastructure, ensuring end users have a variety of choice as to the ISP as well as packages, pricing and service levels on offer. Fibre is a future-proofed technology that offers a scalable, low-cost pathway to major ongoing performance upgrades. The UFB network is continually developed and expanded to meet demand within the existing coverage area and grown to meet demand where economically feasible.

Wireless telecommunications networks

3.15 Our wireless telecommunications networks have a number of benefits, including enabling the provision of Emergency Mobile Alerts by the National Emergency Management Agency. The alerts have been used numerous times for local and national emergencies, including:

(a) the COVID-19 pandemic; and

(b) natural emergencies such as fire or snow flood event warnings to potentially affected people, such as flooding in Nelson, Marlborough, and Westport areas and regularly in Otago for snow events. The alerts are becoming the means by which nationally significant events and information are communicated to New Zealanders in an immediate and succinct manner.

3.16 The rollout of 5G and the digital technology that it enables is critical to a well-functioning urban environment. It is widely expected to transform our cities and the ways in which we use other kinds of infrastructure.[4] 5G into the rural communities enables access to the 600Mhz band, which is particularly important for rural areas given its ability to provide 5G connectivity over greater distances, including 3.5GHz.

3.17 New Zealand has multiple layers of networks (wireless, IoT and fixed line, plus satellite) and providers include:

- Wireless networks of Spark, One NZ, 2 degrees and Rural Connectivity Group (RCG) (a joint venture between Spark, One NZ and 2 degrees
- Fixed line networks operated by Chorus nationally and Enable in parts of Canterbury including Waimakariri. Note that Spark and One NZ have large fibre networks of their own.
- Wireless Internet Service Providers (WISPs) – including Amuri Networks in Canterbury

[4] Nicola Brittain "5G use cases: 31 examples that showcase what 5G is capable of" (5Gradar, 9 September 2021). **Error! Hyperlink reference not valid.**

- International companies e.g. Starlink (SpaceX service), Lnyx, Amazon, Google

3.18 Our wireless telecommunications networks enable the provision of Emergency Mobile Alerts by the National Emergency Management Agency. These are messages about emergencies sent by authorised emergency agencies to capable mobile phones. The alerts are designed to keep people safe and are broadcast to all capable phones from cell towers within the emergency area.

3.19 Telecommunications infrastructure is a key enabler of future technologies that are expected to be one of the solutions to many of today's challenges, from climate change to lifting our productivity and innovation. The Climate Change Commission's final advice to the government for its emissions reduction plan notes precision agriculture as an example of the ways in which technology will help to improve efficiency and reduce environmental impacts in agriculture – it requires digital connectivity and networks to be possible[5].

3.20 The rollout of 5G and digital technology that it enables is critical to a well-functioning urban environment as it is widely expected to transform our cities and the ways in which we use other types of infrastructure[6].

Satellite Services

3.21 Telecommunication connectivity infrastructure (satellite direct to phone or device) continues to be fast evolving and ever changing as we integrate new technology to expand customer opportunity to connect when they want it just about anywhere. New Zealand has a long history of satellite services going back to Warkworth Satellite Earth Station to broadband services satellite to a dish connected to wifi router into a building. However, the utilisation of new non geostationary constellations of multiple satellites that orbit earth has significantly improve the broadband services available to business/rural and residential customers[7]. SpaceX Starlink service is one such global company that retail broadband services into New Zealand. Lynk Global is a satellite service provider that is expanding services into Aotearoa.

3.22 Spark and One NZ have announced they will set providing satellite-to-mobile services. The One NZ expects in late 2024 to be providing text to mobile phone/devices[8]. It is worth remembering that the technology is still evolving, so the service and experience

[5] https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa.pdf; p. 306
[6] https://www.5gradar.com/features/what-is-5g-these-use-cases-reveal-all
[7] https://www.sparkwholesale.co.nz/products/satellite/corporate-satellite-internet/
[8] https://one.nz/why-choose-us/spacex/

will improve and expand as the number of satellites in the sky increases. Satellite services can't provide 100% connect ability, as you need a clear line of sight to the sky to get connected. Satellite services[9] add an additional layer of resilience, particularly now, as we face increasingly severe and frequent weather events due to climate change. Once there are more satellites launched and the service is available more broadly, it will allow mobile customers to start to use their phones in more areas that aren't reached by traditional mobile coverage.

3.23 Satellites are part of the integrated communications network solution and are not expected to replace the need for cell towers. A satellite has finite capacity (e.g. when a satellite service is used for making calls, connectivity is lost inside a building). Hence the continued need for cell towers. To address this, there will continue to be an increasing number of new infill cell towers constructed across Aotearoa, including in sensitive environments such as outstanding natural landscapes, or in the coastal environment.

4. CHALLENGES OF ENSURING NETWORK RESILIENCE

4.1 The Infrastructure Commission's discussion document on Infrastructure for a Better Future recognises the critical nature of telecommunications infrastructure. The report notes that 'Increasing reliance on communications makes telecommunications infrastructure more critical.'[10]

4.2 We recognise and understand that New Zealand depends on our construction and provision of resilient lifeline telecommunication networks especially during and post emergencies is critical. Our national networks exist in and need to traverse areas subject to natural hazards to provide access to digital and communication services to communities, business and people that live and recreate in these environments. Recent extreme weather events have again highlighted the interdependence between telecommunications and other essential infrastructure providers such as electricity, roading and fuel, in the event of a natural disaster.

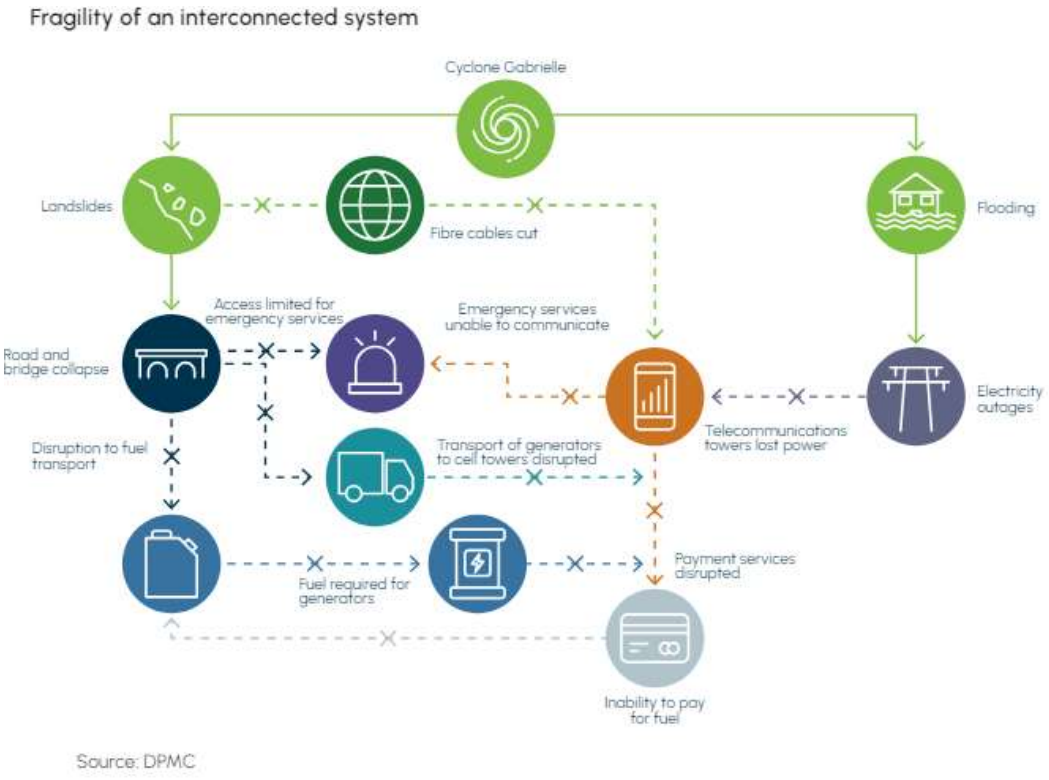
4.3 It is critical consider the impact on communities that disruption to telecommunications and electricity could have during an extreme natural hazard event, such as Cyclone Gabrielle. Such events create challenges for providing telecommunications across a wide area impacted by flooding, landslides, roads and bridges collapsing, prolonged electricity outages. The '*Strengthening the resilience of Aotearoa New Zealand's critical*

[9] https://www.sparknz.co.nz/news/Spark_sends_first_satellite_text_message

[10] https://www.infrastructure.govt.nz/assets/Uploads/Infrastructure-Strategy-Consultation-Document-June-2021.pdf; p. 34

infrastructure'[11] system discussion document outlines why a resilient critical infrastructure system matters for our country and people. New Zealanders live in areas subject to all kinds of natural hazards and climate change. Consequently, our networks are in these same areas to provide critical connectivity.

4.4 The following diagram from the *Report of the Government Inquiry into the Response to the North Island Severe Weather Event*[12] created by Department of the Prime Minister and Cabinet (DPMC) shows the fragility and interdependencies between critical infrastructure and impacts of outages in one sector can have flow on consequences for other sectors. Telecommunications and electricity are the critical sectors our communities and the economy depend.



4.5 We recognise that planning for and designing for natural hazards has become an issue of increased focus following recent severe weather events. Following significant natural hazard events the Telecommunication sector works together to learn and be better prepared. In May 2023 the sector released our plan for enhancing the resilience of our networks. "Enhancing resilience in telecommunications - industry plan and suggested areas for collaboration with government."[13] Reviewing the vulnerability of

[11] https://consultation.dpmc.govt.nz/national-security-group/critical-infrastucture-phase-1-public-consultation/user_uploads/discussion-document--strengthening-the-resilience-of-nzs-ci-system.pdf
[12] https://www.dia.govt.nz/diawebsite.nsf/Files/Government-Inquiry-into-Severe-Weather-Events/$file/Report-of-the-Government-Inquiry-into-the-Response-to-the-North-Island-Severe-Weather-Events.pdf
[13] https://s3.documentcloud.org/documents/23854635/telco-resilience-plan-17p-may-2023.pdf

the fixed network to damage or being severed due to bridges being washed out or significantly damaged will result in some fixed line network being reconstructed to go under or over rivers.

4.6 There is no need for the district plan to regulate the resilience of telecommunications infrastructure where it is in natural hazard areas. In New Zealand, avoiding a natural hazard and other overlays area is not practical or possible for technical and operational reasons to service companies. The companies work together to better understand the impacts of natural hazards caused by climate change (including work on climate related scenario analysis), taking steps to make telecommunications infrastructure more resilient to natural hazards.

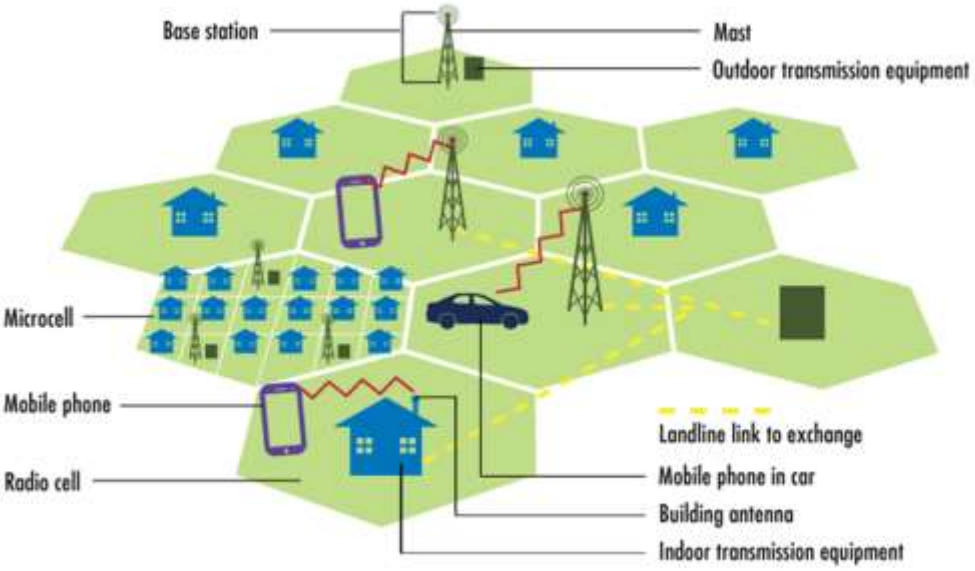
4.7 The telecommunication companies have obligations under the Civil Defence Emergency Management Act 2002 (CDEMA) to provide resilient infrastructure. This is regulated under the CDEMA, and adding another layer of regulation of resilience through regional and district plans is not necessary.

4.8 The proposed plan potentially makes the development of resilient critical infrastructure unnecessarily difficult. A more efficient and effective way to support the development of resilient critical infrastructure is to enable national consistency of mapping/identification and modelling of natural hazards and risk level analysis. Accurate and detailed information is essential to support the companies in making decisions on the design of telecommunication infrastructure in hazard prone areas.

4.9 Amending INF-S7 to provide for the direction drilling under a water course enables the separation of our critical fibre cables from existing structures such as bridges that are increasingly vulnerable to damage or at risk of being completely washed away in extreme natural hazard events. Drilling under a waterway is one of ways of increasing the resilience of our networks by avoiding the scenario where those networks fail due to the failure of the bridge or structure they are attached to.

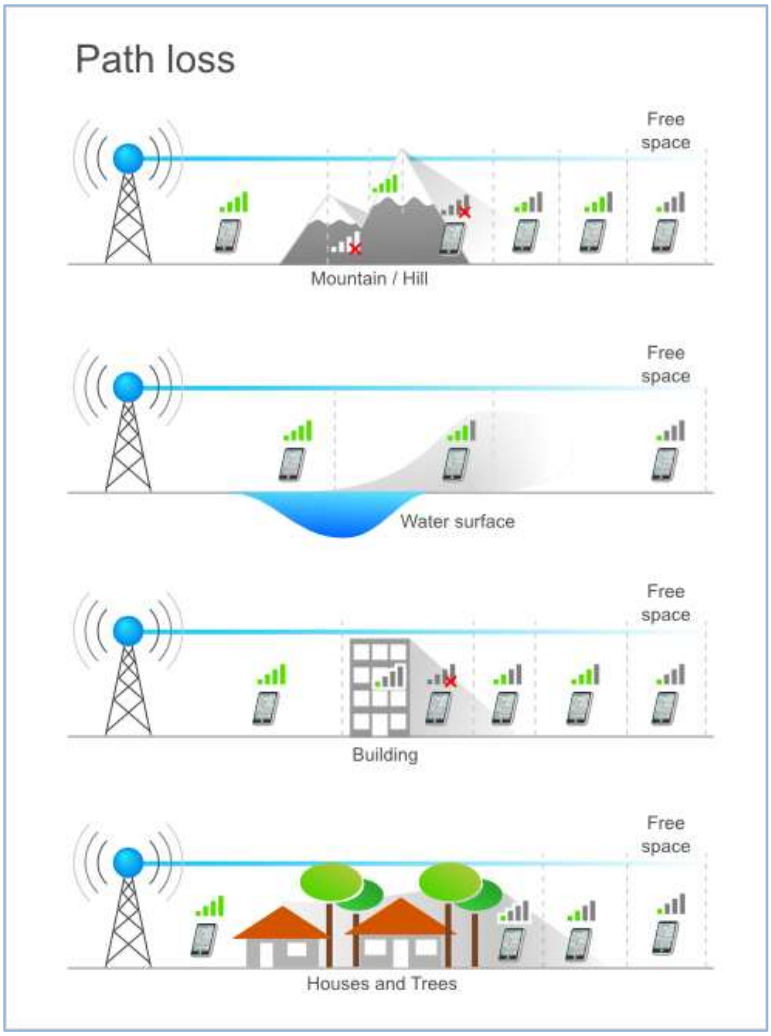
5. LOCATING IN OVERLAYS TO SERVICE COMMUNITIES

5.1 A mobile network is a communication network where the last link is wireless. Mobile networks depend on having direct line of sight from the antennas to receiving device. Commonly in rural areas cell sites are linked via point-to-point digital microwave radio (DMR) dishes on the poles. New Zealand topography makes it challenging to build a mobile network to service communities separated by hills and mountains. Consequently, our networks require to be located on high points and in the valleys to ensure transmission signal line of sight.



5.2 Causes of Path loss, as shown in the diagram below, commonly result from:

- Free-space loss (distance) from the antenna to the device
- Fading (frequency dependent)
- Tree vegetation
- Hills, mountains
- Shadowing from trees and structure
- Reflections at large obstacles



5.3 Our infrastructure needs to locate to be close existing and/or new communities for which the site options are already limited. The technical need for line of sight between cell sites sometimes creates the operational need to locate our small footprint infrastructure in overlays such as Outstanding Natural Landscape or Significant Natural Environments.

6. SUPPORTING CLIMATE CHANGE INITIATIVES

6.1 The telecommunications network and digital technology is a critical pathway to reducing greenhouse gas emissions in many ways:

a. Avoiding transport emissions by enabling more people to work and study from home. This goes beyond connecting people virtually, to enabling secure remote access to systems and services, and monitoring physical assets. A consequential life cycle assessment was undertaken in 2022 to measure how working from home one day a week affects the size of an employee's carbon footprint. One NZ commissioned Thinkstep-anz carry out a Consequential Life

Cycle Assessment (CLCA)[14] which found that the average New Zealand office worker who works one day a week from home will save 4.2kg in carbon emissions per day, compared to commuting into the office every day.

b. Using smart technology to reduce energy consumption for individual households and public institutions such as schools and hospitals. This includes smart thermostats, heat pumps, and water heaters, and demand management technologies to support grid decarbonisation and reduce peak demand by controlling and coordinating energy heavy activities such as EV charging.

c. Using smart cities technology to help tackle climate change. For example, for traffic management, optimising refuse collection, monitoring pollution, optimising street lighting, ride sharing, energy metering, and switching on devices at times to optimise energy use.

6.2 The smart technologies we mention rely on sensors and telecommunications networks to record and relay data. Research from Spark and Thinkstep-ANZ[15] found that digital technology as an enabler of a variety of actions could collectively reduce annual emissions 7.2Mt by 2030 - the equivalent of 42 percent of Aotearoa New Zealand's current emissions budget targets.

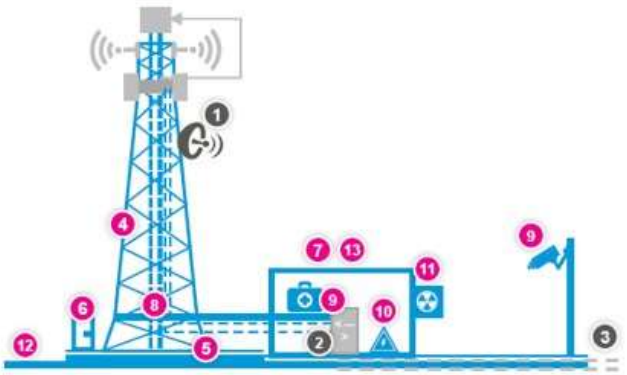
GRAEME MCCARRISON, COLIN CLUNE, AND ANDREW KANTOR,

10 June 2024

[14] What does working from home do to your carbon footprint? (one.nz)
[15] Meeting The Climate Challenge Through Digital Technology (sparknz.co.nz)

Appendix 1 Connexa, FortySouth and Chorus

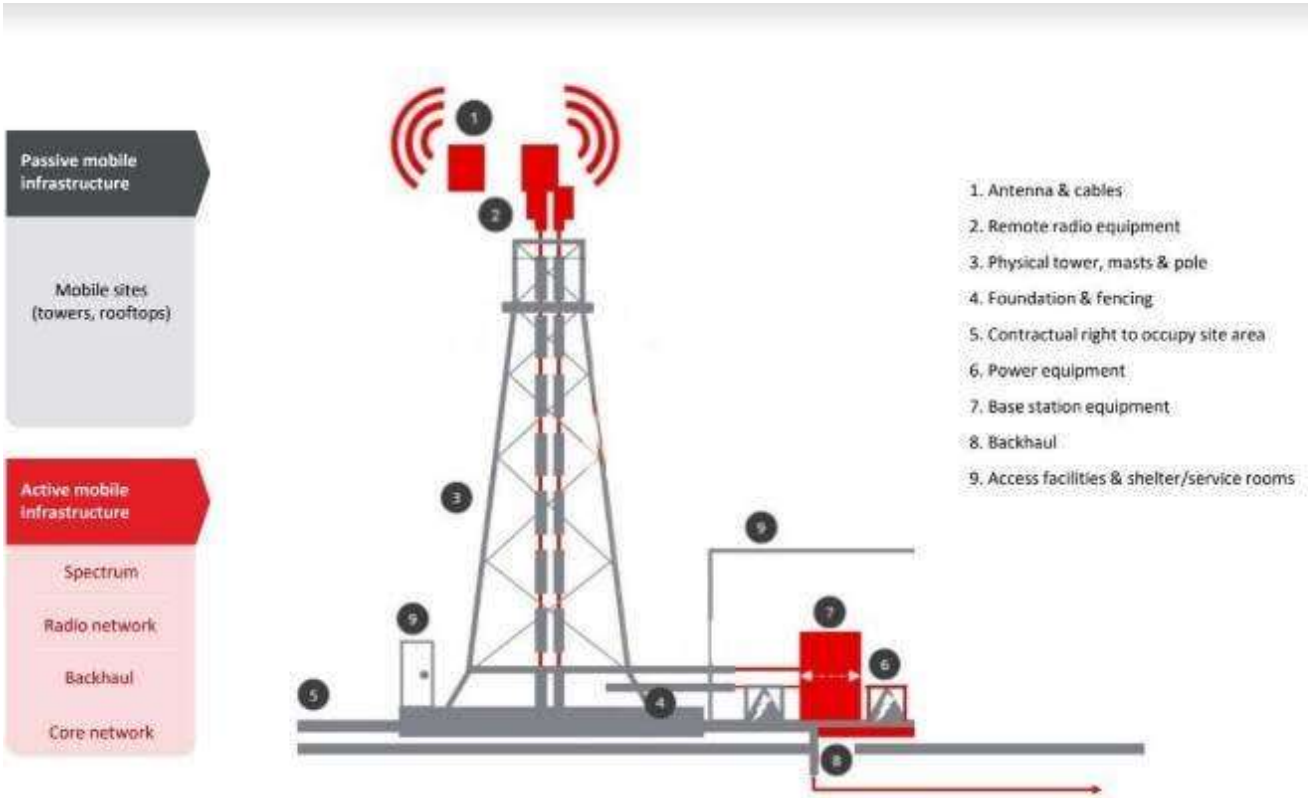
Spark / Connexa asset split on a typical macro tower



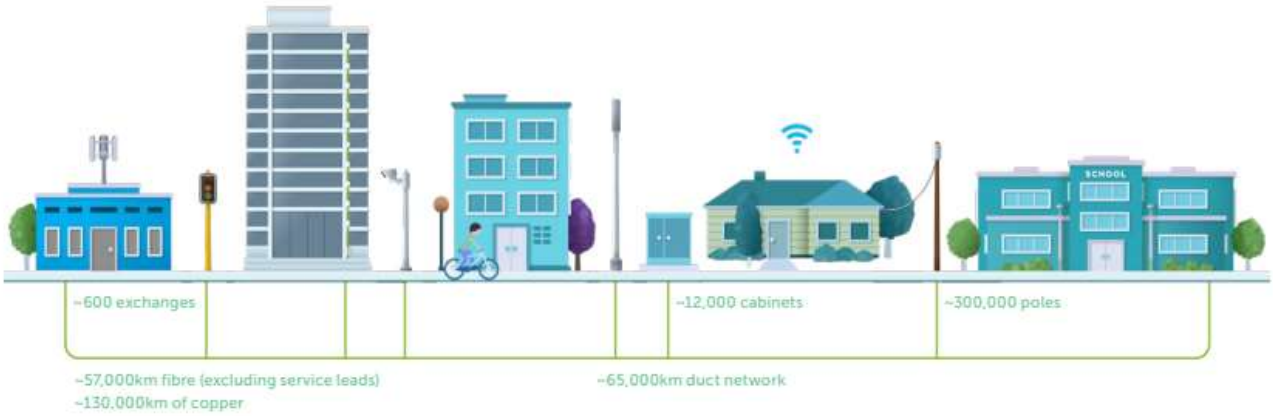
Asset / Equipment	Ownership
1 Active radio-transmission equipment	Spark / third parties
2 Backhaul router	
3 Backhaul fibre	
4 Transmission masts and towers	Connexa
5 Fencing / gates	
6 Access facilities	
7 Huts (incl. rack space and cabinets)	
8 Rooftop walkways / ladders	
9 Fire suppression and security systems[1]	
10 DC power, back-up generators and batteries	
11 Airconditioning units	
12 Mobile only freehold sites	
13 Other passive equipment	

1

FortySouth



Chorus


SCHOOL
~600 exchanges
~12,000 cabinets
~300,000 poles
~57,000km fibre (excluding service leads)
~130,000km of copper
~65,000km duct network