Ministry for the Environment
Manatū Mō Te Taiao

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Proposed Amendments to the National Environmental Standards for Telecommunication Facilities

DISCUSSION DOCUMENT



newzealand.govt.nz

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Background

There are significant technological developments and innovations occurring across the economy that rely on fast, reliable broadband. Many activities in New Zealand, including education, health care and business, would benefit greatly from modern communications technologies. The ability for New Zealand to remain competitive internationally depends on investment in new communications infrastructure. Because of this, the Government is making significant investments in upgrading the national telecommunications network.

When a telecommunications network operator wishes to deploy infrastructure to improve or extend its network, it must obtain a number of authorisations. These include access authorisation from the owner of the land on which the work is to take place, and, where applicable, authorisation from the owner of the structure on which any infrastructure is to be affixed (eg, a building or power pole).

In addition, under the Resource Management Act 1991 (RMA), city and district councils (collectively known as territorial authorities) publish district plans. The network operator may be required under some of these district plans to obtain resource consent for the infrastructure deployment in question from the relevant territorial authority.

The scope of activities that require resource consent can vary from district plan to district plan, which means that even where consent is not required the activity can be subject to varying conditions. Where a network operator is deploying its network across more than one district, this creates inefficiency and delay, slowing the availability of network enhancements for New Zealand customers.

It was in this context that in 2008 national environmental standards (NES) were issued, under section 43 of the RMA, that harmonised resource consent requirements for certain telecommunications facilities. The Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2008 (NESTF) provided, among other things, that the installation and operation of antennas and cabinets within the road reserve did not require resource consent (and were classified as a 'permitted activity'), where certain conditions were met.

This discussion document proposes widening the scope of the NESTF to include newly developed telecommunications facilities, both within and outside the road reserve, as well as updating and clarifying some of the provisions already covered. The aim of these proposals is to ensure the NESTF continues to meet its objectives by bringing it up to speed with the rapid development of the telecommunications sector since 2008. The amendments will speed up the availability of the new and better communications technologies that have emerged in this time.

Addition of new activities to the NESTF

Deployment of telecommunications cables

Regulation 5 of the NESTF is currently limited to the deployment of antennas and cabinets (together defined in the NESTF as 'telecommunications facilities') within the road reserve. In other words, if a network operator wishes to deploy some other type of telecommunications facilities (eg, fibre-optic cable) within the road reserve, it will be subject to the rules of the relevant district plan, which may include a requirement for the network operator to obtain resource consent.

It is proposed that the NESTF be extended to include aerial and underground deployment of telecommunications cables deployed within the road reserve (subject to conditions). It is also proposed that this include the lead-in of these cables (ie, the cable that connects the communal distribution cable to private premises).

If this proposal is adopted, then in those districts that currently require resource consent for the aerial or underground deployment of telecommunications cables, network operators would no longer be required to obtain such consent if they met the conditions. In other districts where these activities are already classified as permitted, the activities would be subject to the conditions in the NESTF rather than the conditions in the district plan.

Deployment of mobile support structures and antennas

Regulation 7 of the NESTF relates to scenarios where, within the road reserve, a network operator wants, among other things to:

- replace an existing utility structure (such as a power pole); or
- add an antenna to, or replace an antenna on, an existing utility structure.

The Regulation sets out the extent to which the network operator, in doing so, may extend the diameter of the utility structure (50 per cent), and it prescribes the maximum size envelope for the new or replacement antennas (2 m high, 0.5 m wide). However, to be able to operate on additional spectrum bands (such as the 700 MHz band), slightly larger antennas will be required.

It is proposed that Regulation 7 be amended to allow network operators to extend the diameter of the utility structure by 100 per cent, and to permit new and replacement antennas to be up to 3.5 m high and 0.7 m wide. It is also proposed that Regulation 7 be amended to state that a replacement utility structure may be moved to within a 3 m radius of the original utility structure location, provided the structure is still located on the road reserve.

The NESTF is currently limited to placing antennas on types of pole (power poles, street-light poles and the like, collectively defined as 'original utility structures'), and these poles must be located within the road reserve. In other words, if a network operator wishes to affix an antenna to any other type of structure within the road reserve (eg, a sign-post) or to any structure outside the road reserve (eg, a building), that process will be subject to the rules of the relevant district plan (which may include a requirement for resource consent).

Therefore, the following amendments to the NESTF are proposed.

(i) For the deployment of antennas in sites where none have yet been deployed, the NESTF should be extended to beyond poles (*what* it applies to) and beyond the road reserve (*where* it applies). The following activities would be permitted:

- **in urban areas**: affixing antennas to multi-storey buildings
- **in rural areas:** affixing antennas to any support structure (eg, poles, multi-storey buildings) and the installation of new masts.

If this proposal is adopted, then network operators deploying new antennas would no longer be subject to the conditions in the district plan but to the conditions in the NESTF.

(ii) For the deployment of antennas in sites where antennas have already been deployed:

- **in non-residential areas:**
  - on an existing mast that already supports an antenna, another network operator will be able to locate their antenna on top of the existing antenna (subject to height conditions)
  - on an existing mast that already supports their own antennas, network operators who affix new antennas that will operate in additional spectrum bands (such as the 700 MHz band) will be able to extend the diameter of the mast by up to an additional 30 per cent, and to extend the diameter of the structure at its widest point (ie, the antenna) by up to an additional 100 per cent
- **in residential and non-residential areas:**
  - network operators replacing existing antennas with antennas that will operate in additional spectrum bands (such as the 700 MHz band) will be able to use a replacement antenna with a diameter up to an additional 50 per cent of the existing antenna, and will be able to expand the diameter of the supporting mast up to an additional 30 per cent.

Regulation 7 of the NESTF also deals with scenarios where, within the road reserve, a network operator wishes to replace an existing support structure (eg, a pole). It is proposed that the NESTF be extended to allow not just the replacement of such support structures but also the installation of new support structures within the road reserve.

Finally, the discussion document proposes that the NESTF be amended to allow the deployment of small units such as micro-cells, pico-cells, femto-cells and wi-fi in the road reserve and on the outside of buildings, without the need to seek a resource consent, subject to certain conditions.

Special requirements for certain areas

Regulation 6 of the current NESTF stipulates that areas:

- within the drip line of a tree
- of historic heritage value
- of visual amenity value
- next to coastal marine areas

must comply with the relevant district plan's rules where they are more stringent than the conditions set out in the NESTF. This is to ensure the environmental effects of

telecommunications infrastructure in these special areas are adequately managed with due consideration given to local conditions.

It is proposed that this Regulation be expanded to apply to the activities included in the proposed amendments to the NESTF outside of the road reserve. It is also proposed that the regulation be extended to apply to natural hazard zones, as identified by the relevant district plan. The discussion document seeks your views on these conditions.

The National Environmental Standards for Electricity Transmission Activities 2009 is another example of an NES that exempts all areas considered to be a historic heritage area[1] from the 'permitted activity' status set out in the NES.

Amendment of conditions applicable to activities already covered by the NESTF

Regulation 4

Regulation 4 of the NESTF concerns radio-frequency fields generated by any telecommunications facilities that a network operator may wish to deploy. The Regulation sets out the conditions under which a network operator will not be required to obtain a resource consent authorising such fields.

Regulation 4 incorporates by reference the standard NZS 6609.2:1990 *Radiofrequency Radiation – Principles and Methods of Measurement – 300 kHz to 100 GHz*, which refers to the measurement of radio-frequency fields. This standard has since been withdrawn and replaced by AS/NZS 2772.2:2011 *Radiofrequency Fields Part 2: Principles and Methods of Measurement and Computation – 3 kHz to 300 GHz*.

It is proposed that Regulation 4 be amended so that it incorporates by reference the new standard.

Regulation 8

Regulation 8 of the NESTF concerns scenarios where, within the road reserve, a network operator wishes to install a cabinet (whether for a fixed or a mobile network). Among other things, the Regulation specifies that where the network operator wishes to install two cabinets on the same side of the road, the two cabinets must be at least 30 m apart. The Regulation also restricts the number of cabinets that can be located in any single site in the non-residential road reserve, but leaves the term 'site' undefined.

It is proposed that Regulation 8 be amended to allow cabinets to be located within 30 m of each other (but more than 500 mm apart) where the second cabinet installed is intended to replace the existing cabinet. This would be subject to the condition that the existing cabinet be removed no later than 12 months following installation of the second cabinet. It is also proposed that Regulation 8 be amended to define the term 'site' as "an area where cabinets are located".

[1] Defined as an area that is protected by a rule because of its historic heritage, including an area that is protected by a rule because it is a site of significance to Māori.

Other legislation

It should be noted that authorisation under the RMA to undertake an activity does not relieve a network operator of any obligation under other legislation, nor does it authorise access to any public or private land. It is important to bear in mind that private property rights *still* apply. As such, the installation of cabling or an antenna on private property would still require permission from the land owner.

1 Introduction

1.1 Background

Many New Zealand industries, including education, health care and business, would benefit greatly from the development and innovation associated with new communications technologies. The ability for New Zealand to remain competitive internationally depends on investment in new communications infrastructure.

In light of the growing importance of connectivity, the Government is making significant investments in upgrading the national telecommunications network. The Ultra-Fast Broadband (UFB) initiative and the Rural Broadband Initiative (RBI) are two of the Government's programmes to expand and improve New Zealand's broadband infrastructure services. Both programmes involve the roll-out of new infrastructure that will provide at least 97.8 per cent of New Zealanders with access to faster, more reliable broadband.

Originally, the scope of the UFB was to enable 75 per cent of New Zealanders in 33 districts to access fibre by the end of 2019. The Government has since committed to extending this even further, to reach 80 per cent of New Zealanders, in even more towns across New Zealand. The RBI will also be extended with an additional $100 million funding, meaning even more New Zealanders will have access to faster broadband.

The roll-out of the UFB and RBI has highlighted local variation in district plan rules and the inefficiencies created by these variations. These variations are a natural result of the devolution of planning decisions to territorial authorities and generally do not reflect significant environmental differences that would necessitate location-specific utility infrastructure rules.

Although most of the decision-making under the Resource Management Act 1991 (RMA) is carried out by councils – territorial and regional authorities – provision is made for national direction to be given on specific issues using instruments such as national environmental standards (NES) and national policy statements (NPS). NES are regulations made under sections 43 and 44 of the RMA on the recommendation of the Minister for the Environment.

The RMA provides considerable scope for what an NES may cover. They can be developed to do anything a district or regional plan can do, but at a national scale. They can apply to all or only specific parts of New Zealand. An NES can permit activities, and also prohibit or require resource consent for activities to manage or protect the environment.

The Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2008 (NESTF) came into force in October 2008. Recognising the growing reliance on telecommunications, and to facilitate the roll-out of new infrastructure, the NESTF was developed to provide national consistency under the RMA for the placement of low-impact telecommunications infrastructure in road reserves, and a limit for human exposure to radio-frequency fields for all telecommunications infrastructure.

The NESTF has the following five objectives:

- to assist in network and infrastructure design and infrastructure sourcing for roll-outs
- to reduce compliance costs and timeframes for service providers
- to reduce the timeframe and lower the costs for the availability of new services to consumers
- to contribute to a reduced council workload in processing and determining consent applications
- to set an appropriate balance between local participation in community planning and cost-effective national infrastructure investment.

1.2 Purpose of this discussion document

The Minister for the Environment and Minister for Communications are proposing that the NESTF be expanded to include:

- new deployment activities, to provide national consistency for a wider range of telecommunications facilities
- amendments to update the conditions attached to telecommunications facilities activities already within the scope of the NESTF.

All the new activities the Government proposes to include, and all amendments to the existing NESTF for activities that are already covered, are collated in appendix 1.

The proposals set out in this discussion document to amend the NESTF aim to reduce the level of regional variation by applying nationally consistent standards to national projects, such as the roll-out of the UFB and RBI. These proposals are also intended to provide for the efficient delivery of new technologies to New Zealanders.

Updating the NESTF will ensure it can continue to meets its original objectives as telecommunications technologies evolve. This is consistent with the purpose of the RMA, because the proposed changes will enable people and communities to provide for their social, economic, and cultural well-being while avoiding, remedying or mitigating any adverse effects of activities on the environment. The RMA also requires recognition of and provision for matters of national importance, including protecting historic heritage, outstanding landscapes, and natural features from inappropriate use and development, which is reflected in the NESTF.

IMPORTANT NOTE: It should not be assumed that the amended NESTF will be written exactly as the requirements are worded or otherwise described in this discussion document. The intent of the discussion document is not to definitively present the proposed requirements, but to explain them in broad terms that will inform readers of our intentions.

Reading the discussion document

As you read through the document you may find it useful to refer to the glossary on page 68 and the descriptions of the infrastructure outlined in appendix 2. We would like to receive your feedback on the questions included throughout this discussion document, and on any other aspects of the proposals.

The following questions apply to all proposals outlined in the document: it may be worthwhile to keep these in mind as you read. There are also questions at the end of each section that are relevant only to the proposals in that section. These questions, along with the more specific questions, are gathered together at the end of the discussion document, on page 47.

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

Questions specifically for territorial authorities are included on page 49, and information on how to make a submission is set out on page 45.

A preliminary evaluation of the proposals under section 32 of the RMA has been completed. In that evaluation, the costs, benefits and risks have been described in more detail and should help you understand and assess the proposals. However, the preliminary evaluation has been based only on the information currently available. It is intended that the consultation process will elicit more data to enable a more comprehensive evaluation. The section 32 report can be used to highlight and test the assumptions that have been made and to see where more information is required.

1.3 The process so far

Evaluation of the NESTF

In 2013, the Ministry for the Environment evaluated the NESTF and found that it has largely achieved its objectives. The NESTF has been successful in reducing timeframes and costs for telecommunications providers and local government, and in lowering costs for making new services available to consumers. The evaluation found that using an NES under the RMA has been an efficient and effective way to bring national consistency to the deployment of low-impact telecommunications facilities covered by the NESTF.

Currently, the NESTF provides that:

- the planning and operation of a telecommunications facility (such as a mobile phone transmitter) that generates radio-frequency fields is a permitted activity provided it complies with New Zealand standard NZS 2772.1:1999 *Radiofrequency Fields Part 1: Maximum Exposure Levels 3 kHz to 300 GHz*

- the installation of telecommunications infrastructure cabinets in the road reserve is a permitted activity, subject to specified limitations on their size and location
- noise emitting from telecommunications infrastructure cabinets located in the road reserve is a permitted activity, subject to specified noise limits
- the installation or replacement of antennas and associated mounts on existing structures in the road reserve is a permitted activity, subject to specified limitations on height and size
- historic heritage is protected by excluding activities adjacent to scheduled historic heritage areas from the permitted status afforded by the NESTF, and instead defaulting to the provisions of the district plan.

The evaluation also highlighted some limitations of the NESTF. Currently the NESTF provides for a very limited range of matters, and over time is becoming less fit for purpose in the rapidly evolving telecommunications landscape. Telecommunications technology has evolved and new infrastructure often falls outside the scope of the current NESTF, and is therefore subject to the rules in the relevant district plan.

The NESTF was developed at the beginning of the smartphone revolution and before the UFB. At the time of its development new infrastructure requirements for these new technologies were not fully foreseen. Several parties submitting on the evaluation pointed out that many activities necessary for the roll-out of modern telecommunications infrastructure are not covered by the current NESTF. As our demands on the telecommunications networks grow, so too will the compliance costs associated with local variation in consenting requirements.

Developing options

After the evaluation, a technical advisory group was set up with representation from industry and local government. In conjunction with this group, issues related to the current NESTF were investigated and options for amending it were developed. The following sections go into more detail about the issues and the amendments that are being proposed.

Through amending the NESTF, our intention is to ensure its scope is wide enough to meet the needs of modern telecommunications infrastructure requirements. This will ensure the NESTF continues to meet the five objectives outlined when it was established.

1.4 Other legal requirements for telecommunications operators

Private property rights

Installing telecommunications facilities on public or private land requires the relevant activity to be authorised under the RMA, either by a consent decision made by a territorial authority or as a permitted activity under the NESTF.

It should be noted that authorisation under the RMA to undertake an activity does not relieve a network operator from any obligation under other legislation, nor does it authorise access to any public or private land. Some of the proposals set out in this document are to extend the scope of permitted activities under the NESTF outside of the road reserve (ie, on to private property). It is important to bear in mind that the following private property rights still apply.

A network operator may apply to the Minister for Communications for network operator status under section 103 of the Telecommunications Act 2001 (as amended). The Minister must grant such status if satisfied that the rights conferred on network operators under the Telecommunications Act (such as access to the road reserve) are necessary to enable the applicant to operate a telecommunications or broadcasting business. Sections 135 to 147 of the Telecommunications Act 2001 prescribe land access conditions under which a network operator may exercise a statutory right of access to the road reserve for telecommunications facilities.

However, in all other cases, whether accessing publicly owned road reserve through a statutory right of access or accessing privately owned land through an easement or another legal instrument, the owner of the land where facilities are to be placed must authorise land access by the network operator. The authorisation of land access by the land owner is separate from authorisation under the RMA for land activities involving telecommunications facilities.

Other legislation

In addition to the RMA and Telecommunications Act, network operators need to comply with all other relevant legislation, regulations and rules, including:

- Radiocommunications Act 1989
- Utilities Access Act 2010, and the *National Code of Practice for Utility Operators' Access to Transport Corridors*
- Electricity Act 1992, and the Electricity (Safety) Regulations 2010 made under it
- Heritage New Zealand Pouhere Taonga Act 2014
- Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
- Health and Safety in Employment Act 1992.

The *National Code of Practice for Utility Operators' Access to Transport Corridors* (the Utilities Access Code), made under the Utilities Access Act 2010, sets out the processes and procedures for utility operators to exercise their right of access to the road corridor for the placement, maintenance, improvement and removal of utility structures; and for corridor managers to exercise their right to apply reasonable conditions on work carried out in the corridor. One of the purposes of the Utilities Access Code is to provide a nationally consistent approach to managing access to transport corridors. More information on the Utilities Access Code and its current review can be found at http://nzuag.org.nz/.

The purpose of the Heritage New Zealand Pouhere Taonga Act 2014[2] (the HNZPTA) is to "promote the identification, protection, preservation, and conservation of the historic and cultural heritage of New Zealand". The HNZPTA makes it unlawful for any person to destroy, or modify the whole or any part of, an archaeological site without the prior authority of Heritage New Zealand Pouhere Taonga (Heritage NZ). This is the case regardless of whether the land on

[2] The Historic Places Act 1993 has recently been reviewed and replaced by new legislation. The Heritage New Zealand Pouhere Taonga Bill renames the Historic Places Trust as Heritage New Zealand Pouhere Taonga, and reforms its governance structure and the archaeological authority (consent) processes established under the 1993 Act. The main changes to the authority processes relate to improving alignment with RMA processes. The definition of an archaeological site and the requirement to obtain an archaeological authority are substantially the same.

which the site is located is designated, or the activity is permitted, or a resource consent has been granted. The HNZPTA also provides for substantial penalties for unauthorised destruction, damage or modification.

An archaeological site is defined in the HNZPTA as any place associated with pre-1900 human activity, including shipwrecks, where there is evidence relating to the history of New Zealand that can be investigated using archaeological methods.

Under the HNZPTA, activities such as earthworks that may affect an archaeological site require an archaeological authority from Heritage NZ before work begins. It is important that telecommunications operators be aware of these provisions, because if there are unanticipated archaeological finds during earthworks and an archaeological authority is not in place, work must stop immediately.

2 Proposed additions

The Ministry for the Environment and the Ministry of Business, Innovation and Employment are seeking comments on the proposed additions to the National Environmental Standards for Telecommunication Facilities (NESTF) set out in this section. The proposed changes would extend the scope of the NESTF to permit specific telecommunications facilities in locations outside road reserve land and include new types of facilities.

These changes are intended to reduce local variation in planning rules applying to national telecommunications infrastructure projects. This will provide national consistency under the Resource Management Act (RMA) in relation to the roll-out of telecommunications networks such as the current Ultra-Fast Broadband (UFB) and its proposed extensions, and fourth generation long-term evolution (4G-LTE) mobile technology. In particular, the proposed standards seek to achieve the same objectives as the existing NESTF (see 'Background' on page 10).

All the new activities that are proposed for inclusion, and all the amendments to requirements for activities already covered, are collated in appendix 1.

Application of the resulting standards

The current NESTF exclusively permits land activities by telecommunications network operators (network operators). 'Network operator' is defined in section 5 of the Telecommunications Act 2001 (as amended). A network operator is a person who has been declared by the Minister for Communications to have network operator status pursuant to section 103 of the Telecommunications Act (a full list is maintained in a register on the Ministry of Business, Innovation and Employment's website).[3]

It is proposed that eligibility for land activity rights granted through the NESTF be expanded to include the Crown and Crown agents. This would ensure that essential agencies, such as emergency service providers, may operate their own telecommunications networks subject to the same provisions. Unless specified otherwise, all standards set out in this section are intended to apply to network operators, the Crown and Crown agents.[4] For simplicity, throughout this document these groups are collectively referred to as 'telecommunications operators'.

It is proposed that the standards be limited to network operators, the Crown and Crown agents as a way to achieve the objectives of assisting in network design, reducing compliance costs, and improving the availability of new services to consumers, while mitigating adverse environmental effects by limiting the proliferation of new infrastructure.

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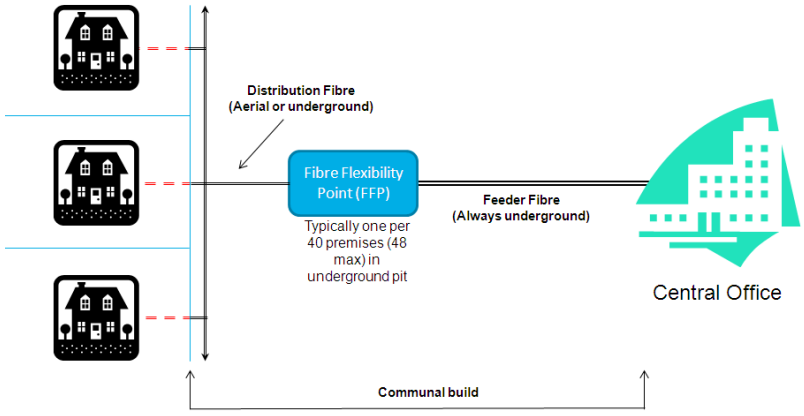
[3] http://www.med.govt.nz/sectors-industries/technology-communication/communications/telecommunication-network-operators.

[4] The 'Crown' is defined in section 2 of the Public Finance Act 1989, and 'Crown agents' are named in Part 1 of Schedule 1 of the Crown Entities Act 2004.

2.1 Telecommunications cables

Figure 1: Fibre cabling generic architecture diagram



Source: Diagram supplied by Chorus NZ Ltd

Introduction

The current copper telecommunications networks were built for voice services. As the internet and broadband have developed, these copper networks were repurposed to provide broadband internet connections.

Demand for broadband data at high speeds is increasing exponentially as internet-capable devices and their applications proliferate. This demand trend is fast outstripping the copper network's current capacity. Fibre-optic technology has the capability to overcome the speed and bandwidth limitations faced by the copper networks.

Fibre-optic cables can be deployed either aerially or underground. Aerial fibre is strung along existing poles, often alongside pre-existing cable infrastructure such as electricity lines. Underground fibre is typically installed into ducts, which are either existing or newly installed via open trenching or directional drilling. All associated excavations are backfilled and reinstated to an as like, or better, condition.

Communal distribution fibre is typically installed in the road reserve, with fibre lead-ins over private land, connecting the communal distribution fibre to the individual premises. In some instances with additional technology, copper lead-ins from the boundary of the property to the dwelling (or other type of building) may be able to produce fast internet speeds, but this is reliant on the fibre distribution network. More detail on fibre infrastructure is included in appendix 2.

Both aerial and underground deployment methods have costs and benefits. In determining whether to install fibre cables above or below ground, the telecommunications operator will look at, among other things, where existing utility structures are placed (eg, copper telecommunications cables and electricity lines strung along the same poles), the terms of the telecommunications operator's network build contracts, the presence of constraints (eg, trees, archaeological sites, contaminated sites, ground conditions) and what the relevant district plan rules provide for.

The issue

UFB and the Rural Broadband Initiative (RBI) are two of the Government's programmes to expand and develop New Zealand's broadband services. UFB, one of the first national infrastructure projects of its type, has highlighted local variation in district plan rules for the installation of telecommunications cables and the inefficiencies it can create. This variation is likely to be a natural result of the devolution of planning decisions to territorial authorities and is unlikely to reflect significant environmental differences that necessitate location-specific telecommunications infrastructure rules.

Aerial installation of cables (both distribution and lead-ins) is a not a permitted activity in many districts, and therefore resource consents are often required. Where aerial installation is permitted, conditions associated with the permitted activity status can also vary from district to district. Similarly, underground deployment can be subject to a suite of different conditions in different districts.

Local variation in district plan rules creates an unnecessary burden on telecommunications operators for the roll-out of new cabling. Differences between district plans drive compliance costs for infrastructure businesses in general, especially where networks cross district boundaries.

In addition to this local variation, district plan rules often duplicate or conflict with requirements under other legislation, including the Utilities Access Code and the New Zealand Pouhere Taonga Act (HNZPTA). As a consequence of the *status quo*:

- each territorial authority may develop its own plan rules and is required to process and determine consent applications
- consenting authorities do not necessarily have the technical capability to ensure their district plan allows the infrastructure to be deployed in an optimal manner
- a significant number of person-hours are involved for telecommunications operators in understanding and complying with district plan rules for a national infrastructure project
- associated financial costs for telecommunications operators can be high
- variation in district plan rules may mean variations are needed in infrastructure requirements or installation methods, increasing costs for operators
- time costs may also be experienced, potentially inhibiting the roll-out of new technology to New Zealanders.

These issues can be resolved by implementing a set of standards throughout New Zealand through a national environmental standard. The proposed amendments seek to remove a large amount of the variability and would reduce the administrative burden for both telecommunications operators and territorial authorities, and also remove duplication with other statutory requirements, while maintaining high environmental standards. The proposed changes set out below would extend the scope of the existing NESTF beyond the road reserve and apply nationally, superseding relevant district plan rules.

Proposals

The proposed changes would classify both aerial and underground deployment of telecommunications cables as permitted activities, as set out below.

The associated standards refer to 'telecommunications cables' generally, rather than fibre-optic cables specifically, to ensure the standards are future-proof for all types of technological

developments. This will also allow for copper-fibre hybrids to be deployed where necessary. Permitted activity status means the activity can be undertaken without resource consent from the relevant territorial authority.

Proposals (indicative NESTF requirements only)	
Aerial cabling	Aerial placement of telecommunications cables by a telecommunications operator is permitted, including any necessary ancillary equipment, subject to the following conditions: • no additional poles are installed • there is existing aerial cabling using the poles to be used for the new telecommunications cables (for electricity or telecommunications or other utilities) • the diameter of the new cabling does not exceed 30 mm • cables use existing crossings and corridors (ie, no new road crossings may be installed). Associated earthworks and ancillary equipment may include (but is not limited to) fibre access terminals, fibre coils or loops, protection guards, ducting, and aerial to underground connections. Ongoing operation and maintenance of the network is permitted. Relocation and/or replacement poles where necessary for structural or safety reasons may be up to 3 m from the original location.
Underground cabling	Underground placement of telecommunications cables by a telecommunications operator is permitted, including any necessary drilling and trenching and associated earthworks and underground ancillary equipment, including (but not limited to) ducting, feeder breakout points, and hand holes or plinths.

Costs and benefits

This section of the discussion document should be read in conjunction with the preliminary section 32 report, *Proposed Amendments to the National Environmental Standards for Telecommunication Facilities: Preliminary evaluation under section 32 of the Resource Management Act 1991*. That report provides a fuller analysis of the costs and benefits of the proposals.

The purpose of the proposed extension of the NESTF to telecommunications is to assist in the efficient deployment of fibre networks while ensuring a low environmental impact. The efficient and timely roll-out of fibre is important so New Zealanders can enjoy the many benefits arising from faster broadband as early as possible, ensuring New Zealand does not fall behind the pace of the rest of the world. The Government has also contracted with Chorus and the local fibre companies to complete the UFB roll-out within a fixed period of time.

Introduction of an NES to provide national consistency will:

- reduce compliance costs for both infrastructure providers and territorial authorities
- provide communities with more certainty on how deployment is likely to occur
- ensure people and communities are able to provide for their social, economic and cultural well-being with improved access to broadband technology.

This is consistent with the purpose of the RMA. Environmental effects will be avoided, remedied or mitigated by meeting the permitted activity conditions.

The proposed extension would bring the following benefits.

- There would be earlier access to fibre networks and the associated social, economic and cultural benefits that come with access to high-speed, reliable broadband technology. It is widely accepted, both in New Zealand and internationally, that broadband is critical for economic growth. A study by Alcatel-Lucent[5] into the economic benefits of fibre estimated the GDP impact of the UFB and RBI programmes will be $5.5 billion over 20 years, and the economic benefits to New Zealand end users of high-speed broadband applications will amount to almost $33 billion over 20 years.
- The applications arising from broadband improvements, such as through UFB, have the potential to produce even greater productivity gains and economic growth. For example, some of the potential applications and benefits that could be furthered by fibre networks include:
  - *business:* businesses will be better able to expand and compete globally, through greater access to research and development and investment, and a greater ability to collaborate with customers, suppliers and partners in real time
  - *health*: new applications and improved health services over broadband are likely to make it easier to identify and treat people through electronic health records, open up the ability for people to be diagnosed and treated from a distance, allow people to better assess their personal health and know when to seek medical advice, and alleviate social isolation in older people and enable them to stay in their homes longer
  - *education*: broadband in schools can deliver a broad curriculum regardless of where a child lives, and promotes digital literacy
  - *environment*: high-speed broadband promotes the development of technologies that enable better monitoring of the environment to assist the agricultural sector with crop care, and the development of more sustainable and environmentally friendly living practices through the use of devices that encourage the smarter and more efficient use of resources (eg, smart cars and smart meters/grids)
  - *quality of life*: broadband enables other improvements in quality of life through better enabling flexible working practices such as remote working, social networking, the ability to make better buying decisions online, and the promotion of more sustainable living practices.
- There will be reduced costs, such as those for telecommunications operators familiarising themselves with district plans for every district in which they operate and applying for resource consents.
- Territorial authorities will make savings through having fewer consent applications for resource consent to process.
- Telecommunications operators can make efficiency savings through standardising their infrastructure and installation methods.
- Conflict and duplication will be removed between district plan rules and other legislation (Utilities Access Code and the HNZPTA).
- It will empower telecommunications operators to make decisions on the best placement of their infrastructure, subject to all other regulatory requirements.

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5 Alcatel-Lucent. 2012. *Building the Benefits of Broadband*. Retrieved from www.tmcnet.com/tmc/whitepapers/documents/whitepapers/2013/6687-building-benefits-broadband-how-new-zealand-increase-social.pdf

Overall, the environmental effects of telecommunications cables are low. The effects of underground cables and other ancillary equipment installed underground are concentrated at the installation phase, whereas aerial cables have fewer effects during construction but an ongoing visual effect. The impact can be mitigated by the proposed condition of limiting aerial deployment to areas with existing aerial networks.

In the installation of underground infrastructure, trenching and drilling can create dust, sediment and erosion, affect water quality, create noise and vibration, and disrupt traffic. However, these effects tend to be low impact and can be mitigated by the provisions of the Utilities Access Code. The Code has requirements to manage environmental effects, including those relating to trees, sediment control, stormwater, road closures and traffic disturbance, as well as reinstatement.

Anyone wishing to relocate poles in the road reserve must liaise with the local road operator (usually the New Zealand Transport Agency or the relevant council). This process enables health and safety matters, such as the location and material of the pole, to be considered and approved.

Any effects on archaeological sites are managed by the HNZPTA. However, if operators are not aware of the requirement to obtain an archaeological authority before starting work in areas where there is reasonable cause to suspect pre-1900 activity, there is a risk that archaeological sites will be modified or destroyed, which is an offence under section 87 of the HNZPTA. Archaeological material is more likely to be discovered in undisturbed ground.

2.1. QUESTIONS ABOUT TELECOMMUNICATION CABLES

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

h. Is additional guidance required to ensure operators are aware of the requirements of the Heritage New Zealand Pouhere Taonga Act 2014 and the Utilities Access Code?

All questions are summarised on page 47.

2.2 Mobile networks

Figure 2: Examples of different mobile network antennas (in the photo on the right, the two structures are telecommunications antennas)

Source: Photos supplied by Vodafone NZ Ltd

Introduction

Nearly all New Zealanders carry a mobile phone, with the number of mobile phone connections equal to 109 per cent of the population. The smartphone revolution started in New Zealand in 2008 with the release of the first big-brand smartphones. This was around the same time as the promulgation of the original NESTF. Smartphones (and, increasingly, 4G-capable tablet devices) have revolutionised the way people access information, network and communicate. As these devices have allowed easy and convenient access to mobile internet browsers and various apps, mobile data has become an essential service to an increasing number of consumers and businesses.

It is expected that the demand for fast, reliable and affordable mobile data access will continue to increase exponentially. People increasingly want, and expect to have, adequate coverage, fast connection speeds, and access to mobile data almost everywhere they go.

A mobile network that meets these demands will require many more antennas, cabinets and backhaul cabling of differing specifications in the places that people want coverage. In addition, mobile networks provide further options for telecommunications providers to offer broadband services in remote areas. The RBI is focused on closing the 'digital divide' between broadband services in urban and rural New Zealand. This includes funding for a number of new cell sites to be built to offer improved rural broadband via wireless. Infrastructure that supports fixed wireless broadband is becoming more attractive with the introduction of new technologies such as 4G-LTE.

The proposed changes to the NESTF reflect this shift in the telecommunications environment. More detail on mobile network infrastructure is included in appendix 2.

There are some concerns among the general public about the health effects of radio-frequency field emissions from mobile antennas. The current NESTF has set limits on exposures based on NZS 2772.1:1999 *Radiofrequency Fields Part 1: Maximum Exposure Levels 3 kHz to 300 GHz.* This New Zealand standard is based on international guidelines produced by the International

Council for Non-Ionising Radiation Protection. The New Zealand standard sets limits for public exposure that are 50 times lower than the level at which health effects may start to occur. This is a widely accepted conservative measure.

This limit remains suitable for new mobile technology, and there are no plans to change the permitted levels of radio-frequency field exposures. As radio-frequency field exposure levels are outside the scope of the proposed amendments to the NESTF, the main consideration for new mobile network infrastructure will be any visual amenity effects. To meet increasing demands and changing technologies, the number and size of infrastructure (such as antennas and cabinets) will change. Any visual effects will have to be balanced against the demand for greater coverage and more capacity from the network.

The issue

The existing NESTF provides for the installation or replacement of antennas and associated mounts on existing structures such as power poles or street-light poles (referred to as 'original utility structures') to be a permitted activity. However, this is limited to where the original utility structure is located within the road reserve, and is subject to specified limitations on height and size.

The increasing uptake of new technologies means that the number of mobile antennas needs to increase to maintain current levels of service. Furthermore, new mobile technologies are likely to be deployed in different ways to those activities permitted by the existing NESTF.

Activities that do not comply with the conditions of the NESTF are subject to the relevant district plan rules. As with the roll-out of fixed-cable infrastructure, new wireless infrastructure is subject to significant variation in district plan rules across the country. For some types of infrastructure, variability related to the local environment is appropriate to reduce environmental effects. However, the telecommunications environment is very similar across the country, and this inconsistency of rules creates problems that the NESTF was originally intended to address.

The provisions for antennas in the existing NESTF reflect only a small part of the infrastructure requirements for mobile networks. Placing antennas on original utility structures (such as power poles and street-light poles) in the road reserve is generally the best solution in residential areas, but in industrial and rural areas the road reserve is not ordinarily the best location for infrastructure to provide the required network coverage. Furthermore, new technology trends require infrastructure that does not fit within the constraints of the existing NESTF.

Proposals

The existing definition of 'antenna' is set out in Regulation 3 of the existing NESTF, which defines 'antenna' as follows:

(a) means a device that—

  (i) receives or transmits radiocommunication or telecommunication signals; and

  (ii) is operated by a network operator; and

(b) includes the mount, if there is one, for the device; and

(c) includes the shroud, if there is one, for the device.

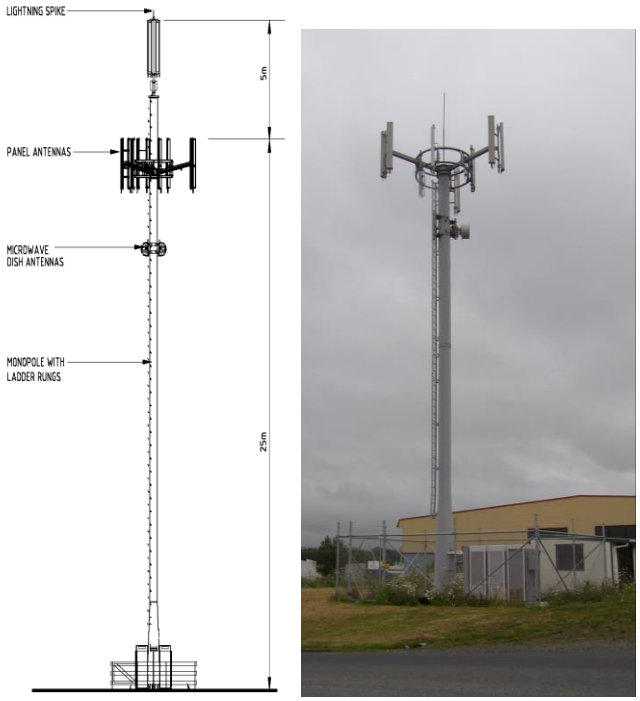
Multi-storey buildings

In most central city areas the placement of antennas on the sides or rooftops of buildings may provide the best coverage with the lowest visual impact. In residential areas there may be multi-storey buildings in excess of five storeys, such as retirement complexes, apartment buildings and public buildings, which provide the most appropriate place to locate an antenna, in terms of providing the best coverage with the lowest visual impact.

Proposals (indicative NESTF requirements only)	
Antennas on multi-storey buildings	The placement of antennas on the roof or side of a building is permitted, subject to the following conditions: • the building is no less than 15 m high • rooftop antennas do not extend 5 m beyond the part of the building to which they are attached • the diameter of the antenna at its widest point does not exceed 0.8 m. Lightning rods may extend beyond the height of the antennas. Associated cabinets with a footprint of no more than 2 m^2 and no more than 2 m high are permitted. All other equipment necessary for the operation of the antenna, such as the mast or other support structure, feeder cables and ancillary antennas, is permitted.

Rural areas

Figure 3: Diagram and photo of a rural/industrial monopole antenna modified to support co-location



Source: Diagram and photo supplied by Vodafone NZ Ltd

The NESTF provisions are rarely of use to telecommunications operators in rural areas, because the most appropriate location for antennas is usually on private land outside of the road reserve (eg, on hill tops). Although the majority of district plans provide for cell sites 20 m or higher in rural areas, and many for 25 m, the associated rules are not nationally consistent, creating uncertainty in the ongoing requirements for telecommunications operators.

Proposals (indicative NESTF requirements only)	
Antennas in rural areas	The placement of an antenna in an area zoned rural in the relevant district plan is permitted, subject to the following conditions: • the total height (of the mast and antenna) does not exceed 25 m • the diameter of the structure at its widest point (excluding the concrete plinth) does not exceed 6 m • the site is not a scheduled site or area subject to any special rules (eg, landscape provisions for outstanding natural landscapes or outstanding natural features) • the antenna is not located closer than 50 m from the boundary of an area zoned residential • the antenna is not located closer than 50 m from the closest external wall of a dwelling in a sensitive land-use area • lightning rods may extend beyond the height of the antenna • all equipment necessary for the operation and security of the antenna, such as the mast or other support structure, casing or coverings, feeder cables, ancillary antennas, cabinets, security equipment, fences, handrails, and steps or ramps, is permitted • the support structure is coloured recessive grey or recessive green • if any earthworks are required to prepare the site: – the earthworks do not occur closer than 20 m from the nearest water body – the ground must be reinstated within 72 hours • if any vegetation clearance (trimming or removal) is required to prepare the site: – the tree(s) must not be scheduled any indigenous vegetation must be reinstated or replaced within the practicable vicinity of the site.

Masts in the road reserve

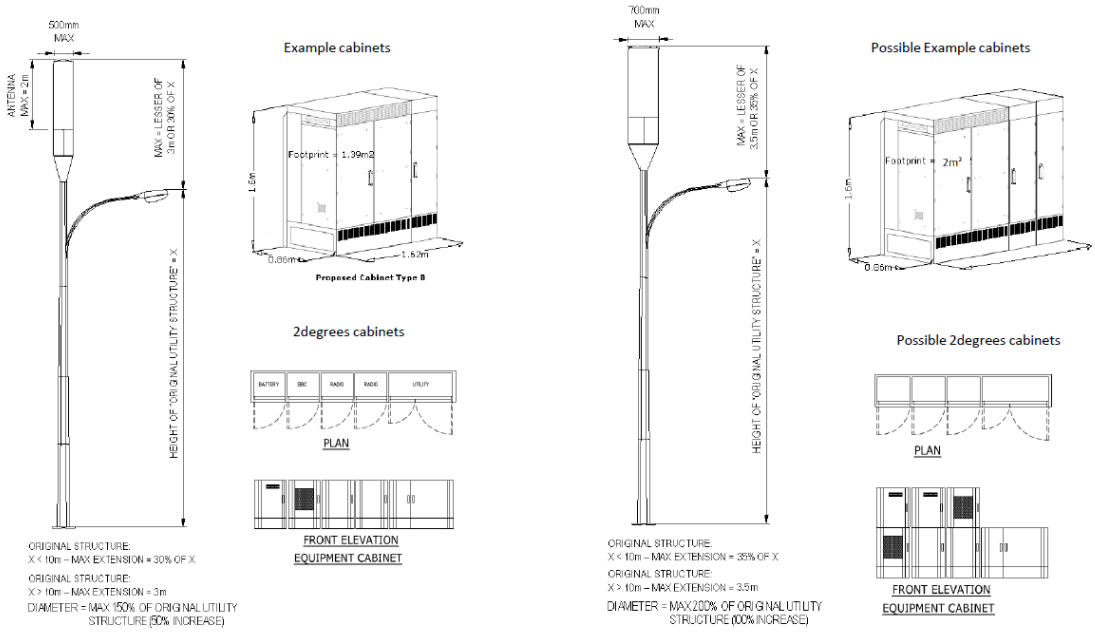
Sometimes the existing structures in the road reserve (such as street-light poles) are not in the optimal location to provide network coverage, and as a result a telecommunications operator may require multiple antennas on existing structures within a relatively small area.

Also, while the NESTF allows an existing utility structure in the road reserve to be replaced, Regulation 7 does not clarify whether the replacement structure must be in exactly the same location. Sometimes the original utility structure may need to be moved slightly; for example, to allow for a larger foundation without interfering with other utilities near or beneath the site.

Proposals (indicative NESTF requirements only)	
New masts to carry antennas in the road reserve	The installation of a new mast with antennas attached in the road reserve is permitted, subject to the following condition: • the total height and width of the mast and antenna is no larger than it would have been if installed in accordance with Regulation 7 (of the existing NESTF) on an existing utility structure within 100 m of the installation site. If there are multiple poles in the 100 m radius, operators must take the average of the poles.
Location of replacement utility structures	A replacement utility structure may be moved to within a 3 m radius of the original utility structure location, provided the structure is still located on the road reserve.

Size of antenna

Figure 4: Diagrams of new light-pole antennas and cabinet requirements



Source: Diagram supplied by 2degrees NZ Ltd

The allocation of spectrum in the 700 MHz band (primarily for 4G-LTE networks) is an example of mobile network operators operating over a wider range of spectrum than they do currently. In many cases existing antennas are not technically able to extend current frequency ranges to include other spectrum bands, and upgrades are required. To operate over both their existing and new spectrum bands, network operators will need to either replace existing antennas with new, larger antennas, or install new antennas capable of operating over the new spectrum band, in addition to the existing antennas at existing sites.

The existing NESTF provides that for the installation of an antenna on a utility structure (such as a light pole or traffic light) to be a permitted activity, an antenna must be no more than 2 m high and 0.5 m wide, and the height of the replacement utility structure must be no more than the original utility structure's highest point, plus the lesser of 3 m or 30 per cent. This size envelope was suitable for the combination of antennas that were used at the time of the establishment of the NESTF, but because of the addition of the 700 MHz spectrum and the 4G-LTE capable technology, a different combination of antennas will need to be used and the envelope will need to become larger. Despite the increase in size being small, these antennas would not be permitted activities under the NESTF and so may currently require a resource consent under the local district plan rule.

Proposals (indicative NESTF requirements only)	
Size envelope for antennas	The antenna(s) – excluding the mount, if there is one, and the shroud, if there is one, and ancillary equipment, if there is any – must fit within the dimensions of a cylindrical shape that, when measured along the centre line of the mast (original utility structure or replacement utility structure), is not more than 3.5 m high and no more than 0.7 m in diameter. The height of the replacement utility structure must be no more than the original utility structure's highest point, plus the lesser of 3.5 m or 35 per cent.

Proposals (indicative NESTF requirements only)	
Size of replacement utility structure (includes mast and antenna)	The height of the replacement utility structure must be no more than the original utility structure's highest point, plus the lesser of 3.5 m or 35 per cent. To support the increased size of antenna, the size of the replacement utility structure will also need to be increased. The proposal is that the replacement utility structure must not have a diameter that is more than the original utility structure's diameter at its largest point, plus 100 per cent.
Replacement of existing antennas to improve service or operate on additional or new spectrum bands such as the new 700 MHz spectrum band	Replacing an existing antenna with a larger antenna capable of operating over additional or new spectrum bands is permitted, subject to the following conditions: • the total height of the replacement infrastructure (mast and antenna) is no more than 2 m higher than the total height of the existing infrastructure • the diameter of the replacement antenna is no more than the diameter of the existing antenna, plus 50 per cent • the diameter of any existing mast is extended no more than the diameter of the existing mast, plus 30 per cent • the existing mast and antenna are lawfully established (ie, authorised by a regulation, plan or consent under the RMA). Lightning rods may extend beyond the height of the antenna. An additional cabinet with a footprint of no more than 2 m^2 and no more than 2 m high housing the necessary equipment of the additional telecommunications operator(s) may be installed at the site. Additional ancillary equipment (such as feeder cables) on the outside of the support structure is permitted.
Additional antennas at existing sites to improve service or operate on additional or new spectrum bands such as the new 700 MHz spectrum band	Installation of additional antennas at a telecommunications operator's existing site (ie, on an existing mast on which a telecommunications operator has an existing antenna) to ensure the site is capable of operating over additional or new spectrum bands is permitted, subject to the following conditions: • the total height of the replacement infrastructure (mast and antenna) is no more than 2 m higher than the total height of the existing infrastructure • the total diameter of the head frame of the structure at its widest point is no more than the diameter of the existing structure plus 100 per cent • the diameter of any existing mast at its widest is extended no more than the diameter of the existing mast, plus 30 per cent • the area is not zoned residential in the relevant district plan • the existing mast and antenna are lawfully established (ie, authorised by a regulation, plan or consent under the RMA). Lightning rods may extend beyond the height of the antenna. An additional cabinet with a footprint of no more than 2 m2 and no more than 2 m high housing the necessary equipment of the additional telecommunications operator(s) may be installed at the site. Additional ancillary equipment (such as feeder cables) on the outside of the support structure is permitted.

Co-location

Co-location of different operators' equipment on the same mast is generally encouraged because it results in fewer individual structures in an area. However, this requires taller structures, and therefore a greater visual effect per site, because the equipment needs to be sufficiently spaced to avoid interference.

Proposals (indicative NESTF requirements only)	
Co-location of multiple telecommunications operators' antennas	Increasing the total height of an existing mast and antenna by up to 5 m is permitted, subject to the following conditions: • one or more additional telecommunications operators place an antenna on the existing mast at the time the height is increased • the area is not zoned residential in the relevant district plan • the existing mast and antenna are lawfully established (ie, authorised by a regulation, plan or consent under the RMA) • this provision is not applied to a single site more than once • telecommunications operators cannot exercise this right of activity until they have disclosed their co-location agreement with the relevant local authority and the Ministry of Business, Innovation and Employment. Lightning rods may extend beyond the height of the antenna. An additional cabinet with a footprint of no more than 2 m^2 and no more than 2 m high housing the necessary equipment of the additional telecommunications operator(s) may be installed at the site. Additional ancillary equipment (such as feeder cables) on the outside of the support structure is permitted.

Small-cell units

Figure 5: Example of a small-cell unit (left) and a pico-cell installed on top of a lamp-post (right)

Source: Photos supplied by Vodafone NZ Ltd

In addition to conventional macro-cell sites, the future is likely to bring a significant increase in small units such as micro-cells, pico-cells, femto-cells and wi-fi, which fill gaps in the coverage of mobile networks, or provide alternatives such as free public-space wi-fi. The units usually fit within the definition of 'antenna' in the existing NESTF, but the dimensions of these units (being more rectangular than cylindrical) means they do not always fit within the permitted antenna rules for placement on existing structures in the road reserve.

Proposals (indicative NESTF requirements only)	
Small-cell units in the road reserve	Installation of a small-cell unit on a structure (eg, bus stops, cabinets, traffic poles, signage, light poles) and all ancillary equipment necessary for the operation of the small-cell unit (eg, mounts, cables, combiner / junction boxes) by a telecommunications operator within the road reserve is permitted, subject to the following condition: the small-cell unit and the ancillary equipment do not exceed a volumetric dimension of 0.11 m^3(eg, 700 mm high x 500 mm wide x 300 mm deep).
Small-cell units on private land (eg, on the outside of buildings)	Installation of a small-cell unit on private land (eg, on the outside of a building) and all ancillary equipment necessary for the operation of the small-cell unit (eg, mounts, cables, combiner/junction boxes) by a telecommunications operator is permitted, subject to the following condition: the small-cell unit and the ancillary equipment do not exceed a volumetric dimension of 0.11 m^3 (eg, 700 mm high x 500 mm wide x 300 mm deep).

Costs and benefits

This section of the discussion document should be read in conjunction with the preliminary section 32 report, *Proposed Amendments to the National Environmental Standards for Telecommunication Facilities: Preliminary evaluation under section 32 of the Resource Management Act 1991*. That report provides a fuller analysis of the costs and benefits of the proposals.

The proposed changes are intended to set out nationally consistent conditions in which resource consent is not required for the major elements of mobile networks' roll-outs and upgrades. Setting consistent standards for telecommunications operators' typical activities will provide increased certainty to the industry and local communities on what is permitted, while avoiding, remedying or mitigating environmental effects by the imposition of conditions. Consistent standards will reduce compliance costs for operators and reduce territorial authorities' workloads, while speeding the roll-out of new services to consumers.

Removing local variation that newer-technology antennas are subject to by amending the NESTF provides the following:

- reduced costs to telecommunications operators when reviewing and submitting on district plan changes
- a reduced need to apply for resource consents, bringing telecommunications operators savings in time and fees
- savings for territorial authorities through having fewer consent applications to process
- efficiency savings for telecommunications operators through standardising their infrastructure and installation methods
- improved access to mobile technology, which enables people and communities to provide for their social, economic and cultural well-being.

In particular, the proposed changes would:

- enable telecommunications operators to achieve better network design by permitting infrastructure placement in strategic locations with low visual impact
- encourage the co-location of different telecommunications operators' infrastructure, minimising the overall number of sites required

- facilitate the roll out of 4G-LTE networks by simplifying the process for site upgrades
- facilitate the roll-out of micro-cells, pico-cells, femto-cells and public-space wi-fi.

Anyone wishing to install or relocate poles or cabinets in the road reserve must liaise with the local road operator (usually the New Zealand Transport Agency or the relevant council). This process enables health and safety matters, such as the location and material of the pole, to be considered and approved.

The proposed changes are unlikely to increase adverse environmental effects relative to the *status quo*, because the aim is to facilitate infrastructure roll-out by streamlining conditions nationally rather than permitting activities that are not currently permitted. With the exception of rural antennas (because of natural landscape disturbance), all the activities covered by the proposals have a low environmental impact. Much of the infrastructure is small and located appropriately with existing infrastructure in the built environment.

In urban areas the environmental effects of mobile networks relate to visual amenity. Cabinets, poles, antennas and small-cell units affect visual amenity. However, visual effects are mitigated by locating infrastructure on buildings or existing utility structures, or by co-locating infrastructure to reduce the overall number of sites needed.

In rural areas the environmental effects may be greater. Rural masts and antennas may have a minor to moderate environmental effect, but providing for co-location avoids the cumulative impact of multiple sites. Rural sites are also more likely to require vegetation clearance; associated earthworks such as clearing and levelling the site; and additional ancillary infrastructure for access and security, such as fences, handrails, and steps or ramps. These effects are mitigated by the proposed conditions on vegetation clearance and earthworks; in addition, the proposed setbacks from residentially zoned areas, dwellings and public buildings mitigate the visual impact in places where people reside.

Allowing a replacement utility structure to be moved within a 3 m radius of the original structure's location will not mean the structure can be moved anywhere within the proposed 3 m radius. Telecommunications operators will still need to comply with the rules in the Utilities Access Code relating to the suitable placement of a structure, and to get permission from the owner of the original structure to move it.

It should be noted that authorisation under the RMA to undertake an activity does not relieve a network operator of any obligation under other legislation, nor does it authorise access to any public or private land. Private property rights still apply. As such, the installation of an antenna on private property, such as a building or on a rural hilltop, would still require permission from the land owner.

2.2. QUESTIONS ABOUT MOBILE NETWORKS`

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

h. Will the proposed permitted activities ensure mobile networks can be built to provide adequate coverage to meet present and foreseeable future demand for services?

i. Are small-cell units defined adequately? What should be included in, or excluded from, the definition?

j. Do special allowances need to be made for small-cell units for ancillary power supply equipment, such as solar panels, to be attached?

All questions are summarised on page 47.

2.3 Special requirements for certain areas

The proposed new standards for cables and mobile network infrastructure set out in the sections above would determine, on a nationally consistent basis, the conditions under which deploying such infrastructure is a permitted activity. This means that these permitted activities would be able to be undertaken without the need for a resource consent, subject to the conditions prescribed in the NESTF. Some of the proposed standards would only apply in specified areas (such as those that are not zoned residential in the relevant district plan), whereas others would apply nationally.

A number of district plans have overlays (eg, heritage rules, urban design rules, areas of special landscape character and natural hazard zones) and scheduled sites that are protected for their environmental, cultural or historic heritage values or to protect the people and infrastructure in that area. In some of these areas it may be appropriate for local environmental factors to override national standards in the NESTF, within certain parameters.

In some cases (eg, the aerial placement of telecommunications cables in areas with existing aerial networks) it may be appropriate for requirements to apply nationally because the environmental effects can be adequately managed by conditions in the NESTF. In other cases, standard conditions might not be able to adequately manage the effects in particular areas, such as sites or areas of historic heritage or cultural significance, or areas susceptible to natural hazards. The table on page 34 provides a discussion of the potential effects of each of the proposals on cultural and historic heritage values, and the impact of natural hazards.

Protection of sites and areas of significance

Regulation 6 of the existing NESTF provides that a district plan's rules must be complied with if consent is already required for works within the drip line of a tree, or where the adjacent site is accorded specific protection under the relevant district plan, such as for historic heritage, visual amenity or coastal protection. The existing NESTF allows these district plan rules to be more stringent than the standards in the NESTF. If the plan's rules are not complied with, then resource consent may be required.

For example, where there is a proposal for a cabinet to be located next to a site identified as having heritage or amenity values, or in an area identified for coastal protection (eg, on the seaward side of a road), and the district plan restricts the location of telecommunications facilities within the road reserve, the proposal will be subject to both the conditions of the NESTF and the relevant rules of the district plan.

Regulation 6 was intended to preserve existing district plan rules relating to protecting trees and vegetation, historic heritage values, visual amenity values and the coastal marine area. It is not intended to create new consenting requirements where none previously existed. Under the existing NESTF, district plan rules relating to historic heritage values, visual amenity values and the coastal marine area must specifically relate to network utility structures in road reserves (not just the adjacent land) for these to be applicable under Regulation 6.

It is *not* proposed that the application of Regulation 6 to the existing standards in the NESTF be changed. However, in extending the scope of the NESTF to a wider range of infrastructure and beyond the road reserve, it is appropriate to apply the existing protection provisions to the proposed new standards.

Again, in these circumstances it should be noted that authorisation under the RMA to undertake an activity does not relieve a network operator of any obligation under other legislation, such as the HNZPTA, nor does it authorise access to any public or private land. The installation of an antenna on private property, such as on a historic building or on a rural hilltop, would still require permission from the land owner.

Resilience to natural hazards

Some district plans include hazard overlays; for example, identifying floodplains is common. These overlays do not tend to change the activity classification of network utility infrastructure, but they can impose additional matters for consideration in consenting decisions. To ensure the infrastructure is resilient to natural hazards and is able to continue operating to provide essential services through an adverse event, it is proposed that for the activities proposed to be permitted under the NESTF, natural hazard zones should also be managed by the district plan.

Proposals (indicative NESTF requirements only)	
Expanding conditions under Section 6 to include telecommunications facilities outside the road reserve	Conditions protecting trees and vegetation, historic heritage values, visual amenity, coastal marine areas and natural hazard zones will apply to all activities under the NESTF.
Adding 'natural hazard zones' to section 6	Conditions managing infrastructure in natural hazard zones in the relevant district plan will prevail over the NESTF where they are more stringent than the NESTF requirements.

Costs and benefits

Proposed new standards	Likely effect on cultural or historic heritage values	Potential impact of natural hazards
Aerial cabling	Aerial cabling in accordance with the proposed new permitted activity standard is likely to have a less than minor effect on cultural or historic heritage values because it will only be classified as permitted in areas with existing utilities lines overhead, and new crossings would not be permitted for lead-ins.	Natural hazards would not affect aerial fibre networks to a greater extent than they would affect the existing aerial telecommunications or electricity networks where the fibre would be located.
Underground cabling	Underground cabling in the road reserve must comply with the Utilities Access Code and the HNZPTA to ensure environmental effects are avoided, remedied or mitigated, and the legal requirements of the HNZPTA relating to the potential modification or destruction of archaeological sites are complied with. It is not expected that there would be any adverse cultural effects resulting from the distribution of underground utilities in the road reserve, provided all other requirements (outside of RMA requirements) are complied with.	Underground utilities infrastructure may be adversely affected by natural hazard events. However, the need for utilities infrastructure in inhabited areas is unavoidable.
Underground works	Underground works must comply with the HNZPTA to ensure environmental effects are avoided, remedied or mitigated, and the legal requirements of the HNZPTA relating to the potential modification or destruction of archaeological sites are complied with. It is not expected that there would be any adverse cultural effects of underground lead-ins to premises, provided all other requirements (outside of RMA requirements) are complied with.	
Antennas on multi-storey buildings	Placement of antennas on heritage buildings may create adverse visual effects or potentially damage features of the building if appropriate care is not taken in the installation process. Placement of antennas on rooftops may also affect protected view shafts in some places. It is not considered that such placement would affect sunlight access due to the size of antennas.	Antennas on buildings are unlikely to be adversely affected by natural hazards to a greater extent than the effect on the building.

Proposed new standards	Likely effect on cultural or historic heritage values	Potential impact of natural hazards
Antennas in rural areas	Placement of antennas in rural areas may in some cases have an impact on sites of cultural significance, historic heritage, or outstanding natural features or landscapes. Antennas may also have an adverse visual impact on papakainga zones (housing development on Māori land), which tend to be in rural areas. Some district plans include 'setbacks', which provide a buffer between rural and residential zoning. The proposed condition that antennas are located no less than 50 m from the boundary of a residential zone, and no less than 50 m from a dwelling in a sensitive land-use area, would manage the visual effect on residential areas.	Rural areas that may be prone to hazards such as landslides or flooding may be inappropriate areas for the placement of new antennas.
New masts to carry antennas in the road reserve	Placement of antennas on new masts in the road reserve may affect protected view shafts in some places.	The Utilities Access Code provides that the corridor manager must agree to the placement of the pole.
Co-location of multiple telecommunications operators' antennas **Replacement of existing antennas and installation of additional antennas at existing sites to operate on additional or new spectrum bands such as the new 700 MHz spectrum band**	The upgrading of an existing site is unlikely to have any adverse effects on cultural or historic heritage values.	Antennas at existing sites are unlikely to be adversely affected by natural hazards to a greater extent than the effect on the existing antenna.
Small-cell units in the road reserve	Placement of small-cell units on existing structures in the road reserve is not expected to have any adverse effects on cultural or historic heritage values.	Small units on structures are unlikely to be adversely affected by natural hazards to a greater extent than the effect on the structure.
Small-cell units on the outside of buildings	Placement of small-cell units on the outside of heritage-listed buildings is in most cases unlikely to have a more than minor visual effect due to the small size of these units. However, care needs to be taken not to damage features of the building.	

Also, under these proposals the assumption is that territorial authorities will be able to provide network operators with the appropriate overlays at the time of the commencement of this Regulation. In reality some territorial authorities may not have done this work, or will be in the midst of it. We need your feedback on which territorial authorities would not have plan overlays available at the proposed time to commence these Regulations. We also want feedback on other issues that may affect the practicability of relying on plan overlays to ensure these sites are appropriately protected, while also taking into consideration the telecommunications needs of the sites.

2.3. QUESTIONS ABOUT SPECIAL REQUIREMENTS FOR CERTAIN AREAS

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

h. Are territorial authorities likely to have these overlays available at the time of the commencement of these standards? If not, which territorial authorities will not have them available? How long would they take to become available? What are the constraints to them being made available?

i. Which other, if any, types of overlays or scheduled sites that district plans commonly include are relevant to telecommunications infrastructure?

All questions are summarised on page 47.

3 Proposed amendments to existing standards

Updating the National Environmental Standards for Telecommunication Facilities (NESTF) provides an opportunity to address minor issues identified in the 2013 evaluation. Amendments are proposed to the standards relating to the following matters:

- Regulation 4 (radio-frequency standard reference update):
  - updating a reference to a radio-frequency standard
- Regulation 8 (conditions controlling cabinets):
  - clarification of the terminology of cabinet installation distances per 'site'
  - clarification of the time required to remove a redundant cabinet when a new cabinet is deployed.

Where the existing NESTF provides that the effects of the activity can be controlled through district plan rules, this would continue to apply after any amendments. All the new activities that are proposed for inclusion, and all the NESTF amendments for activities that are already covered, are collated in appendix 1.

Moving the location of a utility structure may result in more disturbance than just replacing the structure in the same location. However, this cost should only be short term – while the relocation is in progress. The limitation on the area within which the structure can be moved will reduce any difference in visual impact when compared to the original location.

The benefits of this proposal will be that the structure is located in the most appropriate position for all its users.

Increasing the permitted size of the antenna will have a marginal impact on the size of the structure in total, because it is not proposed that the height allowance for the structure as a whole be increased. Although the antenna heights will be increased, the height of the supporting structure will need to be decreased to ensure that the 3 m / 30 per cent increase in structure size, as stated in the current NESTF, is not exceeded. This will result in minimal increased visual impact resulting from a larger antenna.

Allowing the larger-size envelope as a permitted activity will ensure the current standards in the NESTF are still fit for purpose and future-proof. Larger antennas will be used more and more commonly as 4G-LTE networks are rolled out and replace the smaller antennas. Amending the size limits in the existing standards will streamline this transition and ensure the original objectives of the NESTF are met.

3.1 Radio-frequency measurement standard update

Regulation 4 of the NESTF incorporates two New Zealand standards by reference. These relate to:

- maximum exposure levels for radio-frequency fields
- methods of measuring radio-frequency fields.

The exposure level standard was developed based on international guidelines produced by the International Council for Non-Ionising Radiation Protection. The New Zealand standard sets limits for public exposure that are 50 times lower than the level at which health effects may start to occur. This is a widely accepted conservative measure. The NESTF also allows councils to maintain a record of the location of radio-frequency transmitters.

The maximum radio-frequency exposure limits allowed by the current standards remain fit for purpose. While the mobile network will require additional antennas, any infrastructure intensification will not be allowed to surpass the current radio-frequency exposure standards.

Subclauses 4 and 5 of Regulation 4 of the current NESTF also stipulate that mobile network operators must calculate the predicted levels of radio-frequency exposure from all antennas operating in the vicinity of the antenna installation. Should the cumulative radio-frequency exposure levels reach or exceed 25 per cent of the maximum allowed levels, operators must take measurements and provide a report to local authorities. Regulation 4, subsections 4 and 5, are set out below.

> 4 The second condition is that the network operator ensures that the relevant local authority receives, before the telecommunication facility becomes operational, the following:
>
> (a) written or electronic notice of where the facility is or where it is proposed to be; and
>
> (b) a report that—
>
> (i) is prepared in accordance with NZS 6609.2:1990 *Radiofrequency Radiation: Part 2: Principles and Methods of Measurement 300 kHz to 100 GHz*; and
>
> (ii) takes account of exposures arising from other telecommunication facilities in the vicinity of the facility; and
>
> (iii) predicts whether the radiofrequency field levels at places in the vicinity of the facility that are reasonably accessible to the general public will comply with NZS 2772: *Part 1:1999 Radiofrequency Fields Part 1 – Maximum Exposure Levels – 3 kHz to 300 GHz*.
>
> 5 The third condition applies if the prediction referred to in subclause (4)(b)(iii) is that the radiofrequency field levels will reach or exceed 25 per cent of the maximum level authorised by NZS 2772: *Part 1:1999 Radiofrequency Fields Part 1 – Maximum Exposure Levels – 3 kHz to 300 GHz* for exposure of the general public. The network operator must ensure that the relevant local authority receives, within 3 months of the telecommunication facility becoming operational, a report that—
>
> (a) is prepared in accordance with NZS 6609.2:1990 *Radiofrequency Radiation: Part 2: Principles and Methods of Measurement 300 kHz to 100 GHz*; and
>
> (b) provides evidence that the actual radiofrequency field levels at places in the vicinity of the facility that are reasonably accessible to the general public comply with NZS 2772: *Part 1:1999 Radiofrequency Fields Part 1 – Maximum Exposure Levels – 3 kHz to 300 GHz*.

The issue

The NESTF currently incorporates, by reference, the standard NZS 6609.2:1990 *Radiofrequency Radiation – Principles and Methods of Measurement – 300 kHz to 100 GHz*, which refers to the measurement of radio-frequency fields. Specifically, Regulation 4(4)(b)(i) and Regulation

4(5)(a) state that reports on radio-frequency exposure should be prepared in accordance with NZS 6609.2:1990.

This standard has since been withdrawn and replaced by AS/NZS 2772.2:2011 *Radiofrequency Fields Part 2: Principles and Methods of Measurement and Computation – 3 kHz to 300 GHz*. The main difference between the two standards is that the new AS/NZS 2772.2:2011 is more explicit in its requirements and more comprehensive in its guidance for the measurement of radio-frequency fields. There will be no impact on the permitted exposure levels currently permitted.

We are aware that AS/NZS 2772.2:2011 is currently being reviewed by Standards Australia.

Proposed amendment

The proposed amendment to the existing standard is set out below.

Amendments (indicative NESTF requirements only)	
Incorporation by reference	Replace reference to NZS 6609.2:1990 *Radiofrequency Radiation – Principles and Methods of Measurement – 300 kHz to 100 GHz* with reference to AS/NZS 2772.2:2011 *Radiofrequency Fields Part 2: Principles and Methods of Measurement and Computation – 3 kHz to 300 GHz*.

Costs and benefits

This update will affect practitioners working under the NESTF by making the measurement requirements more comprehensive. However, it will be a minor impact because the new standard is based on current best practice. The update will not affect the public.

Practitioners are generally already applying the requirements in the new standard voluntarily. There are only a handful of practitioners that work in this field in New Zealand, and therefore very few people will be affected by the change in requirements. Those practitioners were consulted during the development of the AS/NZS standard and would have been given the chance to make submissions on the impacts of the change.

The new AS/NZS standard was developed to take into account new software. The standard is also based on current best practice. Therefore, the new AS/NZS standard is in effect catching up with current practices and technologies rather than prescribing new ones.

3.1. QUESTIONS ABOUT RADIO-FREQUENCY MEASUREMENT STANDARD UPDATE

a. Do you agree with the proposals?
b. If not, how could they be amended to better gain your support?
c. Are the proposed conditions appropriate?
d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?
e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?
f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?
g. Are there any risks associated with the proposal? How could they be addressed?

All questions are summarised on page 47.

3.2 Conditions controlling cabinets

Regulation 8 in the current NESTF sets standards for the size and location of cabinets housing telecommunications infrastructure in the road reserve.

The issue

The NESTF provides that cabinets of a certain size that are on the same side of the road must be at least 30 m apart, and in non-residential areas a maximum cabinet footprint per site is prescribed at 1.8 m^2. However, the term 'site' needs to be clarified because it is used in the NESTF. 'Site' is generally taken to mean a property title. In the case of cabinets located in the road reserve, the prescribed footprint per site is generally interpreted to refer to the property adjacent to the location of the cabinets. However, this interpretation has created issues; for example, non-residential 'sites' can encompass entire city blocks in some instances.

One interpretation of the term 'site' (as it is currently defined in the NESTF) means that it may not be permitted for a network operator to construct the required number of cabinets adjacent to larger properties (such as a university) to provide the necessary telecommunications services. Additional cabinets in these areas will be subject to the relevant district plan rules, because under that interpretation of the term 'site' they will be deemed to exceed the maximum footprint conditions, even though they comply with the separation conditions in the NESTF.

In addition, the current NESTF states that if two or more cabinets are located in the same site in an area classified as residential, then the cabinets must not be more than 500 mm apart and the total footprint of all the cabinets must be no more than 1.8 m^2. However, when cabinets are being replaced (eg, to upgrade the telecommunications infrastructure), often the replacement cabinet needs to be up and running before the old one is removed, to ensure the transition process is smooth, with minimal disruption to service. To enable this, the original and replacement cabinets are generally placed more than 500 mm apart, which means they are technically (for a limited period) in breach of the NESTF.

Proposed amendments

The proposed amendments to the existing standards controlling cabinets are set out below.

Amendments (indicative NESTF requirements only)	
Clarification of per 'site' terminology	'Site' will be defined as an area where cabinets are located. The requirement that each site must be located a minimum of 30 m from each other site will remain unchanged.
Time for cabinets to be replaced	Two cabinets on the same side of the road may be located within 30 m of each other, but more than 500 mm apart, as a permitted activity subject to the following conditions: • the replacement cabinet is being installed to replace the existing cabinet • the existing cabinet must be removed no later than 12 months following installation of the replacement cabinet.
Additional cabinets	This condition applies if two or more cabinets are located at the same site in a road reserve next to land that a relevant district plan or proposed district plan classifies as primarily for residential activities. Each cabinet's footprint must be no more than 1.4 m^2. The total footprint of all the cabinets must be no more than 2 m^2. The distance between each cabinet and the cabinet or cabinets closest to it must be no more than 500 mm. The cabinets must be no higher than the height of the concrete foundation plinths, if there are any, plus 1.8 m.

Costs and benefits

The proposed definition of 'site' will not significantly change the number or size of cabinets being placed on the road reserve. It will, however, allow more cabinets to be placed adjacent to larger sites (such as universities) that have a requirement for more services than smaller sites. The proposed amendment will not affect any other sites, such as those located in residential areas.

There will be an increase in visual effects if there is an increase in the number of cabinets. However, sites will still be required to be located a minimum of 30 m apart, preventing a significant increase in the number of cabinets in an area.

Allowing two cabinets to be located within 30 m of each other for a temporary period as part of a cabinet replacement programme will increase visual effects. However, imposing a 12-month time limit will mitigate this effect by ensuring it is only short term. The proposed amendment will that cabinets can be replaced without a disruption of the supply of essential telecommunications services to sites, while still adhering to the standards in the NESTF.

3.2. QUESTIONS ABOUT CONDITIONS CONTROLLING CABINETS

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

All questions are summarised on page 47.

4 Summary

Modern telecommunications infrastructure is an increasingly important utility in all communities. Councils and residents desire better, faster and more reliable connectivity. It is assumed that local variation in activity status between different plans has emerged not as a reaction to the varied needs between diverse environments across New Zealand, but rather as a natural consequence of devolved decision-making under the Resource Management Act (RMA).

In this context, many of the costs and benefits associated with the deployment of new telecommunications facilities (such as Ultra-Fast Broadband and Rural Broadband Initiative) will occur anyway. New telecommunications facilities will continue to be deployed across New Zealand. The intention of the NESTF amendments is to expedite the process of obtaining consent, thereby eliminating delays and costs incurred as a result of the variation between different district plans. This includes costs incurred by councils to monitor and enforce the existing rules. The proposals in this discussion document are designed to ensure New Zealanders will have access to superior broadband services earlier, and funds that would have been directed into compliance and enforcement costs can be invested elsewhere.

For some infrastructure, variation according to the local environment is appropriate and necessary. However, it is considered that national consistency is appropriate in the telecommunications environment because the current legislation and regulations (and the Government's standards and requirements for the Ultra-Fast Broadband and Rural Broadband Initiative) roll-outs) are very similar across the country. Variation in rules creates a disproportionate administrative and cost burden on those involved in the consenting and construction of this new infrastructure.

It is proposed that suitable mitigations within the amendments be included so any costs associated with promoting national consistency are appropriately balanced against the benefits, and environmental effects are mitigated.

The main cost associated with expanding the scope of the NESTF is the reduced opportunity for local input. The NESTF will prevail over any district plan rules, so consultation for the whole country will be conducted through this discussion document. Without the NESTF, there would be opportunities to consult through each district plan change.

It is intended that appropriate provision for local variation is enabled. For example, areas or sites of natural, cultural or historic heritage value, or areas of natural hazard zones, may require further mitigations for or exclusions to the installation of telecommunications infrastructure. Comments are welcome on these intentions and assumptions.

Current evidence is that the benefits of an amended NESTF outweigh the costs associated with maintaining the *status quo*.

4. QUESTIONS

a. Are there situations, not already provided for, whereby activities proposed by the NESTF would not be consented or permitted eventually? What other mitigations and controls would be put in place to facilitate these new communications technologies?

b. How practicable is it to rely on district plan overlays to identify areas where variation is appropriate (ie, areas of natural or cultural heritage value, or areas natural hazard zones)?

c. Is there evidence that increased consultation opportunities would provide material benefits to communities? Please specify.

5 Consultation process

5.1 How to make a submission

The Government welcomes you feedback on this discussion document. Anyone can make a submission on the proposal to include new permitted activities within the NESTF, or the proposal to amend the standards associated with activities already permitted under the NESTF. Your submission may address any aspect of these proposals, but we would appreciate you paying particular attention to the questions posed throughout.

The questions provided in section 6 are to guide your feedback. These are collated from throughout the document, where they appeared at the end of each chapter. You may answer some or all of the questions. Additional questions for territorial authorities are listed at the end.

To ensure your point of view is clearly understood, please include the following information in your submission:

- the specific proposal you are making the submission about
- whether you support or oppose the proposal
- the reasons for your views.

There are two ways you can make a submission:

1. Use the online submission tool available at http://www.mfe.govt.nz/more/consultations (preferred)
2. Prepare your submission in a separate document

Please ensure you provide the following information with your submission:

- Contact information:
  - name of submitter/organisation
  - address
  - telephone
  - email
- The title of the discussion document
- Reasons for your views
- Any further information you wish the Minister for the Environment and the Minister for Communications to consider.

The closing time and date for submissions is 5.00pm 17 April 2015.

5.2 Lodging submissions

We prefer submissions to be submitted using the online consultation tool at http://www.mfe.govt.nz/more/consultations.

If you are not using the online consultation tool please email your submission as a PDF or Microsoft Word document (2003 or later version), or other compatible format, to standards@mfe.govt.nz.

If email is not possible please post your submission to:

National Environmental Standards for Telecommunication Facilities
Ministry for the Environment
PO Box 10362
Wellington 6143
New Zealand

5.3 Next steps

Submissions will be considered by officials from the Ministry for the Environment and the Ministry of Business, Innovation and Employment who will then provide advice to the Minister for the Environment and Minister for Communications.

5.4 Publishing and releasing submissions

The Ministry for the Environment may publish all or part of any written submission on its website, www.mfe.govt.nz. Unless you clearly specify otherwise in your submission, the Ministry would consider that you have consented to website posting. **Please advise if any sections of your submission contain sensitive material that cannot be published.**

Contents of submissions provided to the Ministry may have to be released to the public under the Official Information Act 1982 following requests to the Ministry (including via email). **Please advise if you have any objection to the release of any information contained in your submission, and, in particular, which part(s) you consider should be withheld, together with the reason(s) for withholding the information.** The Ministry would take into account all such objections when responding to requests for copies of, and information on, submissions to this document under the Official Information Act.

The Privacy Act 1993 establishes certain principles with respect to the collection, use and disclosure of information about individuals by various agencies, including the Ministry. It governs access by individuals to information about themselves held by agencies. Any personal information you supply to the Ministry in the course of making a submission would be used by the Ministry only in conjunction with the matters covered by this document. Please clearly indicate in your submission if you do not wish your name to be included in any summary of submissions that the Ministry may publish.

6 Questions to guide your feedback on the proposals

Proposed additions

Section 2.1: Telecommunications cables

For each of the proposed new permitted activities that you wish to comment on:

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards, to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

h. Is additional guidance required to ensure operators are aware of the requirements of the Heritage New Zealand Pouhere Taonga Act 2014 and the Utilities Access Code?

Section 2.2: Mobile networks

For each of the proposed new permitted activities that you wish to comment on:

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards, to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

h. Will the proposed permitted activities ensure mobile networks can be built to provide adequate coverage to meet present and foreseeable future demand for services?

i. Are small-cell units defined adequately? What should be included in, or excluded from, the definition?

j. Do special allowances need to be made for small-cell units for ancillary power supply equipment, such as solar panels, to be attached?

Section 2.3: Special requirements for certain areas

For each of the proposed new permitted activities that you wish to comment on:

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

h. Are territorial authorities likely to have these overlays available at the time of the commencement of these standards? If not, which territorial authorities will not have them available? How long would they take to become available? What are the constraints to them being made available?

i. Which other, if any, types of overlays or scheduled sites that district plans commonly include are relevant to telecommunications infrastructure?

Proposed amendments to existing standards

Section 3.1: Radio-frequency measurement standard update

For each of the proposed amendments to existing permitted activities that you wish to comment on:

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

Section 3.2: Conditions controlling cabinets

For each of the proposed amendments to existing permitted activities that you wish to comment on:

a. Do you agree with the proposals?

b. If not, how could they be amended to better gain your support?

c. Are the proposed conditions appropriate?

d. Are the proposed conditions future-proof? What changes could be made to ensure they remain fit for purpose in the long term?

e. What do you consider to be the likely costs of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

f. What do you consider to be the likely benefits of these standards to telecommunications operators, territorial authorities and the general public? Can you provide further information to support your view?

g. Are there any risks associated with the proposal? How could they be addressed?

Summary questions

For each of the proposed amendments to existing permitted activities that you wish to comment on:

a. Are there situations, not already provided for, whereby activities proposed by the NESTF would not be consented or permitted eventually? What other mitigations and controls would be put in place to facilitate these new communications technologies?

b. How practicable is it to rely on district plan overlays to identify areas where variation is appropriate (ie, areas of natural or cultural heritage value, or areas natural hazard zones)?

c. Is there evidence that increased consultation opportunities would provide material benefits to communities? Please specify.

Additional questions for territorial authorities

To gain a greater understanding of the costs and benefits to territorial authorities of the proposed changes, the following questions are specifically for territorial authorities.

Please answer those that you can.

a. How many resource consent applications do you receive for telecommunications facilities per year on average? Please include applications for new facilities and for upgrades and changes. If your council experiences a significant variance in application numbers year to year, please also provide a range. On average, how many hours do council officers spend processing each of these consent applications?

b. How many certificates of compliance do you issue per year on average for telecommunications facilities not covered by the existing NESTF? If your council experiences a significant variance year to year, please also provide a range. On average, how many hours do council officers spend issuing each of these certificates of compliance?

c. How many certificates of compliance do you issue per year on average for telecommunications facilities that are covered by the NESTF? If your council experiences a significant variance year to year, please also provide a range. On average, how many hours do council officers spend issuing each of these certificates of compliance?

d. Would the proposed changes create a net benefit or a net cost for your council's consenting?

e. How would the proposed changes to the NESTF affect your councils' work in developing or reviewing telecommunications sections of district plans (for both rolling reviews and full plan reviews)? Would the proposed changes create a net benefit or a net cost for the planning process?

Appendix 1: Summary of proposals

The proposed new permitted activities and proposed amendments to existing permitted activities are collated below.

Table A1.1: Proposed new permitted activities (with associated standards)

Permitted activities	
Aerial cabling	Aerial placement of telecommunications cables by a telecommunications operator is permitted, including any necessary ancillary equipment, subject to the following conditions: • no additional poles are installed • there is existing aerial cabling using the poles to be used for the new telecommunications cables (for electricity or telecommunications or other utilities) • the diameter of the new cabling does not exceed 30 mm • cables use existing crossings and corridors (ie, no new road crossings may be installed). Associated earthworks and ancillary equipment may include (but is not limited to) fibre access terminals, fibre coils or loops, protection guards, ducting, and aerial to underground connections. Ongoing operation and maintenance of the network is permitted. Relocation and/or replacement poles where necessary for structural or safety reasons may be up to 3 m from the original location.
Underground cabling	Underground placement of telecommunications cables by a telecommunications operator is permitted, including any necessary drilling and trenching and associated earthworks and underground ancillary equipment, including (but not limited to) ducting, feeder breakout points, and hand holes or plinths.
Antennas on multi-storey buildings	The placement of antennas on the roof or side of a building is permitted, subject to the following conditions: • the building is no less than 15 m high • rooftop antennas do not extend 5 m beyond the part of the building to which they are attached • the diameter of the antenna at its widest point does not exceed 0.8 m. Lightning rods may extend beyond the height of the antennas. Associated cabinets with a footprint of no more than 2 m^2 and no more than 2 m high are permitted. All other equipment necessary for the operation of the antenna, such as the mast or other support structure, feeder cables and ancillary antennas, is permitted.
Antennas in rural areas	The placement of an antenna in an area zoned rural in the relevant district plan is permitted, subject to the following conditions: • the total height (of the mast and antenna) does not exceed 25 m • the diameter of the structure at its widest point (excluding the concrete plinth) does not exceed 6 m • the site is not a scheduled site or area subject to any special rules (eg, landscape provisions for outstanding natural landscapes or outstanding natural features) • the antenna is not located closer than 50 m from the boundary of an area zoned residential • the antenna is not located closer than 50 m from the closest external wall of a dwelling in a sensitive land-use area • lightning rods may extend beyond the height of the antenna

Permitted activities	
	• all equipment necessary for the operation and security of the antenna, such as the mast or other support structure, casing or coverings, feeder cables, ancillary antennas, cabinets, security equipment, fences, handrails, and steps or ramps, is permitted • the support structure is coloured recessive grey or recessive green • if any earthworks are required to prepare the site: – the earthworks do not occur closer than 20 m from the nearest water body – the ground must be reinstated within 72 hours • if any vegetation clearance (trimming or removal) is required to prepare the site: – the tree(s) must not be scheduled – any indigenous vegetation must be reinstated or replaced within the practicable vicinity of the site.
New masts to carry antennas in the road reserve	The installation of a new mast with antennas attached in the road reserve is permitted, subject to the following condition: • the total height and width of the mast and antenna is no larger than it would have been if installed in accordance with Regulation 7 (of the existing NESTF) on an existing utility structure within 100 m of the installation site. If there are multiple poles in the 100 m radius, operators must take the average of the poles.
Location of replacement utility structures	A replacement utility structure may be moved to within a 3 m radius of the original utility structure location, provided the structure is still located on the road reserve.
Size envelope for antennas	The antenna(s) – excluding the mount, if there is one, and the shroud, if there is one, and ancillary equipment, if there is any – must fit within the dimensions of a cylindrical shape that, when measured along the centre line of the mast (original utility structure or replacement utility structure), is not more than 3.5 m high and no more than 0.7 m in diameter. The height of the replacement utility structure must be no more than the original utility structure's highest point, plus the lesser of 3.5 m or 35 per cent.
Size of replacement utility structure (including the antenna and the mast)	The replacement utility structure must not have a diameter that is more than the original utility structure's diameter at its largest point, plus 100 Per cent.
Replacement of existing antennas to improve service or operate on additional or new spectrum bands such as the new 700 MHz spectrum band	Replacing an existing antenna with a larger antenna capable of operating over additional or new spectrum bands is permitted, subject to the following conditions: • the total height of the replacement infrastructure (mast and antenna) is no more than 2 m higher than the total height of the existing infrastructure • the diameter of the replacement antenna is no more than the diameter of the existing antenna, plus 50 per cent • the diameter of any existing mast is extended no more than the diameter of the existing mast, plus 30 per cent • the existing mast and antenna are lawfully established (ie, authorised by a regulation, plan or consent under the RMA). Lightning rods may extend beyond the height of the antenna. An additional cabinet with a footprint of no more than 2 m^2 and no more than 2 m high housing the necessary equipment of the additional telecommunications operator(s) may be installed at the site. Additional ancillary equipment (such as feeder cables) on the outside of the support structure is permitted.

Permitted activities	
Additional antennas at existing sites to improve service or operate on additional or new spectrum bands such as the new 700 MHz spectrum band	Installation of additional antennas at a telecommunications operator's existing site (ie, on an existing mast on which a telecommunications operator has an existing antenna) to ensure the site is capable of operating over additional or new spectrum bands is permitted, subject to the following conditions: • the total height of the replacement infrastructure (mast and antenna) is no more than 2 m higher than the total height of the existing infrastructure • the total diameter of the head frame of the structure at its widest point is no more than the diameter of the existing structure plus 100 per cent • the diameter of any existing mast at its widest is extended no more than the diameter of the existing mast, plus 30 per cent • the area is not zoned residential in the relevant district plan • the existing mast and antenna are lawfully established (ie, authorised by a regulation, plan or consent under the RMA). Lightning rods may extend beyond the height of the antenna. An additional cabinet with a footprint of no more than 2 m2 and no more than 2 m high housing the necessary equipment of the additional telecommunications operator(s) may be installed at the site. Additional ancillary equipment (such as feeder cables) on the outside of the support structure is permitted.
Co-location of multiple telecommunications operators' antennas	Increasing the total height of an existing mast and antenna by up to 5 m is permitted, subject to the following conditions: • one or more additional telecommunications operators place an antenna on the existing mast at the time the height is increased • the area is not zoned residential in the relevant district plan • the existing mast and antenna are lawfully established (ie, authorised by a regulation, plan or consent under the RMA) • this provision is not applied to a single site more than once • telecommunications operators cannot exercise this right of activity until they have disclosed their co-location agreement with the relevant local authority and the Ministry of Business, Innovation and Employment. Lightning rods may extend beyond the height of the antenna. An additional cabinet with a footprint of no more than 2 m^2 and no more than 2 m high housing the necessary equipment of the additional telecommunications operator(s) may be installed at the site. Additional ancillary equipment (such as feeder cables) on the outside of the support structure is permitted.
Small-cell units in the road reserve	Installation of a small-cell unit on a structure (eg, bus stops, cabinets, traffic poles, signage, light poles) and all ancillary equipment necessary for the operation of the small-cell unit (eg, mounts, cables, combiner / junction boxes) by a telecommunications operator within the road reserve is permitted, subject to the following condition: • the small-cell unit and the ancillary equipment do not exceed a volumetric dimension of 0.11 m^3(eg, 700 mm high x 500 mm wide x 300 mm deep).
Small-cell units on private land (eg, on the outside of buildings)	Installation of a small-cell unit on private land (eg, on the outside of a building) and all ancillary equipment necessary for the operation of the small-cell unit (eg, mounts, cables, combiner/junction boxes) by a telecommunications operator is permitted, subject to the following condition: • the small-cell unit and the ancillary equipment do not exceed a volumetric dimension of 0.11 m^3 (eg, 700 mm high x 500 mm wide x 300 mm deep).

Table A1.2: Proposed amendments to standards for existing permitted activities

Amendments	
Expanding conditions under Section 6 to include telecommunications facilities outside the road reserve	Conditions protecting trees and vegetation, historic heritage values, visual amenity, coastal marine areas, and natural hazard zones will apply to all activities under the NESTF.
Adding 'natural hazard zones' to section 6	Conditions managing infrastructure in natural hazard zones in the relevant district plan will prevail over the NESTF where they are more stringent than the NESTF requirements.
Incorporation by reference	Replace reference to NZS 6609.2:1990 *Radiofrequency Radiation – Principles and Methods of Measurement – 300 kHz to 100 GHz* with reference to AS/NZS 2772.2:2011 *Radiofrequency Fields Part 2: Principles and Methods of Measurement and Computation – 3 kHz to 300 GHz*.
Clarification of per 'site' terminology	'Site' will be defined as an area where cabinets are located. The requirement that each site must be located a minimum of 30 m from another site will remain unchanged.
Time for cabinets to be replaced	Two cabinets on the same side of the road may be located within 30 m of each other, but more than 500 mm apart, as a permitted activity subject to the following conditions: • the replacement cabinet is being installed to replace the existing cabinet • the existing cabinet must be removed no later than 12 months following installation of the replacement cabinet.
Additional cabinets	This condition applies if two or more cabinets are located at the same site in a road reserve next to land that a relevant district plan or proposed district plan classifies as primarily for residential activities. Each cabinet's footprint must be no more than 1.4 m^2. The total footprint of all the cabinets must be no more than 2 m^2. The distance between each cabinet and the cabinet or cabinets closest to it must be no more than 500 mm. The cabinets must be no higher than the height of the concrete foundation plinths, if there are any, plus 1.8 m.

Appendix 2: Infrastructure

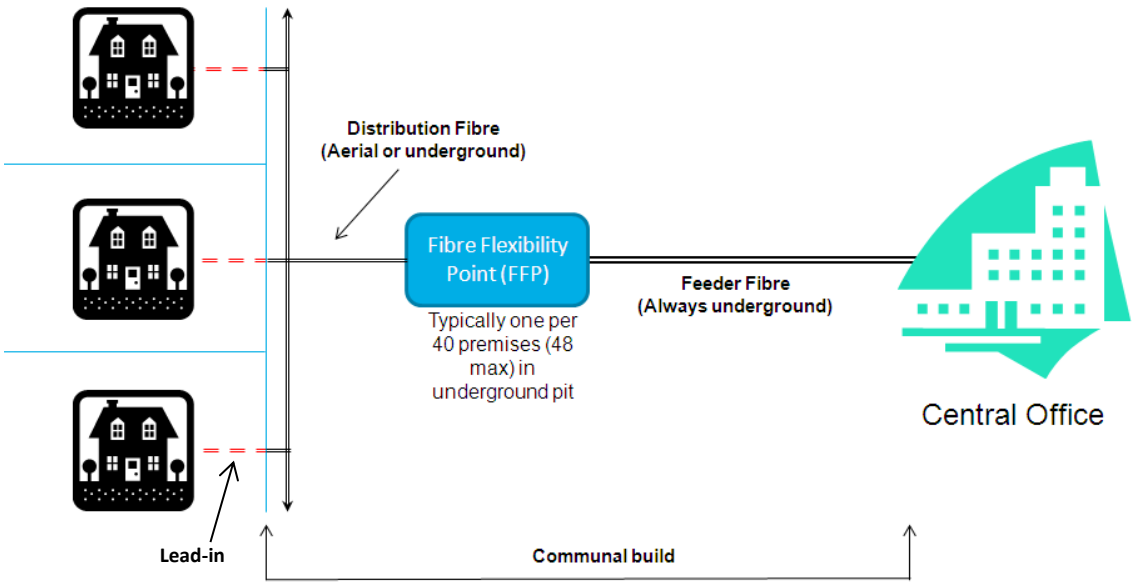
The infrastructure descriptions in this appendix are presented not as standard across New Zealand, but to help readers understand the technical deployment of telecommunications facilities. Not all telecommunications operators' standards are the same in all areas.

Telecommunications cable infrastructure

New telecommunications cable infrastructure is generally made of fibre-optic cabling. Typical fibre-optic cabling can be categorised into three types: feeder fibre, distribution, and provisioning or lead-ins. Feeder fibre connects the central office to a feeder breakout point, sometimes known as a fibre flexibility point or fibre distribution hub, and is always underground. Once the fibre has passed through a feeder breakout point (depending on the technology there may be one per 40 to 180 premises), distribution fibre is used up to the point before the premises. Lead-ins are the connections from the distribution line to the premises. These may be fibre, copper, or a hybrid of both. Both distribution and lead-ins can be deployed aerially or underground.

In determining whether to deploy cables above or below ground, the telecommunications operator will look at where existing utility structures are placed (eg, copper telecommunications cables and electricity distribution lines), what constraints exist (eg, the presence of trees, archaeological sites, contaminated sites, and ground conditions) and what the relevant district plan rules provide for. The diagram below depicts a generic fibre cabling architecture.

Figure A2.1: Fibre cabling generic architecture diagram



Source: Diagram supplied by Chorus NZ Ltd

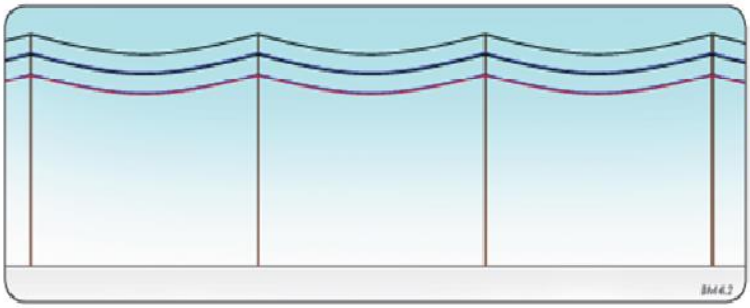
Aerial deployment

Aerial deployment is the aerial suspension of telecommunications cables on poles or other support structures (within the road corridor). During aerial deployment, telecommunications cables are suspended on poles, which are generally made from cement, wood or metal (usually steel). The cable has a minimum ground clearance of 5 m. This increases to 5.5 m at road crossings and carriageways. The heights of the poles generally range from 5.5 m to 7.5 m, with an average height of about 6 m. Where possible, cabling will share poles already in place for electrical and light infrastructure.

Distribution cables are strung along road reserves, and occasionally across private land. Lead-in cables may cross the road where the premises are on the opposite side to the distribution lines in order to connect buildings.

Aerial telecommunications cables are deployed either within the telecommunications envelope or on the low-voltage electricity envelope. The line should follow the line of any existing electricity cabling. There is often a 'sag' line: where the lines droop in the middle of their span between poles, cabling added to a pole where there is pre-existing cables will follow this line. Doing so will ensure that the visual impact of the new cable is minimal and ensure adequate slack, allowing for stretch and therefore resilience in different weather conditions. Figure A2.2 demonstrates this.

Figure A2.2: Diagram demonstrating line sag



Source: Diagram supplied by Chorus NZ Ltd

The outer sheaths surrounding the telecommunication cable are generally, but not exclusively, black. Black is often selected because it is the most cost-effective colour to insulate the cable against ultra-violet damage, and in order to blend in visually with the pre-existing cabling.

The diameter of distribution cables usually varies between 10.5 mm and 17.3 mm. Depending on the technology and the level of protective sheathing required, this may increase up to approximately 30 mm. Reinforced sheathing may be put around cables where they pass through trees.

Lead-in cabling is smaller than distribution cabling. A fibre- or copper-only lead-in may have an approximate standard diameter of 7.0 mm, although the diameter of a hybrid lead-in may increase to 14 mm. Figure A2.3 illustrates the varying sizes of the different cable types.

Figure A2.3: Diagram comparing cable sizes (not to scale)

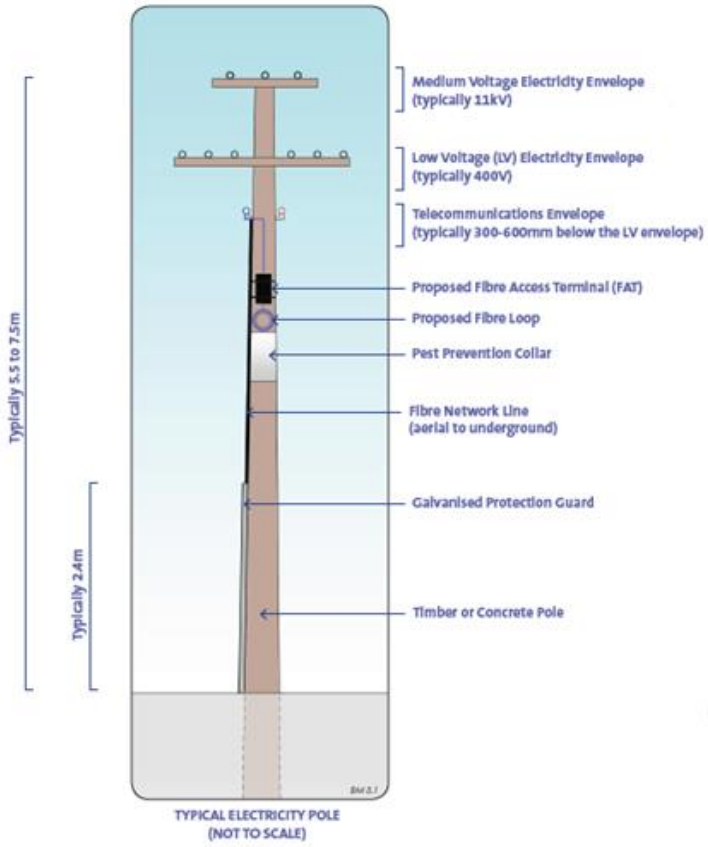
Source: Diagram supplied by Chorus NZ Ltd

Other features of the aerial infrastructure installed by some telecommunications operators include domes and fibre access terminals on the poles. Fibre access terminals are installed on poles in an aerial network. They are typically a small, round or rectangular unit, installed high on a pole, above the pest prevention collar and below the cable line. In some locations, cable coils may also be located on poles at points along the aerial network. These cables may be removed shortly after the build or remain there long term, depending on the methods used by the fibre company responsible.

Figure A2.4: Photo showing fibre coil installation

Source: Photo supplied by Northpower Ltd

Figure A2.5: Diagram of a typical electricity pole modified for aerial fibre



Source: Diagram supplied by Chorus NZ Ltd

Associated activities

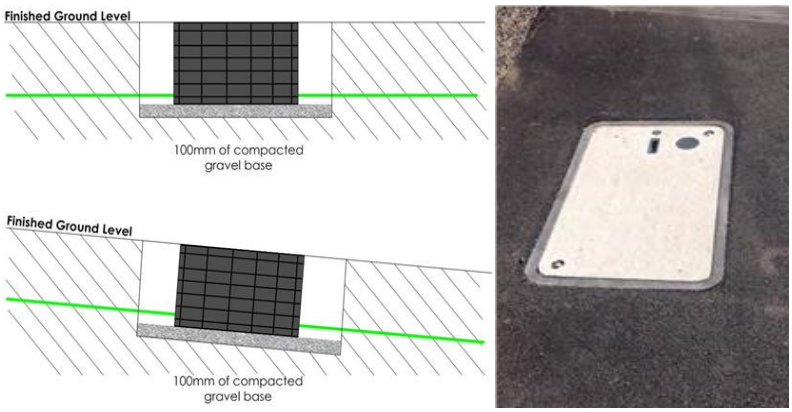
Some earthworks and tree removal/trimming may be required during the installation of poles and underground and aerial cables. In aerial deployment, earthworks are likely to be minimal because the installation is usually only done in areas where poles already exist. Some poles may need to be relocated, however. It is anticipated that holes for posts will be drilled, and these holes could be 3 m deep and 800 mm in diameter. Ongoing maintenance of trees through trimming may also be required.

In addition, traffic management measures will be required for the duration of the installation works.

Underground deployment

Underground fibre cables are installed within a duct or direct buried. Cables are laid underground via trenching, directional drilling or similar methods, which are explained below. If ducting already exists, the installation method will involve feeding the cables through existing ducts. In underground deployment, some telecommunications operators will install a fibre flexibility point, and this is buried in the footpath rather than being located up a pole. A buried fibre flexibility point can manage up to 48 customer connections and is often preferred because it is a cost-effective and safe approach. The fibre flexibility point is buried in a pit with approximate dimensions of 845 mm long x 510 mm wide x 610 mm deep. The pit is then sealed at ground level, as demonstrated in Figure A2.6.

Figure A2.6: Example of a Chorus NZ Ltd installed fibre flexibility point pit



Source: Diagrams and photos supplied by Chorus NZ Ltd

In other areas, some telecommunications operators will install this equipment in a cabinet rather than in a fixed flexibility point pit. The final size of the cabinet may vary depending on cable densities and specific technology requirements. The current NESTF limits the cabinet footprint to between 1.8 m² and 2 m², depending on the zone the cabinet is installed in.

Where there are existing aerial copper lead-ins, the fibre lead-ins may also be provisioned aerially. From underground ducts, cables will be run up inside a pole and then the cable will be connected to the building. Alternatively, the cable may be run up the outside of the pole through grey ducting, which is used to protect and hide the cable. The cables will usually utilise pre-existing poles in the road reserve, such as electricity poles. Occasionally a fibre company may have to erect new poles; for example, to reach premises located on a side of the road where there are no poles already installed. These poles are shorter than standard power poles, usually between 4 and 6 m tall.

More commonly, lead-ins will be underground in areas where distribution cables are also deployed underground. In these circumstances, a lead-in will be trenched all the way to the boundary of the premises, and the lead-in will be buried in the ground ready to be connected to the premises. In some areas a small 'hand hole' will be buried in the ground. The hand hole is a small pit in the ground for engineers to access the fibre lead-in when a customer signs up for their premise to be connected. Once the hand hole has been installed, all that is visible from the road is a small ground-level lid, as shown in the photo below of a Chorus NZ Ltd installation. Other telecommunications operators may choose to bury the lead-in with a radio-frequency identity tag in place, so that they can find the lead-in at a later date when access is needed.

Figure A2.7: Hand hole during and after full installation

Source: Photos supplied by Chorus NZ Ltd

Duct and cable installation

There are three methods typically used to install ducting and cabling underground.

Existing underground network

In places that have existing underground networks, this will be the preferred method of installation. Fibre cabling can be deployed using existing ducts and manholes, with little disruption to the environment.

Directional drilling

Directional drilling is a deployment technology involving the excavation of an underground bore for installing underground utilities infrastructure. A rig is used to drill a bore so the duct can be inserted. It is assumed that bore holes will be around 0.3 m deep.

Open trenching

Open trenching is a deployment technique involving the excavation of a trench for installing underground utility infrastructure. Backfilling of the trench usually occurs within 24 hours of duct installation. Trench depths range from 350 to 600 mm. Trench widths will depend on the trenching method employed, but can range from 50 to 100 mm. The trenching method employed and the depth and width requirements will depend on the soil conditions and location of other utilities infrastructure.

Micro-trenching, sometimes referred to as side-cut trenching or reduced cover trenching, is a form of small-scale trenching that is also used. Micro-trenching uses special machinery to trench at a reduced width of 50–80 mm and a depth of approximately 350 mm. Once the fibre is installed, the trench is backfilled with a flowable mortar mix that can be re-excavated. This method is preferred by industry because it is faster, cleaner and less invasive, and the trench can be more quickly remediated than in traditional trenching operations. The photos below demonstrate the difference between traditional trenching and micro-trenching.

Figure A2.8: Traditional trenching (left) vs micro-trenching (right)

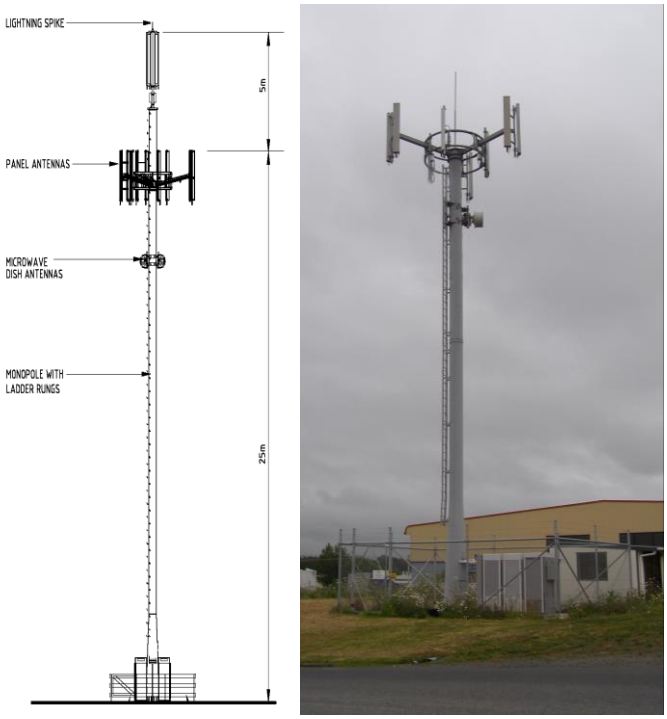
Source: Photos supplied by Chorus NZ Ltd

Mobile network infrastructure

Mobile network infrastructure consists of four basic components: antennas, masts, cabinets, and backhaul. ‘Antenna’ means any device that receives or transmits radio waves for radio-communication or telecommunication signals. ‘Mast’ means any pole, tower or similar structure designed to support antennas to facilitate telecommunications, radio-communications and/or broadcasting. The combination of all components is known as the cell site. A cell site will have a variety of components, including the cabinets, a mast, antennas, and ancillary equipment such as cabling, lightning rods and aerials.

A macrocell site located in an industrial or rural area is typically between 20 and 25 m tall, and may be built in a way that allows more than one telecommunications operator to have antennas on the mast; this is known as co-location. Figure A2.9 (diagram and photo) shows an example of a cell site built to support co-location.

Figure A2.9: Diagram and photo of monopole antennas modified to support co-location, installed in rural/industrial locations



Source: Diagram and photo supplied by Vodafone NZ Ltd

Cell sites tend to be smaller as they move into urban and suburban areas. A stand-alone cell site in a typical suburban–commercial area would be around 20 m tall and built on a slim-line monopole. Alternative solutions are to put antennas on top of pre-existing poles, such as light poles, or on top of a tall building. Figure A2.10 illustrates three different examples of antenna sites.

Figure A2.10: Examples of different installed antennas

a. Slim-line monopole, urban; ~20 m

b. Lamp-post site, suburban/residential; heights typically vary from 8 to 12 m

Rooftop site, urban/suburban; heights may vary between 3 and 5 m according to the building site

Source: Photos supplied by Vodafone NZ Ltd

Mobile telecommunications operators may also use small-cell units to fill in network coverage gaps in urban areas. Small-cell units are box-shaped, with the antenna integrated into a single unit. They can be deployed on buildings, street poles, signs, bridges and the like. Figure A2.11 shows a typical small-cell unit that is attached to a pole. The dimensions of this unit are 700 mm height x 500 mm width x 300 mm depth, with a volume of 0.11 m^3.

Figure A2.11: An example of a small-cell unit

Source: Photo supplied by Vodafone NZ Ltd

Other types of small-cell units may include micro-cells or pico-cells, which can be attached to lamp posts or bus stops.

Figure A2.12: A pico-cell installed on top of a lamp-post

Source: Photo supplied by Vodafone NZ Ltd

A mobile network uses radio waves and antennas to receive or transmit telecommunications signals. The signal is then transferred, via a cable, down a mast to infrastructure housed in a cabinet, and then on to the fixed network. A cabinet is generally defined as casing containing equipment that is required to operate a telecommunications network. This equipment may include electronics equipment, batteries, line terminals, and cooling systems such as heat exchanges and fans.

Under the current NESTF, cabinets are subject to size and noise emission limitations. Depending on the telecommunications operator, the dimension of cabinets can vary from 900 to 1800 mm high, 600 to 860 mm wide, and 500 to 1650 mm deep. There may be one cabinet or several located at a single site. The maximum total footprint must be less than 2 m². Cabinets can be a variety of colours, including green, white and grey, depending on the surrounding environment.

Figure A2.13: Cabinets installed by 2degrees NZ Ltd

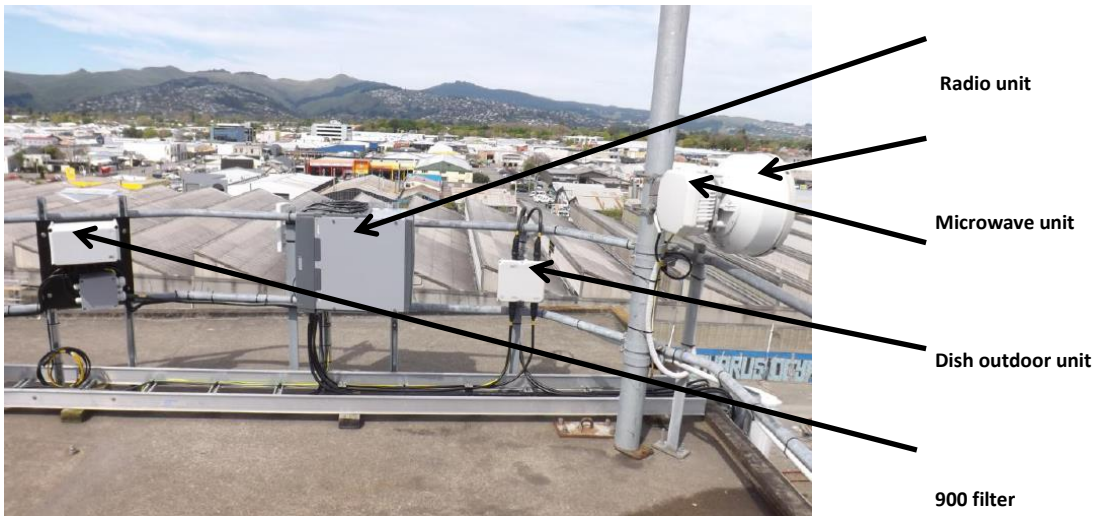
Source: Photo supplied by 2degrees NZ Ltd

Figure A2.14: A fixed network street cabinet

Source: Photo supplied by Vodafone NZ Ltd

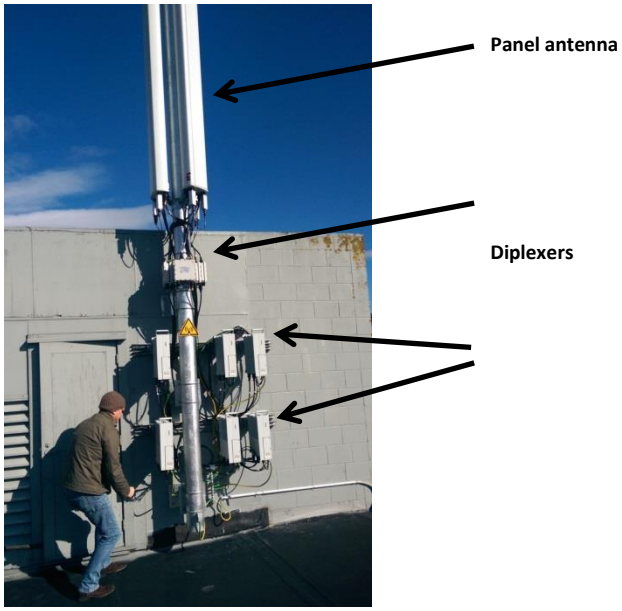
In some sites (eg, roof tops), some equipment may be installed outside of a cabinet. This type of ancillary equipment is small and discretely located.

Figure A2.15: Examples of ancillary equipment installed on a roof-top site



Source: Photo supplied by Vodafone NZ Ltd

Figure A2.16: Example of a rooftop antenna installation



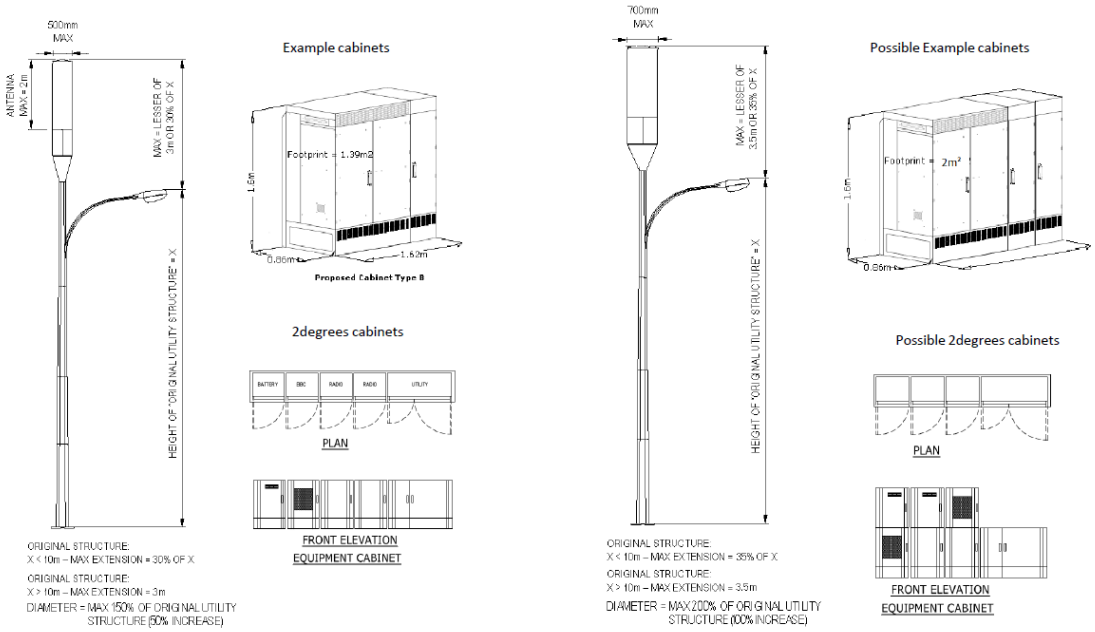
Source: Photo supplied by 2degrees NZ Ltd

The signal is then sent through the backhaul component – usually a microwave antenna, or copper or fibre cabling that is linked to an exchange. A signal, in the form of mobile data or a phone call, may travel across a combination of antennas and fixed-line backhaul routes. To maintain a functioning network with wide coverage, all of these pieces of equipment need to be in place.

Mobile telecommunications facility upgrades

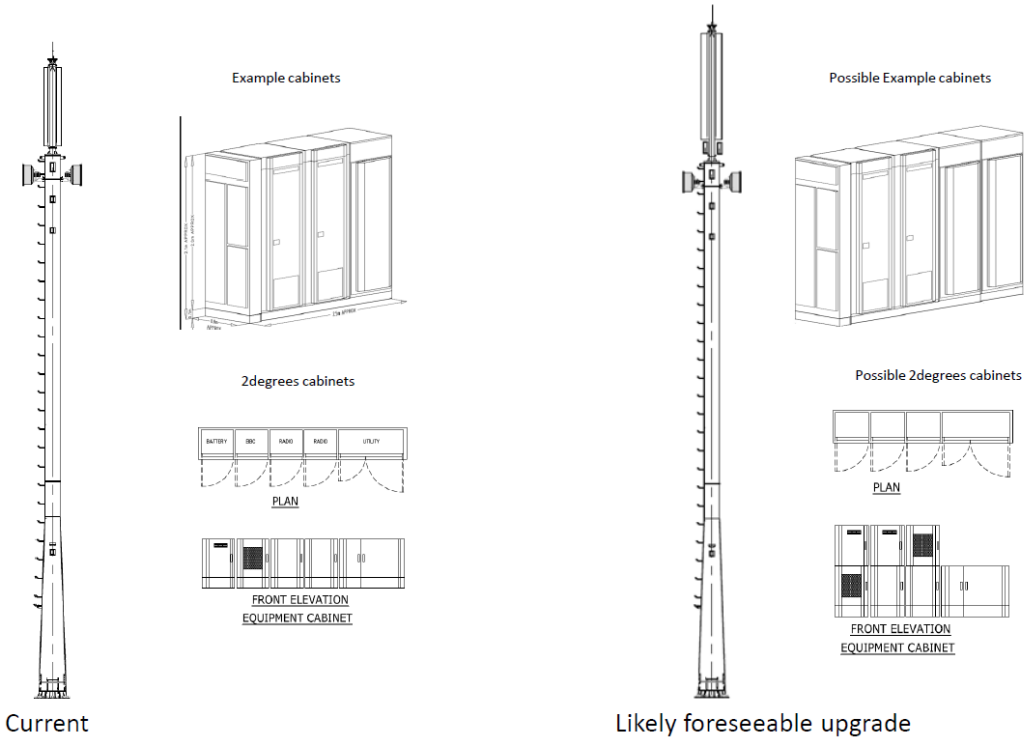
Antennas being upgraded to provide service across a wider array of technologies and/or frequencies (eg, to accommodate the new 700 MHz spectrum and 4G capability) may need to be larger than the currently installed antennas. It is estimated that 4G antennas will need to be 35 per cent taller and 40 per cent wider than 3G antennas, and will require the mast structure to be replaced or reinforced accordingly. These new/upgraded antennas are also likely to require additional and/or replacement cabinets to support the upgrades. Figure A2.17 illustrates some of the proposed changes in dimensions that will be required to support the new technology.

Figure A2.17: Diagrams of new light-pole antenna and cabinet requirements



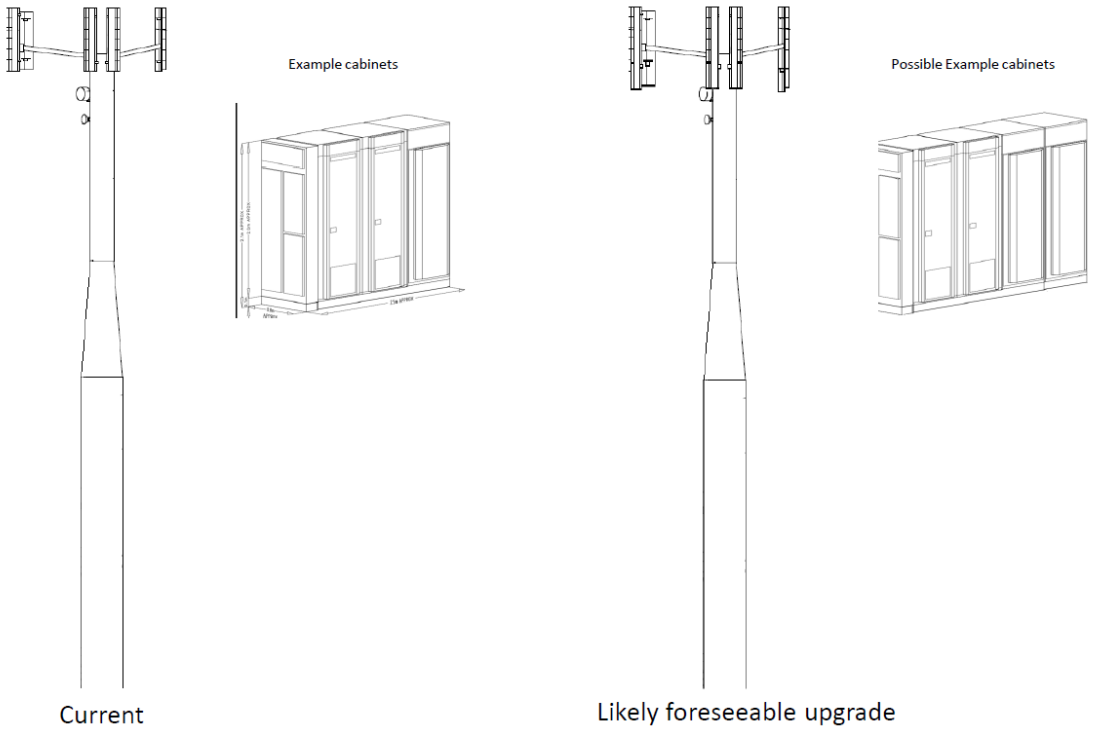
Source: Diagrams supplied by 2degrees NZ Ltd

Figure A2.18: Diagrams of new macro-sites and monopole antenna and cabinet requirements



Source: Diagrams supplied by 2degrees NZ Ltd

Figure A2.19: Diagrams of new macro-sites: armed monopole antenna and cabinet requirements



Source: Diagrams supplied by 2degrees NZ Ltd

Glossary

4G-LTE Fourth generation long-term evolution: the next generation of mobile technology. 4G-LTE is a mobile broadband service that is capable of speeds up to 10 times faster than 3G mobile data networks. The term '4G' is commonly used interchangeably with 'LTE'.

Act Resource Management Act 1991, unless the context implies otherwise.

Ancillary equipment Used in this discussion document to refer to additional equipment immediately associated with the telecommunications infrastructure referred to (eg, remote radio units, remote radio heads, combiners, mast head amplifiers, diplexers, power units, fibre units).

Antenna As defined in the NESTF, antenna:

(a) means a device that—

  (i) receives or transmits radiocommunication or telecommunication signals; and

  (ii) is operated by a network operator; and

(b) includes the mount, if there is one, for the device; and

(c) includes the shroud, if there is one, for the device.

Archaeological site As defined in the Historic Places Act 1993,

… any place in New Zealand that—

  (a) either—

    (i) was associated with human activity that occurred before 1900; or

    (ii) is the site of the wreck of any vessel where that wreck occurred before 1900; and

  (b) is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand

  (c) includes a site for which a declaration is made under section 43(1) of the Heritage New Zealand Pouhere Taonga Act 2014.

Note that archaeological sites may contain above-ground or buried archaeological material, and can include buildings and structures.

Backhaul The capacity between nodes in a network.

Broadband A very general term that refers to the wide bandwidth, or high capacity, of a connection.

Cabinet	Defined in the NESTF to mean "a casing around equipment that is necessary to operate a telecommunication network". In general terms, a cabinet is an equipment casing, operated by a telecommunications operator, usually set on a concrete foundation plinth and used primarily for the purposes of operating a telecommunications network. The cabinet may contain telecommunications equipment, batteries, line terminals, and cooling systems such as heat exchangers and fans, and other devices and equipment that are required to operate a telecommunications network. Furthermore, 'cabinet' means either an individual cabinet or a cluster of cabinets, provided that in the case of a cluster these cabinets are dependent on each other to provide a service, that the spacing between the adjacent cabinets is no more than 500 mm, and that the total dimensions of all cabinets (excluding the space between the cabinets) does not exceed the maximum height and area restrictions set out in the NESTF.
Copper	The original telephone network is a copper network. It allows electrical currents to flow, and was designed exclusively for telephony. The copper network will eventually be replaced by a new fibre network.
Crown	Defined in section 2 of the Public Finance Act 1989 as: (a) means the Sovereign in right of New Zealand; and (b) includes all Ministers of the Crown and all departments; but (c) does not include— (i) an Office of Parliament; or (ii) a Crown entity; or (iii) a State enterprise named in Schedule 1 of the State-Owned Enterprises Act 1986; or (iv) a Schedule 4 organisation; or (v) a Schedule 4A company; or (vi) a mixed ownership model company.
Crown agent	A statutory entity named in Part 1 of Schedule 1 of the Crown Entities Act 2004.
Distribution network	The cable/lines running down the street; also known as the communal network.
District plan	A plan approved by a city or district council pursuant to the Resource Management Act 1991 setting out rules concerning the use of land.
Earthworks	The disturbance of the surface of land by activities including blading, tracking, boring, contouring, ripping, moving, removing, stockpiling, placing, replacing, recompacting, excavating, cutting and filling earth (or any other matter constituting the land, such as soil, clay, sand or rock).
Feeder breakout point	A type of cabinet, sometimes buried underground, which serves as a connection point between the fibre feeder cables and the fibre distribution cables; also known as a fibre flexibility point.

Feeder cables	Cables that are necessary for the operation of antennas.
Feeder fibre	The fibre that runs from the exchange or central office to the fibre flexibility point.
Femtocell	A small, low-power cellular base station, typically designed for use in a home or small business which allows service providers to extend service coverage indoors or at the cell edge, especially where access would otherwise be limited or unavailable.
Fibre access terminal (FAT)	The interconnection point between the fibre distribution cable and the customer's lead-in.
Fibre flexibility point	A type of cabinet, sometimes buried underground, which serves as a connection point between the fibre feeder cables and the fibre distribution cables. Also known as a feeder breakout point.
Fibre-optic, or fibre	An optical fibre is a very thin strand of glass that is used to transport information via a beam of light.
Historic heritage	As defined in the Overseas Investment Act 2005, (a) means those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, deriving from any of the following qualities: (i) archaeological: (ii) architectural: (iii) cultural: (iv) historic: (v) scientific: (vi) technological; and (b) includes— (i) historic sites, structures, places, and areas; and (ii) archaeological sites; and (iii) sites of significance to Māori, including wāhi tapu; and (iv) surroundings associated with the natural and physical resources.
Lead-in	A connection from the distribution network to the customer's premises, also known as provisioning / drop lead.
Mast	Any pole, tower or similar structure designed to support antennas to facilitate telecommunications, radio communications and/or broadcasting.
NES	National environmental standard(s); regulation(s) made under the Resource Management Act 1991.
NESTF	Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2008.

Network operator	Defined in section 5 of the Telecommunications Act 2001 to mean a person who has been declared by the Minister for Communications to have network operator status pursuant to section 103 of the Telecommunications Act 2001.
NPS	National policy statement(s); national policies made under the Resource Management Act 1991.
Original utility structure	Defined in the NESTF to mean a power pole, street-light pole, traffic-light pole, or structure like those kinds of poles, as it is before any of the following happens to it: (a) an antenna is added to it; or (b) it is modified to enable an antenna to be added to it; or (c) it is replaced to enable an antenna to be added to the replacement.
Permitted activity	An activity that can be undertaken without a resource consent from the relevant city, district or regional authority.
Provisioning	A connection from the distribution network to the customer's premises; also known as lead-in / drop lead.
RBI	Rural Broadband Initiative: the programme to develop enhanced broadband infrastructure in non-urban areas of New Zealand with the support of Crown grant funding.
Replacement utility structure	Defined in the NESTF to mean: (a) an original utility structure that has an antenna added to it; and (b) an original utility structure that— (i) is modified to enable an antenna to be added to it; and (ii) has an antenna added to it; and (c) a replacement of an original utility structure that— (i) replaces the original utility structure to enable an antenna to be added to the replacement; and (ii) has an antenna added to it.
RMA	Resource Management Act 1991.
Road reserve	(a) A street and any other place to which the public have access, whether as of right or not; and (b) Land that is vested in a local authority for the purpose of a road as shown on a deposited survey plan; and (c) All bridges, culverts, ferries, and fords that form part of any road, street, or any other place referred to in paragraph (a) or paragraph (b).
Sensitive land use	Includes the use of land for a childcare facility, school, residential building, or hospital.

Site	For the purposes of the NESTF, 'site' will be defined as a geospatial area where cabinets are located.
Structure	For the purposes of this discussion document, 'structure' encompasses the mast, antenna and concrete plinth.
Telecommunications cable	(a) means a wire or cable used for telecommunication; and (b) includes any hardware associated with the wire or cable.
Telecommunications operator	Used in this discussion document to include network operators and the Crown and Crown agents when operating telecommunications networks.
UFB	Ultra-Fast Broadband: as defined in 156AB of the Telecommunications' Act, the project to develop fibre-to-the-premises broadband networks connecting 75 per cent of New Zealand households, with the support of $1.5 billion of Crown investment funding. There are proposals to increase the UFB footprint to reach 80 per cent of New Zealanders. However, policies regarding this expansion are yet to be determined.
Utilities Access Code	The *National Code of Practice for Utility Operators' Access to Transport Corridors*, made under the Utilities Access Act 2010.