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

AND

IN THE MATTER **of Waimakariri District Council's Proposed District Plan**

Hearing Stream 5 regarding: - Historic Heritage Energy and Infrastructure and Earthworks

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 (FORMERLY VODAFONE NEW ZEALAND LTD) AND

FORTYSOUTH

AND

FIONA MATTHEWS FOR

CONNEXA LTD

IN RELATION TO HEARING STREAM 5 OF WAIMAKARIRI DISTRICT COUNCIL'S PROPOSED DISTRICT PLAN

7 AUGUST 2023

1. EXECUTIVE SUMMARY

1.1 Spark, One NZ (formerly Vodafone), Chorus, , Connexa and FortySouth welcome the opportunity to provide this evidence. Connexa and FortySouth are responsible for, building, owning, operating, and maintaining the mobile tower infrastructure which Spark and One NZ attach their 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 2 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 providers provide critical communications infrastructure that connects communities, promotes inclusivity, supports economic and environmental objectives, and is a critical part of our response to climate change. Telecommunications infrastructure is highly dynamic and - unlike other infrastructure sectors - our network requirements are changing and evolving constantly and at a fast pace.

1.3 In parallel, 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, FortySouth and Connexa, 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 To help ensure that the ongoing use of heritage protected buildings remains economically viable we believe it is critical that there be certainty to achieve the replacement or upgrading or new telecommunication connections. Our experience is that the proposed controlled activity amendment is practical and enables existing connections to heritage buildings to be upgraded and replaced with fibre.

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

1.5 We rely on regulatory frameworks both nationally, via the National Environmental Standards for Telecommunications Facilities 2016 (NESTF), and locally, via the Operative and Proposed Waimakariri District Plans, to appropriately enable the planning and funding for upgrading of existing networks and construction of new networks to support growth as well as to increase the resilience of the networks in response climate change and natural hazards.

2. INTRODUCTION

2.1 We presented corporate evidence and details of our experience and qualifications for Hearing Stream 1 and 2. That evidence can be referred to if required.

Graeme McCarrison

2.2 My full name is Graeme Ian McCarrison. I am the Engagement & Planning Manager at Spark New Zealand Trading Limited ("Spark"), a position I have held since February 2015. I am authorised to give this evidence on Spark's behalf.

Colin Clune

2.3 My full name is Colin William Clune. I have been the Planning Manager Fortysouth, a new independent digital infrastructure partner, founded in 2022. Until July I was the Resource Management Planning Advisor at One NZ New Zealand Limited (One NZ). A position I have held since October 2014. Previously, I was an in-house contractor for One NZ, (September 2010 to September 2014), where I advised One NZ on resource management and government matters. I am authorised to give this evidence on One NZ's behalf.

Andrew Kantor

2.4 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.

Fiona Matthews

2.5 My full name is Fiona Elisabeth Matthews. I am the Planning Manager at Connexa Limited (Connexa). I have held this position since October 202.Previously, I was a Planner for Spark New Zealand, (May 2018 to September 2022), where I advised Spark on resource management and regulatory matters. I am authorised to give this evidence on Connexa's behalf.

Scope of evidence

2.6 This statement of evidence covers the following areas:

a. Telecommunication in New Zealand.
b. Connectivity to heritage buildings.
c. Telecommunications infrastructure works around trees and earthworks.

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.

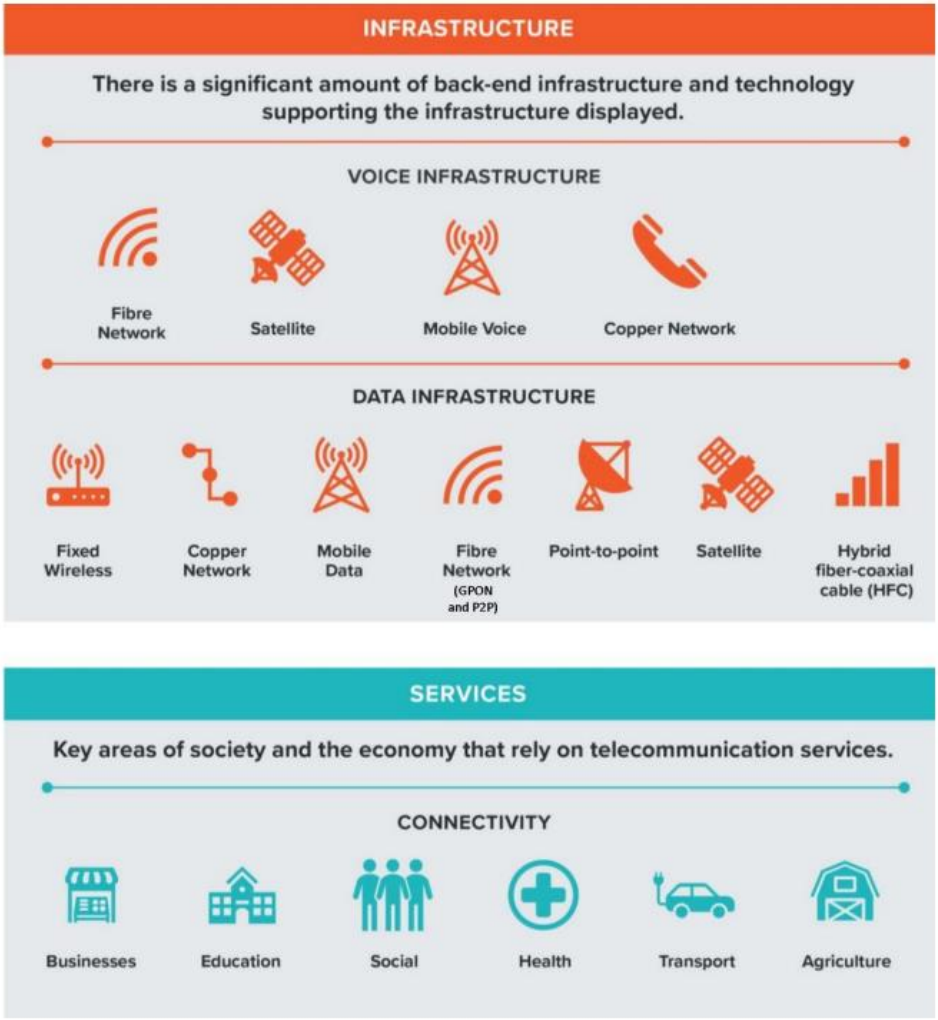
(e) Drones for monitoring especially in high hazard environments e.g. during a forest fire or a flood events when it is unsafe to fly other aircraft; reporting fires and managing search and rescue situations; mapping for hazards or size of forests for carbon credit assessments.

(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.[2]

[2] 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[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,

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

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.

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.

Benefits of 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
- 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].

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

[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

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

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 broadband services into New Zealand. Lynk Global is a satellite service provider that is expanding services into Aotearoa. Spark and One NZ have announced they will set providing satellite-to-mobile services. The first services expected in 2024 will be text to mobile phone/devices. It is worth remembering that the technology is still evolving, so the service and experience will improve and expand as the number of satellites in the sky increases. While satellite can't provide 100% coverage, as you need a clear line of sight to the sky to get connected. Satellite services adds 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 our mobile customers to start to use their phones in more areas that aren't reached by traditional mobile coverage.

3.22 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.

3.23 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.'[7]

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[6] https://www.5gradar.com/features/what-is-5g-these-use-cases-reveal-all
[7] https://www.infrastructure.govt.nz/assets/Uploads/Infrastructure-Strategy-Consultation-Document-June-2021.pdf; p. 34

4. CONNECTIONS TO HERITAGE BUILDINGS

4.1 To help ensure that the ongoing use of heritage protected buildings remains economically viable we believe it is critical that there is certainty to achieve the replacement or upgrading or new telecommunication connections. Normally connections will be designed away from key heritage facades where practicable. Much of the copper network is being transitioned to fibre, consequentially, building owners and tenants will need to explore new connectivity options including replacing copper with fibre. Owners and occupiers of protected buildings need to be able to have access to the critical telecommunication services that residents and businesses depend on. The provision of a controlled activity enables the assessment of a connection proposal to ensure that it is appropriate.

4.2 Our submission on HH-R3 is that it is not clear that customer connections to buildings with heritage values are regulated under EI-R4 in the Energy and Infrastructure Chapter are not also regulated under HH-R3. We submitted that a customer connection to be attached to a heritage item under EI-R4 should be a controlled activity subject to the design and placement of the service connection to minimise impacts on the values and attributes of the listed area, façade or item. This form of requirement has been supported in other Plans including Marlborough Environmental Plan, Auckland Unitary, Waikato, and Opotiki District Plans by Heritage NZ Pouhere Taonga. Chorus has also developed in partnership with Heritage NZ Pouhere Taonga guidelines for designing connections to scheduled heritage buildings.

4.3 Our experience is that a controlled activity enables existing connections to heritage buildings to be upgraded and replaced with fibre while protecting the heritage characteristics. It is our belief that if the building is not equipped with modern telecommunications infrastructure the economic value of the building will be eroded putting the future of the building at risk.

5. TELECOMMUNICATIONS INFRASTRUCTURE WORKS AROUND TREES AND EARTHWORKS

5.1 The upgrading and building new telecommunications network including fibre below ground, expanding cabinet footprints and new cell-sites means doing a lot of work around trees and undertaking earthworks. 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. The NESTF enables significant elements of telecommunication networks are provided for as

permitted activities, reflecting their importance as a significant physical resource. However, 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 such as Sites and Areas of Significance to Māori, protected trees and sensitive natural and built environments including Outstanding Natural Landscapes which still apply to regulated activities where resource consent would otherwise be required in the relevant district plan.

5.2 The NESTF enables the construction of the following (not a comprehensive list):

- new and upgrading of cabinets in the road reserve and outside the road reserve.
- antennas on new poles in the road reserve.
- replacement, upgrading and co-location of existing poles and antennas outside road reserve in rural and urban areas.
- new poles and antennas in rural areas.
- telecommunications lines (underground, on the ground and overhead).
- earthworks related to a NESTF regulated activity.

5.3 District Plan rules apply to new cell sites in urban zones as these are not covered by the NESTF 2016. The district plan regulates for:

- new poles and antennas in the urban zones.
- provision for customer connections.
- regulated equipment in all areas not meeting NESTF permitted standards.
- consenting framework for subpart 5 matters of the NESTF such when in sensitive overlays or working around protected trees or earthworks.
- earthworks for new sites or customer connections or works outside the road.

5.4 A cell tower and cabinets constructed in the road or on private property are reasonably small, approximately $12m^3$ to $45m^3$. Structural requirements for foundations are specific to each location and therefore change depending on for example, soil conditions, height of the pole, if the site will have multiple operators or in a high wind zone. Appendix 1 shows photograph examples of the types of foundation structures required for constructing a cell-site and two sets of foundation plans for Spark sites AKAE and ATKI. Each site has specific engineering design and certification considering the geotechnical conditions and natural hazard information available. Consultancy companies such as Aurecon and WSP provide design and engineering certification for each new site (includes guidance that influences new-site selection regarding soil conditions such as including liquification at Christchurch airport requiring pile foundation of approximately 20m deep and natural hazard risk and

mitigation requirements) and upgrading existing sites. The following are common foundation types to give an idea of the limited scale of earthworks. Note there will be variation in the volume of earth depending on the foundation requirements for each specific location.

- Pile foundations – pole
  See appendix 1 for example Spark site AKAE.
  Earthworks volume = 0.9 dia x 6.0m pile with 2m x 2m x 1.1m pile cap = 10m^3

- Standard concrete pad foundations – pole
  See appendix 1 for example Spark site ATKI.
  Earthworks volume = 5m x 5m x 1.5 slab = 40m^3
  (Will need to additional excavate to place shutters around excavation if more than 1m deep)

- Cabinet foundations
  See appendix 1 for example Spark site AKAE.
  Earthworks volume = 2.85m x 1.1m x 0.6m (includes over excavation for metal below slab) = 2m^3

- Roadside Pole stub
  Earthworks volume (max 0.75 dia x 4.0m pile) = 3m^3

5.5 We are anticipating the need to apply for more resource consents to establish cellsites in areas with medium density developments, response to meeting new standards of resilience and increasing demand for service in rural edges of Canterbury. Nationally there are a number of potential changes in legislation and regulation such as the Emergency Management Bill replacing the Civil Defence Emergency Management Act 2002 (the 2002 Act), Department of the Prime Minister and Cabinet (DPMC) discussion paper Strengthening the resilience of Aotearoa New Zealand's critical infrastructure system and the industry lead initiatives to address how resilience to natural hazards and disasters (such as severe weather events, earthquakes, volcanic eruptions, wildfires and pandemics) can be enhanced.

5.6 The use batteries as back-up to the mains electricity supply for the wireless networks is common. Investment in new battery technology for key sites that potentially run for longer periods of time and require less maintenance. There are, limitations to this approach which is not suitable for all sites. This is due to space constraints in cabinets, and local consenting and land access issues.

5.7 Every site depends on having power and fibre connections. Getting fibre and power to the site will require earthworks and potentially triggers a resource consent under EW. We are concerned that the earthworks rules such as EW-S4 will trigger a resource consent when having to work near a tree with a root protection area. When working within the protected root zones of protected trees professional advice is taken on the best practical option for undertaking the required works. We submitted on several earthwork rules including EW-R8, EW-S, EW-S3, EW-S4 and EW-S5 to ensure clarity around the regulatory regime in EIT and EW.

5.8 Mr Horne will address in his statement the potential options to matters of concern related to matters addressed EI chapter provisions that it should be clear that they exempt from earthworks provisions in EW.

GRAEME MCCARRISON, COLIN CLUNE, ANDREW KANTOR, AND FIONA MATTHEWS

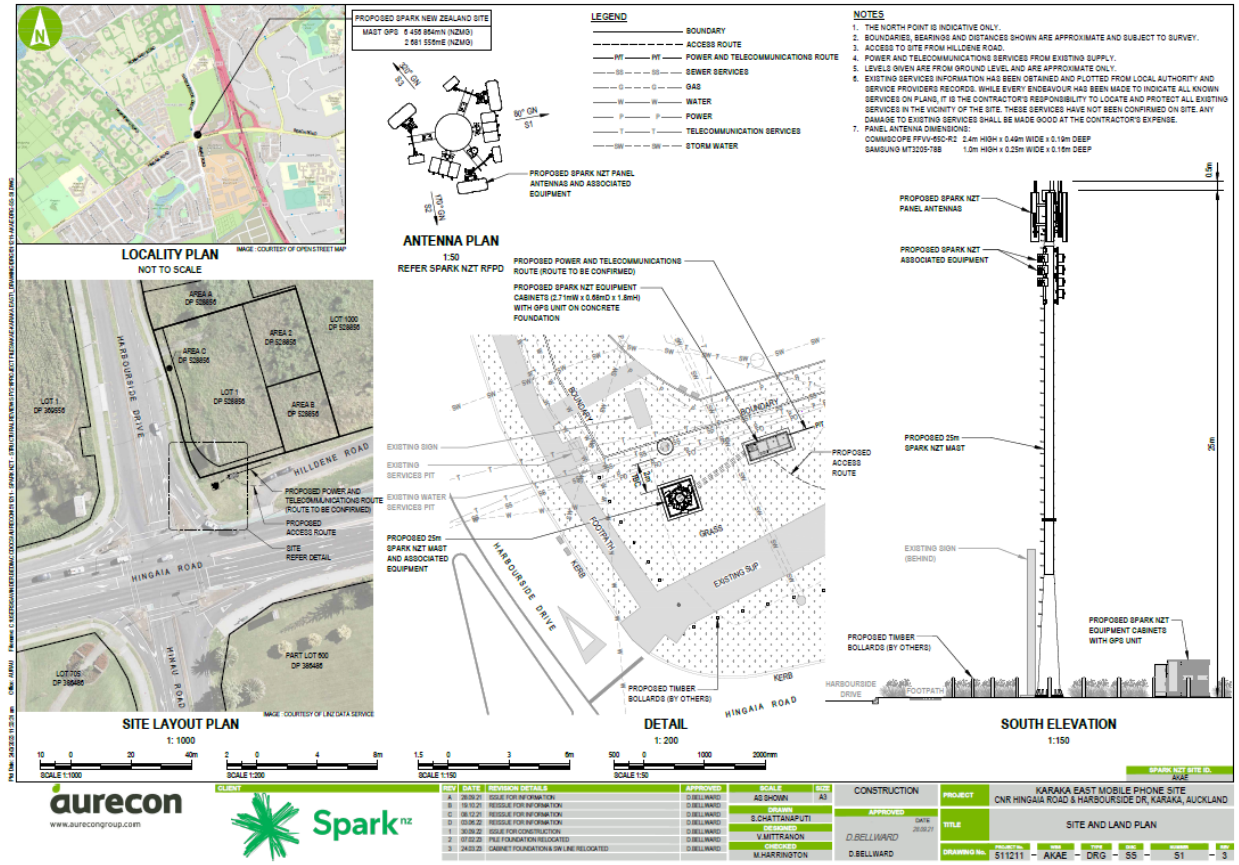
7 August 2023

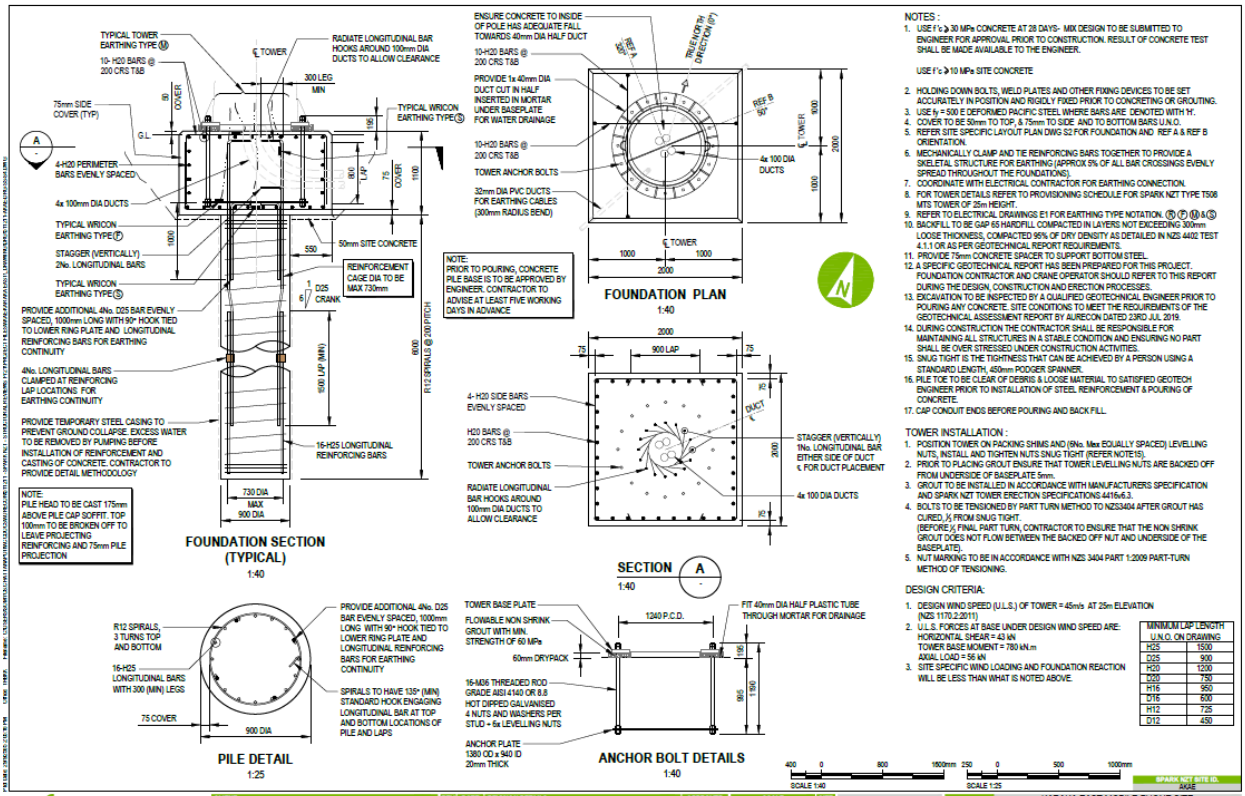
Appendix 1 - Examples of sites foundations

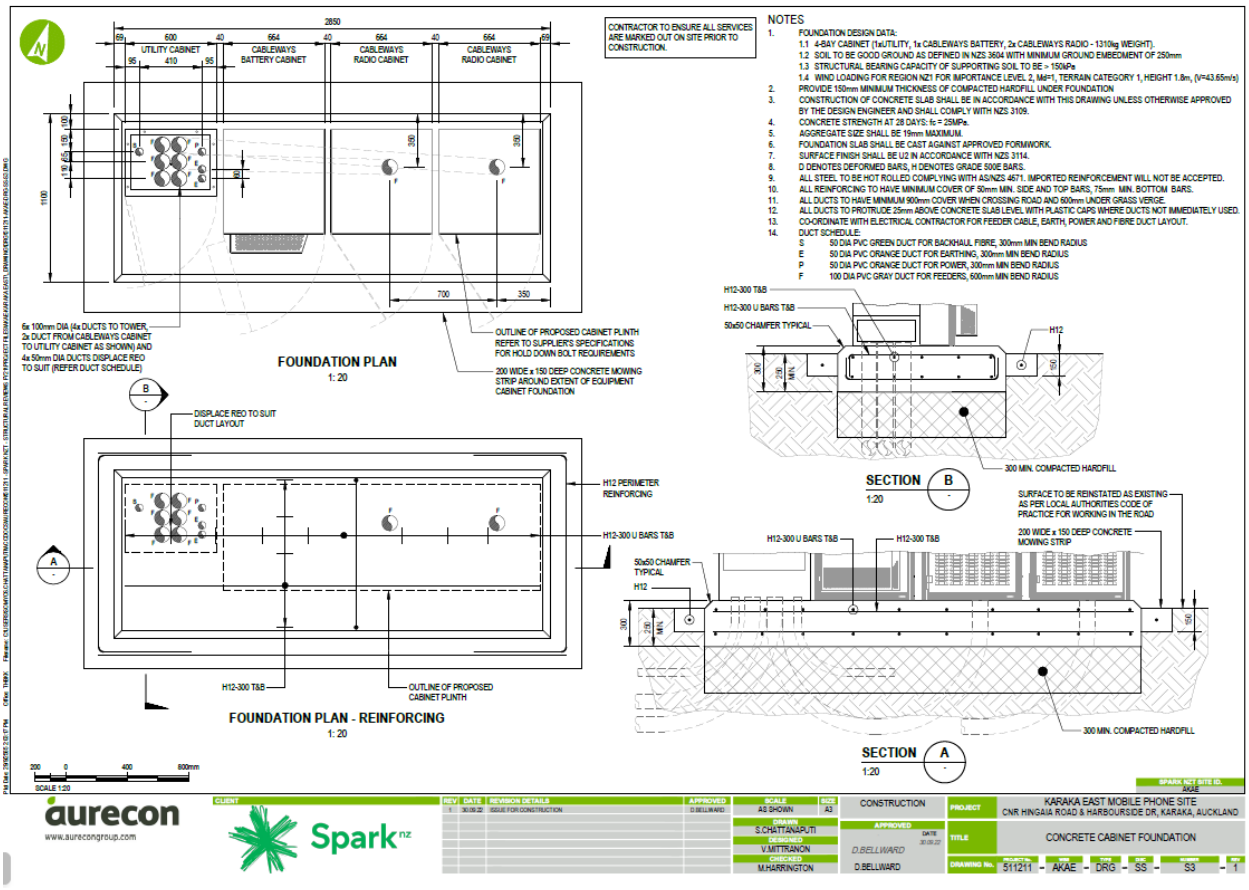

GREEN

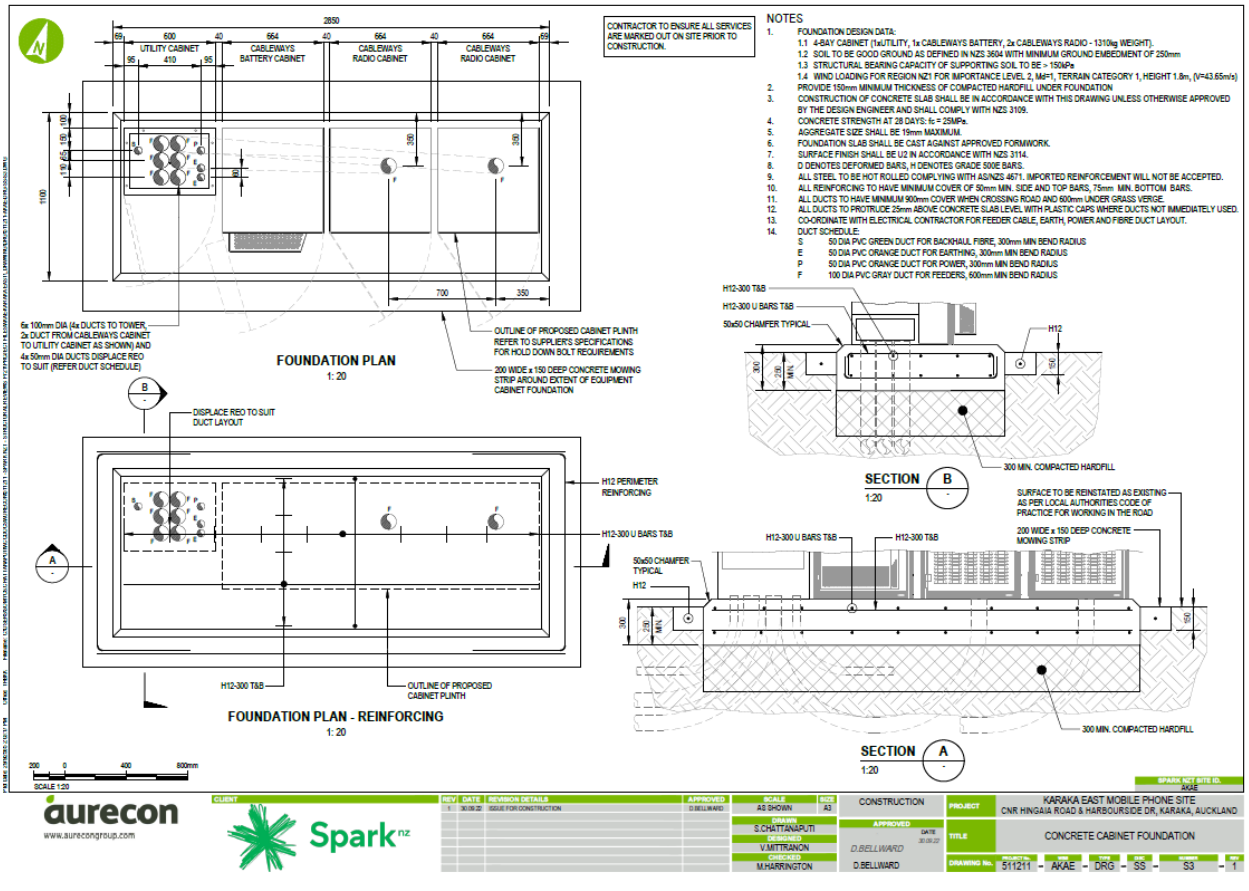

Hertz
DANGER

Spark site AKAE – Corner Hingaia Road and Harbourside Drive Karaka






CONTRACTOR TO ENSURE ALL SERVICES ARE MARKED OUT ON SITE PRIOR TO CONSTRUCTION.
NOTES
1. FOUNDATION DESIGN DATA:
1.1 4-BAY CABINET (1xUTILITY, 1x CABLEWAYS BATTERY, 2x CABLEWAYS RADIO - 1310kg WEIGHT).
1.2 SOIL TO BE GOOD GROUND AS DEFINED IN NZS 3604 WITH MINIMUM GROUND EMBEDMENT OF 250mm
1.3 STRUCTURAL BEARING CAPACITY OF SUPPORTING SOIL TO BE > 150kPa
1.4 WIND LOADING FOR REGION NZ1 FOR IMPORTANCE LEVEL 2, Mdf=1, TERRAIN CATEGORY 1, HEIGHT 1.8m, (V=43.65m/s)
2. PROVIDE 150mm MINIMUM THICKNESS OF COMPACTED HARDFILL UNDER FOUNDATION
3. CONSTRUCTION OF CONCRETE SLAB SHALL BE IN ACCORDANCE WITH THIS DRAWING UNLESS OTHERWISE APPROVED BY THE DESIGN ENGINEER AND SHALL COMPLY WITH NZS 3109.
4. CONCRETE STRENGTH AT 28 DAYS: fc = 25MPa.
5. AGGREGATE SIZE SHALL BE 19mm MAXIMUM.
6. FOUNDATION SLAB SHALL BE CAST AGAINST APPROVED FORMWORK.
7. SURFACE FINISH SHALL BE U2 IN ACCORDANCE WITH NZS 3114.
8. D DENOTES DEFORMED BARS, H DENOTES GRADE 500E BARS.
9. ALL STEEL TO BE HOT ROLLED COMPLYING WITH AS/NZS 4671. IMPORTED REINFORCEMENT WILL NOT BE ACCEPTED.
10. ALL REINFORCING TO HAVE MINIMUM COVER OF 50mm MIN. SIDE AND TOP BARS, 75mm MIN. BOTTOM BARS.
11. ALL DUCTS TO HAVE MINIMUM 900mm COVER WHEN CROSSING ROAD AND 600mm UNDER GRASS VERGE.
12. ALL DUCTS TO PROTRUDE 25mm ABOVE CONCRETE SLAB LEVEL WITH PLASTIC CAPS WHERE DUCTS NOT IMMEDIATELY USED.
13. CO-ORDINATE WITH ELECTRICAL CONTRACTOR FOR FEEDER CABLE, EARTH, POWER AND FIBRE DUCT LAYOUT.
14. DUCT SCHEDULE:
S 50 DIA PVC GREEN DUCT FOR BACKHAUL FIBRE, 300mm MIN BEND RADIUS
E 50 DIA PVC ORANGE DUCT FOR EARTHING, 300mm MIN BEND RADIUS
P 50 DIA PVC ORANGE DUCT FOR POWER, 300mm MIN BEND RADIUS
F 100 DIA PVC GRAY DUCT FOR FEEDERS, 600mm MIN BEND RADIUS
2850
UTILITY CABINET
CABLEWAYS BATTERY CABINET
CABLEWAYS RADIO CABINET
CABLEWAYS RADIO CABINET
6x 100mm DIA (4x DUCTS TO TOWER, 2x DUCT FROM CABLEWAYS CABINET TO UTILITY CABINET AS SHOWN) AND 4x 50mm DIA DUCTS DISPLACE REO TO SUIT (REFER DUCT SCHEDULE)
OUTLINE OF PROPOSED CABINET PLINTH REFER TO SUPPLIER'S SPECIFICATIONS FOR HOLD DOWN BOLT REQUIREMENTS
200 WIDE x 150 DEEP CONCRETE MOWING STRIP AROUND EXTENT OF EQUIPMENT CABINET FOUNDATION
FOUNDATION PLAN
1: 20
DISPLACE REO TO SUIT DUCT LAYOUT
H12 PERIMETER REINFORCING
H12-300 U BARS T&B
H12-300 T&B
OUTLINE OF PROPOSED CABINET PLINTH
FOUNDATION PLAN - REINFORCING
1: 20
H12-300 T&B
H12-300 U BARS T&B
50x50 CHAMFER TYPICAL
H12
300 MIN. COMPACTED HARDFILL
SECTION B
1:20
SURFACE TO BE REINSTATED AS EXISTING AS PER LOCAL AUTHORITIES CODE OF PRACTICE FOR WORKING IN THE ROAD
200 WIDE x 150 DEEP CONCRETE MOWING STRIP
SECTION A
1:20
SCALE 1:20
aurecon
www.aurecongroup.com
Spark nz
CONSTRUCTION
KARAKA EAST MOBILE PHONE SITE
CNR HINGAIA ROAD & HARBOURSIDE DR, KARAKA, AUCKLAND
CONCRETE CABINET FOUNDATION
S.CHATTANAPUTI
V.MITTRANON
M.HARRINGTON
D.BELLWARD
511211 - AKAE - DRG - SS - S3 - 1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3. CONSTRUCTION OF CONCRETE SLAB SHALL BE IN ACCORDANCE WITH THIS DRAWING UNLESS OTHERWISE APPROVED BY THE DESIGN ENGINEER AND SHALL COMPLY WITH NZS 3109.
4. CONCRETE STRENGTH AT 28 DAYS: fc = 25MPa.
5. AGGREGATE SIZE SHALL BE 19mm MAXIMUM.
6. FOUNDATION SLAB SHALL BE CAST AGAINST APPROVED FORMWORK.
7. SURFACE FINISH SHALL BE U2 IN ACCORDANCE WITH NZS 3114.
8. D DENOTES DEFORMED BARS, H DENOTES GRADE 500E BARS.
9. ALL STEEL TO BE HOT ROLLED COMPLYING WITH AS/NZS 4671. IMPORTED REINFORCEMENT WILL NOT BE ACCEPTED.
10. ALL REINFORCING TO HAVE MINIMUM COVER OF 50mm MIN. SIDE AND TOP BARS, 75mm MIN. BOTTOM BARS.
11. ALL DUCTS TO HAVE MINIMUM 900mm COVER WHEN CROSSING ROAD AND 600mm UNDER GRASS VERGE.
12. ALL DUCTS TO PROTRUDE 25mm ABOVE CONCRETE SLAB LEVEL WITH PLASTIC CAPS WHERE DUCTS NOT IMMEDIATELY USED.
13. CO-ORDINATE WITH ELECTRICAL CONTRACTOR FOR FEEDER CABLE, EARTH, POWER AND FIBRE DUCT LAYOUT.
14. DUCT SCHEDULE:
S 50 DIA PVC GREEN DUCT FOR BACKHAUL FIBRE, 300mm MIN BEND RADIUS
E 50 DIA PVC ORANGE DUCT FOR EARTHING, 300mm MIN BEND RADIUS
P 50 DIA PVC ORANGE DUCT FOR POWER, 300mm MIN BEND RADIUS
F 100 DIA PVC GRAY DUCT FOR FEEDERS, 600mm MIN BEND RADIUS
2850
UTILITY CABINET
CABLEWAYS BATTERY CABINET
CABLEWAYS RADIO CABINET
CABLEWAYS RADIO CABINET
6x 100mm DIA (4x DUCTS TO TOWER, 2x DUCT FROM CABLEWAYS CABINET TO UTILITY CABINET AS SHOWN) AND 4x 50mm DIA DUCTS DISPLACE REO TO SUIT (REFER DUCT SCHEDULE)
OUTLINE OF PROPOSED CABINET PLINTH REFER TO SUPPLIER'S SPECIFICATIONS FOR HOLD DOWN BOLT REQUIREMENTS
200 WIDE x 150 DEEP CONCRETE MOWING STRIP AROUND EXTENT OF EQUIPMENT CABINET FOUNDATION
FOUNDATION PLAN
1: 20
DISPLACE REO TO SUIT DUCT LAYOUT
H12 PERIMETER REINFORCING
H12-300 U BARS T&B
H12-300 T&B
OUTLINE OF PROPOSED CABINET PLINTH
FOUNDATION PLAN - REINFORCING
1: 20
H12-300 T&B
H12-300 U BARS T&B
50x50 CHAMFER TYPICAL
H12
300 MIN. COMPACTED HARDFILL
SECTION B
1:20
SURFACE TO BE REINSTATED AS EXISTING AS PER LOCAL AUTHORITIES CODE OF PRACTICE FOR WORKING IN THE ROAD
200 WIDE x 150 DEEP CONCRETE MOWING STRIP
SECTION A
1:20
SCALE 1:20
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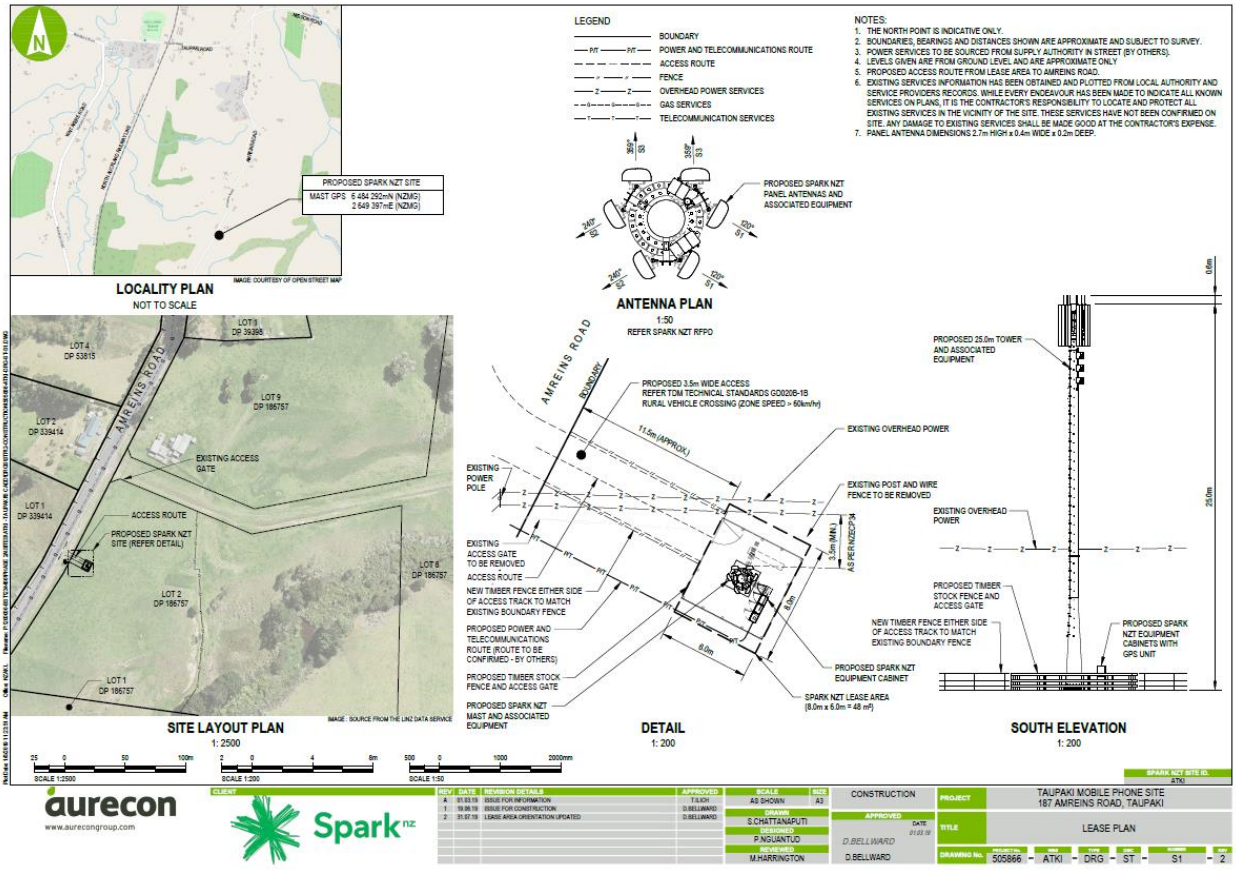
Spark nz
CONSTRUCTION
KARAKA EAST MOBILE PHONE SITE
CNR HINGAIA ROAD & HARBOURSIDE DR, KARAKA, AUCKLAND
CONCRETE CABINET FOUNDATION
S.CHATTANAPUTI
V.MITTRANON
M.HARRINGTON
D.BELLWARD
511211 - AKAE - DRG - SS - S3 - 1

Spark site ATKI – 187 Amreins Road, Taupaki



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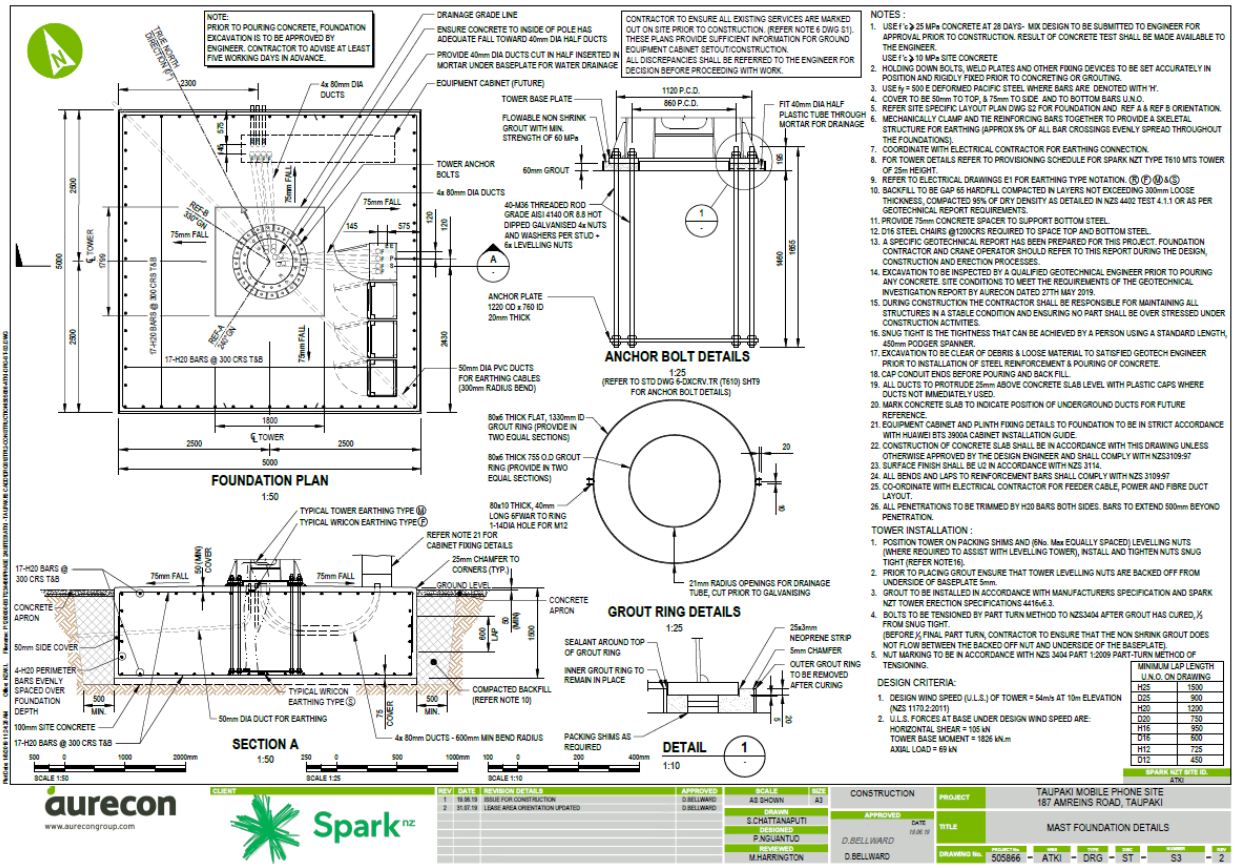
Spark nz

REV	DATE	REVISION DETAILS	APPROVED
A	01.03.19	ISSUE FOR INFORMATION	T.ELDH
1	19.06.19	ISSUE FOR CONSTRUCTION	D.BELLWARD
2	31.07.19	LEASE AREA ORIENTATION UPDATED	D.BELLWARD

SCALE: AS SHOWN, SIZE: A3
DRAWN: S.CHATTANAPUTI
DESIGNED: P.NGUANTUD
REVIEWED: M.HARRINGTON
CONSTRUCTION
APPROVED: D.BELLWARD, DATE: 01.08.19
D.BELLWARD

PROJECT: TAUPAKI MOBILE PHONE SITE
187 AMREINS ROAD, TAUPAKI
TITLE: LEASE PLAN
DRAWING No.: 505866 – ATKI – DRG – ST – S1 – 2



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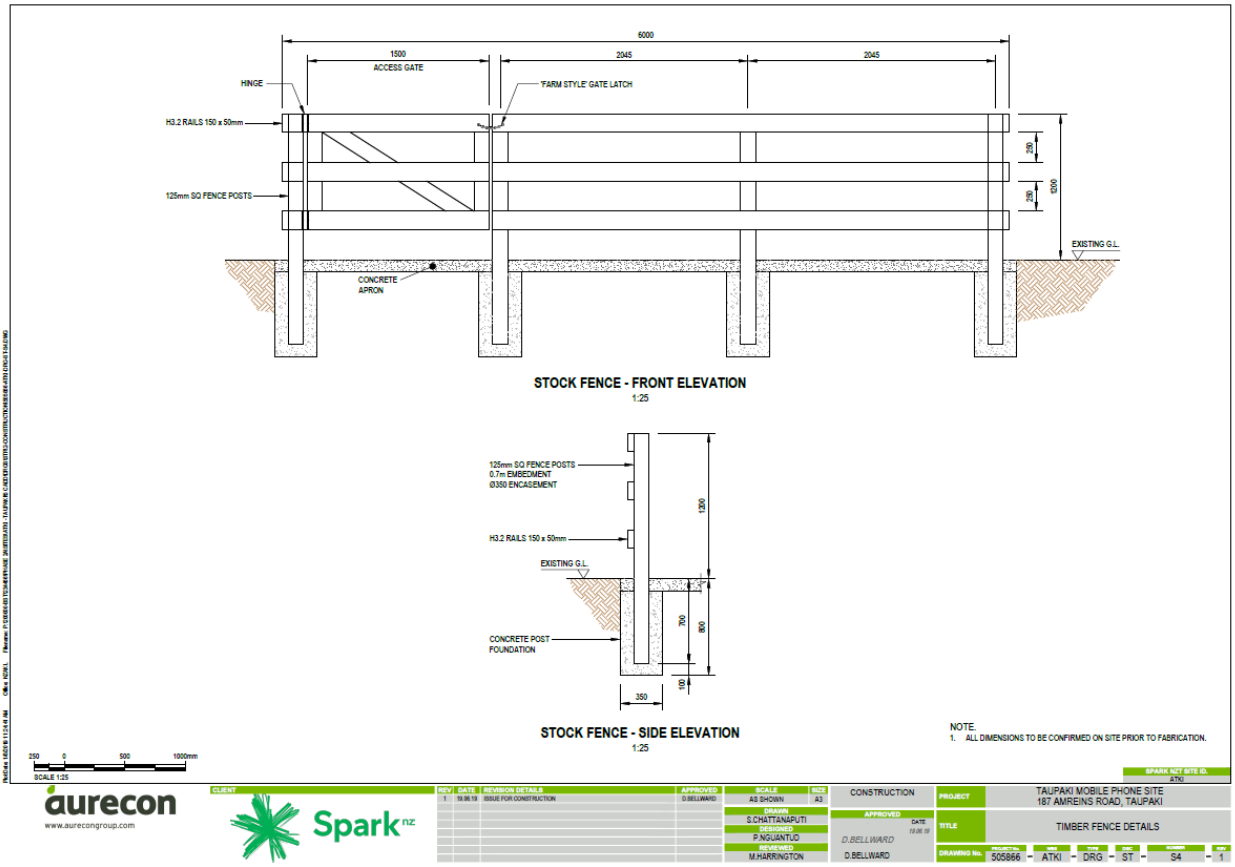
Spark nz

REV	DATE	REVISION DETAILS	APPROVED
1	19.06.19	ISSUE FOR CONSTRUCTION	D.BELLWARD
2	31.07.19	LEASE AREA ORIENTATION UPDATED	D.BELLWARD

SCALE: AS SHOWN, SIZE: A3
DRAWN: S.CHATTANAPUTI
DESIGNED: P.NGUANTUD
REVIEWED: M.HARRINGTON
CONSTRUCTION
APPROVED: D.BELLWARD, DATE: 19.06.19
D.BELLWARD

PROJECT: TAUPAKI MOBILE PHONE SITE
187 AMREINS ROAD, TAUPAKI
TITLE: MAST FOUNDATION DETAILS
DRAWING No.: 505866 – ATKI – DRG – ST – S3 – 2


6000
1500
ACCESS GATE
2045
2045
HINGE
'FARM STYLE' GATE LATCH
H3.2 RAILS 150 x 50mm
125mm SQ FENCE POSTS
EXISTING G.L.
CONCRETE APRON
STOCK FENCE - FRONT ELEVATION
1:25
125mm SQ FENCE POSTS
0.7m EMBEDMENT
Ø350 ENCASEMENT
H3.2 RAILS 150 x 50mm
EXISTING G.L.
CONCRETE POST FOUNDATION
1200
700
800
100
350
STOCK FENCE - SIDE ELEVATION
1:25
NOTE.
1. ALL DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO FABRICATION.
250 0 500 1000mm
SCALE 1:25
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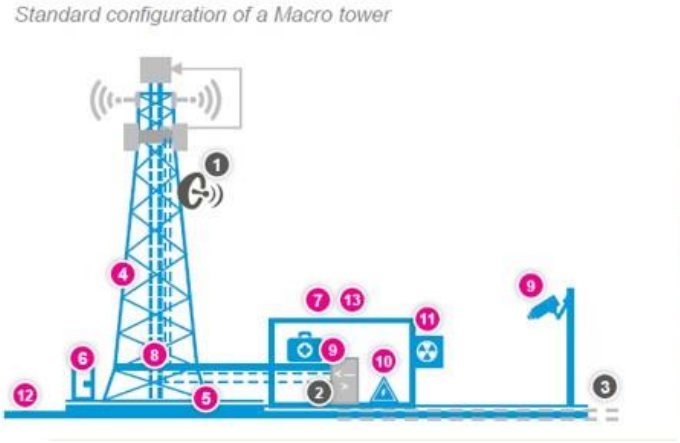
Spark nz
REV 1 DATE 19.06.19 REVISION DETAILS ISSUE FOR CONSTRUCTION APPROVED D.BELLWARD
SCALE A3 SHOWN SIZE A3
CONSTRUCTION
DESIGNED S.CHATTANAPUTI
DRAWN P.NGUANTUO
REVIEWED M.HARRINGTON
APPROVED D.BELLWARD DATE 19.06.19
SPARK NZ SITE ID. ATKI
PROJECT TAUPAKI MOBILE PHONE SITE 187 AMREINS ROAD, TAUPAKI
TITLE TIMBER FENCE DETAILS
DRAWING No. 505866 - ATKI - DRG - ST - S4 - 1

Appendix 2 Connexa, FortySouth and Chorus

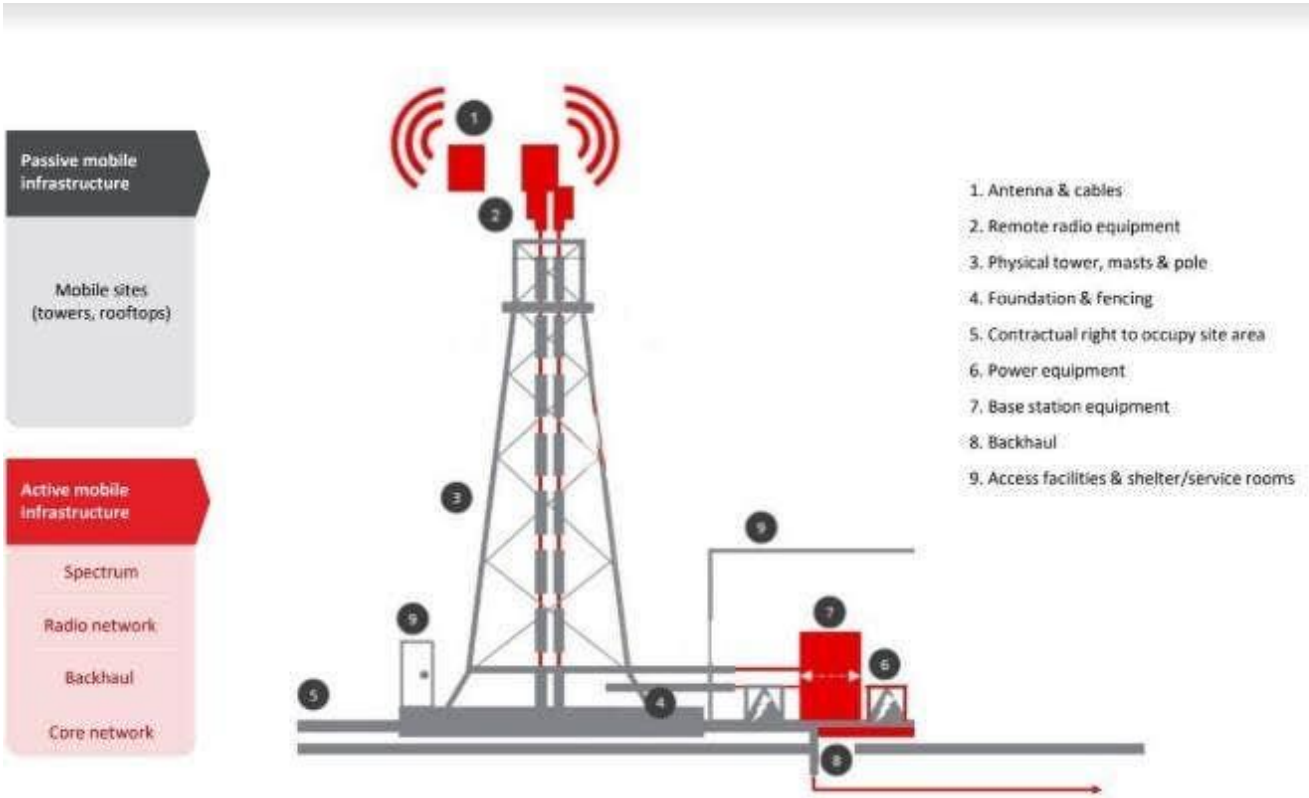
Spark / Connexa asset split on a typical macro tower



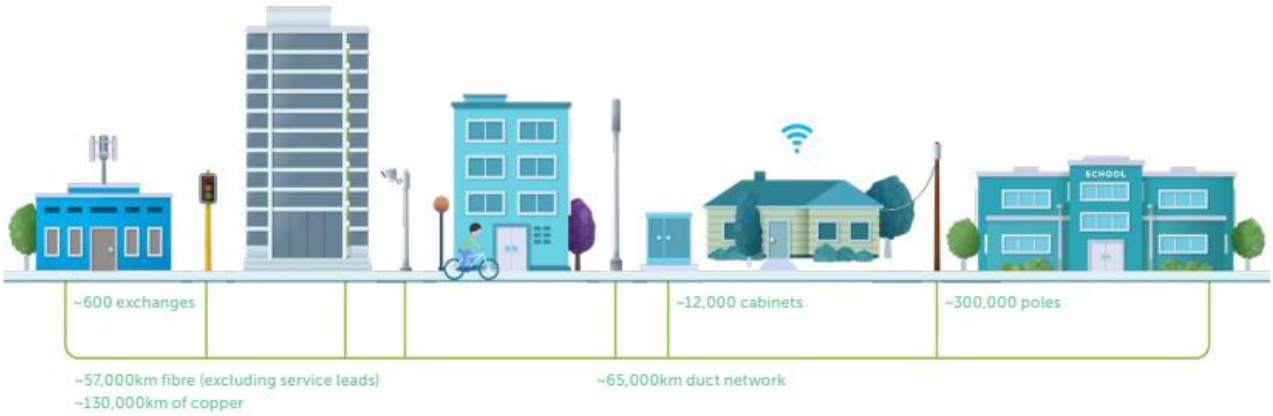
	Asset / Equipment	Ownership
1	Active radio-transmission equipment	Spark / third parties
2	Backhaul router	
3	Backhaul fibre	
4	Transmission masts and towers	Connexa
5	Fencing / gates	
6	Access facilities	
7	Huts (incl. rack space and cabinets)	
8	Rooftop walkways / ladders	
9	Fire suppression and security systems[2]	
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