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

AND

IN THE MATTER **of the Proposed Central Hawke's Bay District Plan**

Central Hawke's Bay District Council

JOINT STATEMENT OF EVIDENCE OF

GRAEME IAN MCCARRISON FOR

SPARK TRADING NEW ZEALAND LTD

AND

ANDREW KANTOR FOR CHORUS NEW ZEALAND LTD

AND

COLIN CLUNE FOR

VODAFONE NEW ZEALAND LTD

IN RELATION TO

THE PROPOSED CENTRAL HAWKE'S BAY DISTRICT PLAN

29 NOVEMBER 2022

1. EXECUTIVE SUMMARY

1.1 Spark New Zealand Trading Limited ("**Spark**"), Vodafone New Zealand Limited[1] ("**Vodafone**") and Chorus New Zealand Limited ("**Chorus**") (together referred to as the "**telecommunication companies**"), along with other telecommunication providers, invest every year in our networks to ensure people within the Central Hawke's Bay District, and New Zealanders more generally, have access to world class digital services.

1.2 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 framework in regions, 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 RMA appropriately recognise the importance of telecommunication infrastructure and enable the construction of this infrastructure through sensitive natural and built environments.

1.3 The telecommunications industry collectively invests an average of $1.6 billion each year to deliver new services and network technology to New Zealanders.[2] Our network requirements are constantly changing and evolving unlike any other infrastructure sector, as reflected by fast changing telecommunication network technology such as 4G and 5G and planning for 6G in 2030 and increasing the capacity and speed of the fibre network to meet the significant growth in data use and customer demand for digital services.

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

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1 We note that Vodafone is changing its name to One New Zealand in early 2023.

2 https://comcom.govt.nz/__data/assets/pdf_file/0019/279100/2021-Annual-Telecommunications-Monitoring-Report-17-March-2022.pdf

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 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.

1.6 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.

1.7 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.[3]

1.8 We would like to recognise and thank Council, its planning officers and consultants for the constructive and engaging process around the development of the proposed district plan. We have appreciated the opportunities to talk, discuss and explore how our industry can support Central Hawke's Bay.

1.9 The key focus of our 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 and, in particular, what the future looks like over the life of the Proposed District Plan.

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[3] New Zealand Infrastructure Commission / Te Waihanga "State of Play: Telecommunications Discussion Document", (December 2020) www.tewaihanga.govt.nz.

c. To outline the challenges of ensuring digital equity and connectivity, especially in rural and remote areas.
d. To provide an overview of the regulatory frameworks that telecommunications depend on, including the need to align district plan provisions with the NESTF.
e. To provide an overview the Telecommunications Companies use of designations to provide a nationally consistent management framework for strategic telecommunications sites.

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 full member of the New Zealand Planning Institute and have 35 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 2016 I was honoured with 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 During the last 38 years 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, Vodafone and Chorus to be involved at a national level in every relevant Plan review which currently comprises 28 plan reviews including: Horizons, Auckland, Porirua, Wellington City, Dunedin, Gisborne, New Plymouth, Christchurch City, Timaru, Selwyn, Waimakariri, New Plymouth, Timaru, McKenzie, Waitaki, Waikato, Far North, and Central Hawkes Bay. Recently completed Great Wellington Regional – Natural Resources Plan, Taranaki Regional – Coastal Plan, Queenstown, Opotiki.

2.5 I represent the Telecommunications Forum (TCF) on the Technical Advisory Group for the NESTF alongside my colleagues Andrew Kantor – Chorus, Colin Clune – Vodafone, and Ben Blakemore – 2degrees. 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 NESTF. The NESTF is being reviewed for integration to the proposed National Planning Framework under the Proposed Natural and Built Environments Act.

2.6 I have submitted on behalf of Spark and/or combined with Chorus and/or Vodafone on a wide range of Resource Management Act and Resource Management reform documents including:

(a) Spark Trading New Zealand Limited and Vodafone New Zealand Limited Submission - Resource Management (Enabling Housing Supply and other matters) Amendment Bill, November 2021.

(b) Spark Trading New Zealand Limited and Vodafone New Zealand Limited Submission - Natural and Built Environments Bill Exposure Draft, August 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.

2.7 I represented the telecommunications industry on the MfE established project and working group[4] to draft a potential draft National Planning Standards for Network Utilities, which first met on the 12 October 2016. However, the change in government in November 2017 meant that MfE's work programme, priorities and budget commitments did not include the National Planning Standards for Network Utilities ("**dNPS-NU**") project. In February 2018 it was confirmed by MfE that funding was no

[4] Joint working group of representatives from telecommunications, electricity, water (including Wellington Water Limited), transport, gas, MfE, Local Government NZ, and iwi interests, with the working group being assisted by an independent planning consultant.

longer available for the independent consultant. 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 draft document is referred to as a "draft Network Utilities best practice provisions", a copy of which is attached in **Appendix 1**. Within the document is framework infrastructure/network utilities that includes draft Regional Policy Statement and District Plan Objectives and Policies with appropriate rules/standards.

Colin Clune

2.8 My full name is Colin William Clune. I am the Resource Management Manager at Vodafone, a position I have held since October 2014. Previously, I was an in-house contractor for Vodafone (September 2010 to September 2014), where I advised Vodafone on resource management and government matters. I am authorised to give this evidence on Vodafone's 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 the 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. TELECOMMUNICATIONS IN NEW ZEALAND

An overview of the telecommunications industry

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 would be 44 zettabytes by 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, mobile calls, gaming, video conferencing, streaming films/series including via Netflix or YouTube and smart technology machine to machine communication.

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 enables 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, Vodafone 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 swimability or drinking; flood warning accompanied with real-time mapping and predictions.

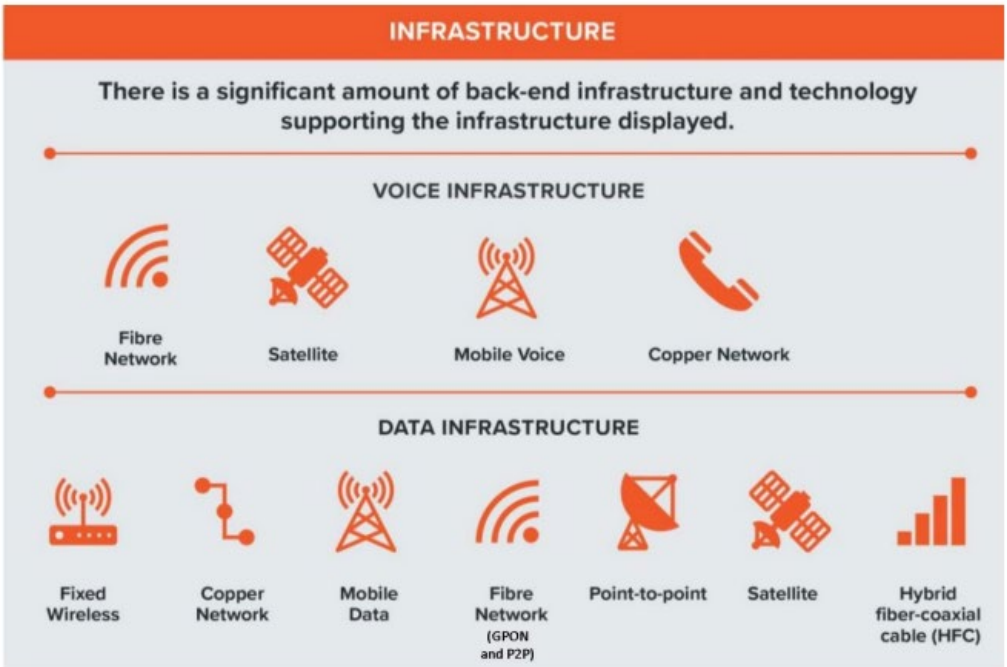
(e) Drones for monitoring especially in high hazard environments e.g. during a forest fire or a flood events when it is unsafe to fly other aircraft; reporting fires and managing search and rescue situations; mapping for hazards or size of forests for carbon credit assessments.

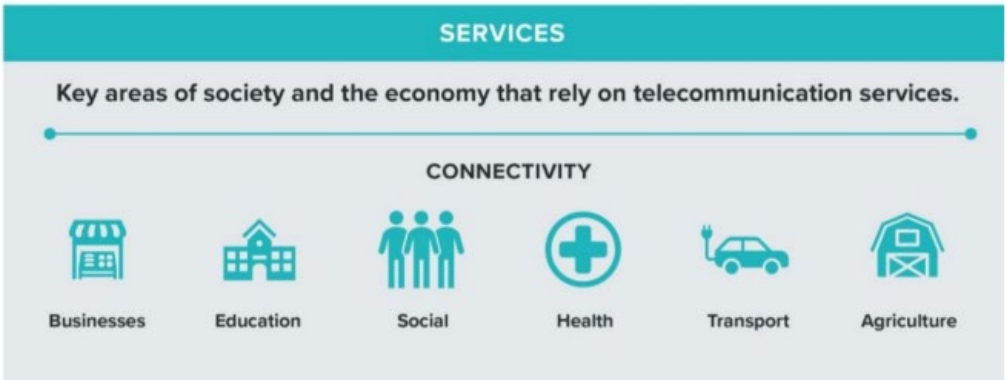
(f) Health and safety monitoring, for example GPS tracking sensors.

(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.[5]

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





Source: New Zealand Infrastructure Commission, Te Waihanga and TCF

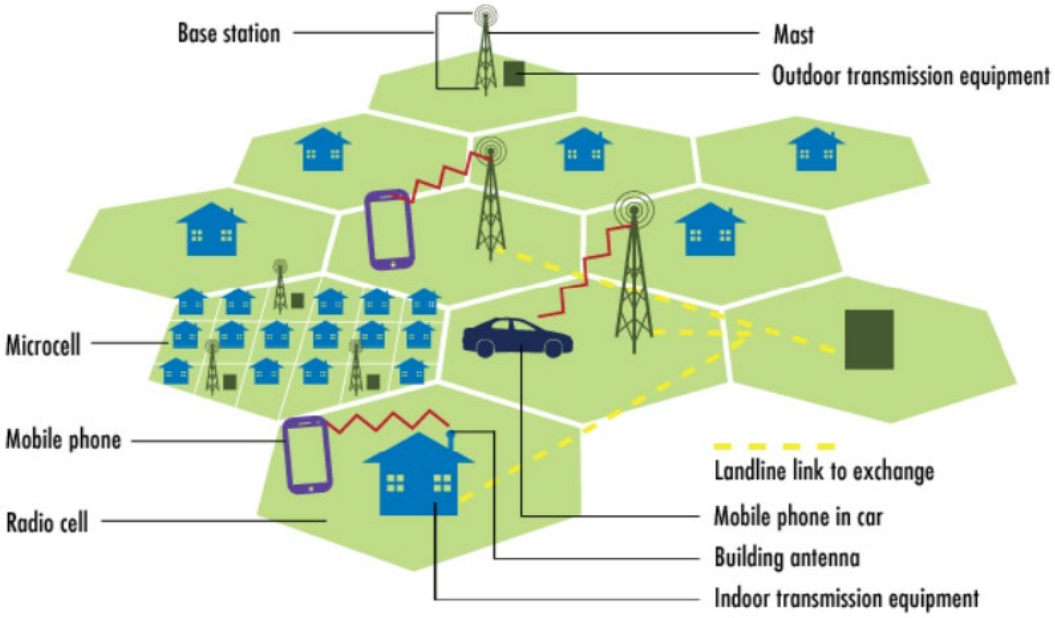
New Zealand's Telecommunication Networks

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[6] 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.

6 Commerce Commission New Zealand / Te Komihana Tauhokohoko *Annual Telecommunications Monitoring Report 2021* (17 March 2022).

3.10 In mobile services, Spark, Vodafone 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, Vodafone and 2degrees established and jointly own Rural Connectivity Group ("**RCG**"), a wireless network that will extend mobile and wireless broadband coverage to remote areas of rural New Zealand as part of the Government's Rural Broadband Initiative.

3.11 The following shows the basics of a mobile network.



3.12 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 Vodafone that provide services to customers.

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

3.14 The various components of the telecommunications network are detailed below.

Ultrafast Broadband

3.15 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 and the Point of Interconnect ("**POI**"). Multiple cables emanate from GPON locations to clusters of end users within a geographic area.

3.16 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 Internet Service Provider ("**ISP**") as well as packages, pricing and service levels on offer.

3.17 Fibre is a future-proofed technology that offers a scalable, low-cost pathway to major ongoing performance upgrades.

3.18 The UFB network is continually developed and expanded to meet demand within the existing coverage area and grown to meet demand where economically feasible.

Benefits of wireless telecommunications networks

3.19 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.

3.20 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 the ways in which we use other kinds of infrastructure.[7] 5G into the rural communities enables access

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

to the 600Mhz band, which is particularly important for rural areas given its ability to provide 5G connectivity over greater distances, including 3.5GHz.

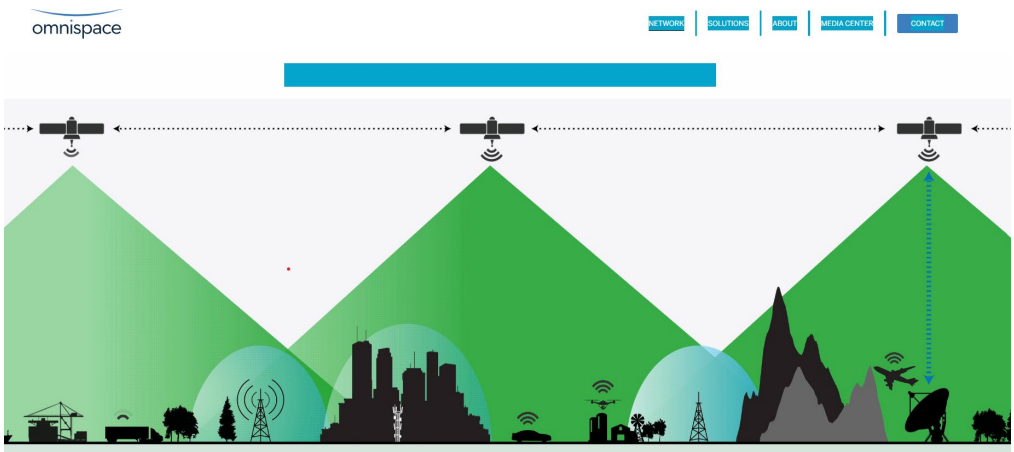
Satellite

3.21 Telecommunication connectivity infrastructure continues to be fast evolving and ever changing as we integrate new technology to expand customer opportunity to connect when they want it anywhere. One of the newer frontiers is non geostationary constellations of multiple satellites that orbit earth. SpaceX Starlink service is one such global company that retail services into New Zealand. Other satellite companies launching and developing global satellite constellations include Omnispace, OneWeb, LeoSat, and Amazon's Kuiper Project. “5G satellite communication” is about the integration of next generation 5G networks on the ground with communication satellites.

3.22 In April 2022 Omnispace launched its first satellite as part of an initial 2 satellite programme. The program aims to develop a global non-geostationary satellite orbit ("**NGSO**") space network to utilise the company’s 2 GHz mobile satellite spectrum allocation and operate in the 3GPP band n256. 3GPPTM is a partnership project bringing together national Standards Development Organizations ("**SDOs**") from around the globe to develop technical specifications for the 3rd generation of mobile, cellular telecommunications, UMTS[8]. Omnispace promotes itself as the first 3GPP-compliant 5G NTN network - a network that has the potential to deliver the power of 5G directly to billions of devices everywhere, enabling people and assets to communicate in real-time through a single, seamless global service. Through integration with Omnispace network, mobile network operators (such as Spark and Vodafone) can enhance and expand their service area(s), while improving resiliency.

3.23 The below diagram shows that when standing within the mobile network’s coverage area your device will connect to your local provider’s network (eg Spark or Vodafone). When beyond this coverage or roaming, your device will seamlessly connect through the satellite network.

[8] ETSI "Third Generation Partner Project (3GPP)" www.etsi.org.



3.24 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 (eg 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.

Digital inequity

3.25 The COVID-19 pandemic demonstrated the opportunities afforded by digital technologies which allowed society to adapt quickly to remote online working, education, health care, retail and entertainment. At the same time, the pandemic revealed that a lack of access to smart technology could exacerbate existing socio-economic inequalities through a growing digital divide. Digital inequity therefore became a statistic of national interest. The failure of regulatory regimes to recognise that digital equity is a critical issue for part of the solution is recognition that all residents, communities and visitors or businesses need access to telecommunications where they are.

3.26 The importance of ensuring digital equity (access to telecommunications connection) is recognised by industry with a range of equity initiatives being delivered including:

(a) Spark Foundation, which supports the delivery of the Skinny Jump program. Skinny Jump is a not-for-profit wireless broadband service for those who find cost is a barrier to having an internet connection at home.

(b) When COVID-19 forced the shutdown of schools across New Zealand, Chorus offered to switch existing intact connections on for homes identified by the Ministry of Education as requiring broadband for essential

learning. Since April 2020, the initiative has helped connect over 12,000 student homes through retailers delivering broadband services, using free wholesale connections from Chorus, other New Zealand wholesale providers and the Ministry of Education.

(c) In FY21 Chorus donated $250,000 to charities and organisations focussed on digital inclusion. Donations included Alexa Echo Dot speakers for Blind Low Vision New Zealand clients and devices to support Digital Skills courses for seniors and families through Age Concern NZ and Digital Inclusion Alliance Aotearoa. Chorus also supported Kiwrious, who provide science sensors and an online collaboration platform for low decile schools to encourage Science, Technology, Engineering and Maths (STEM) learning.

(d) In 2018, the Vodafone NZ Foundation commissioned the Out of the Maze report alongside InternetNZ, looking at 'Building Digitally Inclusive Communities'. This highlighted there are a wide range of elements needed to address digital exclusion including access/affordability, skills, motivation, capacity and trust. Vodafone agrees that digital inclusion is a broader societal change that we all need to collaborate on, with business and not for profits supporting government agencies in helping Aotearoa's most vulnerable citizens.

(e) For Vodafone this includes investing $2 million per annum in the Vodafone NZ Foundation, a charitable trust with a vision of an Aotearoa New Zealand where all young people have access to the resources and opportunities they need to thrive. The Foundation is on a 10 year, $20 million journey to reduce the number of excluded and disadvantaged rangatahi in Aotearoa and digital access is one of the issues they're looking to address. Vodafone has signed on to InternetNZ's five point plan for digital inclusion showing our commitment to collaborating on efforts to address this growing issue. This includes investing millions in making it easier for all New Zealanders to use our digital services and applications, through continual improvements, better process design, and through the use of smart technologies such as artificial intelligence and machine learning.

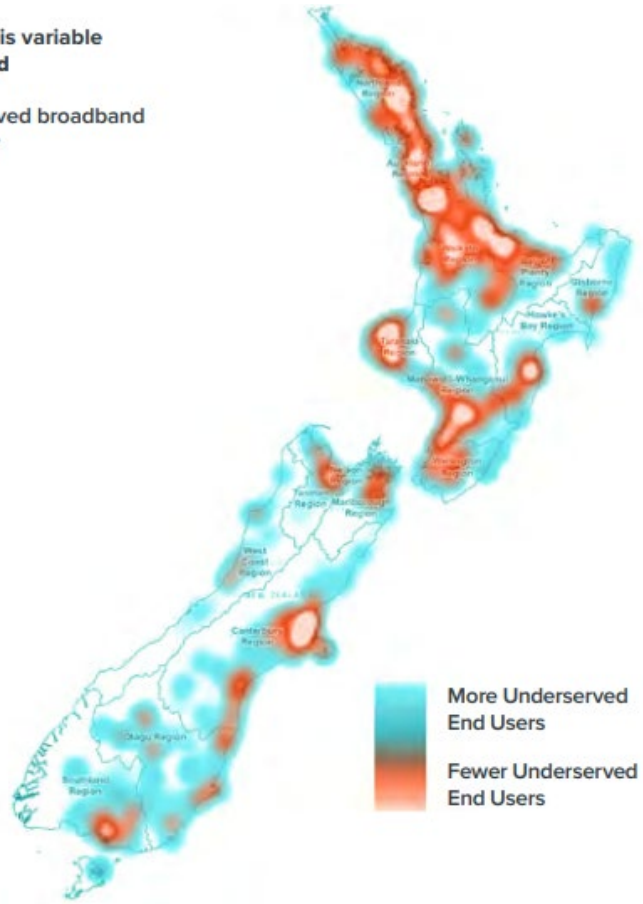
Underserved Broadband Access

3.27 Te Waihanga has created a map of areas in New Zealand that in 2020 highlighted access to quality broadband in 2020. Since this map was prepared the continued

rollout of the RBI initiatives including the new sites by RCG and UFB programme expansion into smaller towns by Chorus and the other local fibre companies and network expansions by Spark, Vodafone and 2degrees plus the launch of satellite broadband services have improved the opportunity for people to improve the quality of their broadband. The physical environment such as topography, vegetation and housing cause physical disruption to devices being able to connect to a cell-site. In appendix 3 is a diagram explaining disruption to radio-waves. The map highlights the challenge of local and remote communities to access broadband which includes parts of Central Hawke's Bay. The map is clear that urban areas are well serviced.

Broadband quality is variable across New Zealand

Figure 21: Underserved broadband end users by quality

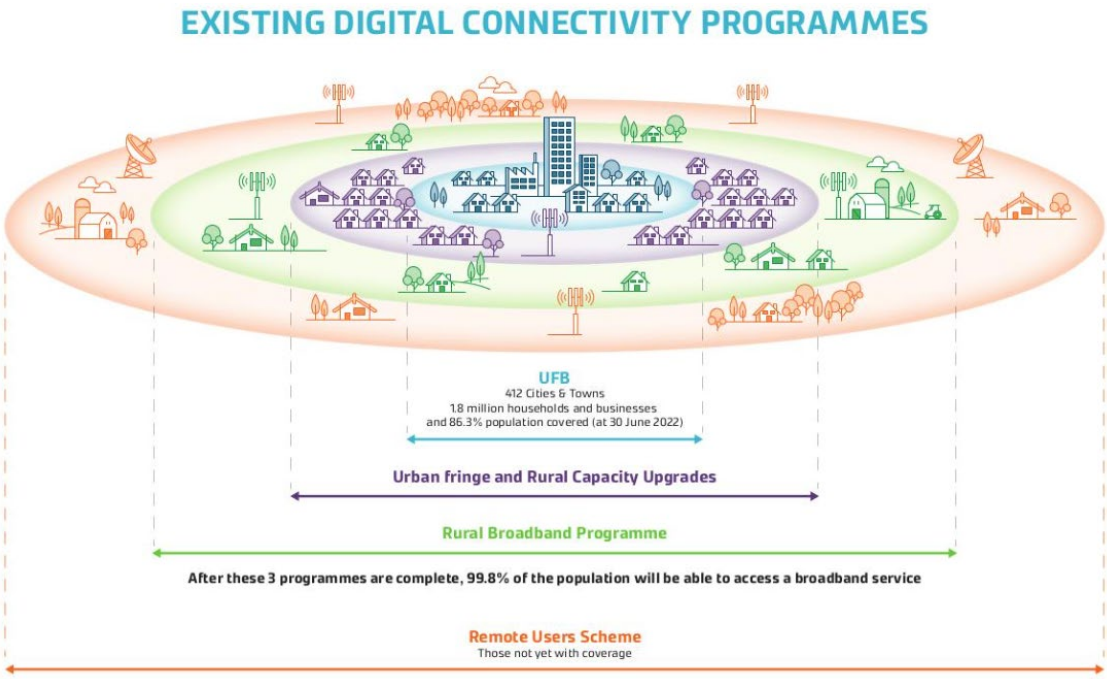


Source: Te Waihanga, data from Crown Infrastructure Partners (2020)

3.28 Crown Infrastructure Partners (**CIP**) and MBIE have recognised that the various digital connectivity programmes (UFB, RBI and other rural initiatives) have worked to generally cover large parts of Aotearoa including many small communities, but there are still more remaining to be covered. These are generally the most remote areas and difficult to find a solution for. CIP have established a new funding initiative, Remote Users Scheme, which is for eligible households and communities in Aotearoa's most remote areas where broadband is not currently or there is poor internet coverage. RUS aims to expand broadband internet service to an area by

extending existing networks in 2023. Then those still without coverage after network expansion, may be eligible to receive a one-off grant of up to $2,000 towards set up and installation costs of a suitable broadband solution.

3.29 The following diagram shows the various digital connectivity programmes.



Spark

3.30 Spark is New Zealand's largest digital services company delivering mobile, fixed and IT products and services to millions of New Zealand consumers and businesses. Spark's vision for New Zealand is 'To help all of New Zealand win big in a digital world'.

3.31 Spark is a multi-brand business, with principal brands Spark (supporting home, consumer mobile and small business customers) and Spark Digital (supporting government and business customers with strong Cloud services, mobility and Information and Communication Technologies ("**ICT**") capabilities). Specialist and flanking brands include Skinny (consumer mobile and broadband), Revera and CCL (data hosting services), Digital Island (business telecommunications), Lightbox (internet TV), Qrious (data analytics), and Bigpipe (consumer broadband). Spark has transformed the way New Zealanders view sport with the introduction of Spark Sport streaming platform.

3.32 New Zealand is geographically isolated and is reliant on global communications via critical international and national submarine cables. Spark is a commercial partner in several international submarine cables including Southern Cross and its replacement Southern Cross Next and Tasman Global Access ("**TGA**"). Ultimately New Zealand depends on data held in data centres in other countries such as Australia, USA or Singapore.

3.33 Mike McGrath, Manager International Operations, Spark New Zealand Trading Limited estimates that at least 98% of all international communication in and out of New Zealand is carried via submarine cables, these cables are our lifelines to the online world. International cables connecting New Zealand are shown in **Appendix 2** shows the Southern Cross cable international routes. The new (July 2022) Southern Cross NEXT boosts the capacity of the existing cable ecosystem by approximately 500 per cent, to around 100 Terabits/second, effectively more than doubling Australia and New Zealand's direct international connectivity capability to the USA. To put this in perspective, this would allow the transfer of the half petabyte of data generated from the approximate 7,500 F1 2022 car wind-tunnel model tests in 111 seconds, or just over 300 seconds to transfer the estimated 10 billion photos on Facebook.

3.34 Currently Spark owns 1337km backhaul fibre and has 630km backhaul fibre exclusive, right to use granted by a third party) and shared with Chorus 7742km backhaul fibre. **Appendix 2** shows the national and regional cable routes within New Zealand including those that connect Central Hawke's Bay to the rest of New Zealand and internationally.

3.35 Spark is expanding the access to broadband services through Skinny Broadband, a prepaid service, and Wireless Broadband. All these wireless broadband services deliver a fast and reliable internet connection using 4G/4.5G/5G mobile technology instead of a connection using the traditional copper line ADSL network. Spark is deploying the next generation mobile network 5G technology across New Zealand.

3.36 The New Zealand mobile market is growing. Success in wireless-based products and services is underpinned by our investment in the mobile network. The delivery of a 5G network is reliant on the availability of spectrum. We are also replacing the ageing Public Switched Telephone Network ("**PSTN**") with our new Converged Communications Network ("**CCN**"), which will enable richer and better customer experiences with voice, video, and collaboration features over whatever Spark service is available when customers want to use it.

3.37 Spark's two low-power networks, such as LoRaWAN, with one of these now covering more than 98% of the population. LoRaWAN is a Low-Power, Wide Area ("**LPWA**") wireless networking protocol for the IoT. LoRaWAN network operates separately to the 5G/4G mobile networks. Our IoT capability is enabling a range of opportunities, such as Smart City Infrastructure, video surveillance, smart wearables, outpatient monitoring including voice and video features, metering, smart lighting and environmental monitoring, connected vehicles and trackers on industrial vehicles to monitor location of packages and condition of vehicles. Several interesting use cases for IoT sensors include in agribusiness to better manage farms, orchards and other agricultural use cases such as beehives. IoT enables businesses to adopt new technology that will give them the data and information they need to make smarter business decisions. Spark continues to provide a paging service network for emergency services such as New Zealand Fire Service, in particular volunteer fire officers in rural areas and health boards and customers for whom paging is also business critical. The network is being upgraded and expanded for coverage.

3.38 In Spark's view, constructing networks in non-urban communities and environments is just as important as constructing networks in urban environments. However, this can be significantly more challenging for a variety of reasons including, topography, cost, sparse population, access to power and fibre. Access to telecommunication enabled digital technology is improving a game changer for tourism, rural businesses, health providers, agribusiness.

Vodafone

3.39 Vodafone New Zealand started with 138,000 customers in 1998. It now has 2.4 million, making Vodafone New Zealand one of the leading digital services and connectivity companies in New Zealand.

3.40 Vodafone seeks that every New Zealander will thrive with access to the world's best digital services. Providing over 3 million connections to our Consumer and Business customers, the Vodafone mobile network covers 98.5% of where Kiwis live, work and play. Vodafone New Zealand is jointly owned by New Zealand-based Infratil, and Canada-based Brookfield Asset Management. A partner market of the Vodafone Group, which is one of the world's largest and most respected telecommunications companies.

3.41 On a typical weekday, Vodafone customers make more than 7 million mobile calls. Over 3 billion minutes are used every month through mobile calls and our fixed line

network. Vodafone New Zealand delivers more than 13 million TXT messages a day and over 4,500 terabytes of mobile data and 55,000 terabytes of fixed line data every month.

3.42 Vodafone has made a commitment to bring broadband to rural New Zealand, in partnership with Chorus and the New Zealand Government.

3.43 With over 1,560 cell sites Vodafone cover 98.5% of where Kiwis live, work and play. Our superfast 4G network provides coverage for over 96% of New Zealanders. Our investment in 4.5G technology means even faster speeds.

3.44 Vodafone has extensive fibre, Hybrid Fibre Coaxial (HFC) and core infrastructure around Aotearoa New Zealand, including more than 10,000km of Vodafone fibre cables. This provides a diverse, resilient, and reliable network from Whangarei to Invercargill. Vodafone's fully protected core at up to 800Gbps wavelengths enables capacity for demanding applications and data growth.

3.45 With four international points of presence in the USA and Australia, Vodafone can provide connectivity to Tier 1 ISPs and cloud service providers across the globe.

3.46 Vodafone was the first New Zealand provider to offer optical capacity across all three international fibre optic cables - Tasman Global Access (TGA), Southern Cross and Hawaiki - enabling high capacity and high-speed data transfer to power operations.

Chorus

3.47 Chorus was formed on 1 December 2011 when it demerged from Telecom (now Spark). Structural separation of Telecom's (now Spark) retail business from the business that owns and operates the Fibre-To-The-Premise (FTTP) network was a pre-requisite for participation in the Government's Ultra-Fast Broadband programme (UFB).

3.48 The UFB is one of the largest and most ambitious infrastructure projects ever undertaken in New Zealand. It will see around 87% of New Zealanders, in over 390 towns and cities, able to access fibre by the end of 2022.

3.49 Chorus is the Government's largest UFB partner and is contracted to deliver UFB to over 1,300,000 properties – including approximateyl 4,000 properties in Waipukurau, Waipawa, Otane, Takapua and Ongaonga in the Central Hawkes Bay District.

3.50 The core of Chorus' business is the nationwide network of fibre optic and copper cables connecting homes and businesses together. Cables typically connect back to local telephone exchanges, of which Chorus has approximately 600 nationwide.

3.51 The Chorus fibre network also connects many mobile phone towers and facilities owned by mobile service operators.

3.52 Chorus has committed to a significant, ongoing infrastructure investment, building a world-class fibre network across New Zealand in order to help bring economic and social benefits that come with access to high-speed reliable broadband infrastructure.

3.53 The successful rollout of the fibre infrastructure necessary to support the current UFB rollout and any future extension to the current footprint together is reliant on an appropriate and enabling regulatory framework.

4. NATIONAL ENVIRONMENTAL STANDARDS FOR TELECOMMUNICATIONS FACILITIES

4.1 Network operators registered in accordance with the Telecommunications Act 1987 and the Telecommunications Act 2001 can use the NESTF. Across New Zealand are a number of small regional telecommunications companies that provide critical generally wireless services to customers, often in locations that the large national companies have had no or poor services. In the Hawkes Bay area, we know of two providers AoNet and Gecko Broadband that are not registered network operators. These companies rely of the provisions of the district plan, especially the infrastructure chapter to build network and provide service. To enable these small but critical telecommunication companies to provide local network services it is essential to have provisions in the infrastructure chapter that mirror the NESTF. It is fair and reasonable that small providers are enabled to setup to meet the needs of communities that are often not well serviced by other providers.

4.2 We rely primarily on the regulatory framework of the NESTF to upgrade the existing network and build new telecommunications infrastructure in roads and in rural zoned areas. While significant elements of telecommunication networks are provided for as permitted activities, reflecting their importance as a significant physical resource, we rely on district plan provisions in the infrastructure chapter to build new infrastructure in urban zones (outside of roads). In addition, regulated activities not complying with the relevant permitted activity standards in the NESTF remain subject to the relevant district plan. Further, subpart 5 of the NESTF identifies certain types of district plan

rules relating to sensitive natural and built environments which still apply to regulated activities and where resource consent would otherwise be required in the relevant district plan.

4.3 Poles, antennas and cabinets are subject to all of these controls, whilst customer connection lines, aerial lines following existing telecommunications or power lines and underground lines may only be subject to some of these matters depending on circumstances. District rules still apply to regulated activities in regard to the following:

(a) Regulation 44 – Trees and vegetation in road reserve;
(b) Regulation 45 – Significant (scheduled) trees;
(c) Regulation 46 – Historic heritage (including cultural heritage);
(d) Regulation 47 – Visual amenity landscapes (e.g. significant ridgelines, view shafts etc);
(e) Regulation 48 – Significant habitats for indigenous vegetation;
(f) Regulation 49 – Significant habitats for indigenous fauna;
(g) Regulation 50 – Outstanding natural features and landscapes;
(h) Regulation 51 – Places adjoining the coastal marine area (in regard to specific coastal protection rules such as coastal yards etc); and
(i) Regulation 52 – Rivers and lakes (the regulations do not apply to works in, on, under or over the bed of any river, except .that they apply to anything done over a river or a lake such as on a bridge).[9] Regulation 52 confirms that any relevant regional rules apply in addition to the regulations that may be relevant.

4.4 Given the above, we constantly face challenges as a result of councils administering the NESTF particularly when it comes to determining which or if any regional or district plan provisions apply to a proposal. It can be difficult and complex especially when a proposal is in one or multiple sensitive environments (NESTF Subpart 5 environments). Consistency across the national, regional and district planning frameworks is fundamental to the industry having certainty and clarity around what is supported and enabled in each region.

4.5 As set out in this evidence above, the telecommunication network technology requirements are constantly changing and evolving. Unlike any other infrastructure sector, it is expensive to have to relocate a cell site because of unanticipated regulatory changes impacting on the effectiveness of the NESTF. The common

[9] National Environmental Standards for Telecommunications Facilities 2016, Regulation 8.

reasons for relocation being required include where changes to property ownership leads to a lease being terminated or a new building is constructed that blocks some of the coverage footprint of a cell site. For Spark, each time a site has be relocated or significantly rebuilt it costs on average $350,000 per site. The process to find new sites can be anywhere from 3 to 18 months. Complexity of this is partly due to the wide range of disciplines involved, including engineers, project managers, resource management experts, council, mana whenua and the community.

4.6 Occasionally the loss of a site leads to replacement with 2 or more sites to achieve the same coverage footprint as it is increasingly difficult to acquire new locations especially in residential and rural locations in sensitive environment overlay areas for a range of reasons:

(a) Physical environment e.g. contours of the locality, height of existing buildings or shelter belts/vegetation that interfere with coverage;

(b) Site characteristics e.g. wind, soil conditions, access to the site, fibre and power, geotechnical conditions and slope of the property;

(c) Finding a new landowner to establish a site and in agreeable position for both parties;

(d) Opposition to telecommunication facility by residents, even if permitted under the NESTF or the regional and/or district planning documents;

(e) Regulatory requirements i.e. development controls such as height and consideration of significant cultural sites or outstanding natural landscapes, or tower height restricting the opportunity for colocation of multiple operators.

5. DESIGNATIONS

5.1 Chorus has designated sites in all 67 District and Unitary Plan's in New Zealand. Only 17 of these plans have conditions attached to the designations[10]. The structures and activities provided for by the designations within the Central Hawke's Bay plan are long established.

5.2 Chorus' designated sites within the Central Hawkes Bay District cover a range of strategic sites such as exchanges. Exchanges are the hubs of the

[10] Chorus sites Central Hawke's Bay, Auckland, Ashburton, some but not all in Christchurch, Gisborne, some but not all in Hamilton, Hauraki, Horowhenua, Waimate, Gore, Rangitikei, some but not all in Lower Hutt, some but not all in Wellington, Far North, Whangarei, Waipa, Dunedin

telecommunications system without which the system cannot function. Customers are linked to these facilities by either physical lines or wireless means.

5.3 Designation of these sites is required to ensure the ongoing security and resilience of essential services, and to provide flexibility for the networks to adapt to changing technologies and community expectations.

5.4 Chorus has a countrywide strategy of designating its strategic sites to provide a nationally consistent management framework whereby these sites can be reasonably managed enabling their telecommunications function while balancing this against environmental effects via the outline plan process. The outline plan process allows for the consideration of any future effects should there be any additional works undertaken, including visual effects, overshadowing and dominance, noise effects, hazardous substances, contaminated land and access and parking effects.

5.5 Designations as a mechanism therefore provide a degree of certainty as to the nature of works Chorus can carry out on any particular site and allows Chorus to undertake wider network planning with a higher degree of ongoing certainty throughout the country.

6. CONCLUSIONS

6.1 Telecommunications infrastructure is essential for shaping and enabling the future of the Central Hawke's Bay by ensuring that it's residents and businesses have the opportunity to be connected internationally and across New Zealand. Changes in the way people access and use telecommunications and data networks is rapidly evolving. It is critical that the regulatory framework provides certainty and enables efficient roll out of current and future technology.

6.2 While it is recognised that the telecommunication industry is complex and requires involvement of multiple company's local authorities should be proactively working with the industry specially to support all customers to get access to the digital services they demand, without unnecessary regulatory intervention. We are looking to forward to continuing to work with Central Hawke's Bay District Council.

Graeme McCarrison, Colin Clune and Andrew Kantor

29 November 2022

Appendix 1

Draft Network Utilities Best Practice Objectives and Policies as at Nov 2019

Significant resource management issues and discussion

PSSIG-1 The operation, maintenance, upgrade and development of network utilities is essential to enabling people and communities to provide for their social, cultural and economic well-being and necessary to support safe, responsive and resilient communities. Network utilities are often also lifeline utilities and must be able to function to the fullest possible extent in emergencies.

PSSIG-2 To realise the benefits of network utilities, the provision for, and protection of, network utilities should be integrated and coordinated with land use development and able to adapt to and adopt emerging and new technologies.

PSSIG-3 The development of network utilities can result in significant adverse effects on the environment.

PSSIG-4 The extent to which it is feasible to avoid or mitigate the adverse effects of network utilities on the environment is often limited by functional needs and operational needs.

PSSIG-5 Activities in the vicinity of network utilities can have an impact on the network utilities' operation, maintenance, upgrade and development.

District Wide Matters

IE - Energy, Infrastructure and Transport

Infrastructure and Energy

Infrastructure and Energy Objectives (Network Utilities)

IE-O1	**Network utilities**

Effective, resilient, efficient and safe network utilities that:

1. provide essential and secure services, including in emergencies;
2. facilitate local, regional, national or international connectivity;
3. contribute to the economy and support a high standard of living;
4. integrate with urban development;
5. enable people and communities to provide for their health, safety and wellbeing.

IE-O2	**Adverse effects of network utilities**

The adverse effects of network utilities on the environment are avoided, remedied or mitigated while recognising:

1. the functional need and operational need of network utilities;
2. that positive effects of network utilities may be realised locally, regionally or nationally.

IE-O3	**Adverse effects on network utilities**

Network utilities are protected from adverse effects, including reverse sensitivity effects, of subdivision, use and development by, where necessary:

1. set-backs or buffer corridors within which incompatible activities will be managed;
2. controls on the activities of others' where they can compromise the operation, safety, maintenance, upgrade and development of network utilities.

Infrastructure and Energy Policies (Network Utilities)

IE-P1	**Recognising the benefits of, and providing for, network utilities**

1. Recognise the benefits of network utilities by:
    a. enabling the operation, maintenance, repair, minor upgrade or removal of existing network utilities throughout the district;
    b. enabling investigation, monitoring and navigation activities associated with network utility operations throughout the district;
    c. providing for significant upgrades to, and the development of new, network utilities;

d. providing for the functions and responsibilities of network utilities as lifeline utilities during an emergency.

The national, regional and local benefits of network utilities that are recognised are those that enable the economic, social, cultural and environmental well-being of people and communities and provide for their health and safety, including through:

a. the effective safe, secure and efficient transmission or distribution of electricity, gas, fuel or energy;
b. an integrated, efficient and safe transport network for the movement of people and goods by land, air or water, including public transport, walking, cycling, private vehicles;
c. effective, reliable and future-proofed communications networks and services;
d. effective, resilient, efficient and safe water, wastewater and stormwater treatment systems, networks and services.

IE-P2	**Network utilities, land use, subdivision, development and urban growth**

Enable the coordination of network utilities planning and delivery with land use, subdivision, development and urban growth so that future land use and network utilities are integrated, efficient and aligned.

IE-P3	**Technological advances**

Provide flexibility for network utilities to adopt new technologies that:

1. improve access to, and efficient use of, networks and services;
2. allow for the re-use of redundant services and structures;
3. increase resilience, safety or reliability of networks and services;
4. result in environmental benefits and enhancements; or
5. promote environmentally sustainable outcomes including green infrastructure and the increased the utilisation of renewable resources.

IE-P4	**Adverse effects of network utilities**

Manage the adverse effects of network utilities on the environment by:

1. recognising that the adverse effects of the ongoing operation, maintenance, repair, upgrade and removal of existing network utilities are typically insignificant or minor by enabling these activities to occur without the need for planning approvals;
2. avoiding, remedying or mitigating the adverse effects of substantial upgrades to, or the development of new network utilities, including effects on:
    a. natural and physical resources;
    b. amenity values;
    c. sensitive activities;
    d. the safe and efficient operation of other network utilities;
    e. the health, well-being and safety of people and communities.
3. managing the potential adverse effects of noise, vibration, radiofrequency fields and electric and magnetic fields by requiring compliance with national environmental standards or other nationally recognised standards or guidelines.
4. preferring the undergrounding of new network utilities in urban areas where it is:
    a. technically feasible;
    b. justified by the extent of adverse visual effects; and
    c. viable, including where costs are proportionate to the adverse effects being avoided.

IE-P5	**Adverse effects of network utilities on areas of outstanding or significant value**

In the coastal environment

1. Avoid adverse effects of substantial upgrades to, or the development of new network utilities on:
    a. the values and attributes of areas that are identified in the plan as having outstanding natural character, outstanding natural features or outstanding natural landscapes;
    b. taxa, ecosystems or vegetation types identified as threatened, rare or protected in the plan in accordance with Policy 11(a) of the NZCPS;
2. avoid significant adverse effects of substantial upgrades to, or the development of new network utilities on the values and attributes of areas that are identified in the plan as having natural character, natural features, natural landscapes, or being significant indigenous vegetation or significant habitats of indigenous fauna and remedy or mitigate other adverse effects.

In all areas

3. Give priority to avoiding the adverse effects of substantial upgrades to, or the development of new network utilities, on the values and attributes of areas that are identified in the plan as:
    a. wetlands and lakes and rivers and their margins that have natural character;
    b. outstanding natural features and landscapes outside of the coastal environment;
    c. areas of significant indigenous vegetation and significant habitats of indigenous fauna outside of the coastal environment;
    d. ancestral lands, water, sites, wāhi tapu and other taonga of mana whenua;
    e. historic heritage.
4. Where the avoidance of adverse effects under clause (3) is not possible, the appropriateness of the substantial upgrades to, or the development of, new network utilities will be determined by having regard to the matters listed in {Link,5146,Policy IE-P7}.

IE-P6	**Natural hazards and network utilities**

Only provide for network utilities in areas identified in the plan as subject to natural hazards where the network utility:

1. does not pose a significant risk, or exacerbate an existing risk, to other people or property; and
2. has a functional need or operational need to be located in the area; or
3. is not vulnerable to the risks of the natural hazard; or
4. is designed to maintain reasonable and safe operation during and in the immediate aftermath of a natural hazard event.

IE-P7	**Consideration of the adverse effects of network utilities**

When considering the adverse effects of network utilities on the environment:

1. recognise that there may be situations where all adverse effects cannot be avoided, remedied or mitigated;
2. recognise that the adverse effects on the values and attributes of the areas listed in Policy IE-P5(3) can be mitigated by locating some types of network utilities in land transport corridors;
3. decision-makers must have regard to:
    a. the extent to which adverse effects can be avoided, remedied or mitigated may be constrained by a network utility's functional need or operational need;

b. the time, duration or frequency of adverse effects;
c. the necessity of the network utility including:
    i. the need to quickly repair and restore disrupted services;
    ii. the impact of not operating, repairing, maintaining, upgrading, removing or developing a network utility;
d. existing network utilities including:
    i. the complexity and connectedness of networks and services;
    ii. the potential for co-location and shared use of network utility corridors;
e. anticipated outcomes for the receiving environment and the degree to which past modifications have compromised the achievement of those outcomes;
f. the benefits derived from the network utility at a local, regional and national scale;
g. the extent to which the network utility is integrated with, and necessary to support, planned urban development.

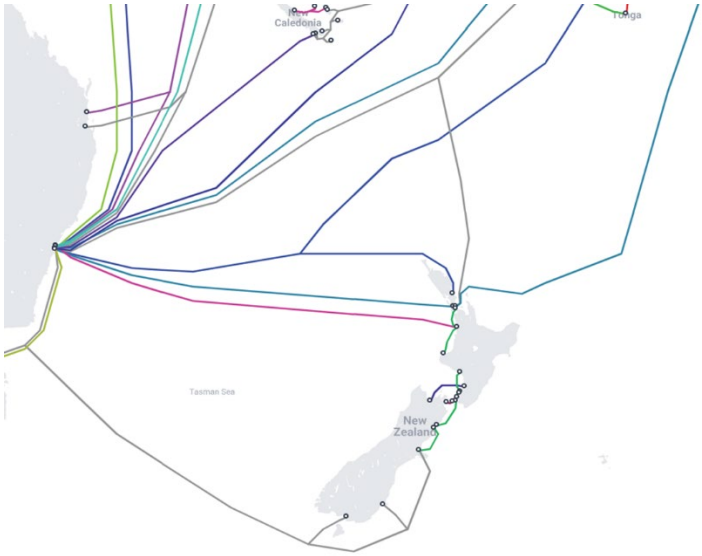
IE-P8	**Adverse effects on network utilities**

Protect network utilities from the adverse effects of subdivision, use and development that may constrain or compromise the safe and efficient operation, maintenance, repair, upgrading, removal and development of network utilities, including by:

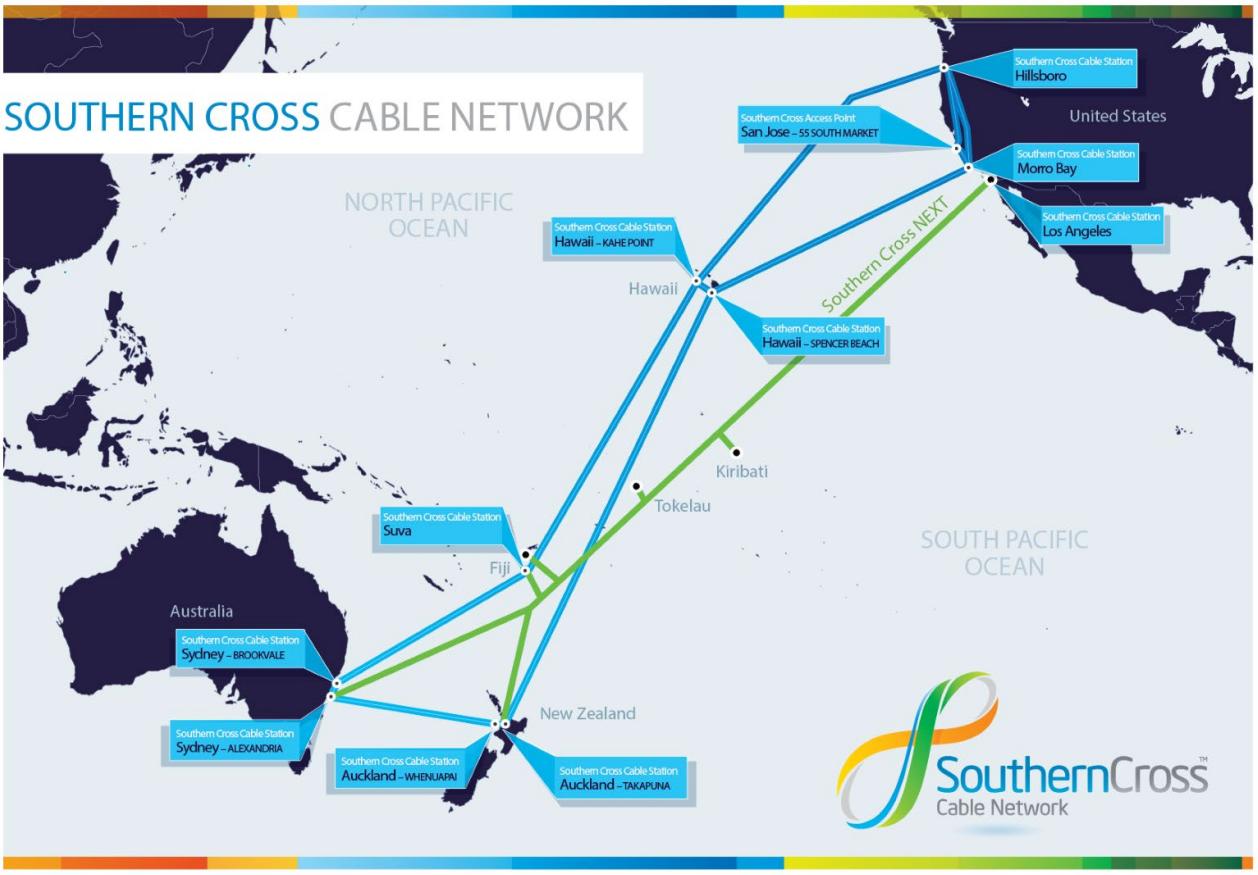
1. locating and designing new buildings and activities sensitive to noise to avoid the potential adverse effects of the railway corridor and national and regional road network;
2. managing access to the railway corridor and national and regional road network;
3. managing new activities sensitive to noise within a defined air noise contour;
4. avoiding physical obstructions in take-off, approach, landing or departure paths and runway end protection areas;
5. requiring subdivision of sites containing significant electricity distribution lines to:
    a. retain the ability for the network utility operator to access, operate, maintain, repair and upgrade the significant electricity distribution line; and
    b. ensure that future buildings, earthworks and construction activities maintain safe electrical clearance distances under all building and electricity distribution line operating conditions;
6. managing land disturbance and activities sensitive to gas transmission to avoid or mitigate potential adverse effects of, and on, gas transmission pipelines;
7. requiring subdivision of sites containing a gas transmission pipeline to retain the ability for the network utility operator to access, operate, maintain, repair and upgrade the gas transmission pipeline;
8. managing the activities of others' through set-backs and design controls where it is necessary to achieve appropriate protection of a network utility.

APPENDIX 2 –

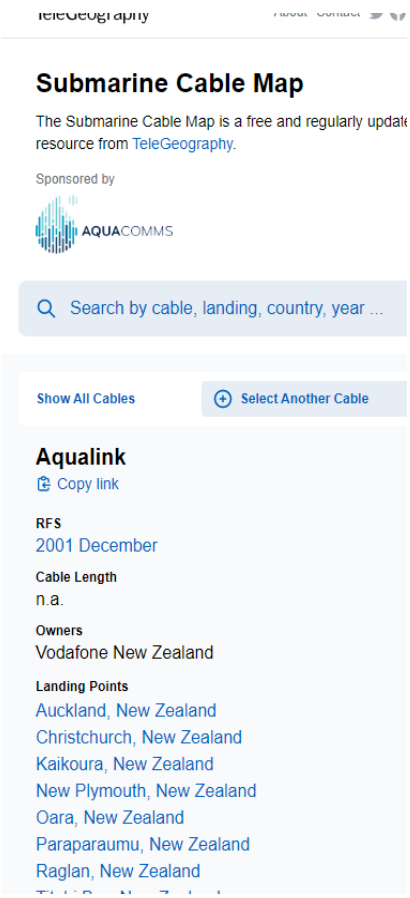
Overview of New Zealand International and National Submarine Cables



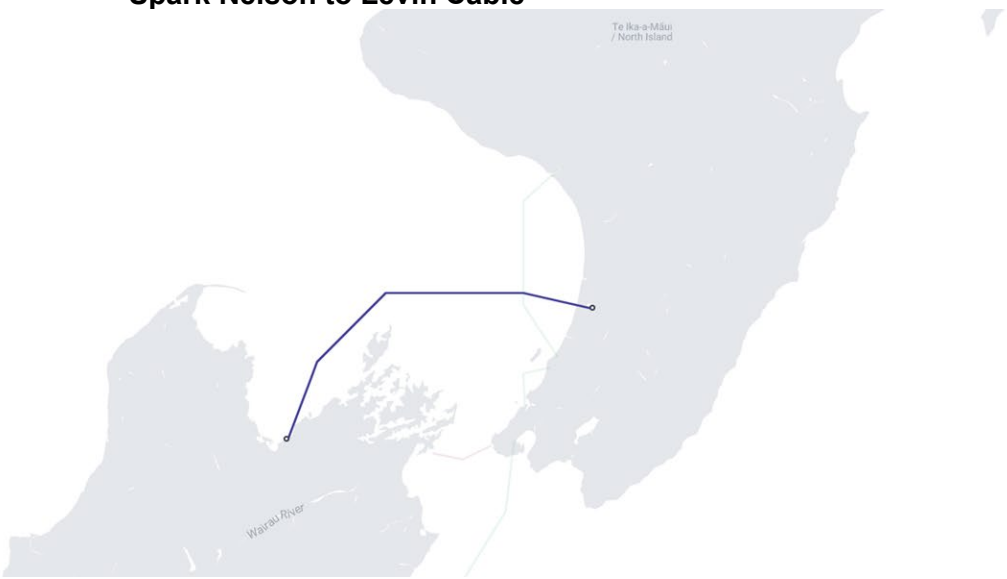
Southern Cross Ceo-System of International Telecommunication Cables Overview as at 7 July 2022

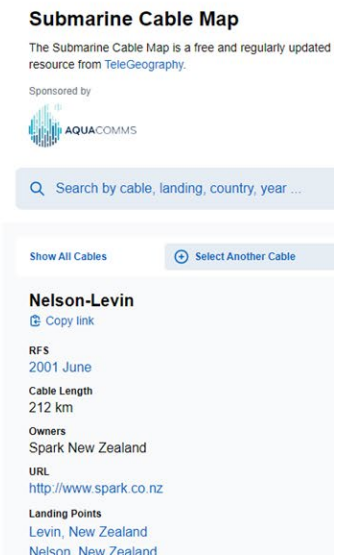


National Submarine Cables
Vodafone Aqualink Cable



Spark Nelson to Levin Cable





National Fibre Cable Routes

Key
Spark – **pink** 1337km
Chorus - **blue** (noting that Spark and others will have commercial issues) 7742km
Other providers **teal blue** (noting that Spark and others will have commercial issues) 630km

Appendix 3

Radio signal path loss

Path Loss

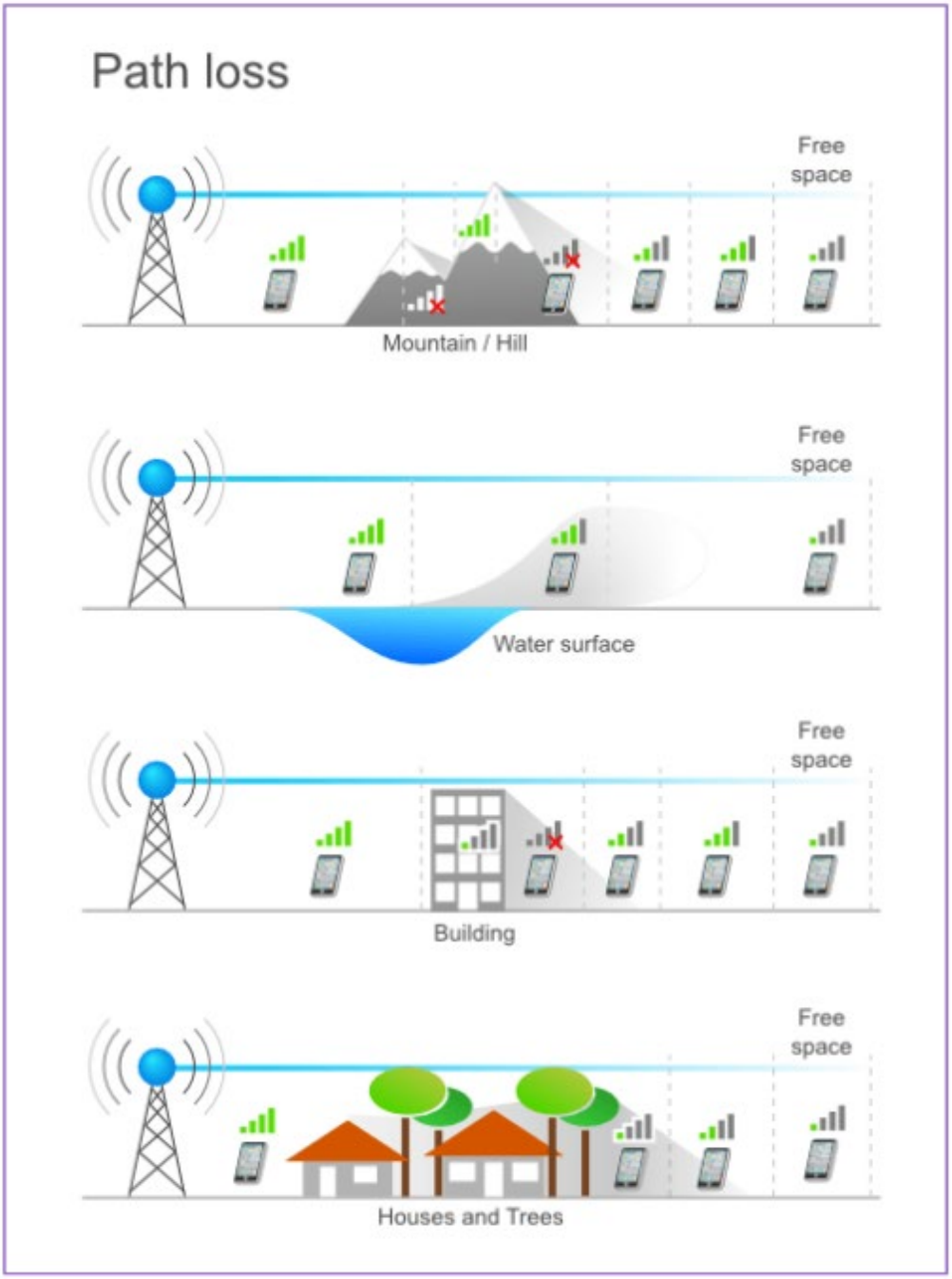
Path Loss, as a radio propagation concept, refers to the phenomenon of the power density decrease (attenuation) of an electromagnetic wave as it propagates through space i.e. from mobile base station to mobile phone (downlink), and vice versa (uplink). Path Loss is a key factor in the design of any wireless communications system.

Path loss can be caused by various factors:

- Free-space loss (distance)
- Fading (frequency dependent)
- Shadowing
- Reflections at large obstacles
- Refraction depending on the density of the medium
- Scattering at small obstacles
- Diffraction at edges

Other important variables in determining the path loss are the environment (urban, suburban or rural), terrain contours, absorption (buildings, walls, vegetation), the distance between transmitter and receiver, and the type and height of antennas.

The formulas for calculating path loss are outside the scope of this document.


Path loss
Free space
Mountain / Hill
Free space
Water surface
Free space
Building
Free space
Houses and Trees