



Northern Rivers Joint Organisation
Mobile coverage issues, opportunities, and advocacy
Priorities Report



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1. Mobile Networks Overview

The Infrastructure challenge in Australia

Building and maintaining mobile network infrastructure is capital intensive and Mobile Network Operators (MNOs) face an ongoing infrastructure investment challenge. Mobile Networks involve capital investment and fixed operating costs which represent a significant proportion of the total costs to be borne by the industry and its customers.

As referenced by the ACCC, the high costs involved in expanding mobile network coverage and service quality is correlated to Australia's highly urbanised population, where revenues from the provision of mobile services to regional and rural customers diminish as population density decreases. These costs are further exacerbated by the need for MNOs to continually deploy new network technologies to market quickly, such as 5G, while earlier network investments become redundant (e.g. 3G).

The investment decision of expanding mobile network infrastructure is typically a function of –

1. The level of utilisation of mobile network infrastructure which impacts the business case for infrastructure investment and the ongoing cost of mobile service provision to recover such investment
2. The nature of mobile service provision which requires MNOs to offer services and maintain network infrastructure across a wide coverage area that is inconsistent with customer utilisation of the network. Increasingly, customers expect to be able to access mobile services in rural and regional areas, including where they travel from urban areas to rural and regional areas

3. Increased consumption of data as newer generations of mobile technology support more data intensive apps and services consume more bandwidth, meaning MNOs face continuing investment demands after the initial deployment of new generations of mobile technology to address these capacity constraints.

Due to the low returns from building network infrastructure in sparsely populated regional and rural areas, the commercial incentives to roll out network infrastructure in these areas are typically lower than in metropolitan areas. Consequently, co-contribution funding is likely to be a key driver for MNOs when considering expanding mobile coverage. As a result, local, state and federal governments have developed co-contribution programs from time to time to provide subsidies to network operators to roll out infrastructure in these areas.

Co-contribution programs, like the Federal Mobile Black Spot Program (MBSP), provide incentives to invest in areas where there is either inadequate or no mobile coverage. However, the design of these programs often means that governments are generally subsidising the capital component and individual commercial entities without requiring broader benefits to be shared by consumers.

Mobile Network Operators

Telstra

Telstra supplies fixed and mobile voice and broadband services in Australia. Telstra also owns and operates its own mobile network, which covers around 99.5% of the Australian population.

Telstra plans to deliver 95% population coverage for 5G by FY25, which includes a 100,000 km² increase in its 4G / 5G mobile footprint. This coverage will be supported by Telstra's continued 5G rollout and the doubling of metro cells to increase density for greater capacity and speed. As a result, Telstra expects 80% of all mobile traffic to be on 5G by FY25.

Telstra will extend its 4G coverage to 100% of its mobile network by June 2024, enabling it to lead in composite coverage, speed and performance for 4G and 5G as it closes the 3G network.

Optus

Optus supplies fixed and mobile voice and broadband services over its wholly owned and operated network. Optus has the second largest number of subscribers in mobile services and covers around 98.8% of the Australian population.

Optus planned to commence a network refresh from April 2022, under which it will reallocate its 2100MHz spectrum assets (currently used to support 3G technology) to provide a better 4G network experience and provide for the growth of 5G.

TPG Telecom (Vodafone)

TPG merged with Vodafone on 13 July 2020 to be the third largest telecommunications provider in Australia, through the provision of fixed and mobile voice and broadband services.

TPG owns and operates its own 3G / 4G network in major metropolitan areas. Its coverage of 3G / 4G in regional and urban fringe Australia comprises approximately 725 sites and a 3G roaming agreement with Optus. TPG has made limited investments in regional Australia in recent years, focusing more on the 5G roll out in the metropolitan areas.

Spectrum Types Deployed

An MNO typically uses a range of radiofrequency spectrum bands for the purpose of providing mobile services. The spectrum an MNO deploys at each of its mobile sites is one of the factors that may impact end-user experience. Radiofrequency spectrum can be used across a variety of technologies including 3G, 4G and 5G and can also be repurposed or re-farmed over time to support a different technology. Generally, spectrum is classified into three categories – low band, mid-band and high band. Each band serves a different purpose in the MNOs' networks and the equipment at a mobile site can support the use of multiple bands at the same time.

Low band

- Radiofrequency bands less than 1 Gigahertz (GHz) or 1,000 Megahertz (MHz).
- Typically used by a mobile network to provide the primary coverage layer and also provides capacity.
- Can transmit information over greater distances and through obstacles such as buildings and trees more easily than higher frequencies. This means it is ideal for providing mobile services in sparsely populated regional and remote areas. It also allows for the

deployment of a smaller number of sites, as a given site provides coverage over a greater geographical area.

Mid-band

- Refers to radiofrequency bands between 1 GHz and 6 GHz.
- Typically deployed to supplement low-band spectrum.
- Information sent and received through mid-band spectrum can only occur over shorter distances than that of low band spectrum, meaning an MNO may need to build more sites when using this spectrum compared to low-band, to cover areas of the same size.
- Is likely to have a larger amount of spectrum available than in the low band, and hence a higher capacity, which makes it very useful in more populated and congested areas.

High band

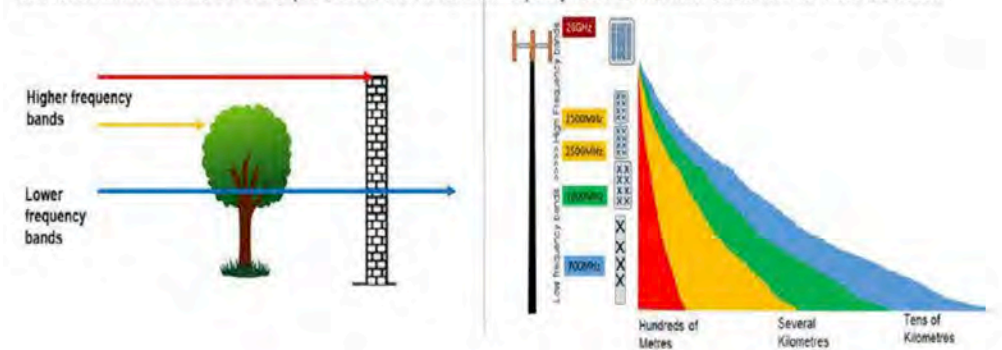
- High band spectrum generally refers to radiofrequency bands greater than 6 GHz.
- The distances information can travel using high band spectrum is less than both low band and mid-band spectrum. The notable characteristic of this frequency band is that it delivers very short range, mainly line of sight coverage. This is combined with significant capacity, due the large amount of spectrum available, for very high-speed data transmission, making it ideal for use in heavy-traffic areas.

The capacity of a network depends on the quantity of spectrum available in a band, not on the frequency of that band. That is, the same quanta of spectrum in the low band can provide the same capacity as the same quanta of spectrum

in the mid or high band. However, because larger amounts of spectrum are available in the higher bands those bands are likely to have greater capacity.

As shown in the diagram below, low band spectrum is more important in regional and rural areas because its signal carries further and can penetrate obstacles, such as trees.

Higher frequency spectrum has a smaller coverage foot print and is more susceptible to obstructions. The high capacity that comes with higher frequency bands is important but requires sites to be located in close proximity to users. Lower frequency bands can reach further in distance and depth indoors and hence their capacity reaches the most customers for most use cases.



Each of the three MNOs have spectrum in the low band and mid band ranges in regional Australia, including the Northern Rivers JO region, shown below

Spectrum Band	Telstra (MHz)	Optus (MHz)	TPG (MHz)
700 MHz	2 x 20	2 x 10	2 x 15
850 MHz	2 x 25	0	2 x 5
900 MHz (from July 2024)	0	2 x 25	0
1800 MHz	2 x 35 to 2 x 40	2 x 20 – 2 x 25	2 x 10 – 2 x 20
2100 MHz	2 x 10	2 x 5	2 x 5
2300 MHz	0	0	0

Spectrum Band	Telstra (MHz)	Optus (MHz)	TPG (MHz)
2600 MHz	2 x 40	2 x 20	0
3600 MHz	50 – 82.5	30 – 67.5	20 – 45
26000 MHz	1000	800	600

Telstra and TPG no longer offer 3G on their 2100 MHz spectrum, while Optus has announced it will redeploy its 2100 MHz for use with 4G and 5G services in April 2022. Whilst focusing on expanding network and service offerings on the 4G and 5G networks, all three MNOs will continue to offer 3G services using lower frequency spectrum (such as 900 MHz). Telstra has announced that it plans to switch off its 3G services in June 2024. The spectrum that TPG uses for 3G services expires in June 2024.

Telstra TPG Network Sharing Agreement

Telstra and TPG Telecom have announced a ten-year regional Multi-Operator Core Network (MOCN) commercial agreement, which will provide TPG Telecom subscribers with 4G and 5G services within a defined coverage zone across regional and urban fringe areas.

Under the deal TPG Telecom will gain access to around 3,700 of Telstra's mobile network assets, increasing TPG Telecom's current 4G coverage from around 96 per cent to 98.8 per cent of the population.

Telstra will gain access to TPG Telecom's spectrum across 4G and 5G, which will allow it to grow its network, increase capacity and continue to provide the country's largest and fastest network.

Under the MOCN arrangement Telstra will share its Radio Access Network (RAN) for 4G and subsequently 5G services in the defined coverage zone, however both carriers will continue to operate their own core network where key differentiating functionality resides.

Telstra will also obtain access to and deploy infrastructure on up to 169 TPG Telecom existing mobile sites, improving coverage for TPG and Telstra customers in the zone.

In December 2022, the ACCC announced it will not authorise the Telstra/TPG deal, highlighting concerns over the long-term impact on infrastructure-based competition and concentration of spectrum ownership as reasons for the refusal. It concluded the deal would reduce overall incentives for regional mobile investment and concentrate control of spectrum in Telstra's hands, outweighing the deals benefits.

Telstra and TPG have sought a Federal Court review. Based on the precedent of the TPG/Vodafone merger case, a case might take around 9 months, imposing almost a year of industry uncertainty.

Competition with NBN

The three mobile providers (Telstra, Optus and TPG Telecom (Vodafone)) are operating in a competitive and profitable part of the telecommunications market and they invest more in their mobile technology than in any other area since the advent of the NBN. This market changes technology platforms increasingly often (3G, 4G and now 5G) to meet market demand for data driven services for smart phones and tablets. The current significant investment in the rollout of 5G technology from 2019 will deliver significantly faster

download speeds (greater than 200Mb/s) to mobile devices. Many in the industry consider the advent of 5G services will support many broadband demand requirements and reduce the demand for fixed services such as those delivered by the NBN.

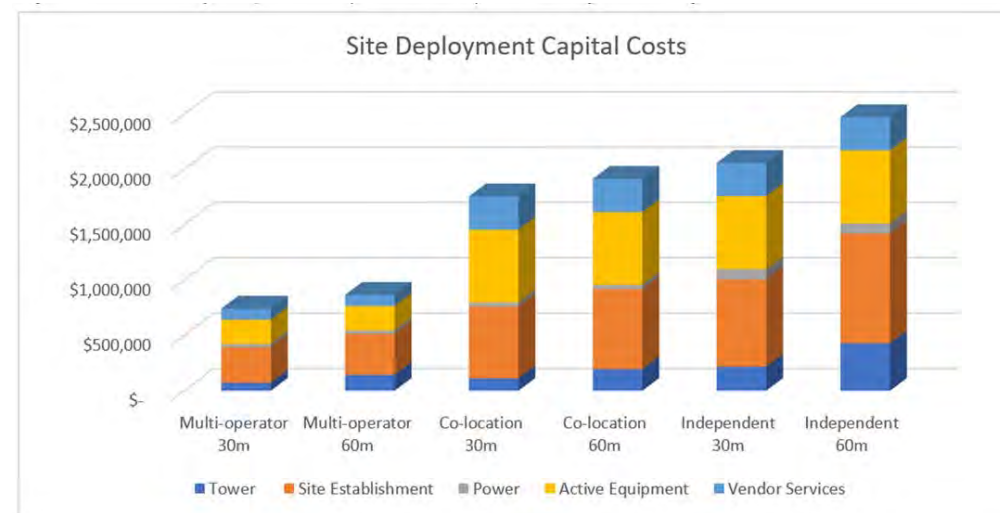
While this potential competition with the NBN is speculative, it will be a potentially valuable alternative to NBN services, especially where they offer limited access technology options.

In order to deliver 5G services, many more base stations are needed due to propagation limitations and to conserve radio spectrum and this expensive development of service providers' networks will probably not be economic in some regional areas due to the poor economies of scale.

Network Deployment Costs

This section provides data on the cost associated with deploying a mobile site in an area that is likely to have inadequate coverage. Unfortunately, there is no single solution that can be applied uniformly in all cases. The characteristics of the coverage area will always dictate the design of the solution. Often, the ideal topographic location for a tower may pose challenges such as limited access, power, backhaul, or site acquisition. Due to the many trade-offs involved, a taller tower located in a more convenient location may be required to provide adequate coverage of the target area. In such cases, this compromise would be necessary to ensure the desired coverage of the area is achieved.

Capital Costs



1. Tower - In the deployment of mobile networks, a range of tower types can be used depending on factors such as site location, required height, and amount of equipment to be installed. Monopoles, which are concrete or metal poles typically ranging from 20m to 40m in height, are commonly used in urban and peri-urban areas. In remote areas where visual impact is less of a concern, lattice towers or guyed masts with heights exceeding 100m may be used. A higher tower can result in better coverage as radio signals are affected by hills or obstructions.
For serving mobile blackspots, a 30m monopole or 60m lattice tower are commonly used as models. The cost of a tower can increase up to two-fold in challenging terrain due to more complex engineering and footings and earthing. The strength of a tower can vary based on its

intended use, with a tower built for a single mobile infrastructure or neutral carrier host being less expensive than one designed to carry the load of infrastructure from multiple carriers.

2. Site Establishment – The cost of establishing a new mobile network site can vary significantly depending on the specific customer requirements and the location of the site. To determine the complexity of the build, a rigorous Site Acquisition, Environmental & Design (SAED) process is employed. This process helps to identify the Site Make Ready (SMR) costs, which include solution design, location mobilization, foundation requirements, access tracks, and power runs.

The design and planning for tower deployment is a comprehensive process that involves several activities. The cost of this process is impacted by the type of landowner (government, corporate or private), any potential native title matters, and the complexity of town planning approval, regulatory compliance application, and approval processes.

In addition to material supply costs, such as towers, steel, technical equipment, and shelters, significant costs are often incurred during the construction stages to mobilize heavy equipment and towers to the site. The construction of a tower site can take several weeks to complete, which means that for locations outside metropolitan areas, there may be additional accommodation and allowance costs while workforce personnel are away from home.

3. Power – When connecting a new tower location to mains power, underground trenching or new aerial links are typically required. In remote site locations, trenching costs can be substantial and involve

the approval processes necessary to run cables across third party, government, and native title land. In locations where the mobile network operator's (MNO) power requirements exceed the existing grid capability, which is common for remote and regional locations, there may be substantial energy infrastructure contributions payable to power distributors to upgrade supply. These costs can exceed \$1 million, making a site commercially unviable.

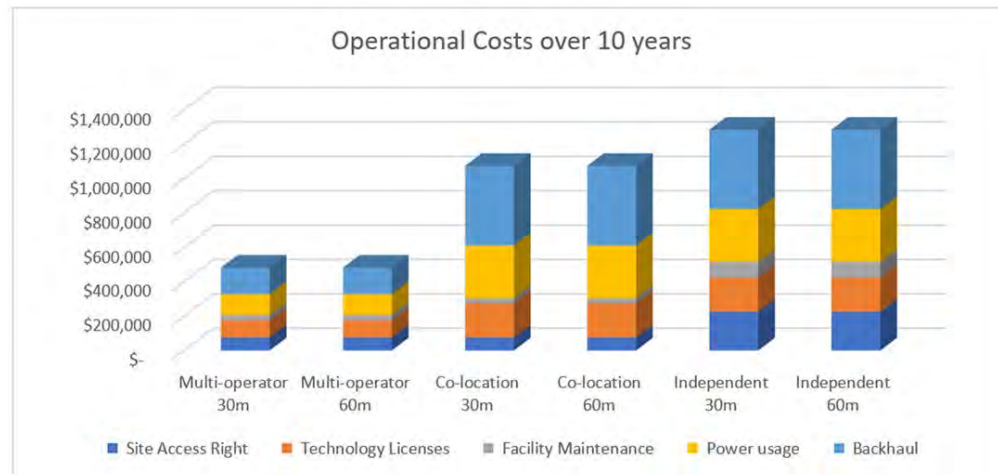
In such cases, solar power can be a more practical option, with the cost of powering a site through solar being approximately \$250,000. However, asset theft in remote locations remains a common problem.

4. Backhaul – At a mobile site, the primary focus of the equipment installed is to communicate with customers' devices. However, once the traffic reaches the tower, it must be passed into the larger telecommunications network. This is typically accomplished through either an optical fiber connection or a microwave link. The cost of this connection can vary widely depending on the site location and its proximity to existing infrastructure that can support interconnection. Significant ongoing operating costs are likely to be associated with the carriage of this traffic. These costs can include maintenance and upgrade expenses, as well as the cost of leasing or installing new infrastructure.
5. Active Equipment – The active equipment passes mobile data traffic and controls the mobile network.
6. Vendor Services - In Australia, equipment vendors, typically Nokia and/or Ericsson, work closely with mobile network operators to set up and ensure the performance of the network. This involves generating

a high-level design for the specific site and, once constructed, integrating it with other sites in the local area. The equipment vendor plays a vital role in guaranteeing the performance of the network and works closely with the operator throughout the process.

Operational Costs

The ongoing operational costs of a mobile network site are of equal importance to the capital costs incurred by the facility operator. While these costs may not be critically important for a high-capacity metropolitan site, they can be a significant consideration for comparatively low-usage blackspot areas where revenue is lower. In such cases, the operational cost over ten years can be comparable to the original capital cost. Thus, it is important to factor in ongoing operational costs when evaluating the financial viability of a mobile network site, particularly in areas with lower usage rates.



Setting up and operating a mobile network site incurs several ongoing costs that are critical to the financial viability of the site. These costs include:

1. **Site Access Right** - Entering into a ground lease with the property owner is essential to enable the tower build and guarantee ongoing access for site operators. The cost of these leases varies considerably depending on the owner (private or government entity) and location. They typically include rental escalations and terms related to site maintenance.
2. **Licences** - Recurring licensing fees are typically correlated to the number of "cells" used in most mobile network hardware. A "cell" refers to the use of a particular frequency channel transmitted in a specific direction. Point-to-point licenses obtained from the Australian Communications and Media Authority are required for any backhaul links.
3. **Facility Maintenance** - Maintenance is required on all sites to ensure the tower remains robust, obtain certifications for safety equipment, keep the compounds weed-free, repair any damage, sometimes resulting from vandalism, and maintain any access roads.
4. **Power** - The power consumption of a mobile site can be significant, with 4-10kW per operator being consumed, depending on the amount of equipment deployed. This can result in annual electricity costs approaching \$20k per site for each carrier. However, in blackspot areas, consumption is likely to be at the lower end of this range due to lower demand and power draw.

5. Backhaul - Most blackspot locations are unlikely to be in close proximity to existing optical fibre routes. Therefore, in most cases, a new blackspot site will require a microwave connection to an existing (upstream) mobile site, which will already have a backhaul path into the core of the network. Costs for backhaul will include co-location on the upstream site to install the remote end of the new microwave link and an ethernet service from that site back into the core of the network.

Active Components of a Mobile Tower Site

Regardless of the equipment vendor, a mobile site will always consist of the same basic elements:

1. Antennas - These are the most visible parts of the system and come in various shapes and sizes, depending on the network's spectrum and capacity requirements. Common antennas are panels approximately 50cm wide and 1.5m to 2.8m long, covering 120 degrees. Modern multiband antennas accommodate the wide range of frequencies used by carriers.
2. Radios - These devices generate the signals sent to the antennas. Different radios are required based on the spectrum used, and each radio can typically generate several concurrent data streams to end-users.
3. Baseband - This unit controls the mobile site, managing all the radio functions and traffic, features, and high-level functions of the network. A baseband unit can be shared among several sites, but it

must communicate with the radios with minimal delay. For remote locations, a baseband for each site is necessary to avoid delays.

4. Router - While not strictly necessary, a router is typically used to help bring traffic from a site back into the core of the network, depending on the site's location within a larger network architecture.
5. Backhaul - Traffic from a site must be sent into the larger network before reaching its destination. A separate non-mobile network is required to carry this traffic. Most mobile towers use a connection to a fiber-optic cable for backhaul, while more remote sites use a wireless point-to-point microwave link consisting of an antenna and radio on the tower and a similar setup at an upstream site.

2. Future State Digital Infrastructure


Digital Infrastructure technologies are rapidly evolving





The days of dial-up, when the internet moved at a glacial pace, are now a distant memory. Today technology heeds our commands at the touch of a button. But even in urban areas, the digital world is not as fast and responsive as it could be. Calls still drop, connections go down, large files fail to download, and videos freeze for buffering.

All that is about to change, and quickly, thanks to the next generations of fixed and mobile connectivity as well as the proliferation of some existing technologies. More than any single advance on its own, it is the convergence of these developments that could enable new capabilities and create a more connected world.

In the coming years, connections could be 10 times faster, with a new level of reliability and stability. As latency improves by up to 50 times, applications will respond seamlessly to commands. Consumers could enjoy instant high-definition video streaming and even new types of immersive experiences with augmented and virtual reality.

Connectivity Technologies towards 2030

Connectivity Technology	Description	Applicability & timeline for Mallee Region
 Low to mid band 5G	High-speed, low-latency cellular connectivity overlay on existing 4G infrastructure	<ul style="list-style-type: none"> Highly applicable upgrade to all current 4G and 3G networks By 2025 for all Towns in Mallee Region

 Fibre to the Premise	High-speed, low-latency fixed networks that support other connectivity	<ul style="list-style-type: none"> Highly applicable upgrade to all current NBN in township areas By 2030 for all Towns in Mallee Region
 LPWAN	Low-power and low-maintenance networks that support high densities of connected devices	<ul style="list-style-type: none"> Highly applicable to Agricultural areas
 LEO Satellite	Global coverage with significantly reduced latency vs. existing satellite offerings	<ul style="list-style-type: none"> Highly applicable upgrade to NBN Satellite Dependent on NBN upgrading to LEO Satellite technology or alternative provider (i.e., Starlink)
 High band 5G	Highest speed, low latency, and highly secure cellular connectivity	<ul style="list-style-type: none"> Highly applicable enhancement to 5G networks By 2030 for all Towns in Mallee Region

Mobile (Cellular) 5G

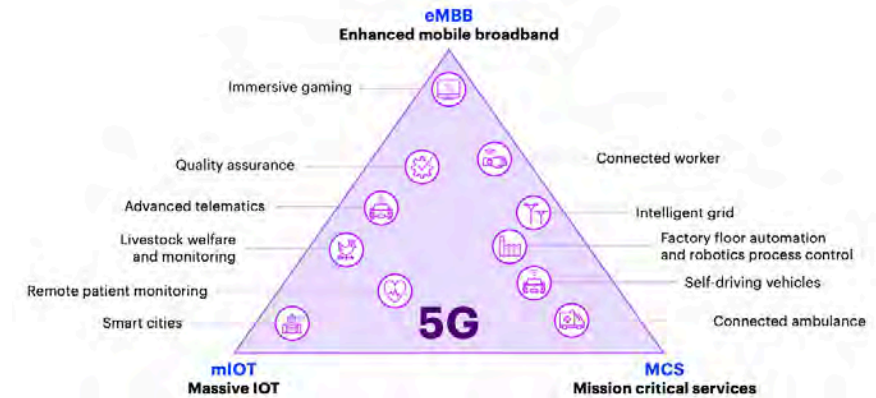
In terms of mobile coverage, providers are upgrading existing 4G infrastructure with low- to mid-band 5G network overlay. The end results of these upgrades will vary depending on the spectrum used and tower density. But in general, these low- to mid-frequency 5G networks can offer significant improvements in speed and latency, all while supporting a greater density of connected devices.

High-band (also known as millimetre-wave or standalone) 5G networks represent a step change in performance. Designed to be the most ultra-fast mobile option, high-band 5G promises to put the speed, latency, reliability, and security of fibre in the air, expanding what mobile devices can do. Because this requires a highly densified radio access network, an upgraded 5G core network, and upgraded network support systems, these networks are highly capital-intensive to build. Users will also need to upgrade to 5G-capable devices in order to experience the full benefits. Some companies will connect to commercially available services, while others may opt to build their own private 5G networks.

5G will lay the platform for the anticipated surge in connected devices and sensors by making more efficient use of spectrum and core networks than 3G and 4G technologies.

The improved connectivity offered by 5G will enable the potential of emerging technologies including augmented and virtual reality, autonomous vehicles, machine learning and robotics to be explored.

5G can better handle the increasing number of wireless devices being used simultaneously, so it will also facilitate greater use of Internet of Things (IoT).



IoT is currently enabled by 4G and other networks and in 2017 its adoption in the Australian consumer market rose by 55 per cent. In addition, government investment in and use of sensor technologies is becoming more compelling as they are capable of gathering more information and data, become self-powering and cheaper.

Business and industry use of IoT solutions is driving exponential growth and it is predicted that the existing 4G network will be unable to cope with the projected growth in data and devices - driving the need for 5G.

5G will require more sites than 2G, 3G or 4G because the radio spectrum used for 5G in metropolitan areas is generally higher frequency and less able to travel long distances than that used for earlier generations. 5G can be combined with other technologies such as 'edge computing' to deliver its potential. Edge computing is a distributed computing framework that brings enterprise applications closer to data sources (such as IoT devices or local edge servers), delivering faster insights, improved response times and better bandwidth availability.

	Low-band 5G 'Blanket' range	Mid-band 5G Sub 6 range	High-band 5G mmWave range
Spectrum used in Australia	850 MHz / 900 MHz	3.6 GHz	26 GHz
Sites required to fully cover a typical suburb with 5G	A couple Big, macro sites	A few Mix of macro sites and small cells	A few dozen A couple of macro sites and many small cells
Maximum reach	A few kilometres	Up to a kilometre	A few hundred metres
Coverage and wall penetration	Great Excellent propagation	Good Gets through walls	Poor Struggles to penetrate brick walls
Maximum speeds and latency	Fast Similar to 4G	Faster About 5–10 times faster than 4G	Lightning fast Up to 20–30 times faster than 4G
Ideal areas for deployment	Outer metro and regional	Metro and suburban	High-density urban and CBDs

Comparing 5G to other Technologies

	Wi-Fi 6	4G	5G
Latency	Several seconds	~55 milliseconds	<10 milliseconds
Mobility	Low	High	High
Coverage	10m (30 feet)	100m to km ^{1*}	100m to km ^{1*}
Bandwidth	High bandwidth ²	Up to 20MHz band ³	Up to 400 MHz ³
Security	Reasonably secured ⁴	Very secure ⁵	Very secure ⁶

With 4G, consumers can already stream media with fast download rates, but 5G takes this a step further. 5G has faster bi-directional connectivity and enhanced latency that can unlock many use cases across industries that 4G could not, such as augmented or virtual reality. 5G also offers several important benefits compared to WiFi-6. While WiFi-6 offers low cost and high speed, it lacks wireless mobility, reliability over wide-area coverage and the low latency benefits of 5G.

Fibre Optic

On the fixed line side, fibre optic networks continue to expand.

There are a few types of fibre connections:

- **Fibre to the Premises (FTTP)** – fibre optic cable is laid all the way to a home or business premises. High capacity services for businesses can be installed using a Point to Point architecture as compared to the NBN Fibre to the Premise which uses a Passive Optical Network architecture.
- **Fibre to the Curb (FTTC)** – fibre optic cable is laid to your kerb or driveway, and then connects to an existing copper phone line.
- **Fibre to the Node (FTTN)** – fibre optic cable is laid to a central point in a locality, and then connects to the existing copper phone line for each premise.
- **Fibre to the Building (FTTB)** – in an apartment building, fibre optic cable is laid to a central point, and then connects to the existing copper phone line for each apartment or office premises.
- **Cable (aka Hybrid Fibre-Coaxial, or HFC)** is a broadband technology that uses the sort of cable used by pay TV to connect you to the world wide web.

WIFI 6

Once a location is wired with fibre, the next generation of Wi-Fi (Wi-Fi 6) will improve speeds while supporting many more connected devices. Wi-Fi 6 will make the biggest difference in crowded environments such as airports, apartment buildings, theatres, stadiums, public spaces, and homes with multiple internet users and smart gadgets.

It also extends the battery life of smart devices and IoT sensors by employing “target wake time,” which recognizes higher data transmission times instead of continuously scanning for signals. Users need to have Wi-Fi 6-ready devices, however.

LPWAN

Low-power wide-area networks (LPWANs) provide connectivity over broader areas and longer ranges. Different protocols, such as LoRa, NB-IoT, and Sigfox, compete in this realm, with no clear winner at this stage. Since LPWANs require less power from the devices they connect, they could enable batteries in those devices to last 10 years or more. This could set the stage for billions of additional battery-powered devices and sensors to come online. Beyond network developments, IoT sensors themselves are becoming more sophisticated and robust. They can perform more complex tasks, from location tracking and temperature measurement to small-scale processing. Even as they gain capabilities, unit prices are rapidly declining.

LEO Satellites

Like 5G, Low Earth Orbit (LEO) satellites enable other technologies, but their viability is less certain. If successful, they could deliver a breakthrough—not necessarily in network performance but in breadth of coverage. They could cover parts of the world where the economics do not work for laying fiber or building networks of towers (although providing coverage requires a constellation of many satellites orbiting at once). LEO satellite constellations could potentially substitute for mobile backhaul in disadvantaged or remote areas, essentially beaming broadband down from above, and providing coverage to those who lack connectivity today. The next generation of LEO satellite constellations promise substantial improvements over versions launched in the 1990s. However, OneWeb and SpaceX are the only companies to launch test satellites (as of this writing), and no commercial services are yet available.

3. Northern Rivers JO region Analysis

This section provides an analysis of the change in Mobile Network Operator sites in the Northern Rivers JO region from 2018 to 2021.

Total Number of Sites by MNO

Northern Rivers JO region	2018	2022
Optus	60	82
Telstra	80	98
TPG	42	49

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Northern Rivers JO region	2018	2022
Optus		
900 MHz	56	79
2100 MHz	51	54
Telstra		
850 MHz	73	81
2100 MHz	13	0
TPG		
900 MHz	42	47
2100 MHz	39	12

Note – A single site may host multiple spectrum bands.

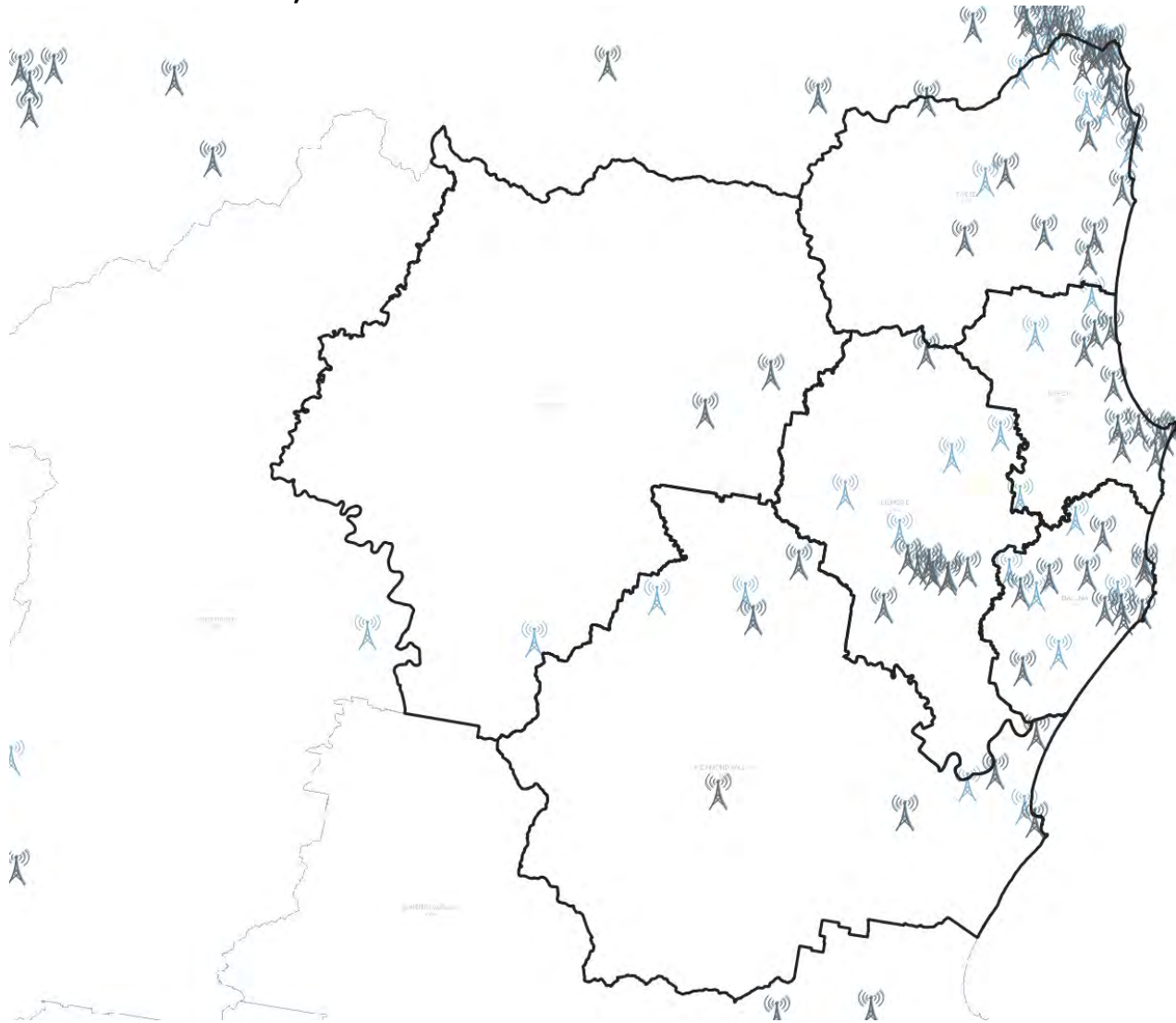
Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

Northern Rivers JO region	2018	2022
Optus		
700 MHz	53	76
900 MHz	1	20
1800 MHz	29	62
2100 MHz	14	49
2300 MHz	0	0
2600 MHz	34	46
3500 MHz	0	0
Telstra		
700 MHz	67	87
900 MHz	0	0
1800 MHz	41	48
2100 MHz	1	18
2600 MHz	6	18
TPG		
700 MHz	0	0
850 MHz	37	49
1800 MHz	15	19
2100 MHz	18	36
2600 MHz	0	0

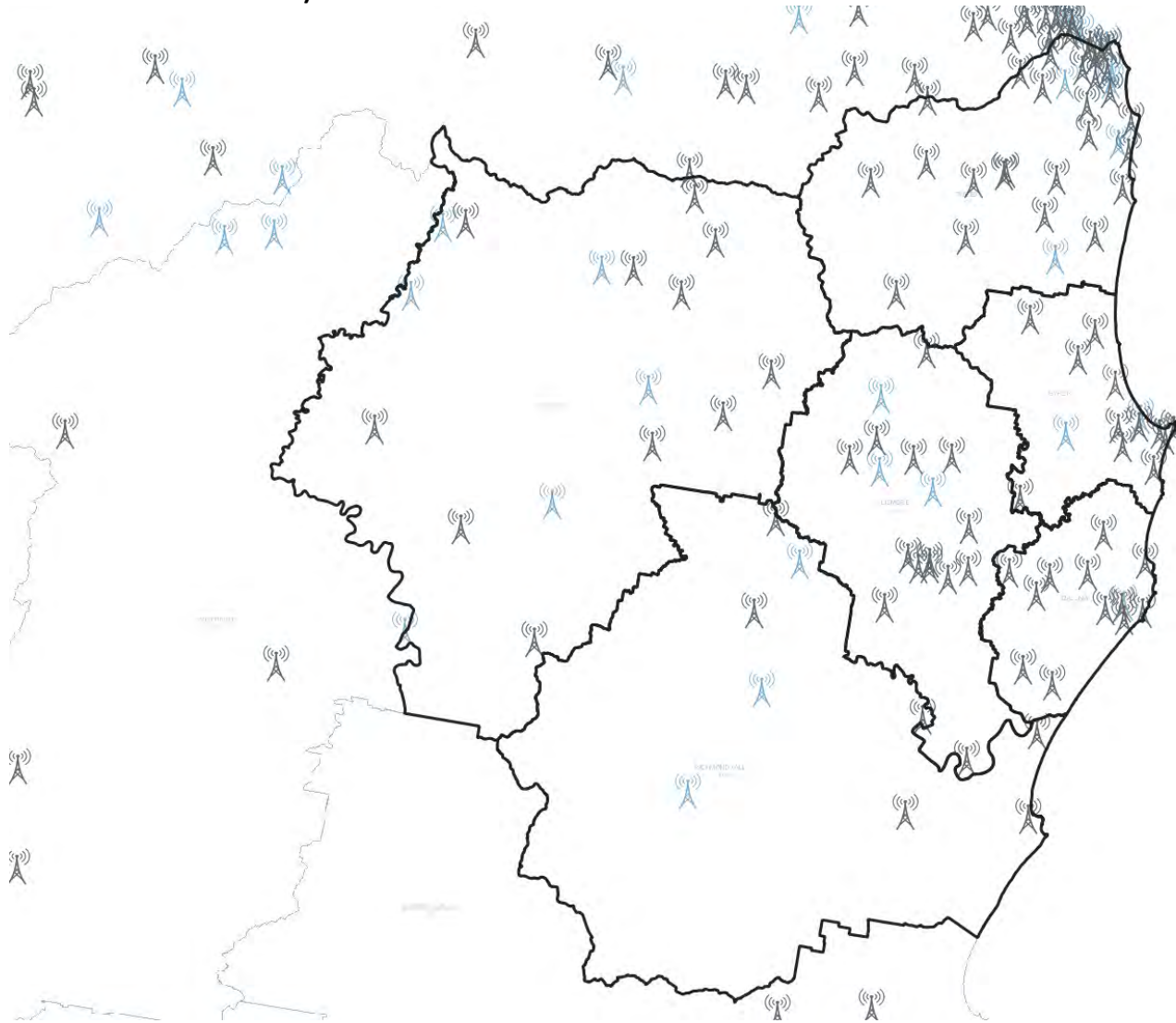
Total Number of 5G Sites by MNO

Northern Rivers JO region	2018	2022
Optus		
2100 MHz	-	5
2300 MHz	-	-
3500 MHz	-	-
26000 MHz	-	-
Telstra		
850 MHz	-	7
2600 MHz	-	-
3600 MHz	-	22
TPG		
700 MHz	-	1
3600 MHz	-	1

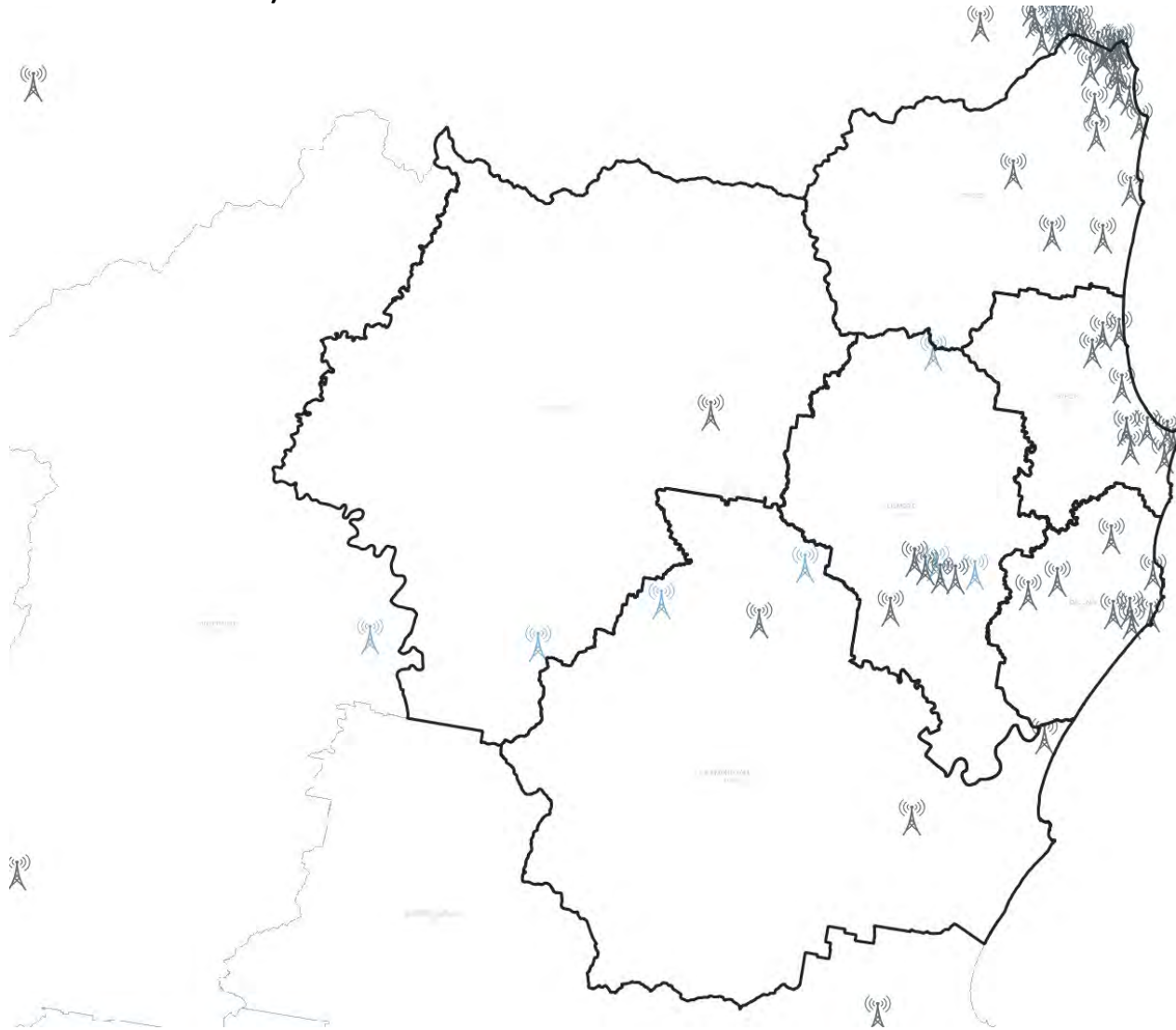
Optus (blue = new sites since 2018)



Telstra (blue = new sites since 2018)



TPG (blue = new sites since 2018)



4. Mobile Network Testing

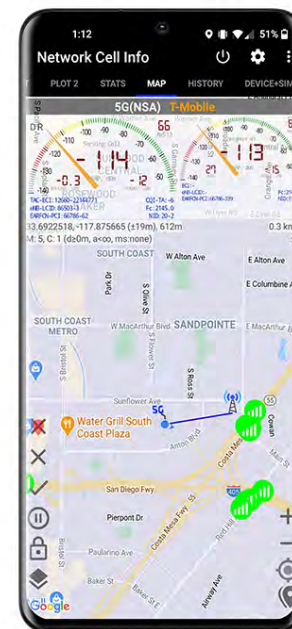
Mobile Network Testing

By using independent mobile testing technology, Gravelroad Group provides impartial user experience-based reports and recommendations. The methodology used by us to independently test mobile network performance and identify carrier blackspots has been developed over the last 10 years to provide results that describe the 'user experience'.

We used three Google Pixel 4a 5G handsets, as commonly used by members of the public, to capture information about signal strength and network performance for each of the national carriers - Telstra, Optus & Vodafone. This benchmarking process provides a rich methodology that has been acknowledged and respected by all major wireless service providers.

Other local governments have typically used the report and specific recommendations to advocate for increased funding by Federal, State governments together with each of the three national carriers – often through the Mobile Black Spot Program.

We have employed the only independent 3G, 4G and 5G Mobile Network coverage and capacity testing solution in the Australian Advisory market to collect rich and granular mobile network signal level readings (taken every 100 metres) to demonstrate both coverage and capacity across the Telstra, Optus and TPG Telecom (Vodafone) networks.



By providing the GPS location and current results in real time, testers can monitor and authenticate the testing accuracy in real time.

There are six simple principles used to inform our testing methodology:

- User experience based – we use handsets commonly owned by users rather than other more technical and theoretical approaches.
- Same handset, same settings – this provides an equitable basis for bench marking network performance.

- Simultaneous testing – all tests are carried out in the same vehicle – spaced to remove interference and completed at the same time in that location.
- Signal Strength – for 3G, 4G & 5G
- Network Performance Test – download, upload and latency

Signal Strength

We have tested mobile signal strength for each of the three mobile network operators (Telstra, Optus and Vodafone) in both 3G, 4G and 5G modes at approx. every 100m as per the maps in this report. This methodology will comprehensively demonstrate the quality of coverage by carriers in each area tested.

The contrast between Black Spots and hotspots of coverage is clearly shown in both the 3G, 4G and 5G tables and maps below.

Signal strength by itself is not the best indicator of a network performance as it only shows where local access is possible. The signal strength information combined with the network performance testing provides a clear assessment on the networks in the region of study.

3G Signal Strength explained

The following indicators are used to determine the quality of a 3G signal. The table below indicate guidelines as to what constitutes a particular level of quality, ranging from excellent to unusable (poor or no usable signal). White in the map indicates no signal collected at all.

Signal	Quality	Description
>= -75dbm	Excellent	Strong signal enabling maximum data capacity
>= -80dbm	Good	Good signal and speeds with no dropouts expected
>= -90dbm	Fair	Fair/usable signal with possibility of dropouts and slowdowns
>= -112dbm	No / Poor / Unusable	No usable signal - expect frequent disconnections and sluggish performance

4G Signal Strength explained

The following indicators are used to determine the quality of a 4G signal. The table below indicate guidelines as to what constitutes a particular level of quality, ranging from excellent to unusable (poor or no usable signal). White in the map indicates no signal collected at all.

Signal	Quality	Description
>= -80dbm	Excellent	Strong signal enabling maximum data capacity
>= -90dbm	Good	Good signal and speeds with no dropouts expected
>= -110dbm	Fair	Fair/usable signal with possibility of dropouts and slowdowns

>= -120dbm	No / Poor / Unusable	No usable signal - expect frequent disconnections and sluggish performance
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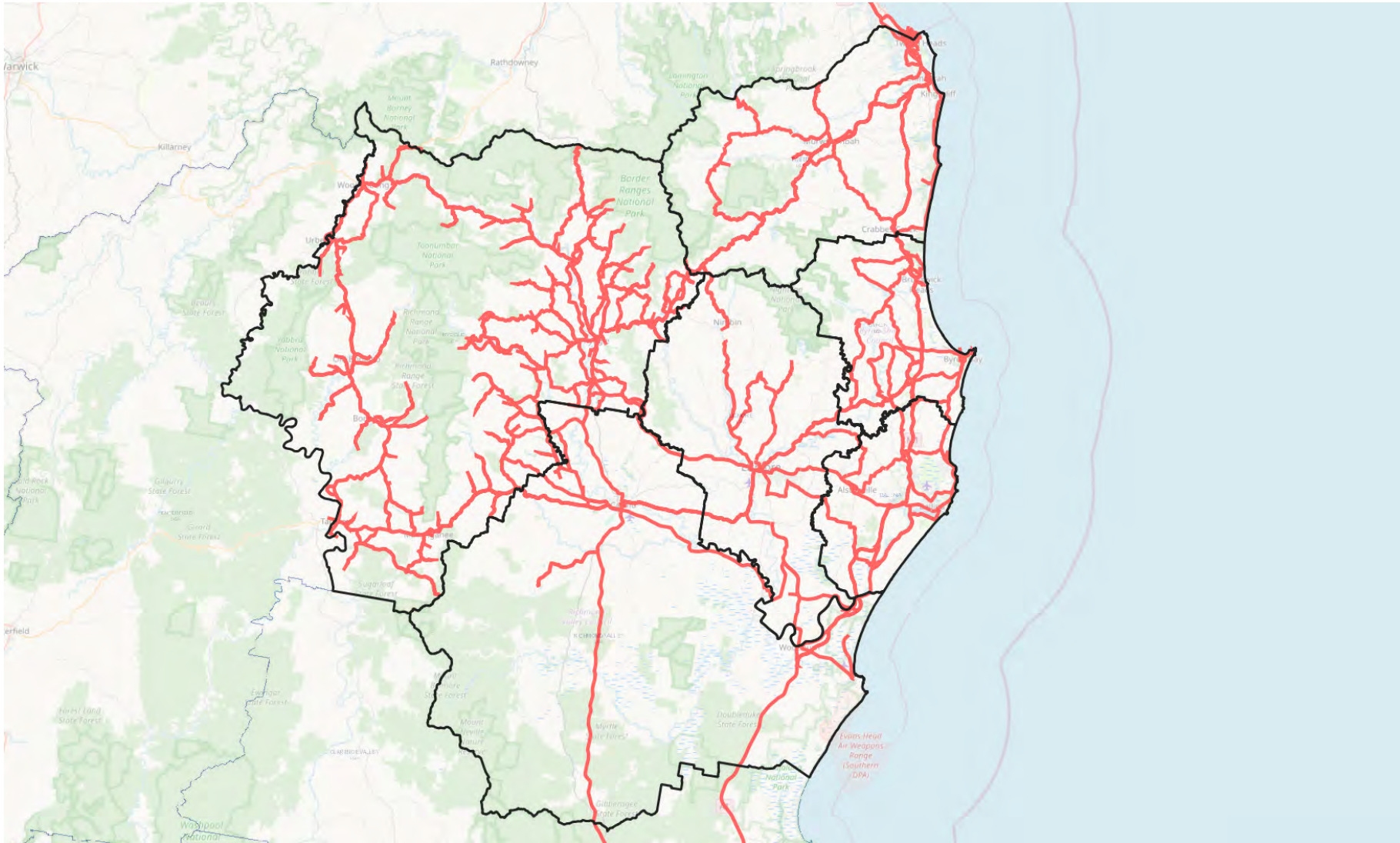
5G Signal Strength explained

The following indicators are used to determine the quality of a 4G signal. The table below indicate guidelines as to what constitutes a particular level of quality.

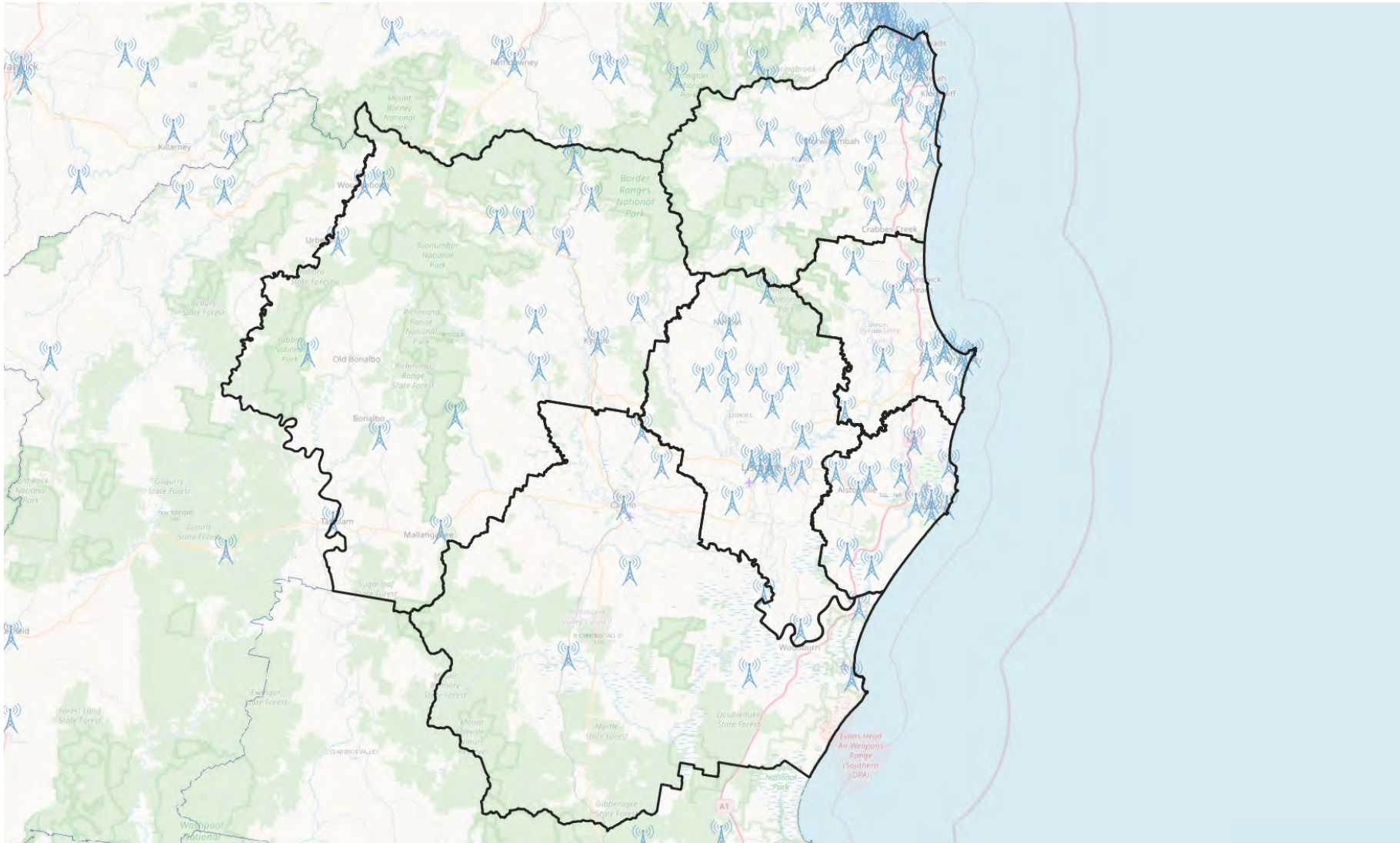
Signal	Quality	Description
>= -80dbm	Excellent	Strong signal enabling maximum data capacity
>= -80 to -90dbm	Good	Good signal and speeds with no dropouts expected
>= -90 to -100dbm	Fair	Mid Cell
<= -100dbm	No / Poor / Unusable	Cell Edge

5. Drive Testing Route

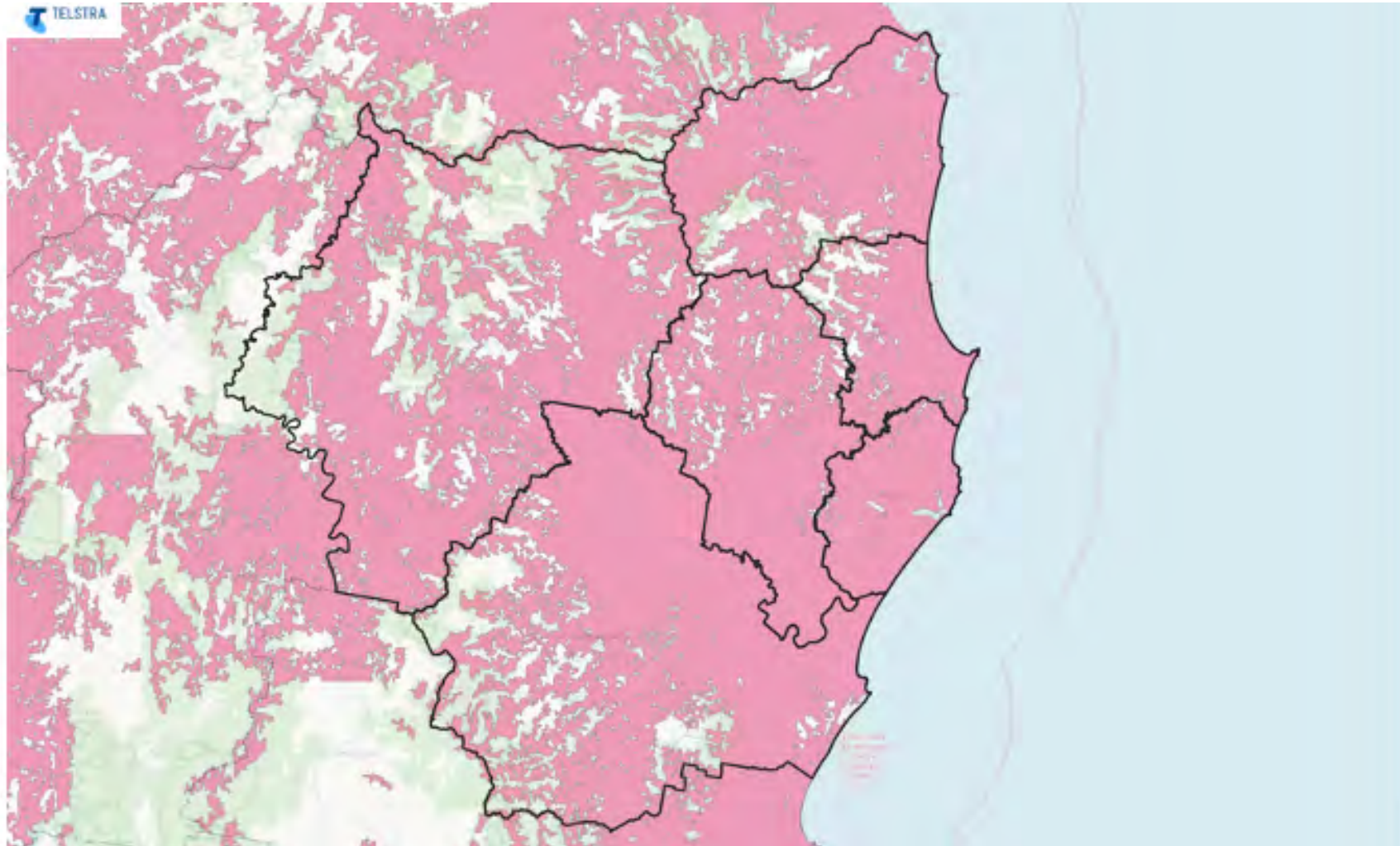
Drive Testing Route



6. Telstra mapping



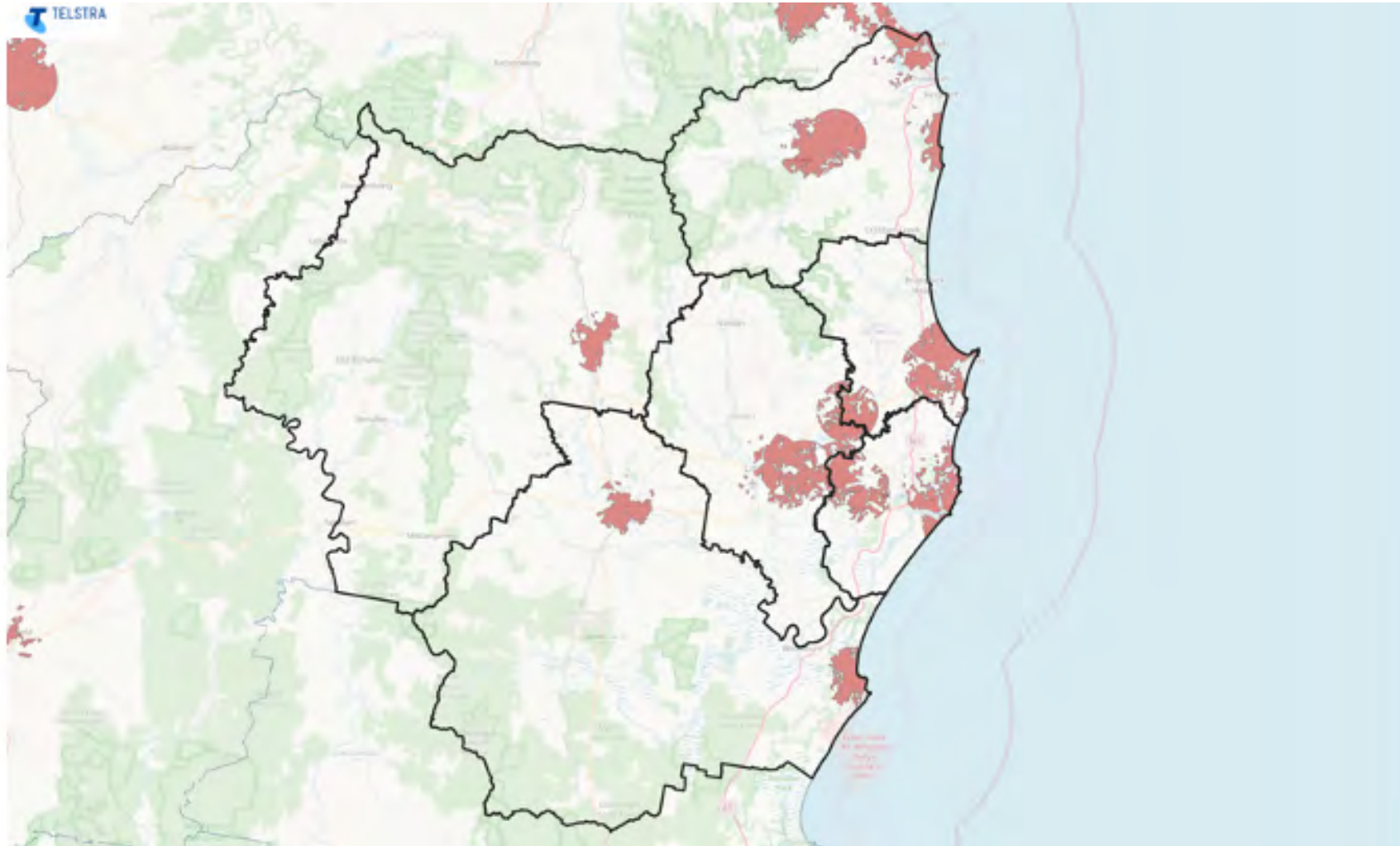
Telstra 3G Coverage



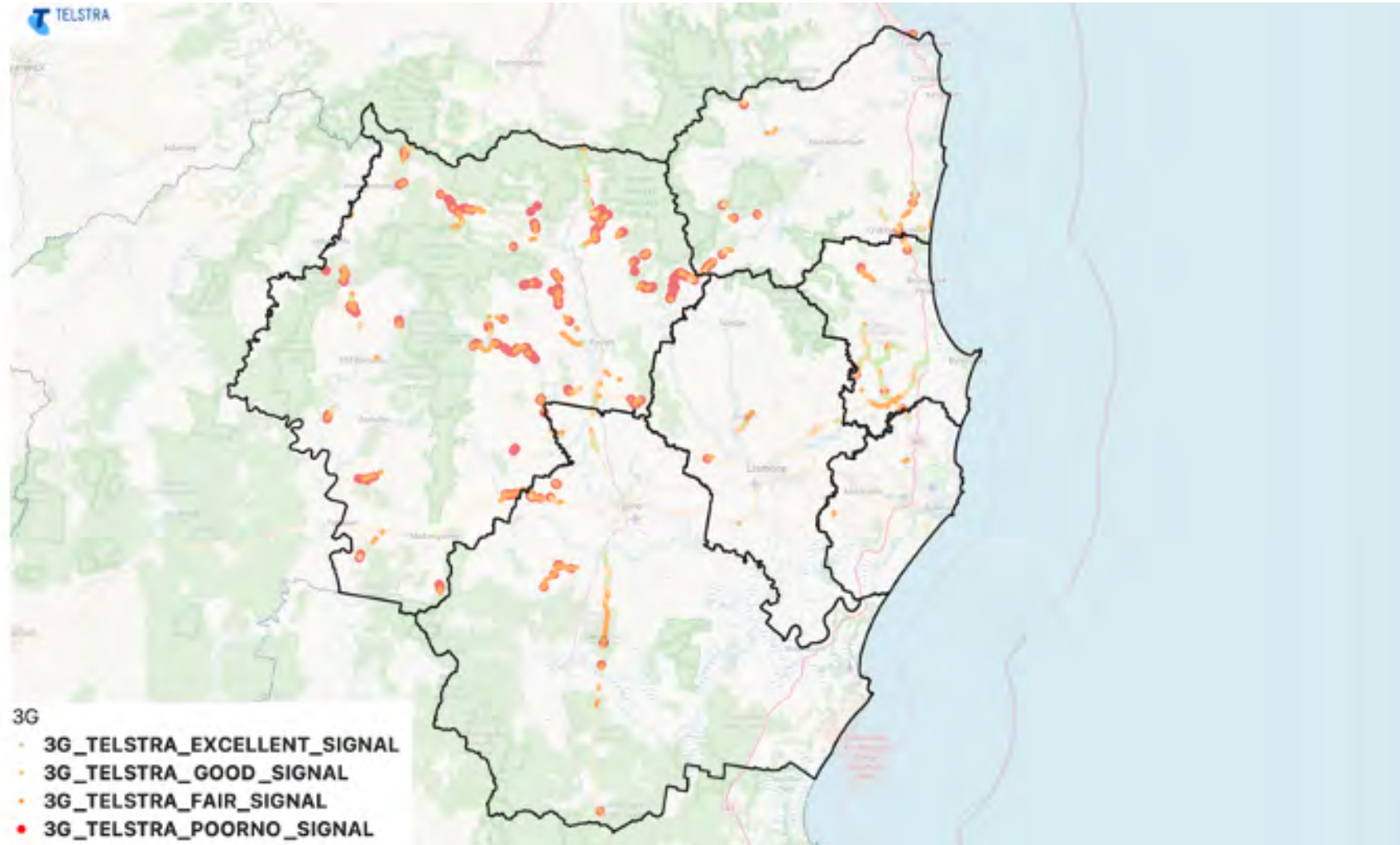
Telstra 4G Coverage



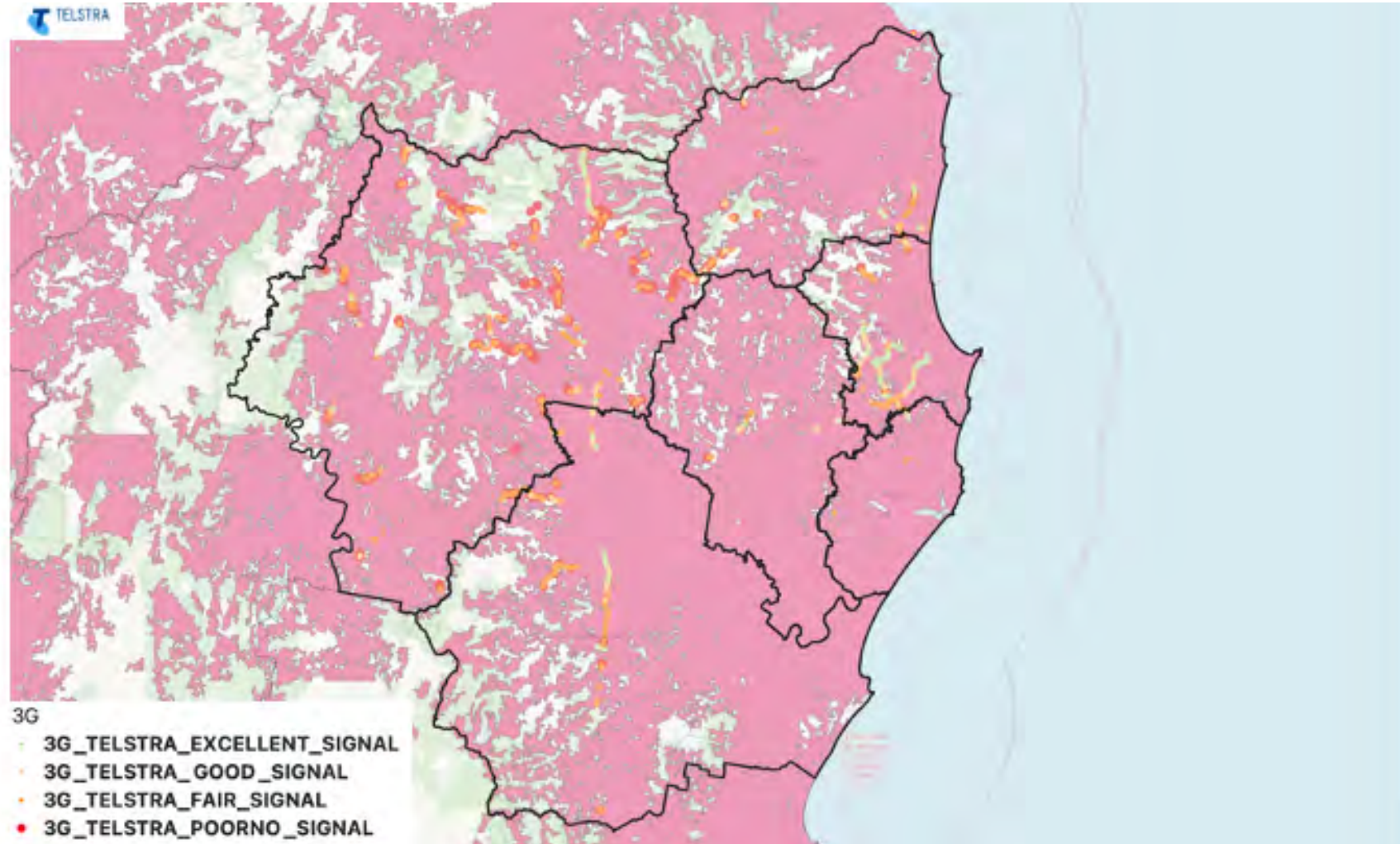
Telstra 5G Coverage



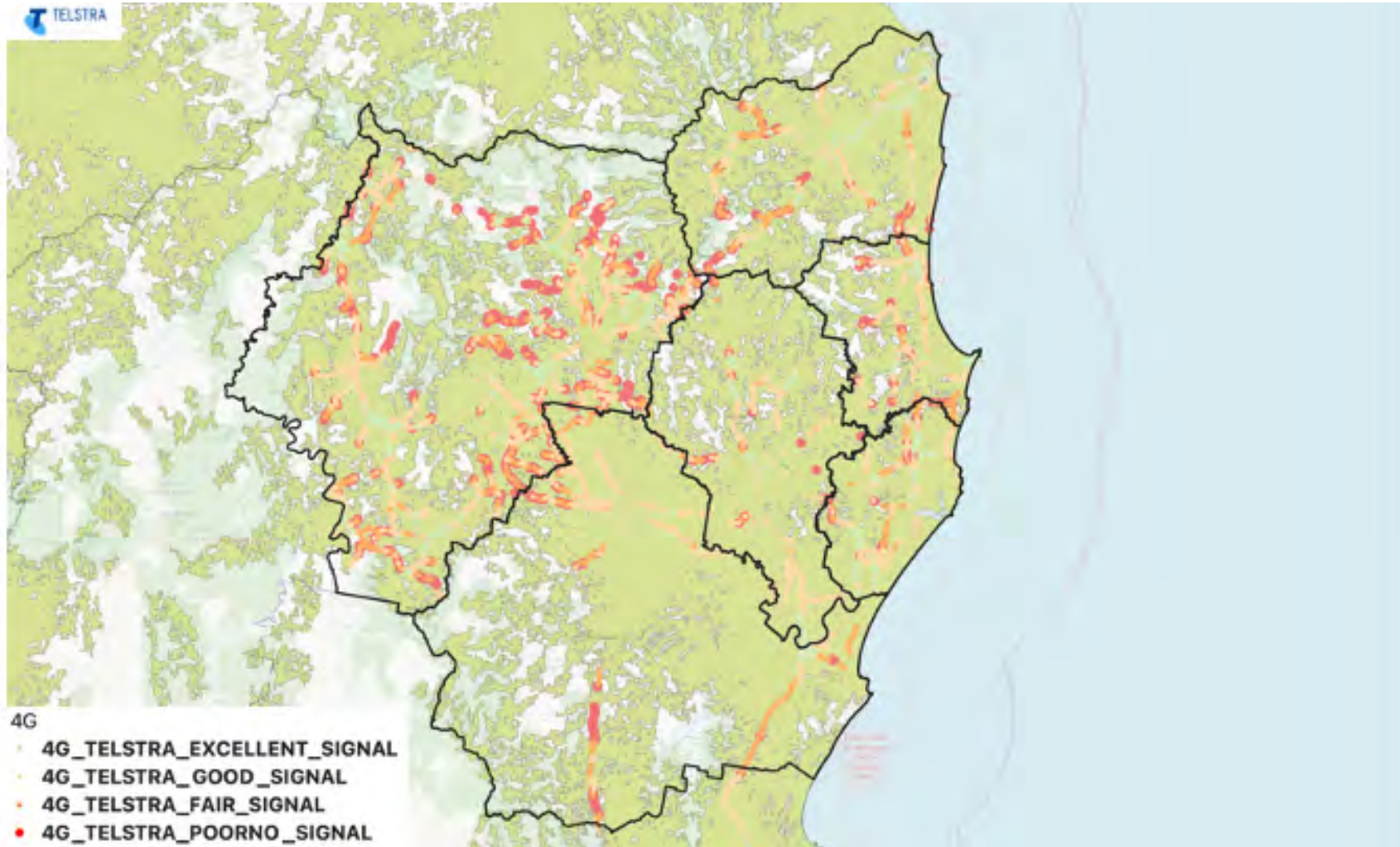
Telstra 3G Drive Testing Results



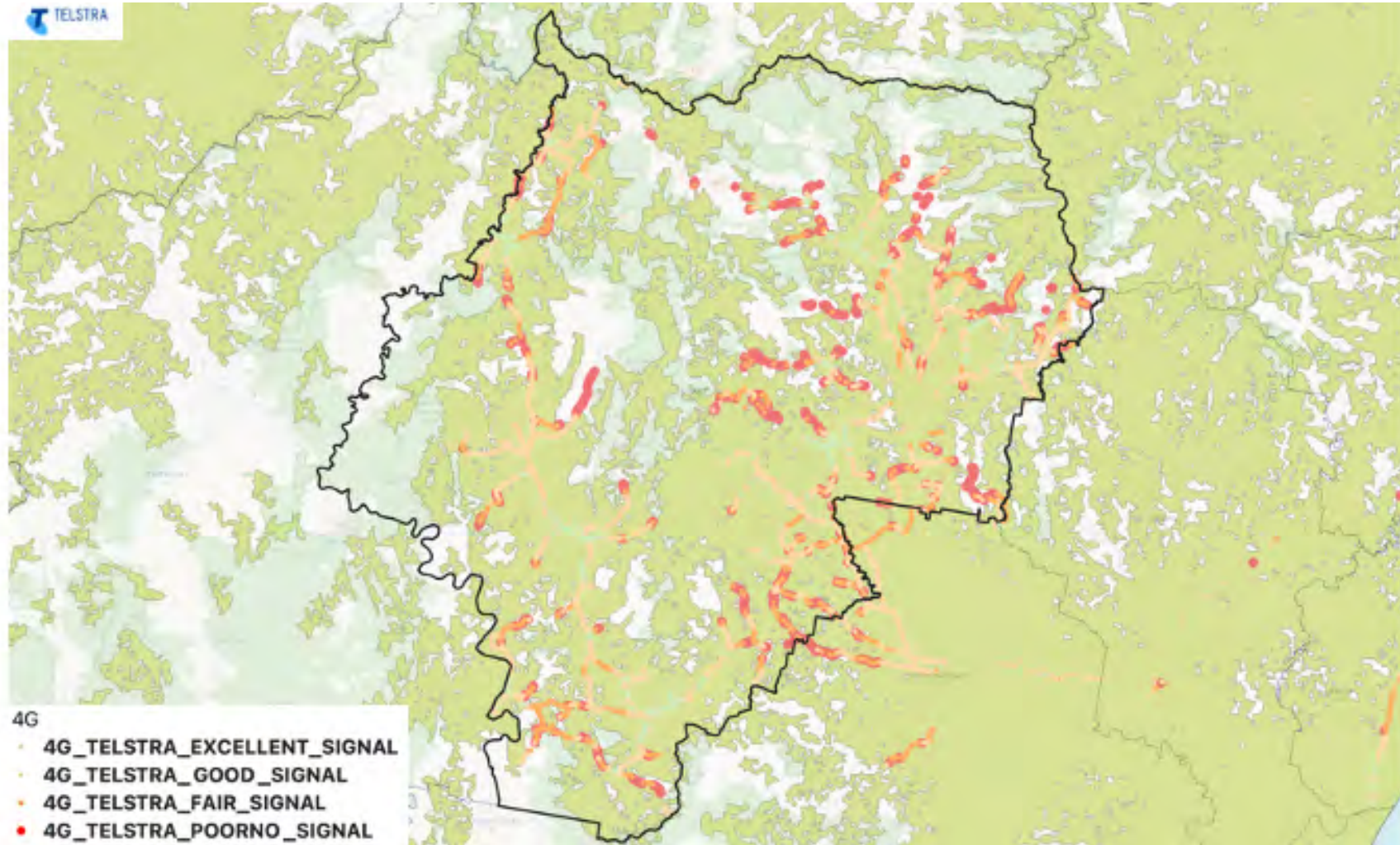
Telstra 3G Drive Testing Results vs Coverage Map



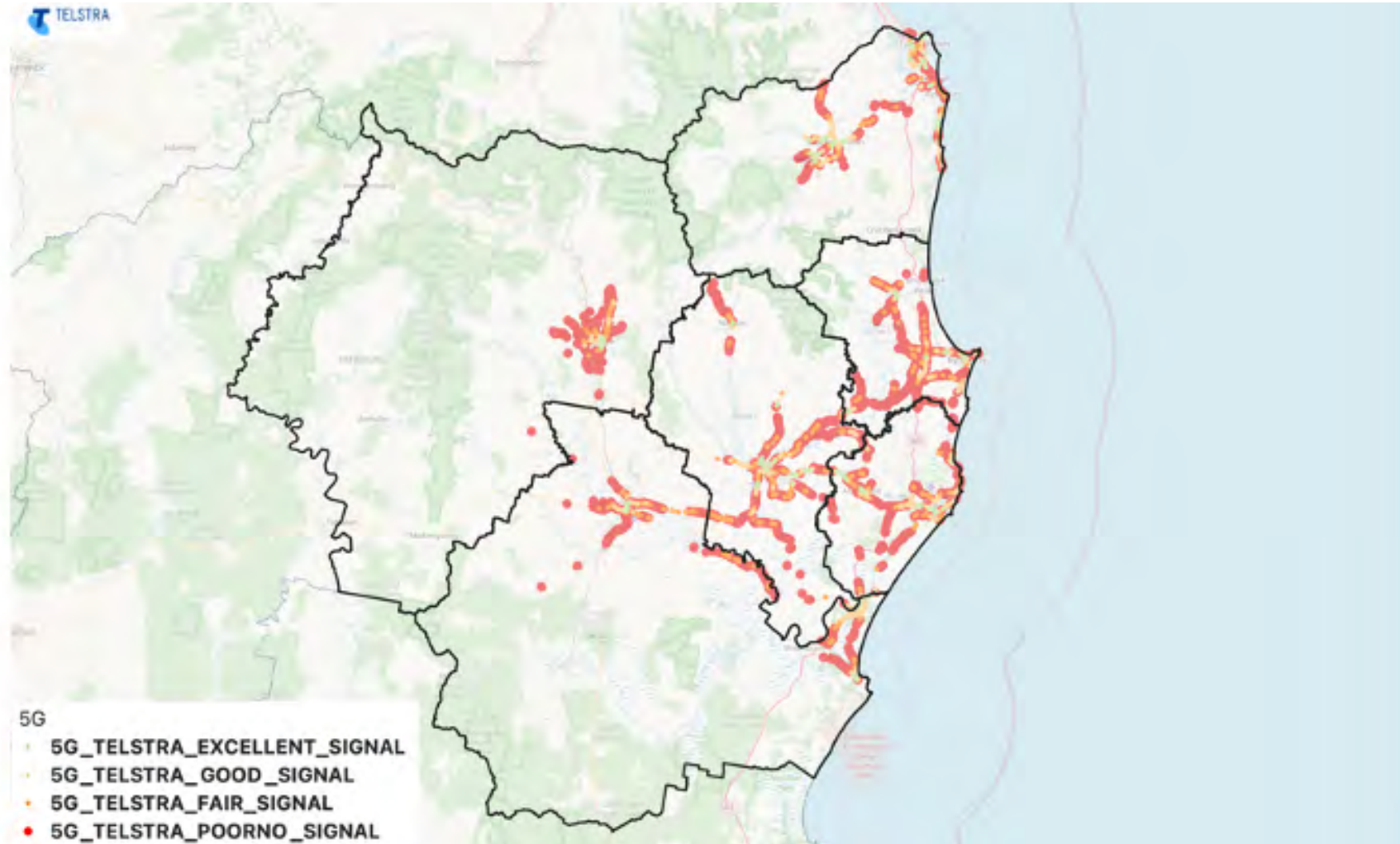
Telstra 4G Drive Testing Results



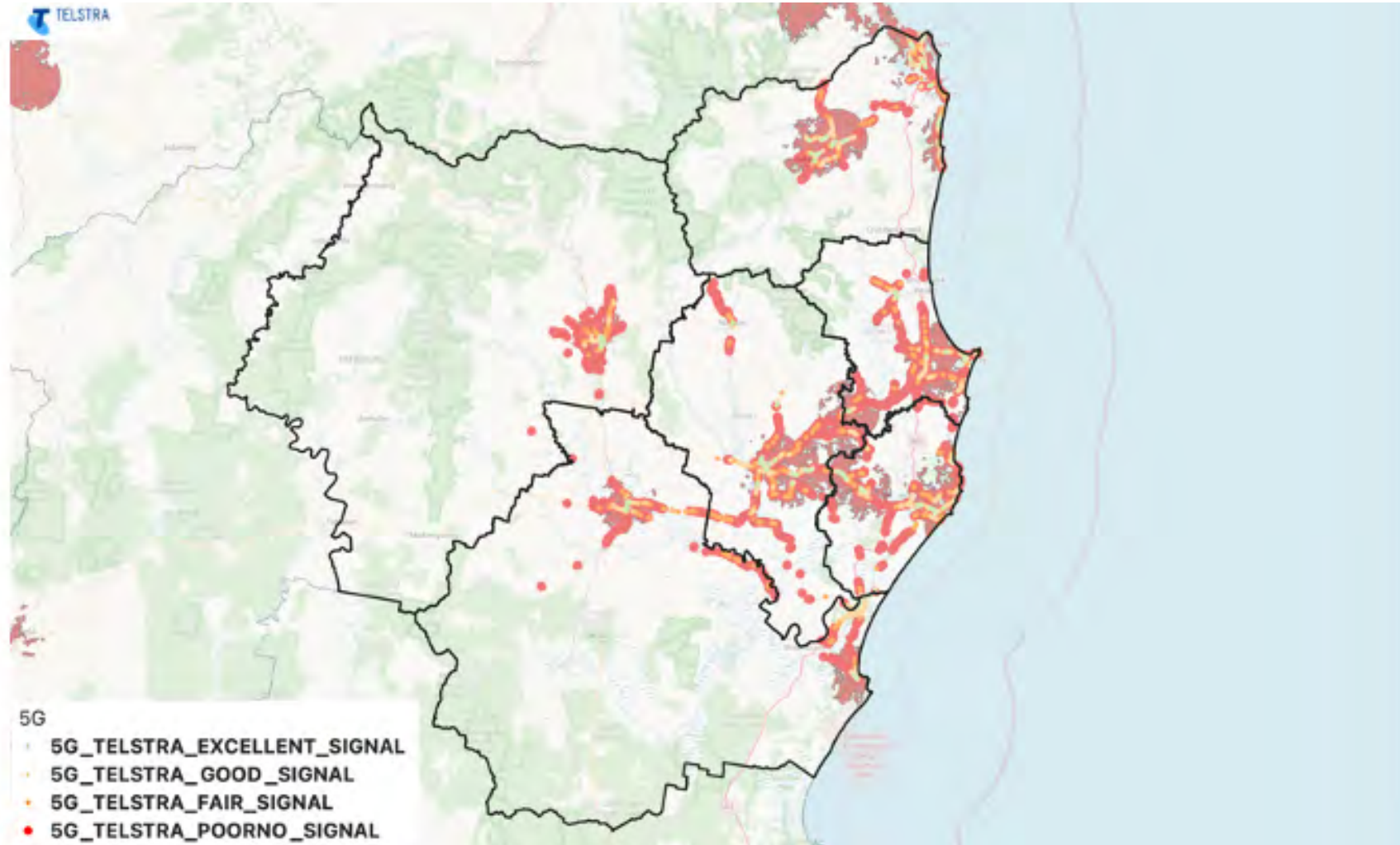
Telstra 4G Drive Testing Results vs Coverage Map



Telstra 5G Drive Testing Results

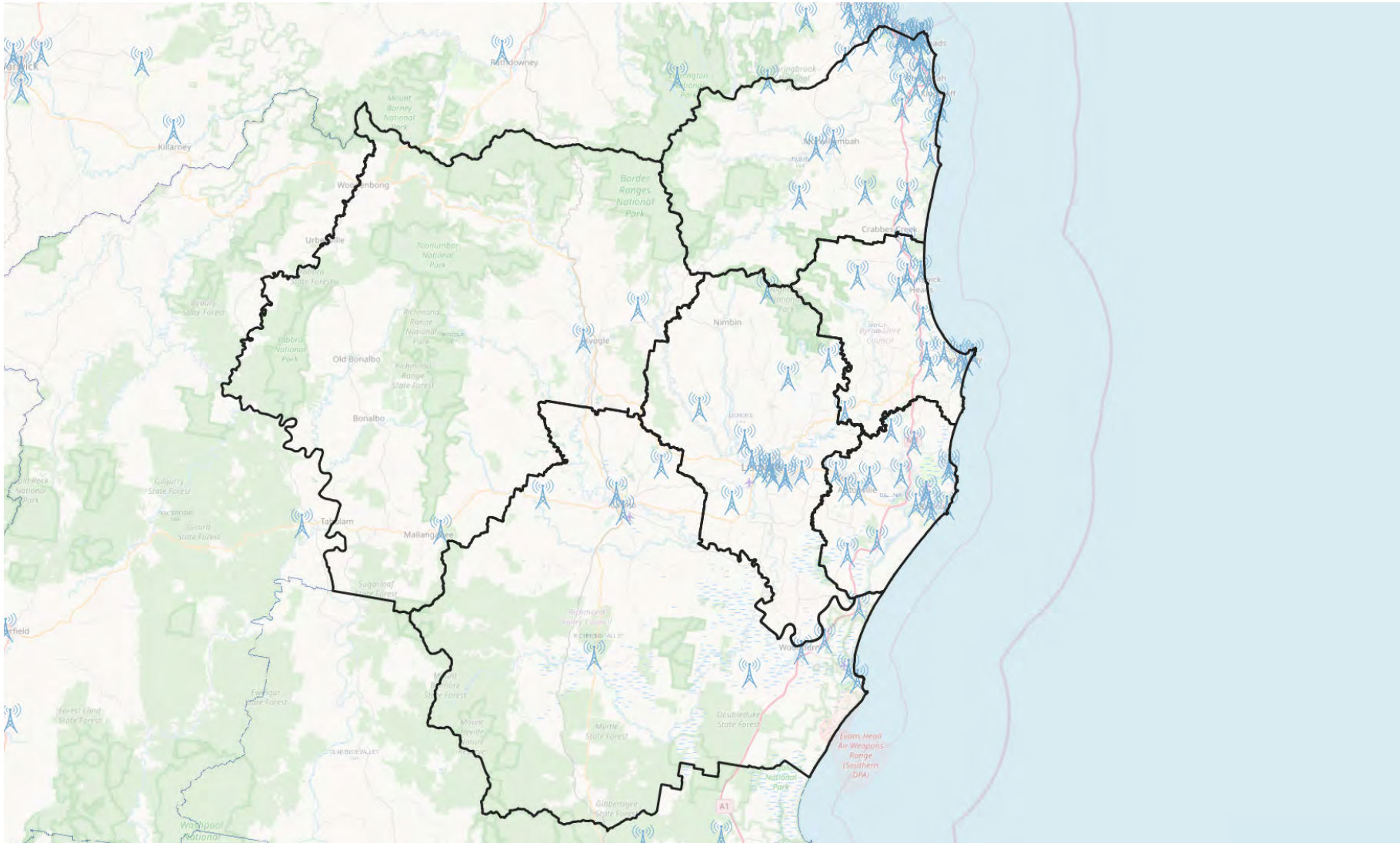


Telstra 5G Drive Testing Results vs Coverage Map

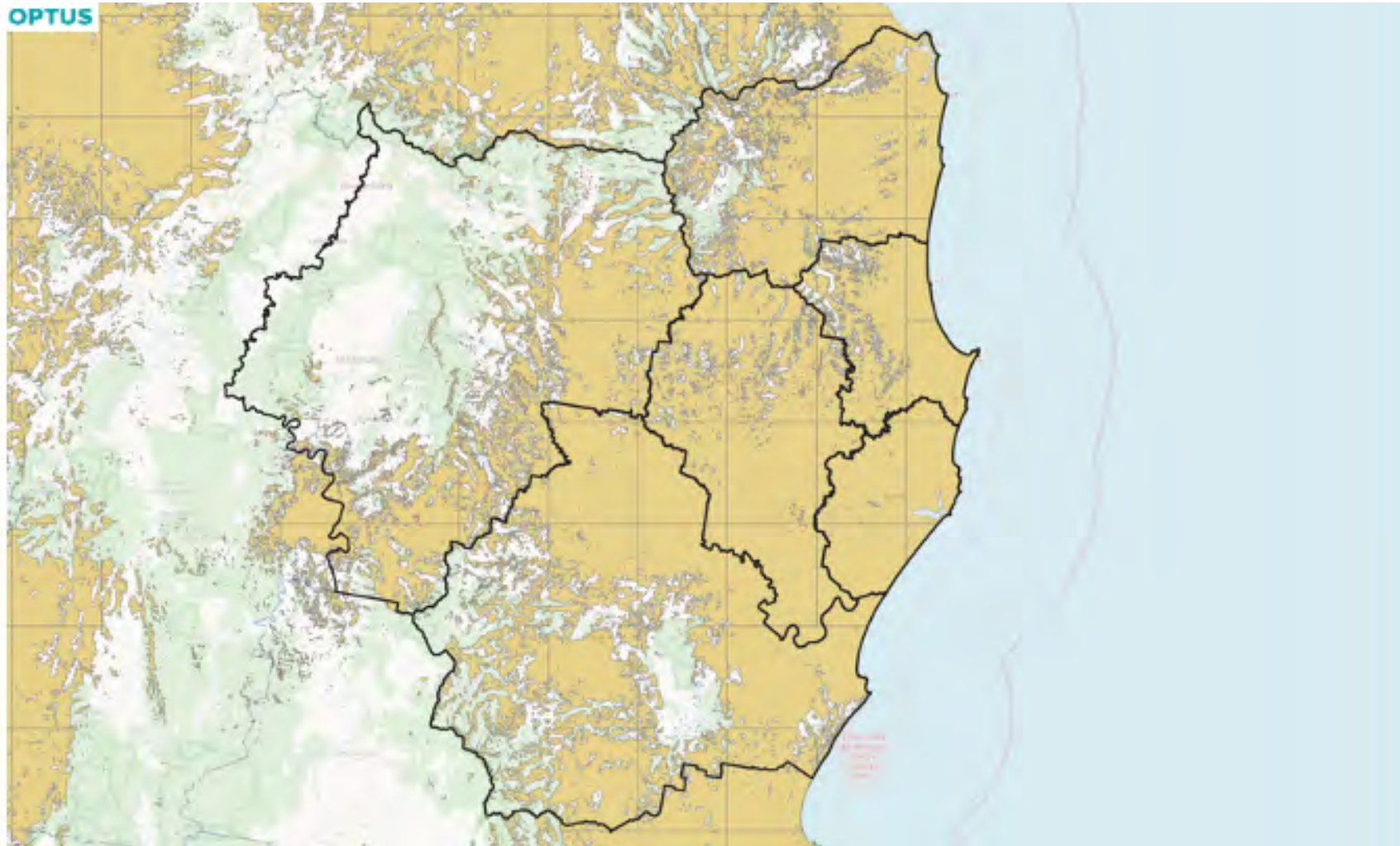


7. Optus mapping

Optus Mobile Tower Sites



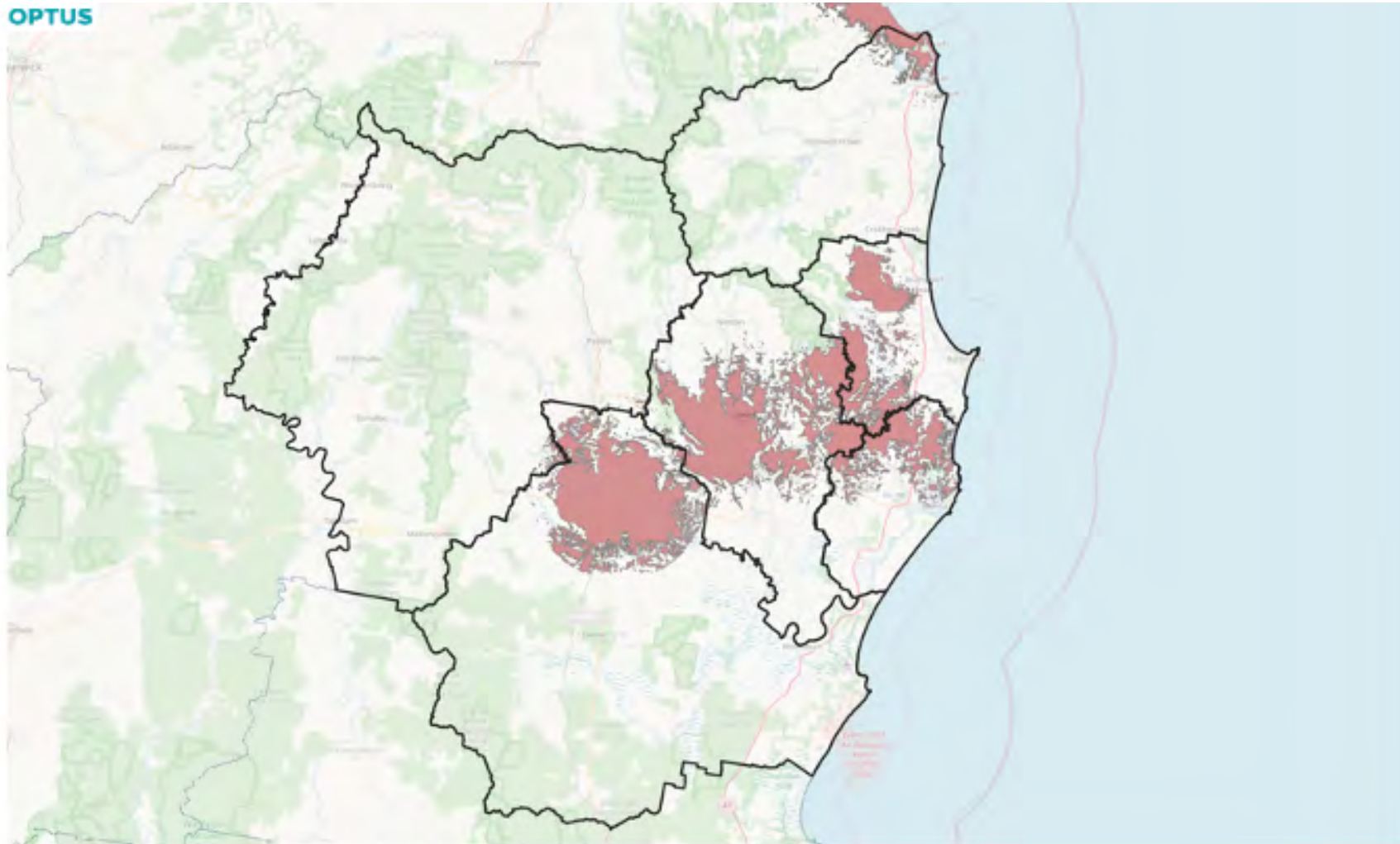
Optus 3G Coverage



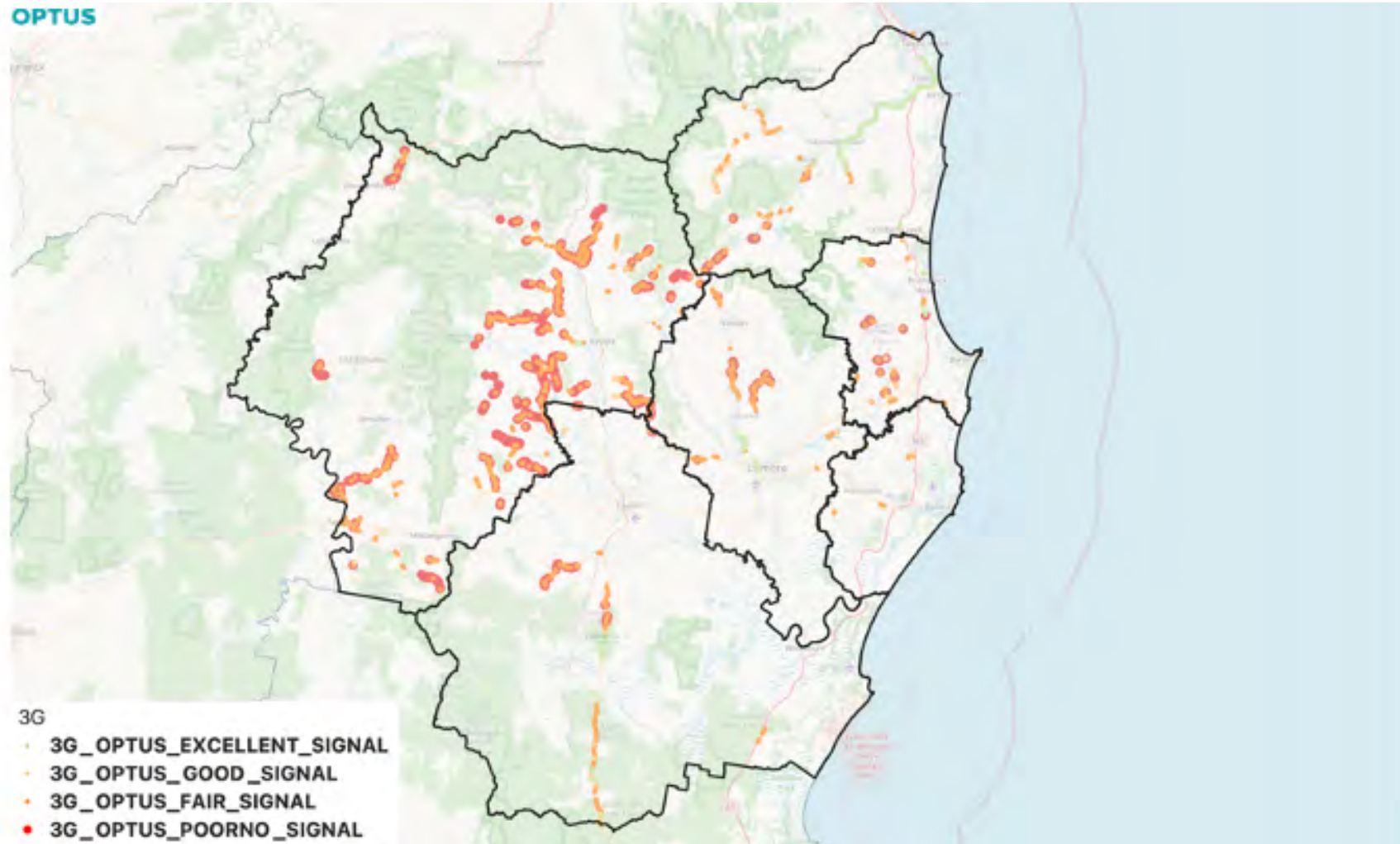
Optus 4G Coverage



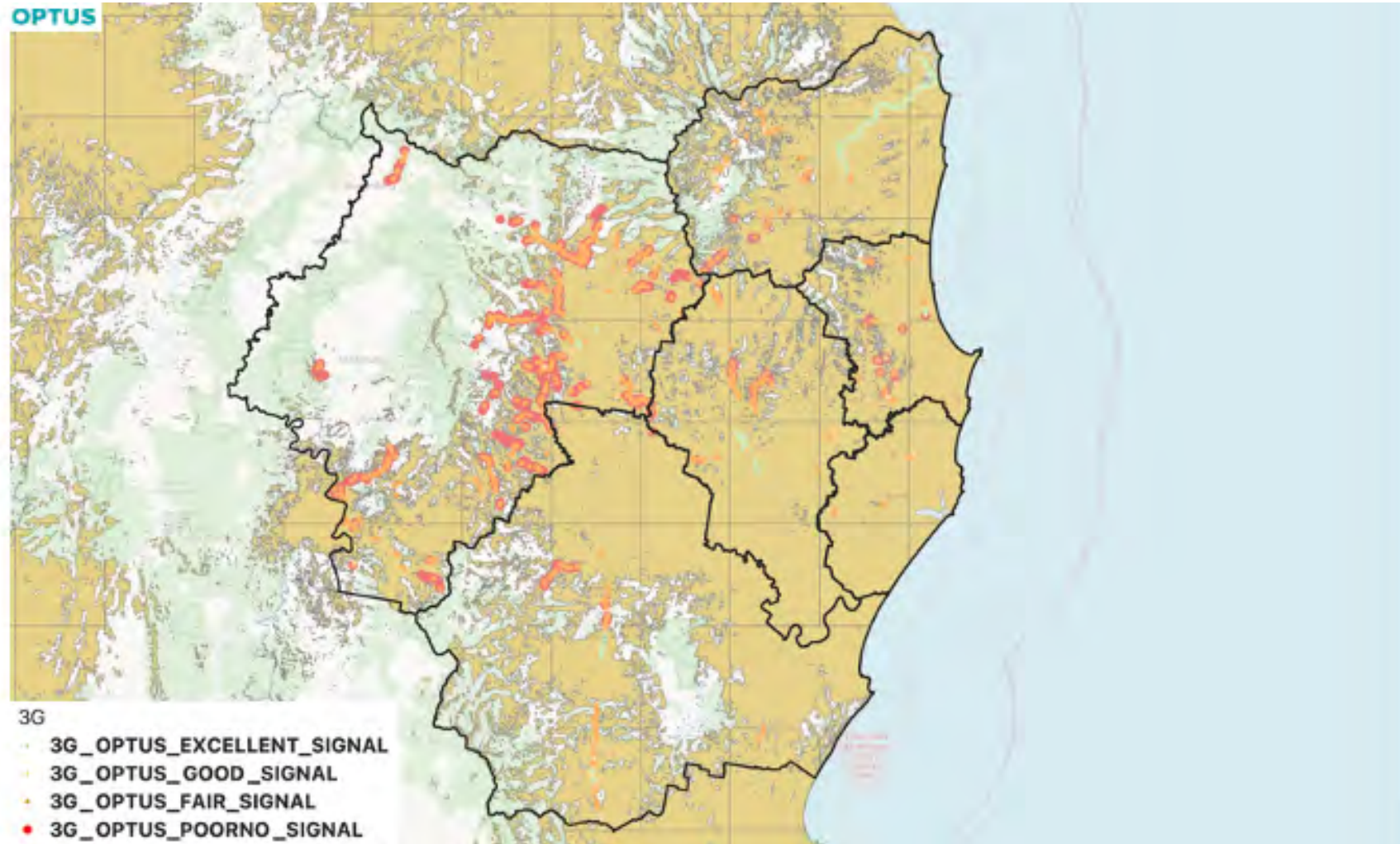
Optus 5G Coverage



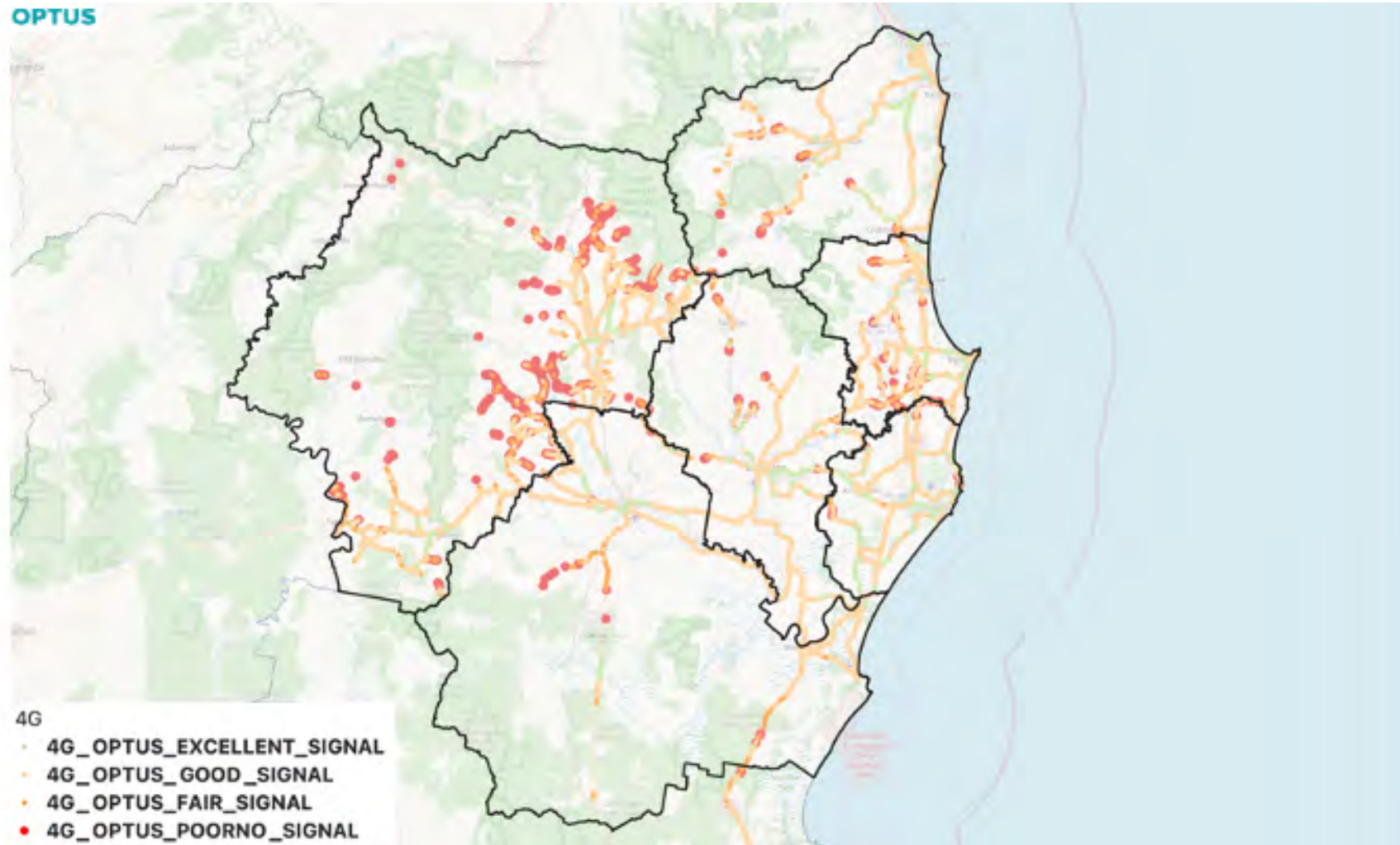
Optus 3G Drive Testing Results



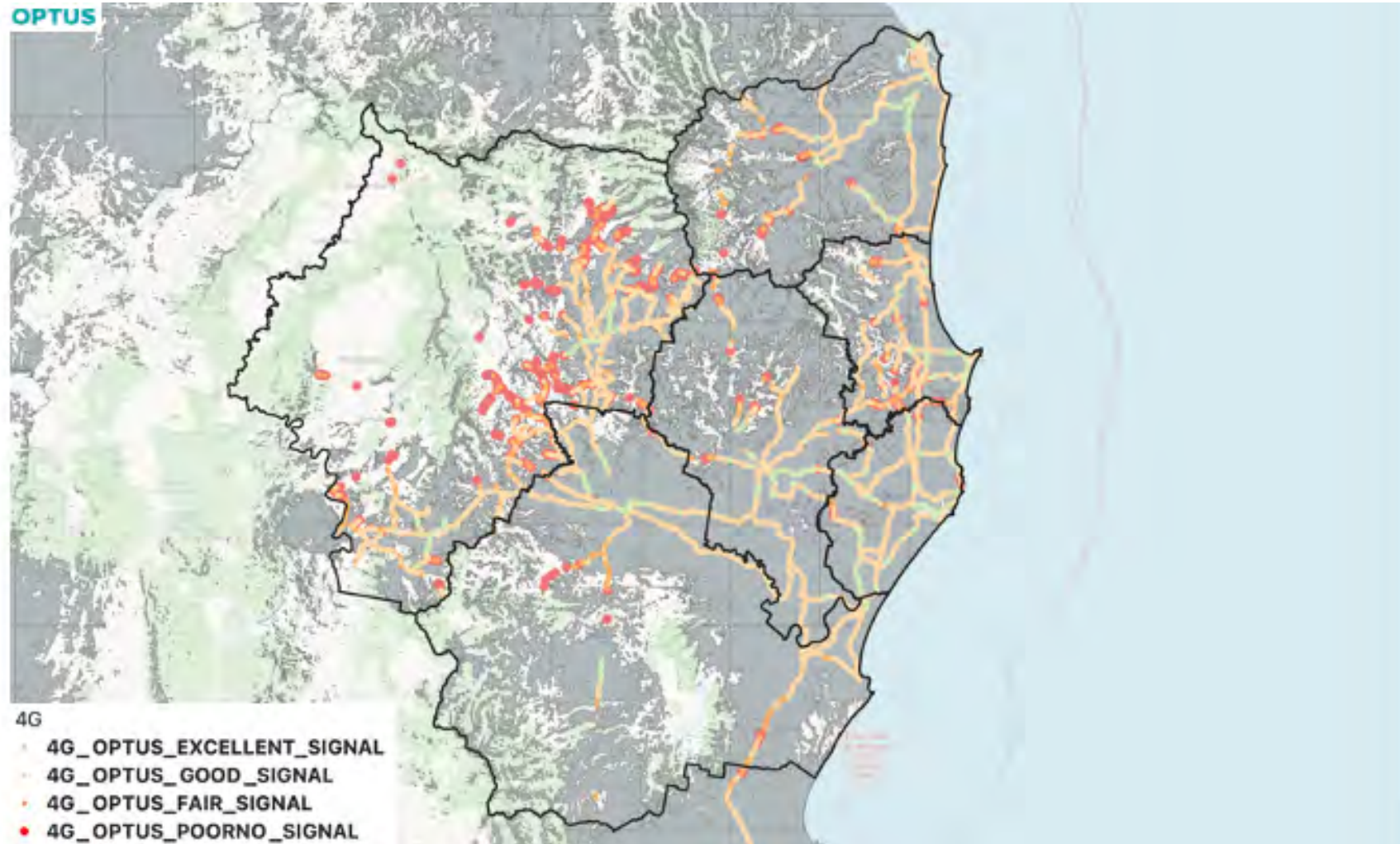
Optus 3G Drive Testing Results vs Coverage Map



Optus 4G Drive Testing Results



Optus 4G Drive Testing Results vs Coverage Map

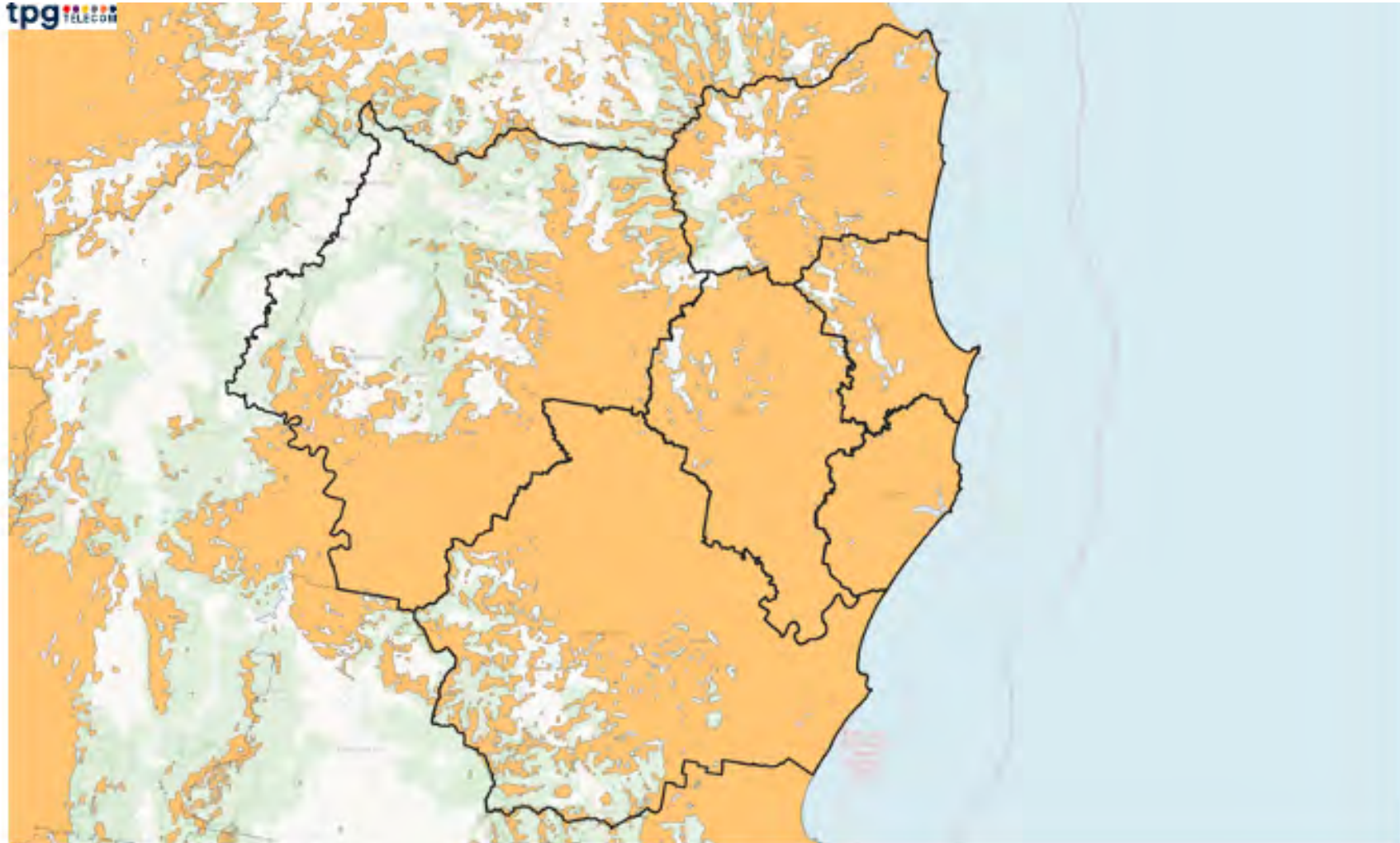


8. TPG / Vodafone mapping

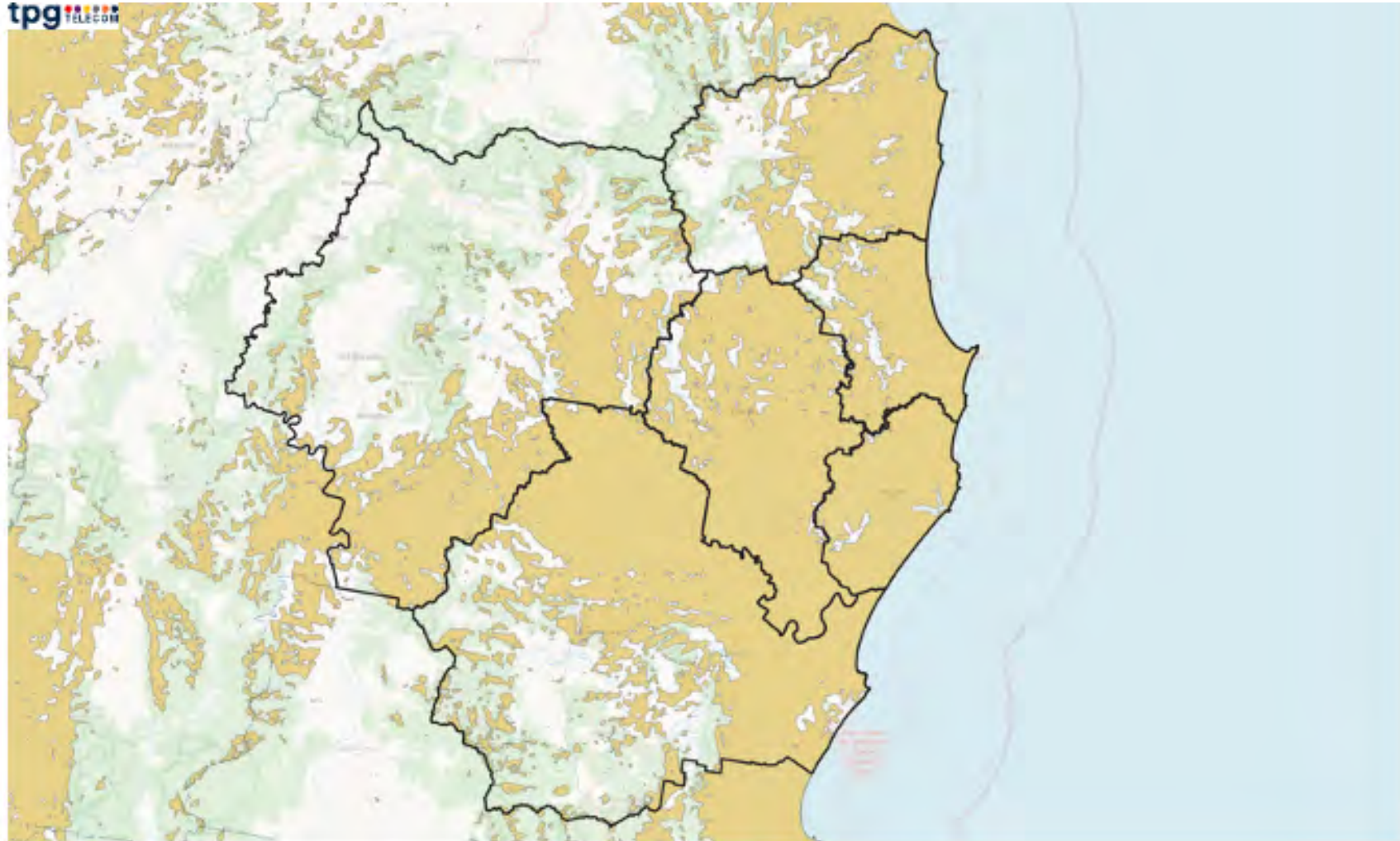
TPG Telecom / Vodafone Mobile Tower Sites



TPG Telecom / Vodafone 3G Coverage



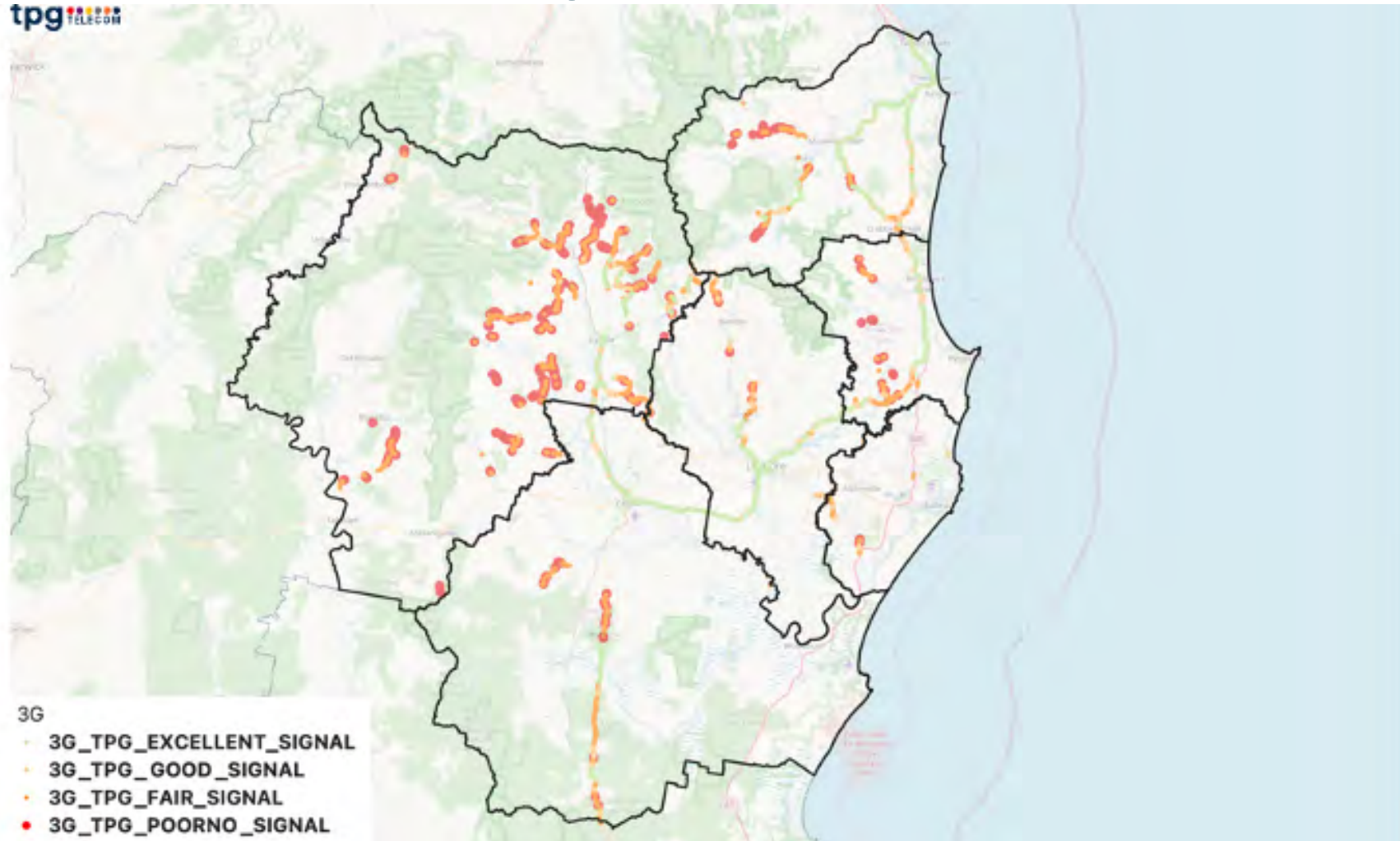
TPG Telecom / Vodafone 4G Coverage



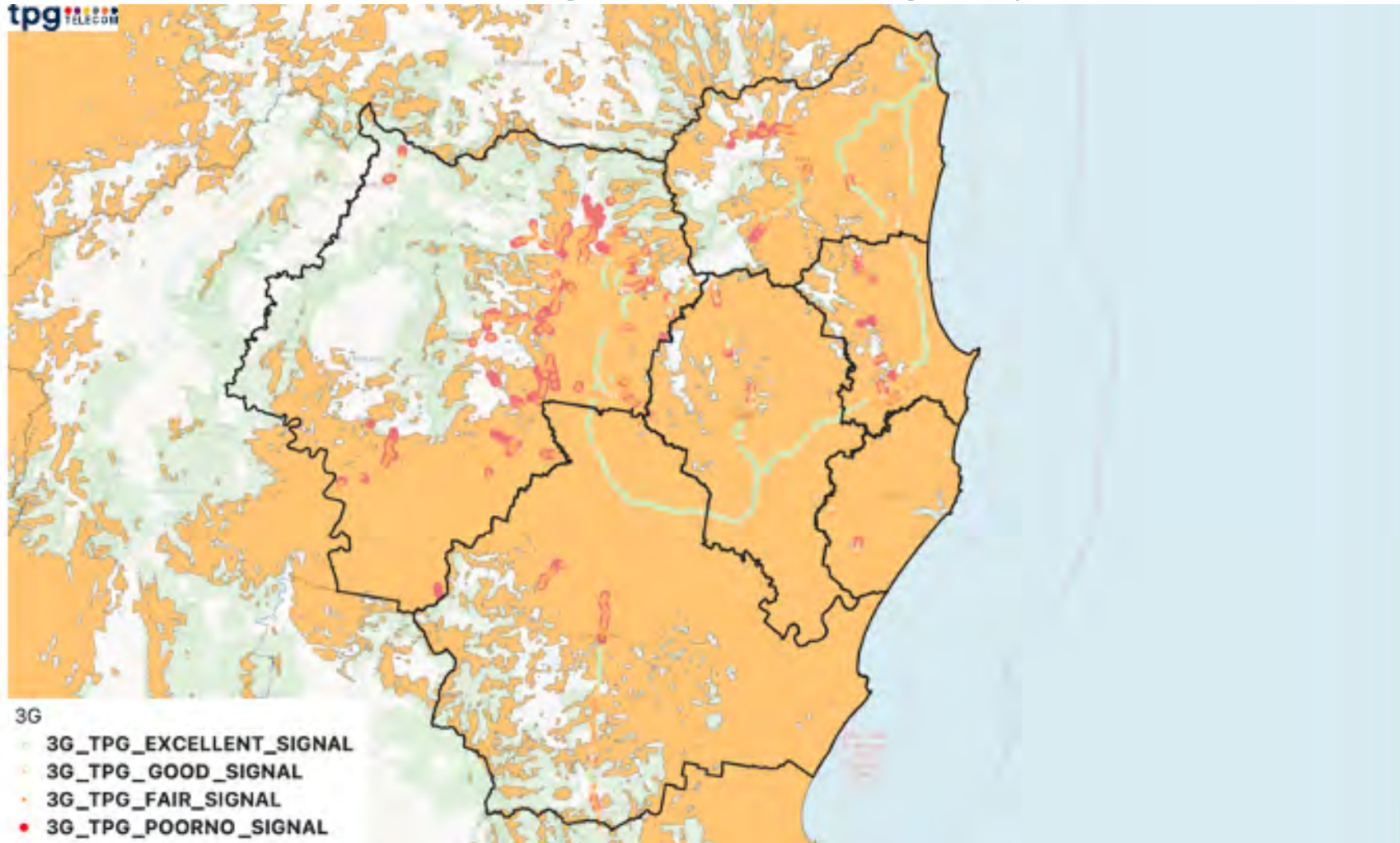
TPG Telecom / Vodafone 5G Coverage



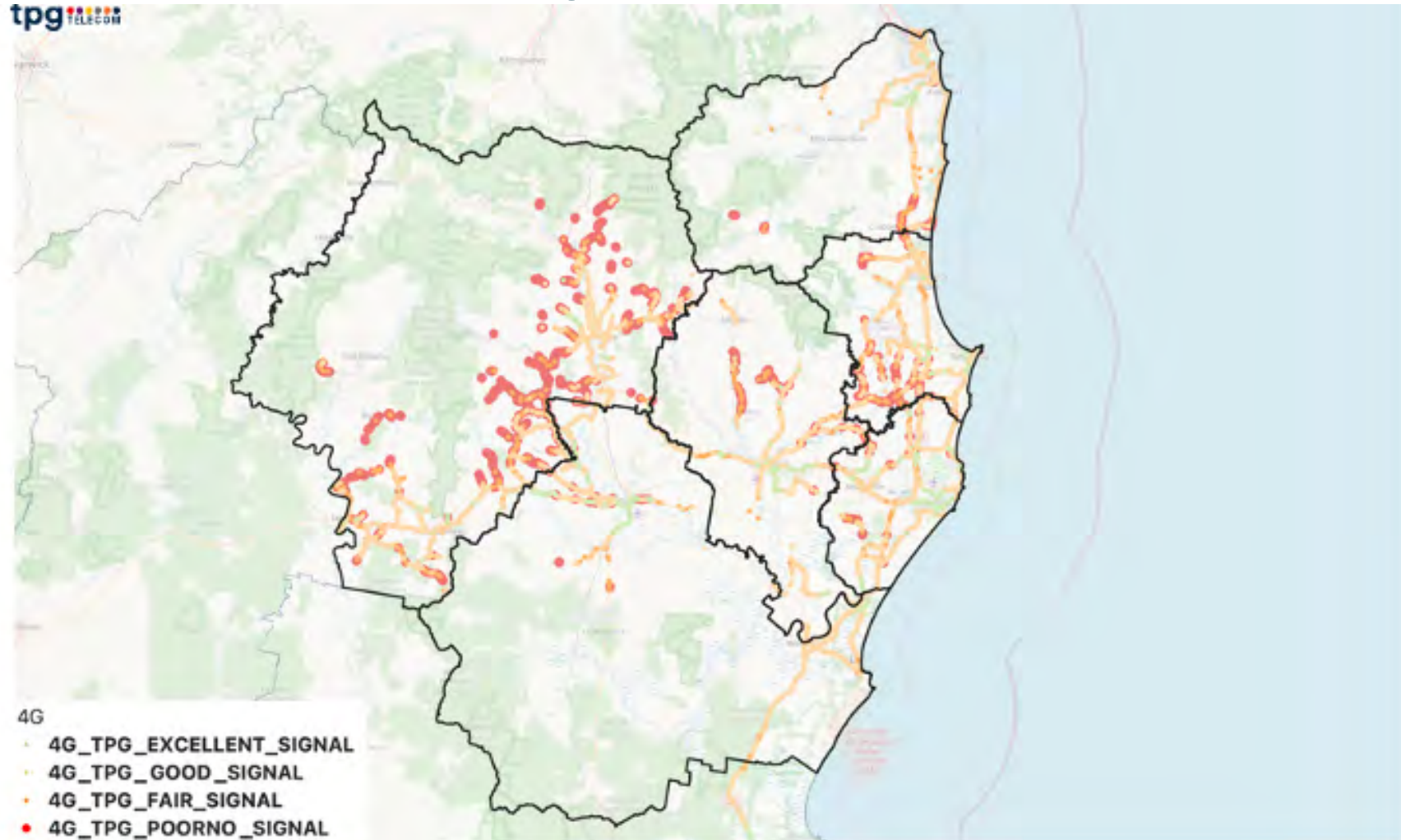
TPG Telecom / Vodafone 3G Drive Testing Results



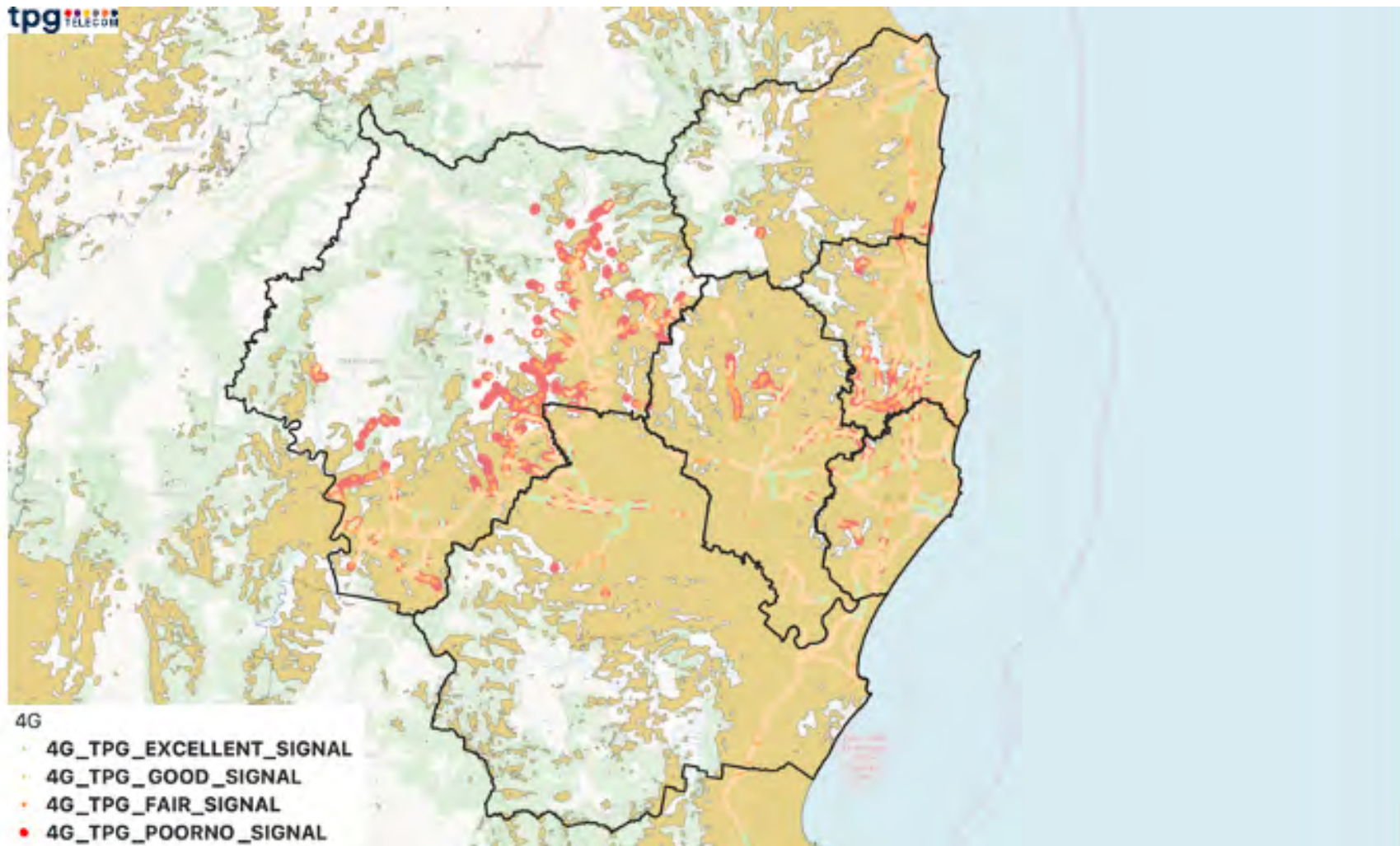
TPG Telecom / Vodafone 3G Drive Testing Results vs Coverage Map



TPG Telecom / Vodafone 4G Drive Testing Results



TPG Telecom / Vodafone 4G Drive Testing Results vs Coverage Map



9. Tweed Shire Analysis

Tweed Shire Analysis

Signal Testing:

Road name	From	To	Approx Distance
Pacific Highway	Northern Shire Boundary	Southern Shire Boundary - Crabbes Creek	47km
Tweed Coast Road	Chinderah	Southern Shire Boundary - Crabbes Creek	33km
Tweed Valley Way	Chinderah	Southern Shire Boundary - Crabbes Creek	48km
Tomewin Road	Murwillumbah	Northern Shire Boundary - Tomewin	12km
Numinbah Road	Murwillumbah	Northern Shire Boundary – Natural Bridge Retreat	26km

Tyalgum Road	Murwillumbah	Tyalgum	25km
Kyogle Road	Murwillumbah	Shire Boundary	38km

Network Bandwidth Point Tests:

- Tweed Heads
- Chinderah
- Kingscliffe
- Pottsville
- Murwillumbah

This section provides an analysis of the change in Mobile Network Operator sites in the Tweed Shire from 2018 to 2022.

Total Number of Sites by MNO

Tweed Shire	2018	2022
Optus	19	24
Telstra	25	30
TPG	15	16

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Tweed Shire	2018	2022
Optus		
900 MHz	17	22
2100 MHz	18	19

Telstra		
850 MHz	24	26
2100 MHz	8	-
TPG		
900 MHz	15	15
2100 MHz	13	3

Note – A single site may host multiple spectrum bands.

Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

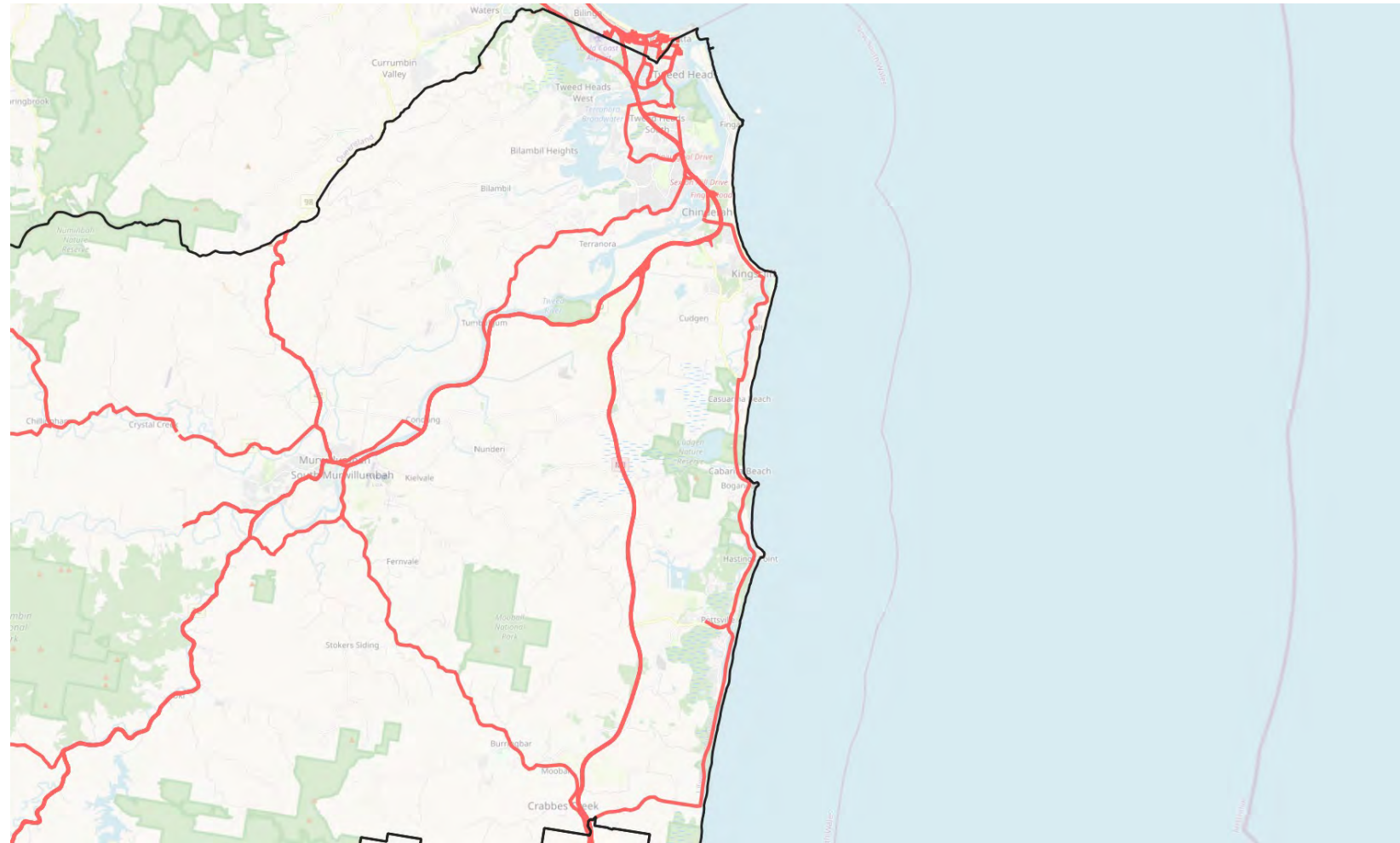
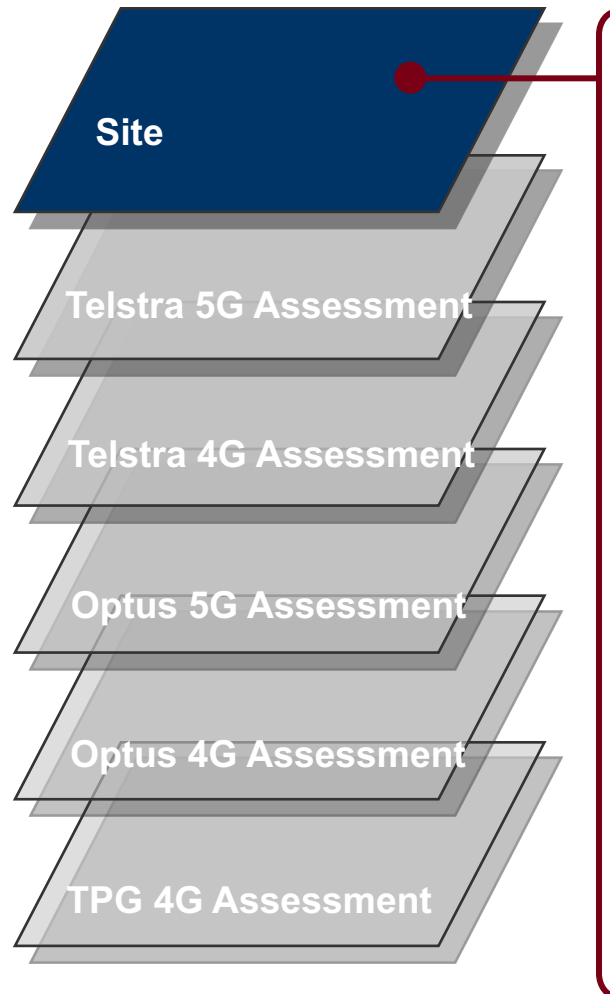
Tweed Shire	2018	2022
Optus		
700 MHz	17	22
900 MHz	1	4
1800 MHz	17	23
2100 MHz	8	17
2300 MHz		
2600 MHz	9	13
3500 MHz		
Telstra		
700 MHz	22	27
900 MHz		
1800 MHz	16	18
2100 MHz		5
2600 MHz	2	8
TPG		
700 MHz		
850 MHz	15	16
1800 MHz	12	15
2100 MHz	7	12
2600 MHz		

Total Number of 5G Sites by MNO

Tweed Shire	2018	2022
Optus		
2100 MHz	-	-
2300 MHz	-	-
3500 MHz	-	-
26000 MHz	-	-
Telstra		
850 MHz	-	1
2600 MHz	-	
3600 MHz	-	10
TPG		
700 MHz	-	1
3600 MHz	-	1

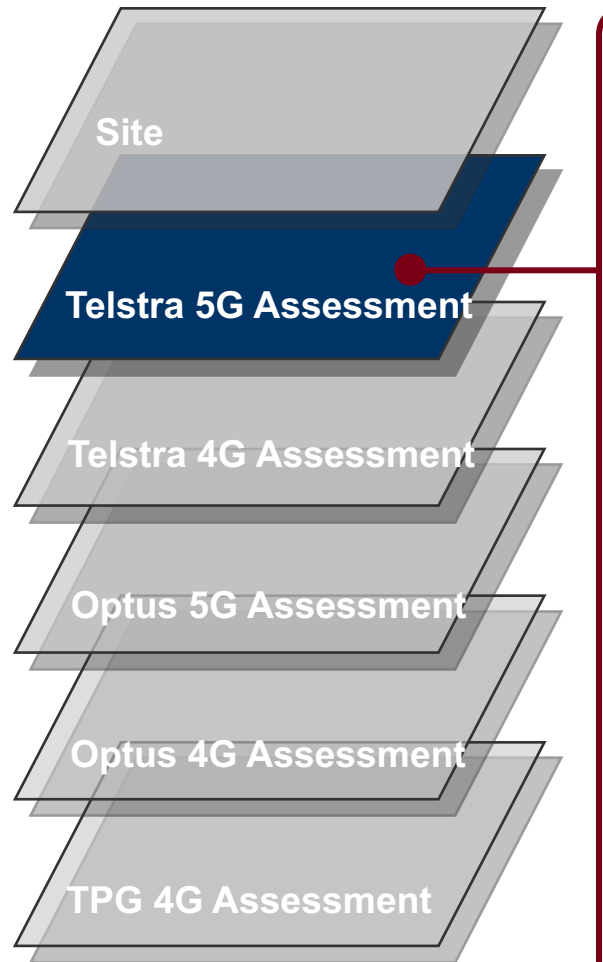
Tweed Shire Analysis

Pacific Highway



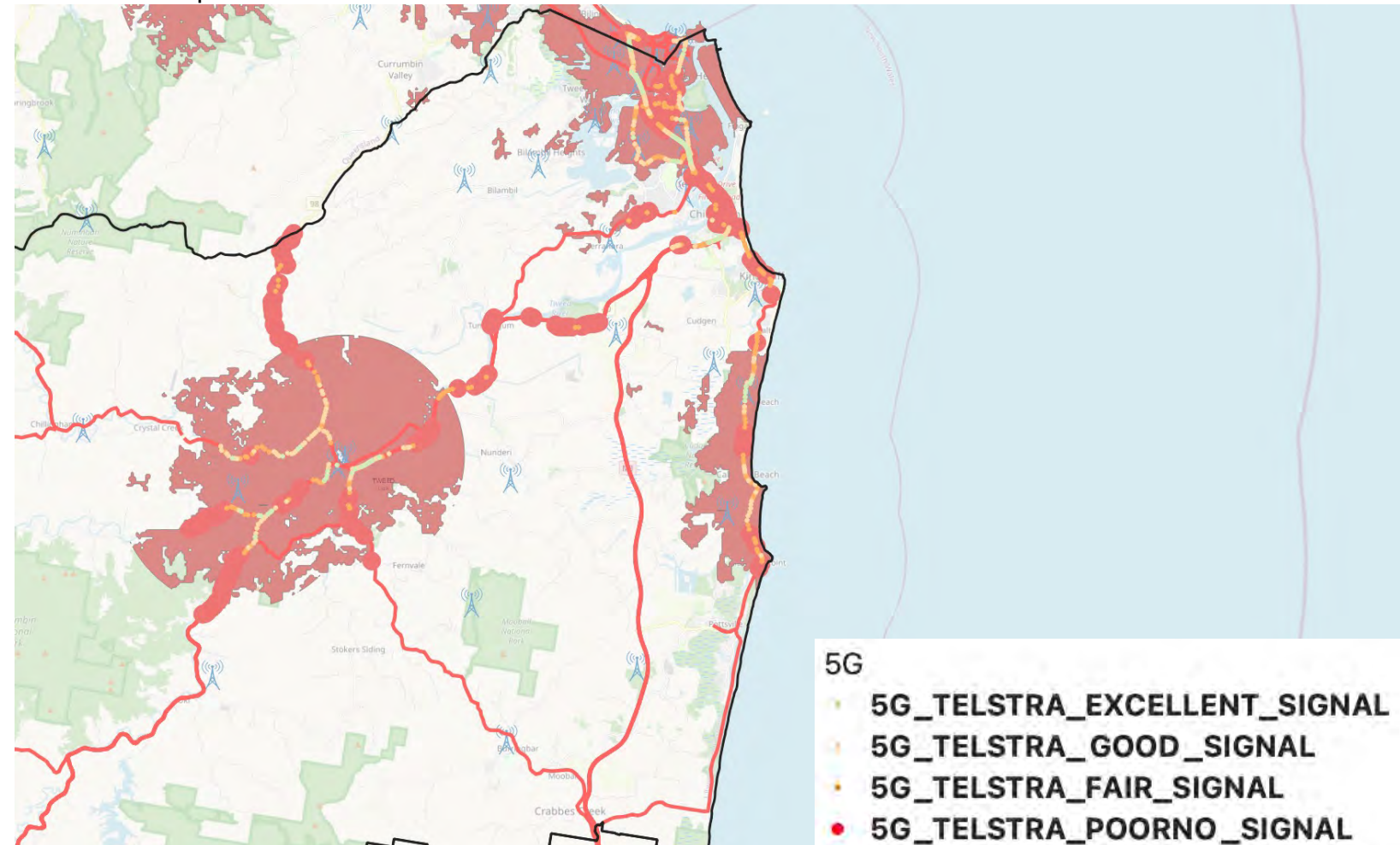
Tweed Shire Analysis

Pacific Highway



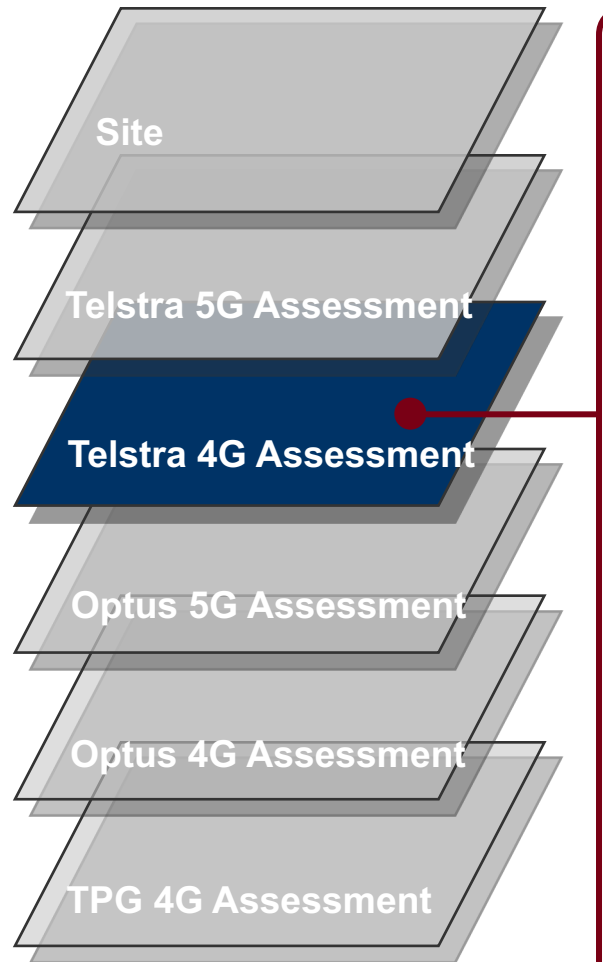
Assessment – Good 5G coverage near Tweed Heads. Large areas with no current 5G coverage

Action – Telstra - Upgrade 2 x Telstra Tower Sites with 3.6Ghz 5G & Telstra / Fed Govt (MBSP) – 3 new 5G Tower Sites required



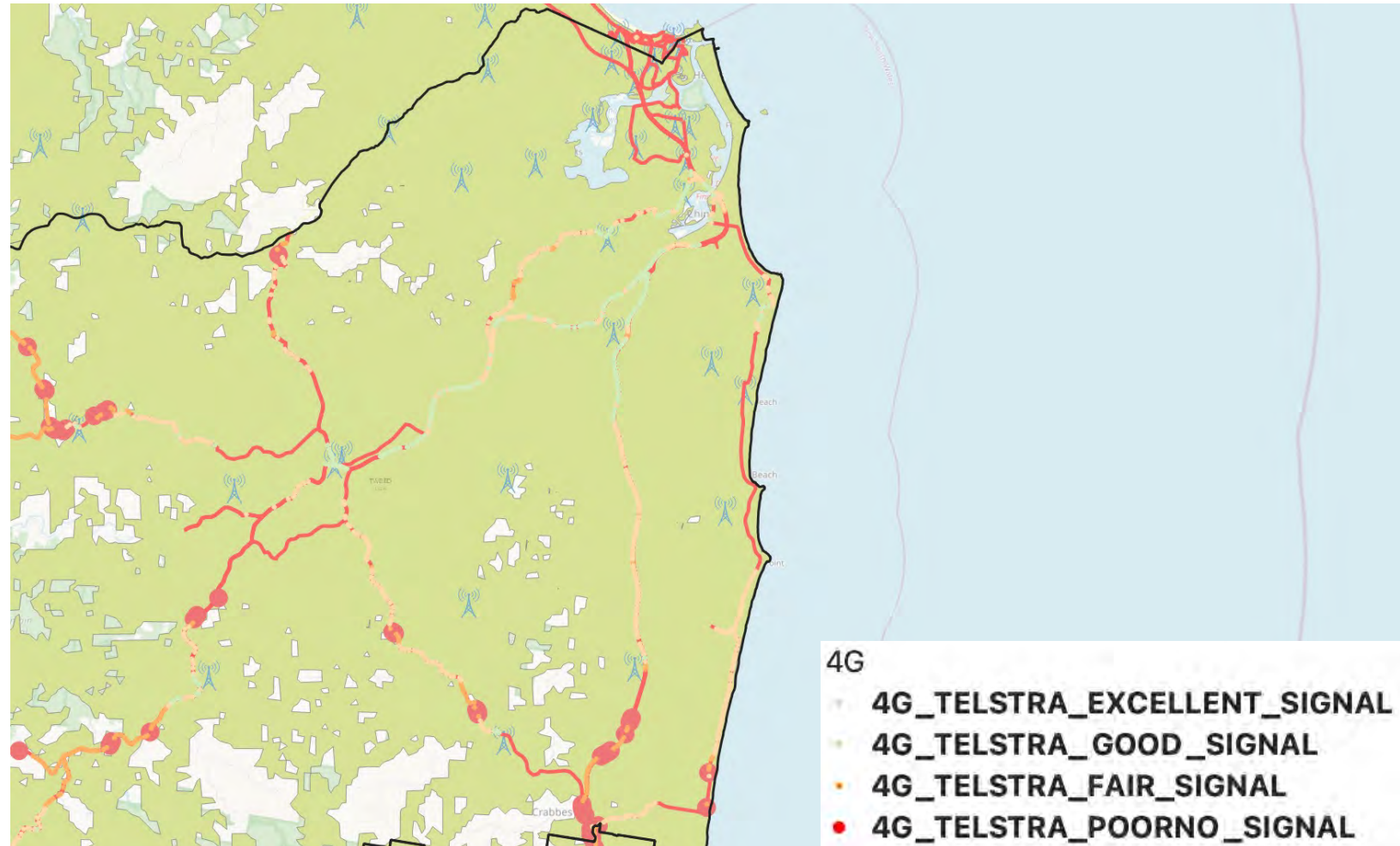
Tweed Shire Analysis

Pacific Highway



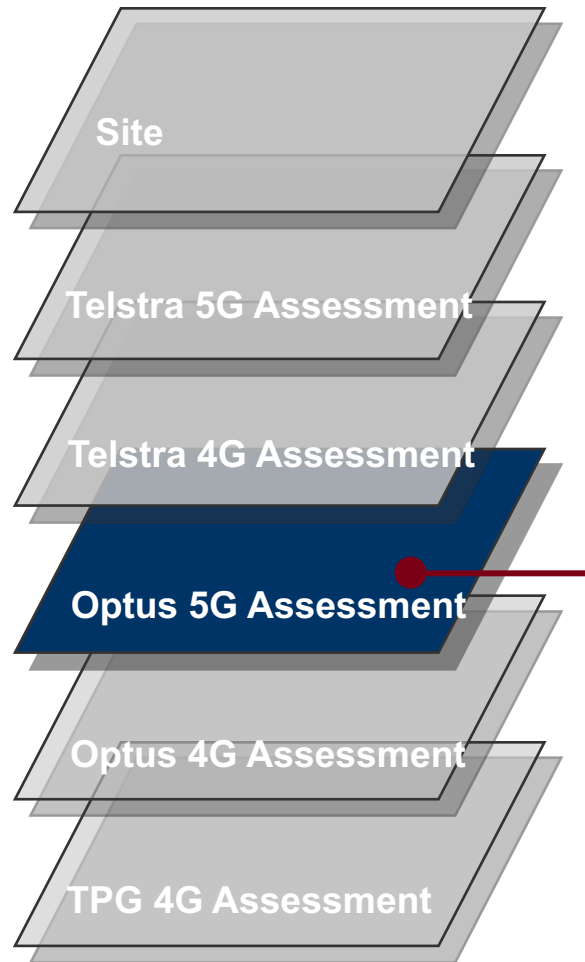
Assessment – Good 4G coverage with 4G Blackspot areas near Southern Shire Boundary

Action – Telstra / Fed Govt (MBSP) – up to 1 new 4G Tower sites



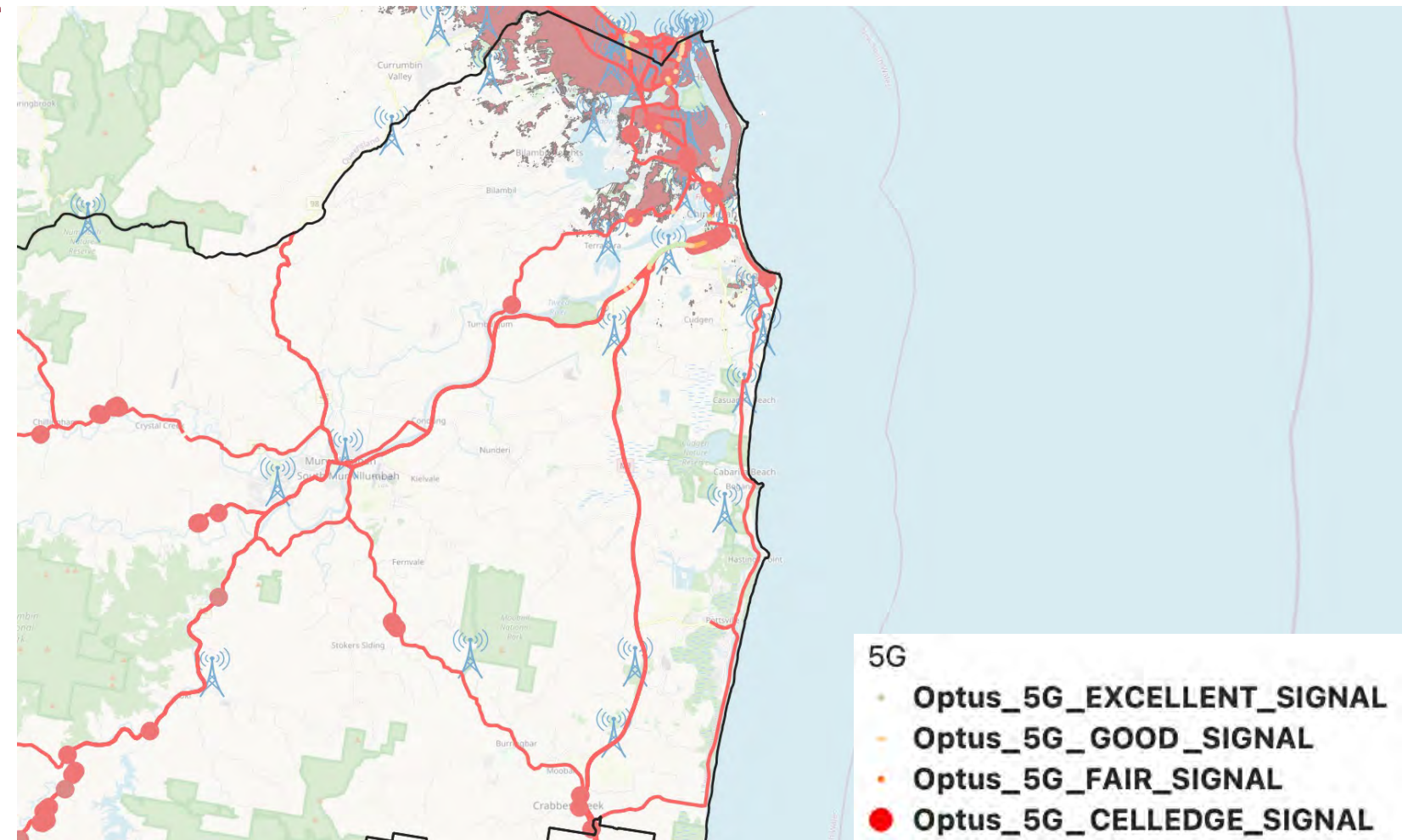
Tweed Shire Analysis

Pacific Highway



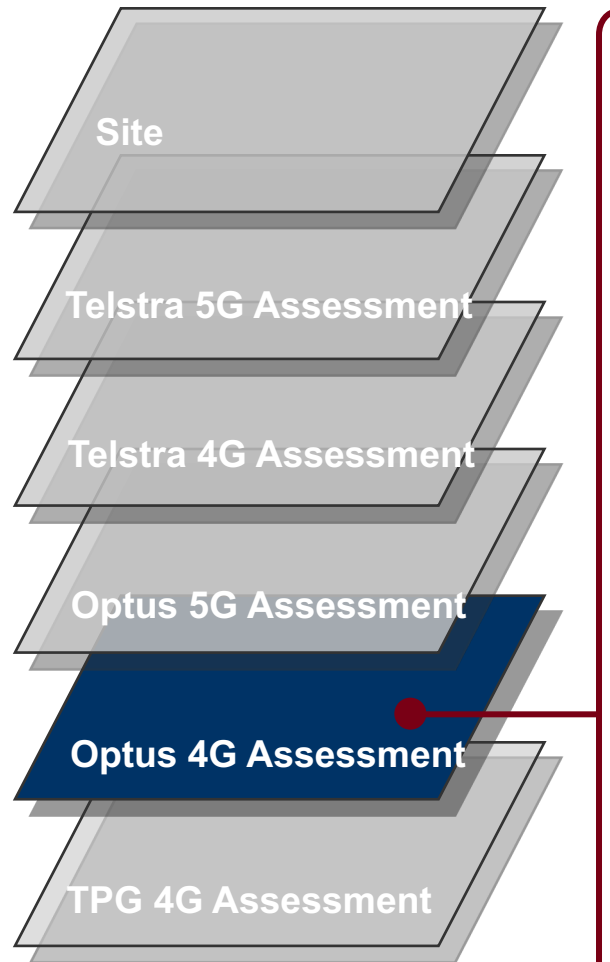
Assessment – Initial Optus 5G coverage areas near Tweed Heads. Broad 5G blackspot areas.

Action – Optus - Upgrade 6 x Optus Site to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites



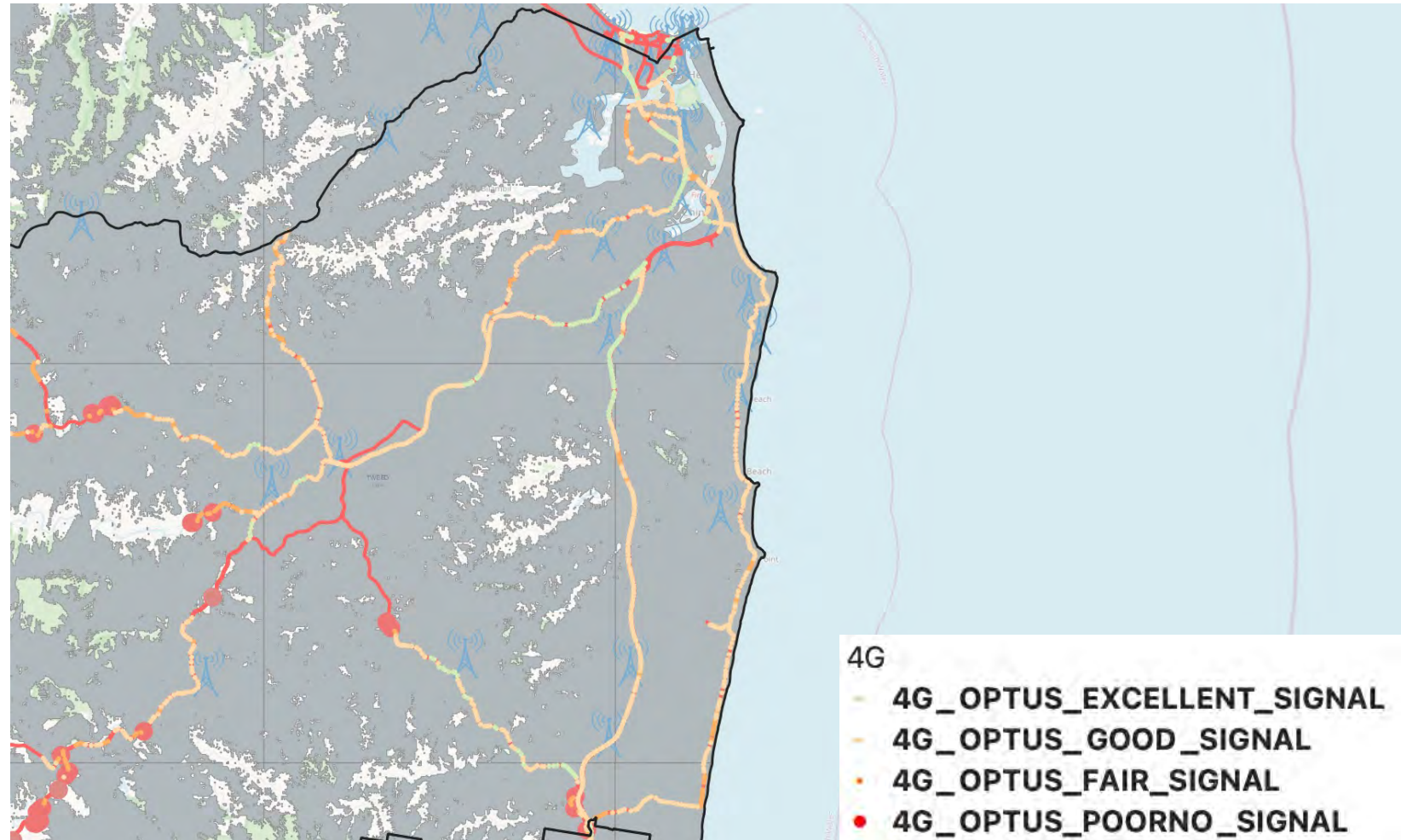
Tweed Shire Analysis

Pacific Highway



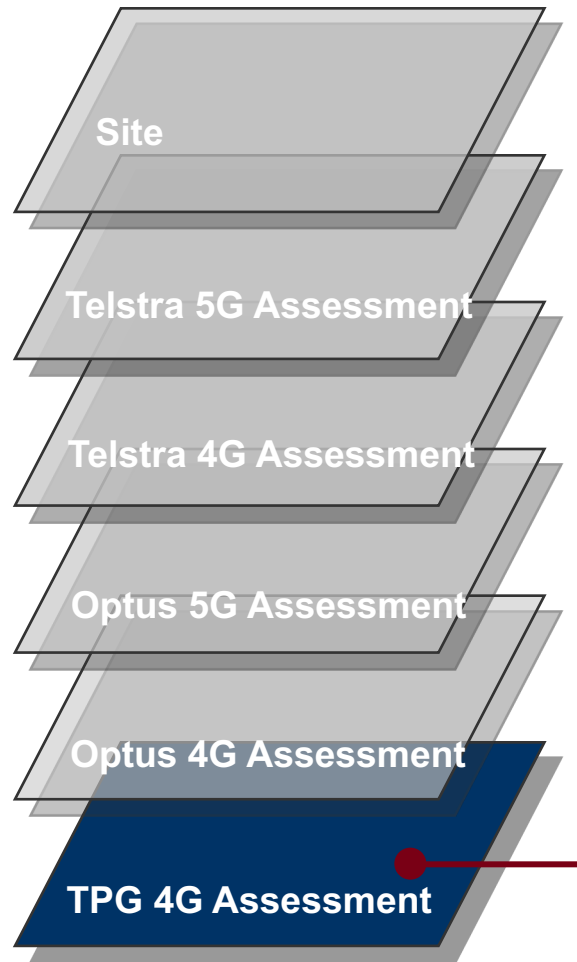
Assessment – Good 4G coverage. 4G blackspots near Shire Boundary

Action – Optus – 4G mid band upgrades required



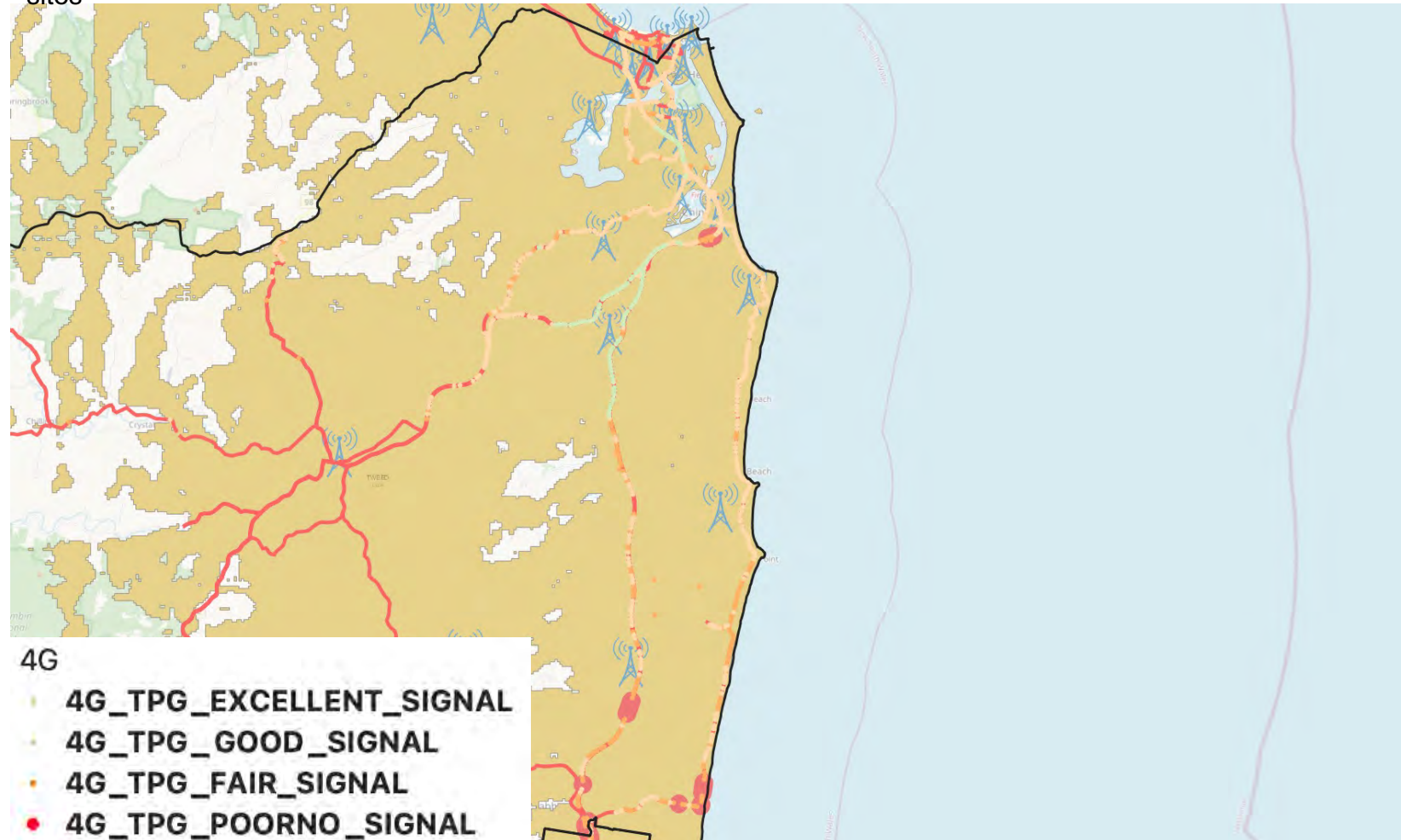
Tweed Shire Analysis

Pacific Highway



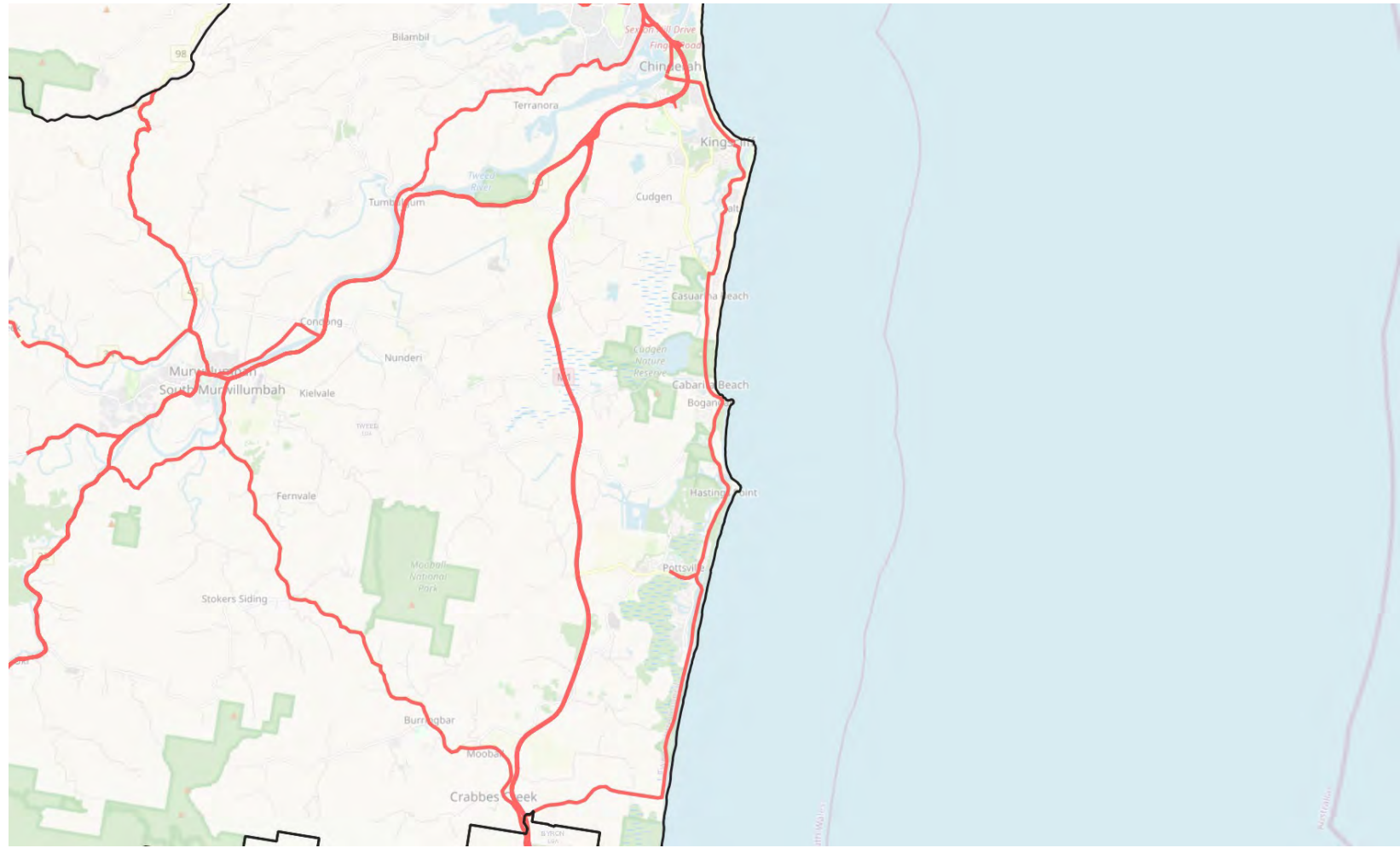
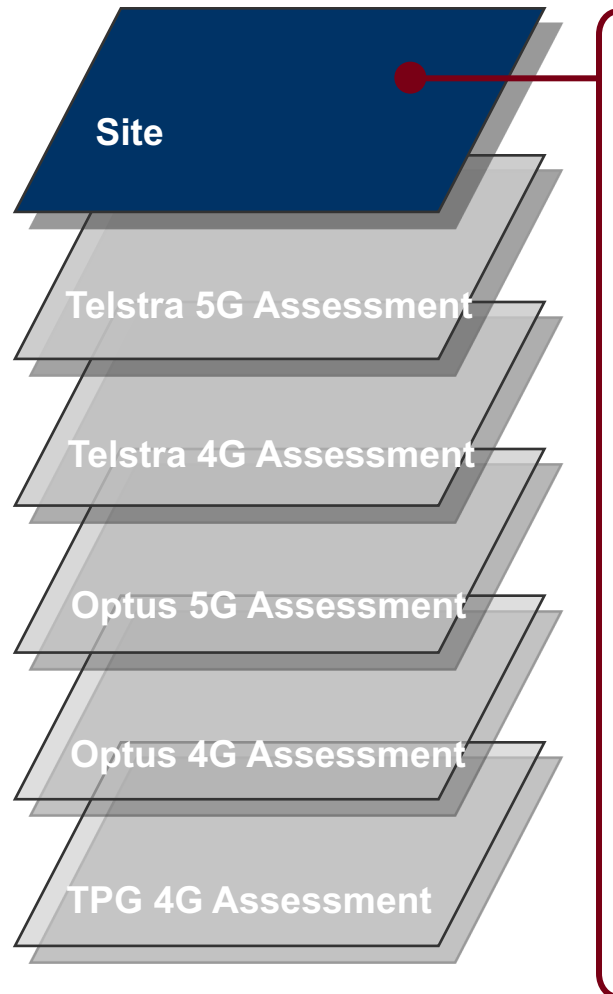
Assessment - 4G blackspots more frequent between Chinderah and southern Shire boundary

Action – TPG – Upgrade 3 existing sites with 4G mid band & TPG / Fed Govt (MBSP) – up to 3 new 4G Tower sites



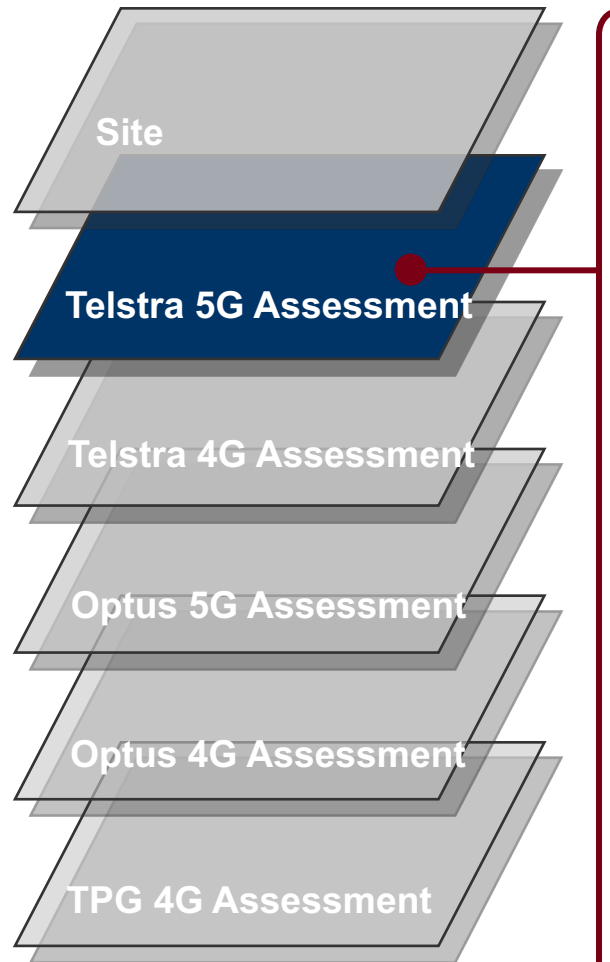
Tweed Shire Analysis

Tweed Coast Road



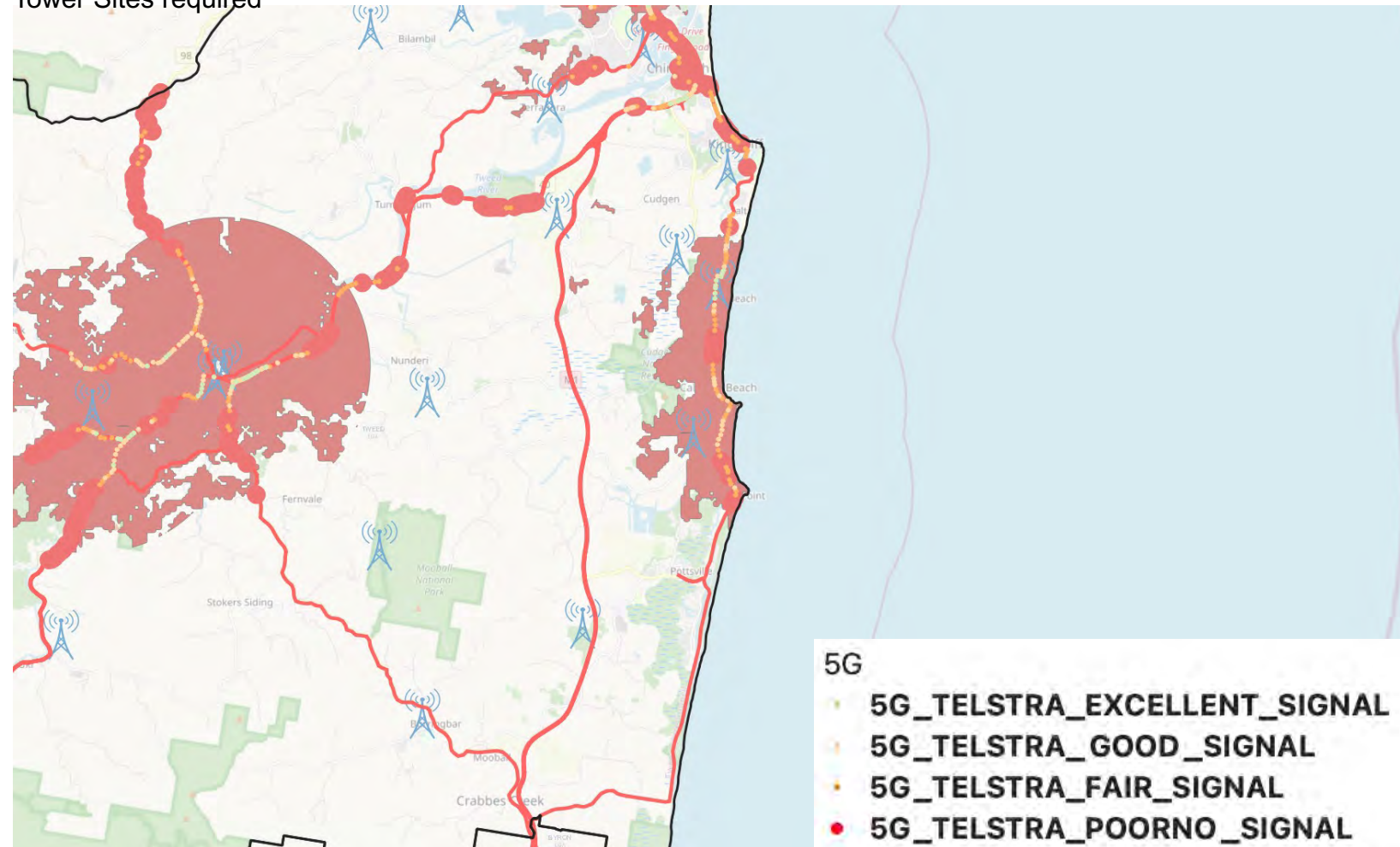
Tweed Shire Analysis

Tweed Coast Road



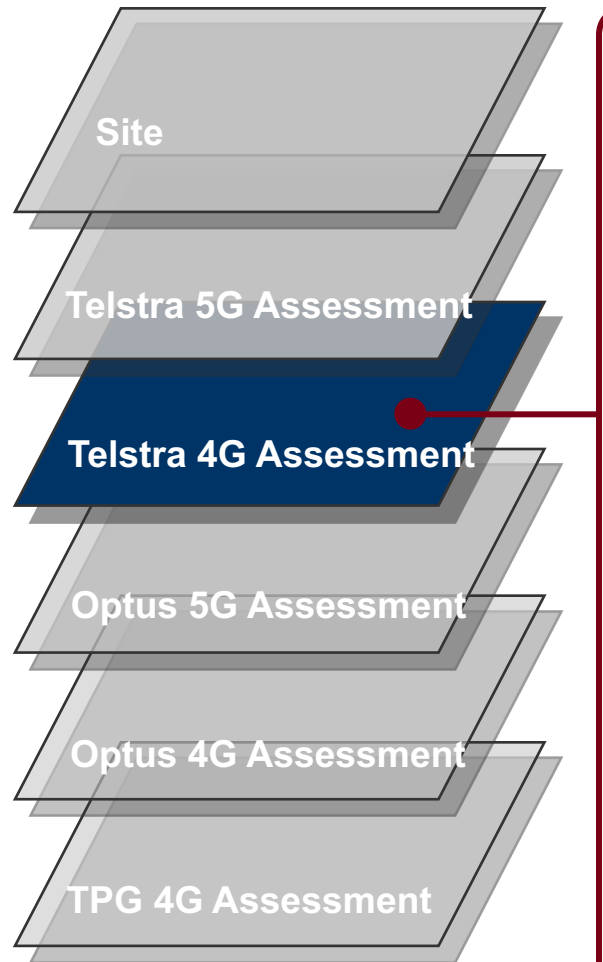
Assessment – Good 5G coverage at Kingscliff and Pottsville. Large areas with no current 5G coverage

Action – Telstra - Upgrade 1 x Telstra Tower Sites with 3.6Ghz 5G & Telstra / Fed Govt (MBSP) – 2 new 5G Tower Sites required



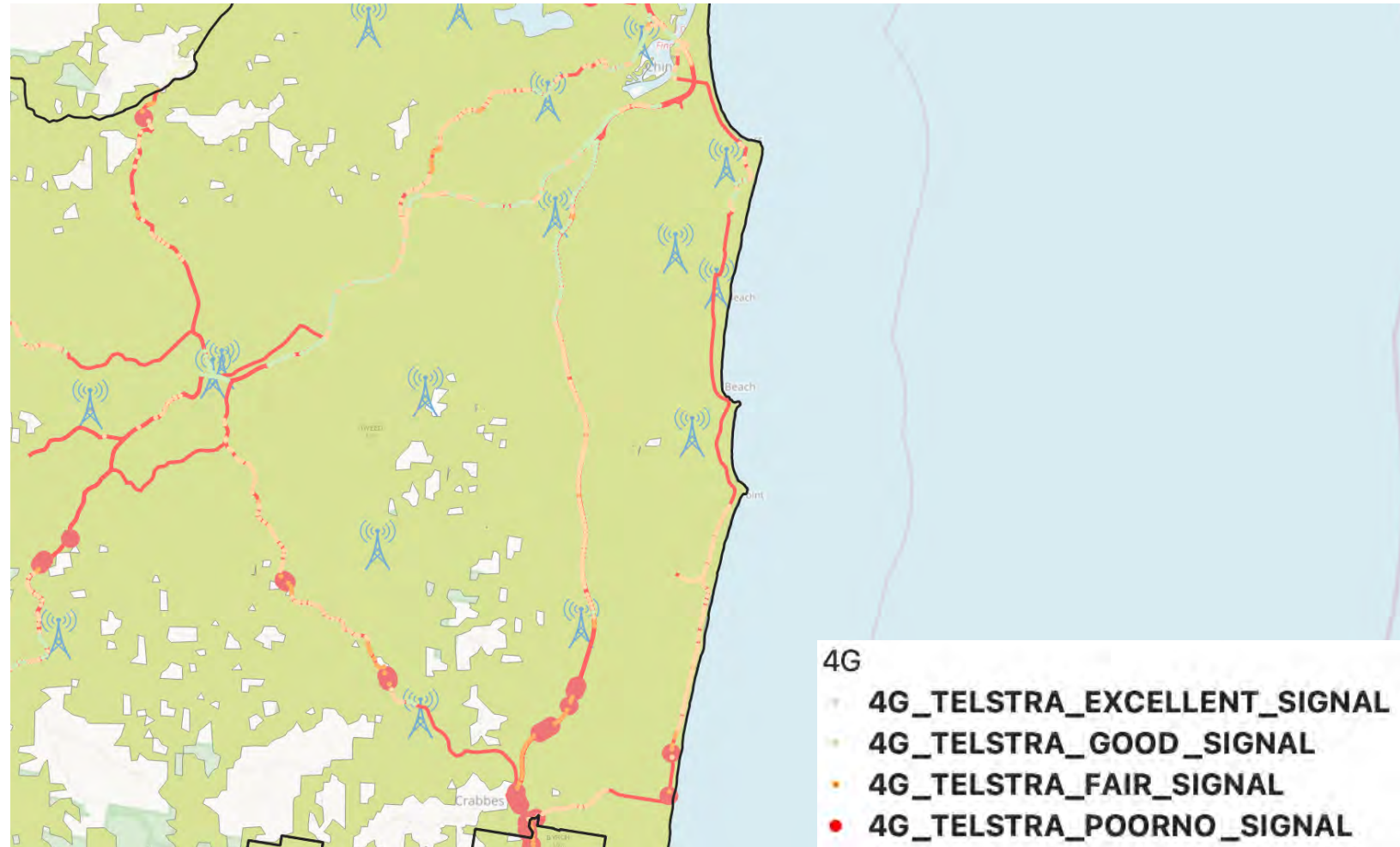
Tweed Shire Analysis

Tweed Coast Road



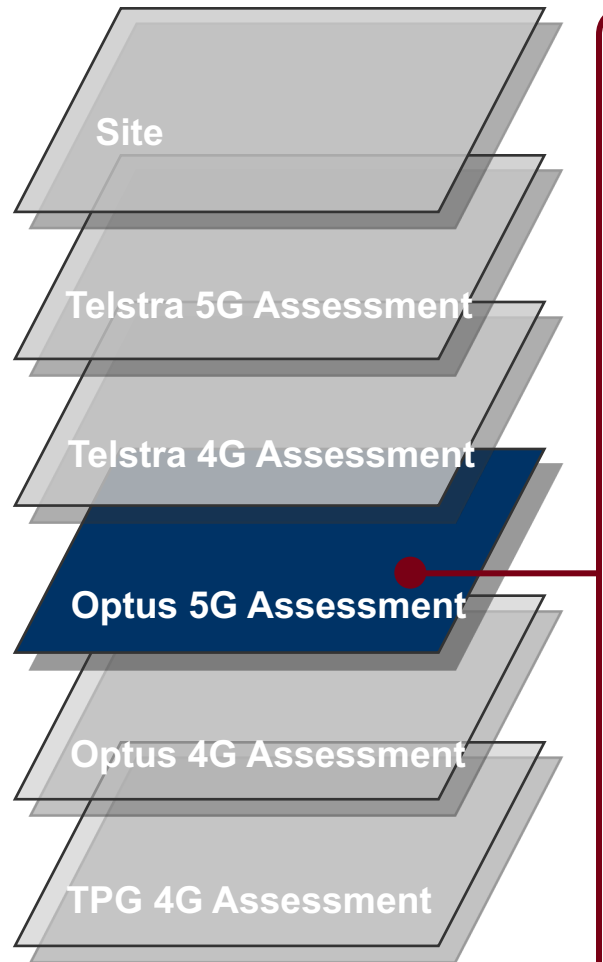
Assessment – Good 4G coverage with 4G Blackspot areas at southern coastal end

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



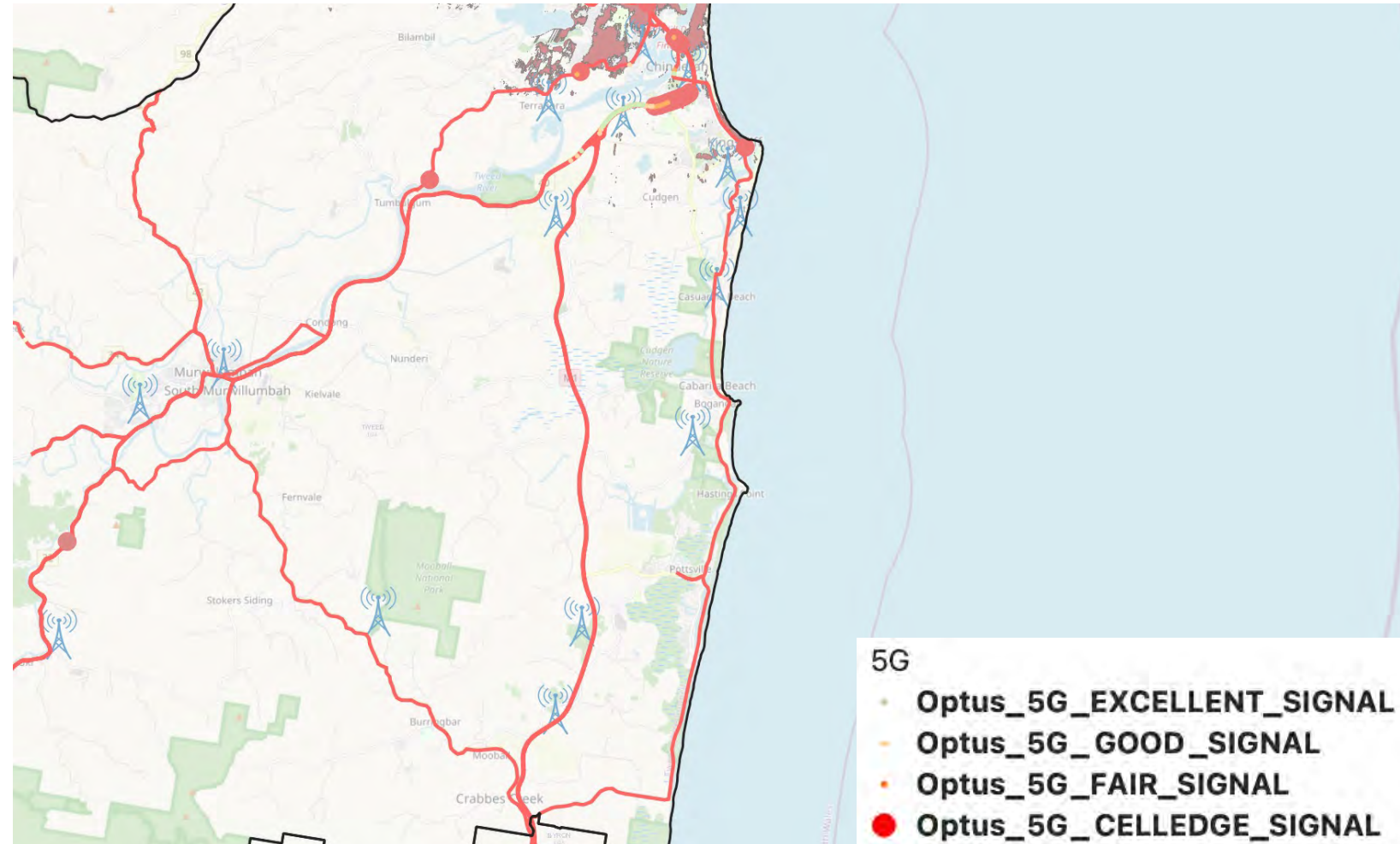
Tweed Shire Analysis

Tweed Coast Road



Assessment - No current Optus 5G coverage

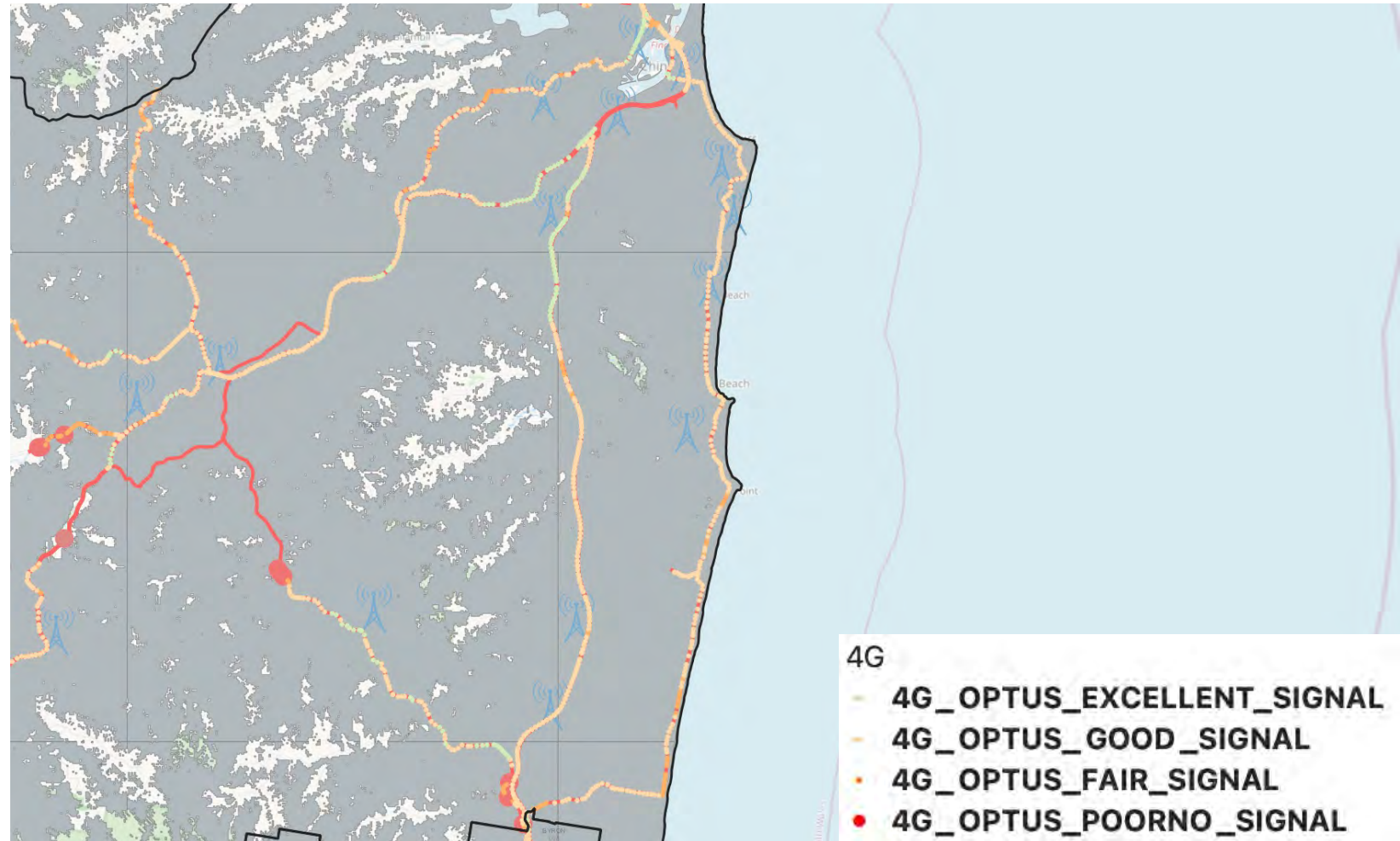
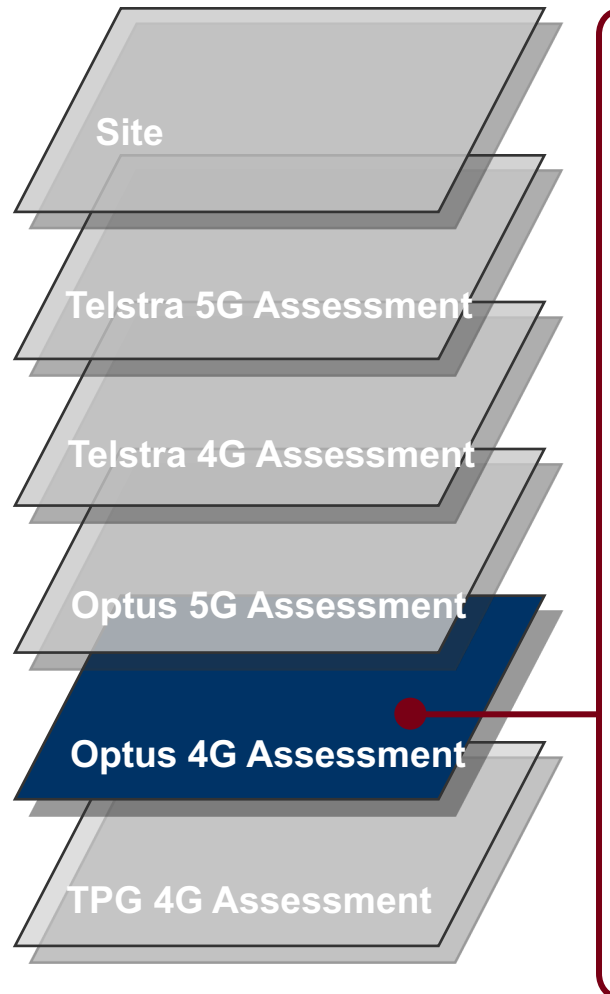
Action – Optus - Upgrade 4 x Optus Sites to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites



Tweed Shire Analysis

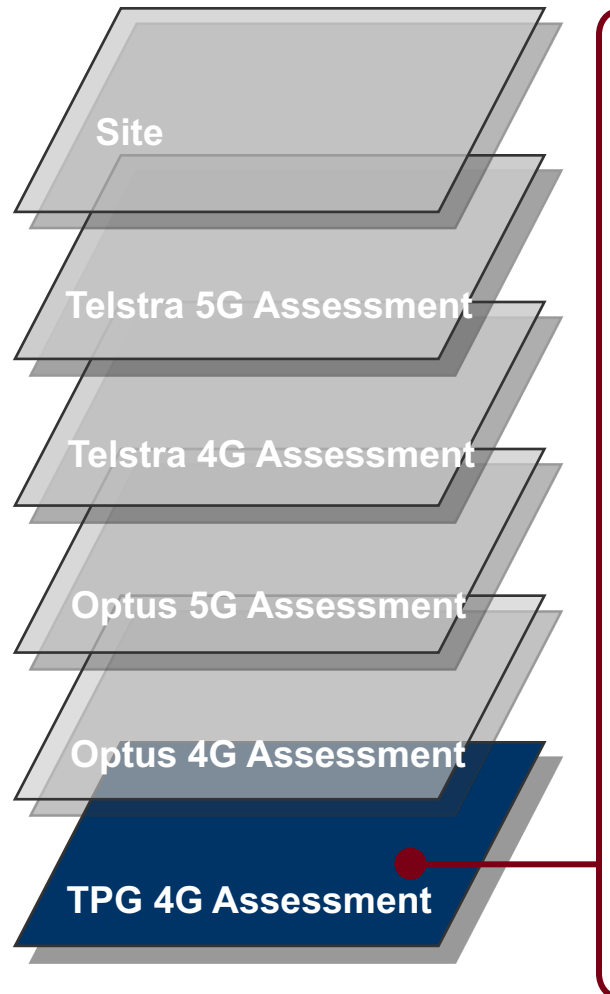
Tweed Coast Road

Assessment – Good 4G coverage



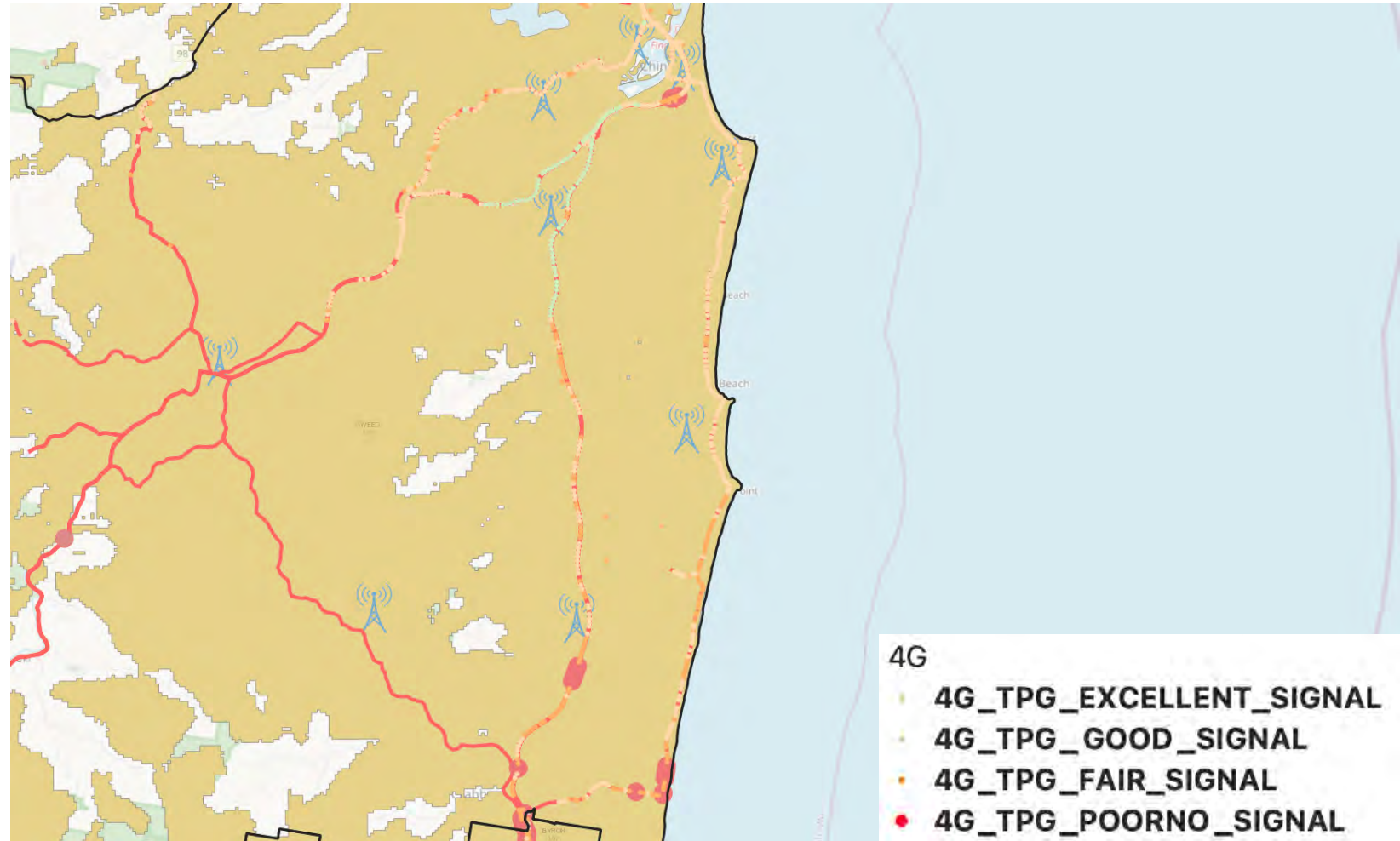
Tweed Shire Analysis

Tweed Coast Road



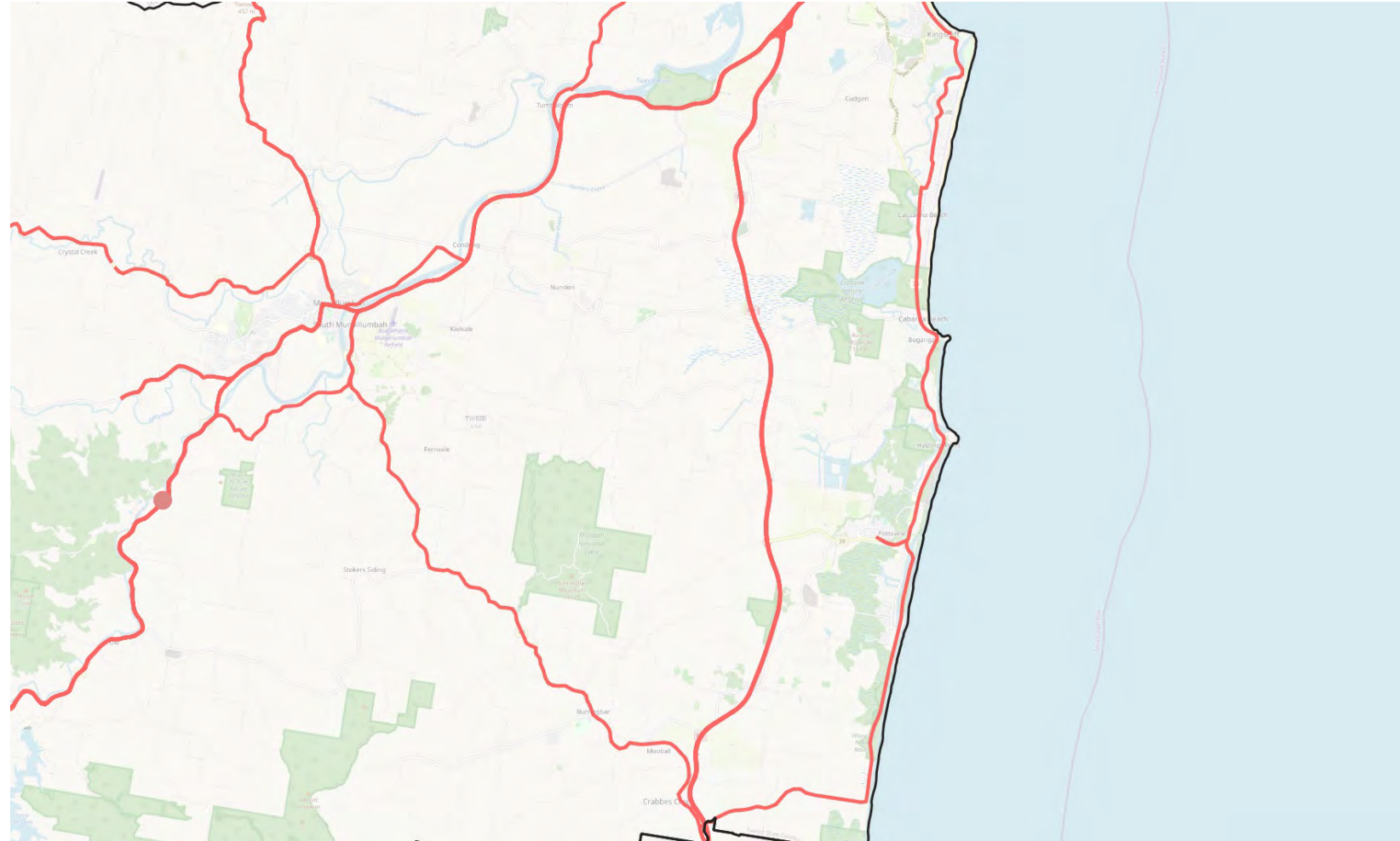
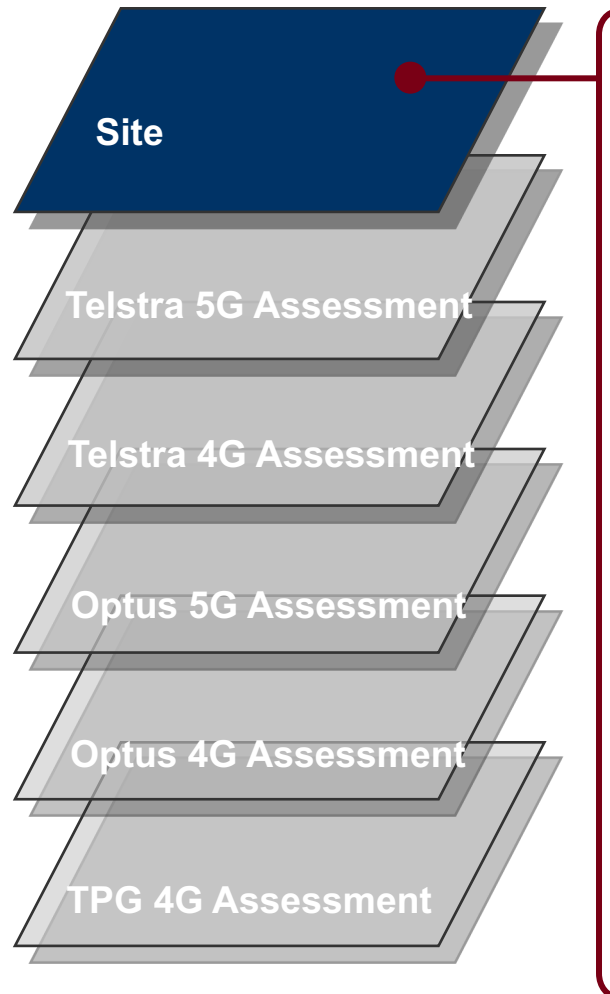
Assessment – Good 4G coverage with 4G Blackspot areas at southern coastal end

Action – TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites



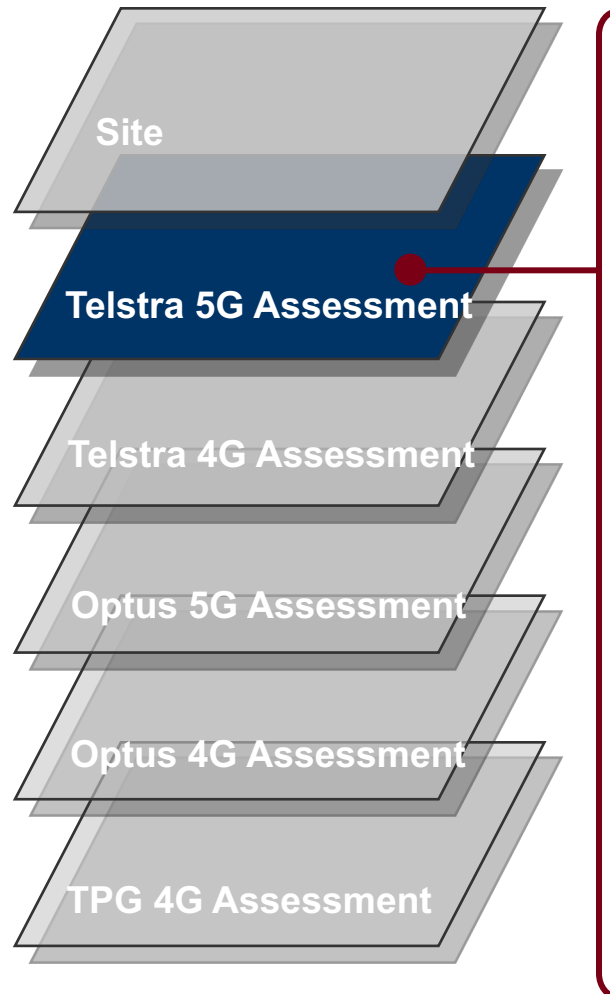
Tweed Shire Analysis

Tweed Valley Way



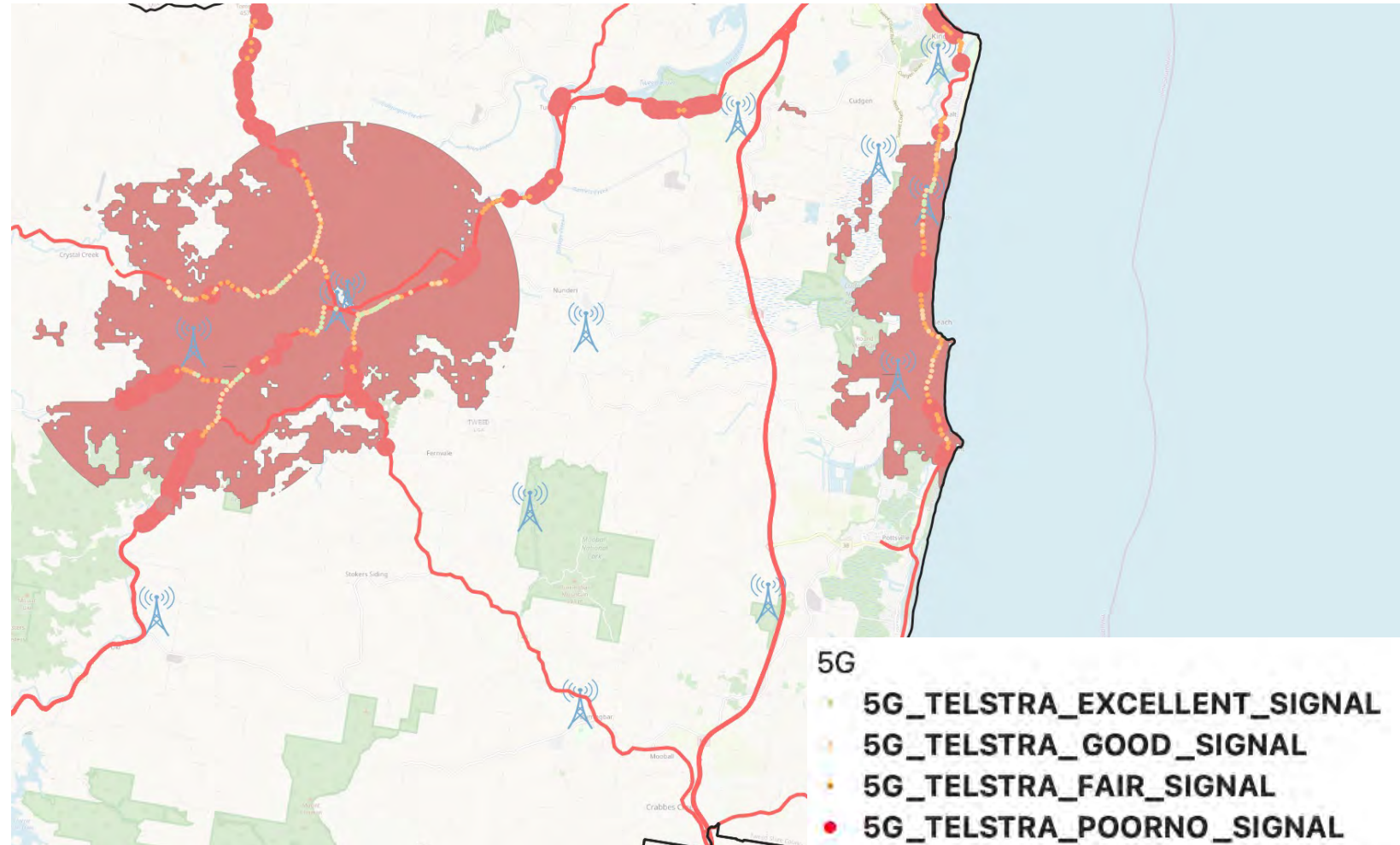
Tweed Shire Analysis

Tweed Valley Way



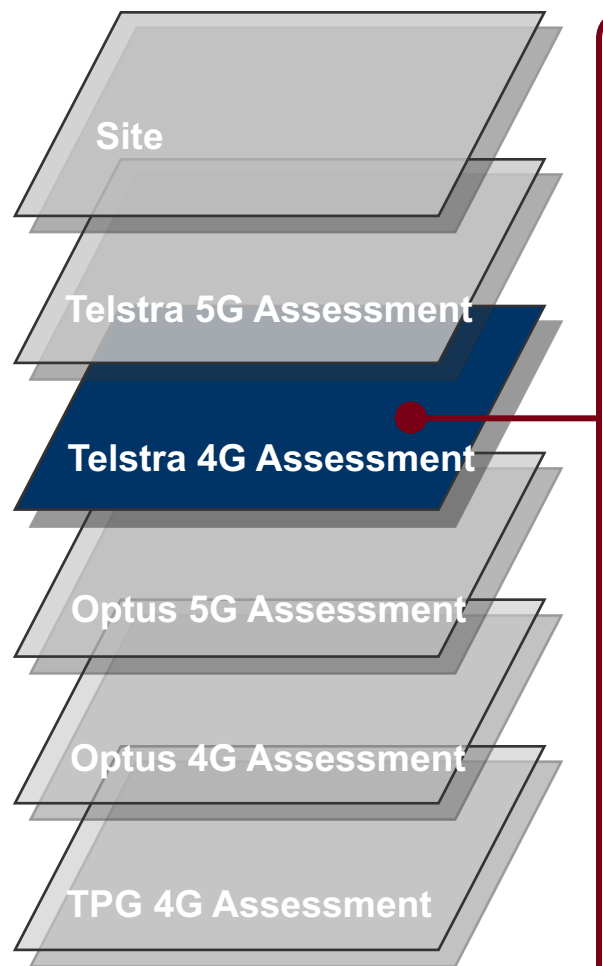
Assessment – Initial 5G coverage limited to Murwillumbah township and outskirts. Broad 5G blackspot areas.

Action – Upgrade 4 x Telstra Tower Sites with 5G & Telstra / Fed Govt (MBSP) – 1 new 5G Tower Sites required



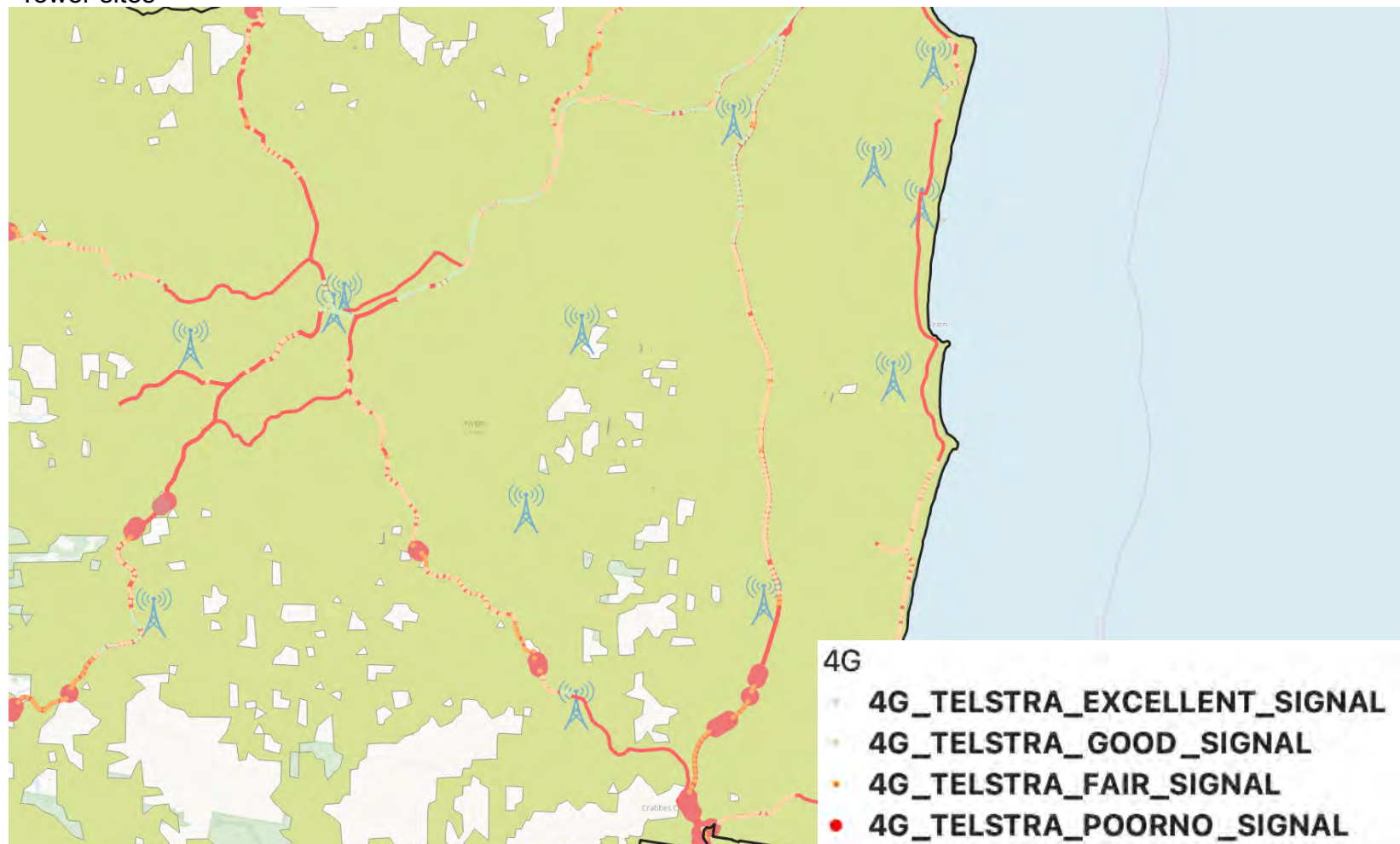
Tweed Shire Analysis

Tweed Valley Way



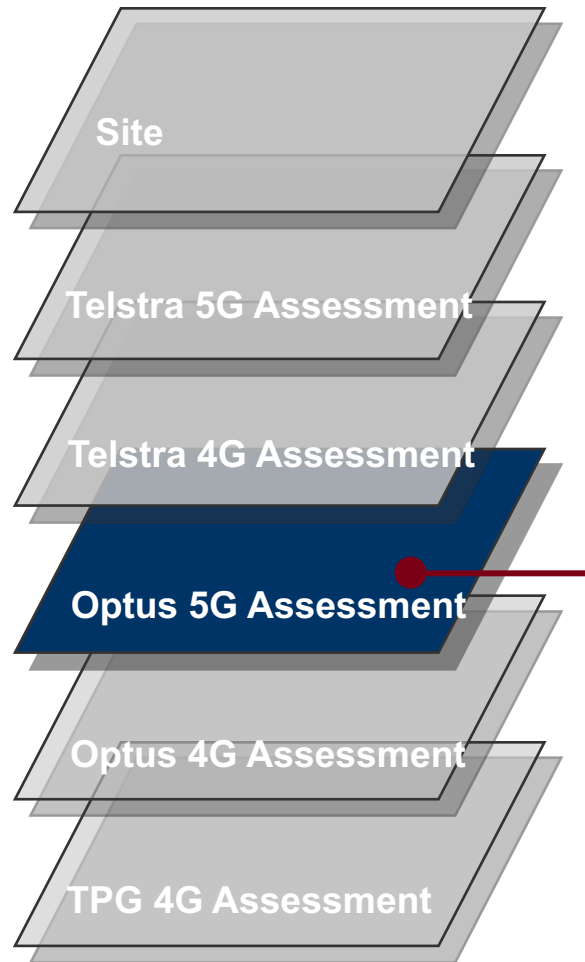
Assessment – Good 4G coverage with some blackspots near Burrinbar

Action – Telstra – Upgrade 2 x Existing Sites with 4G midband & Telstra / Fed Govt (MBSP) – up to 1 new 4G Tower sites



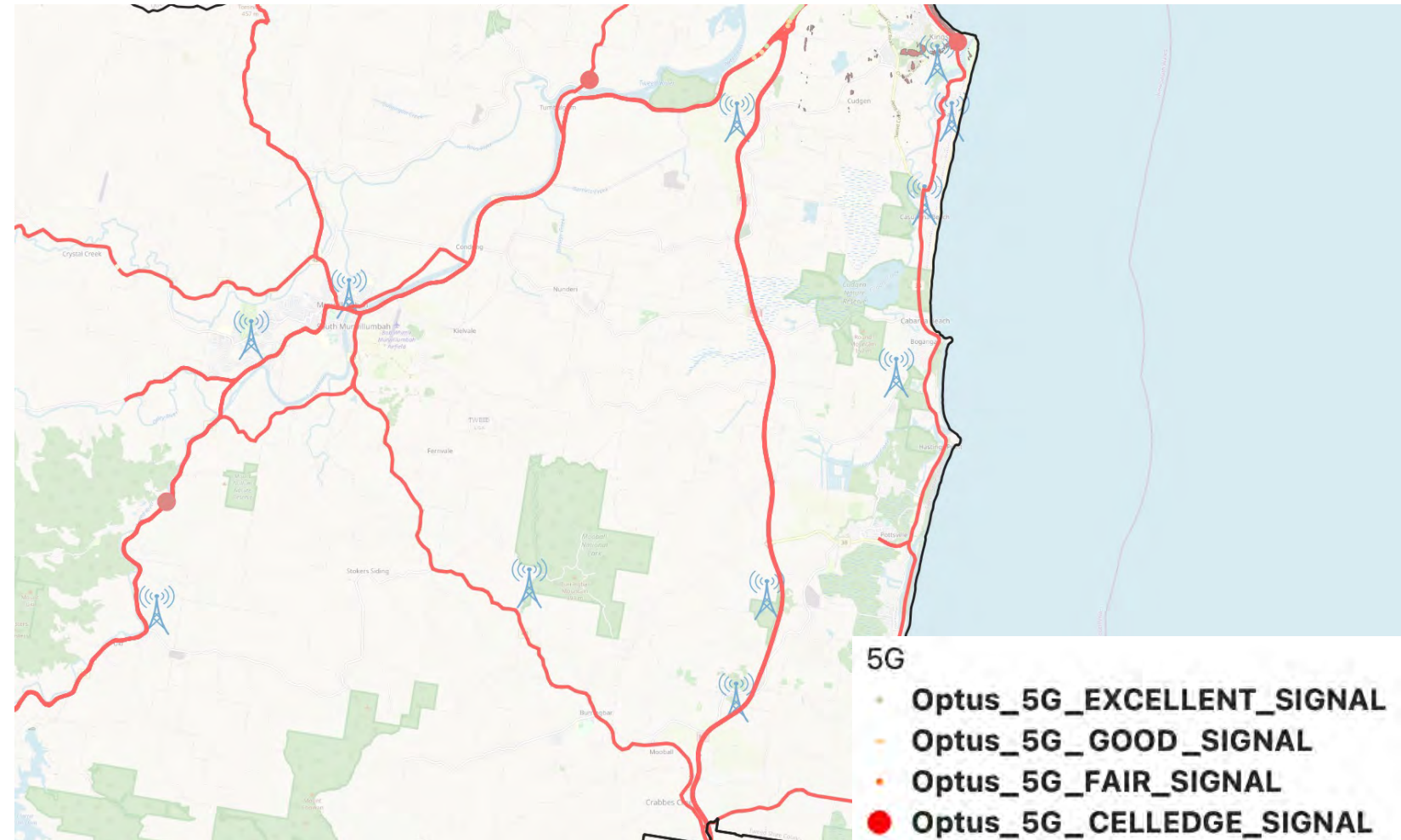
Tweed Shire Analysis

Tweed Valley Way



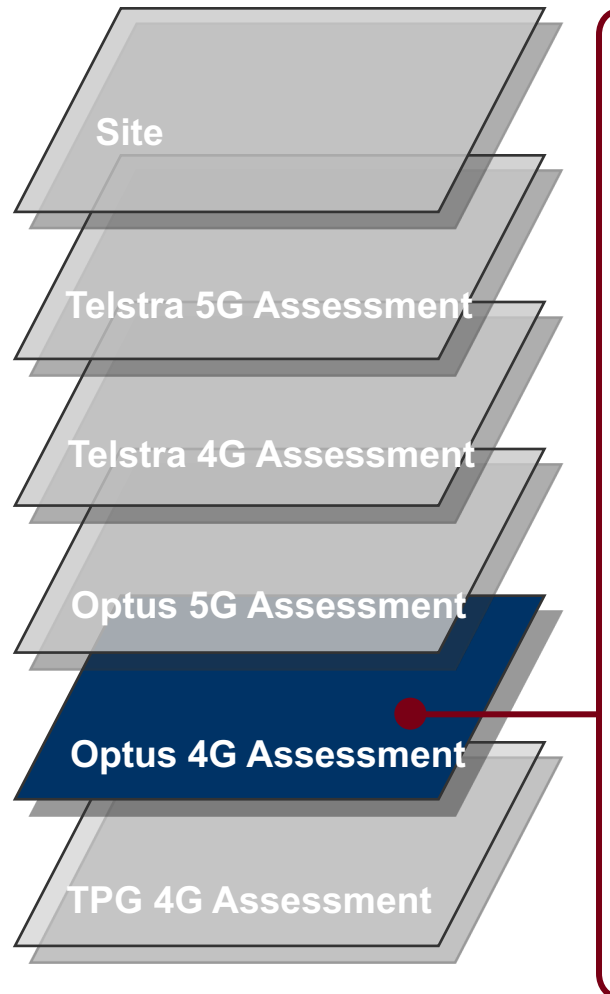
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 3 x Sites to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites



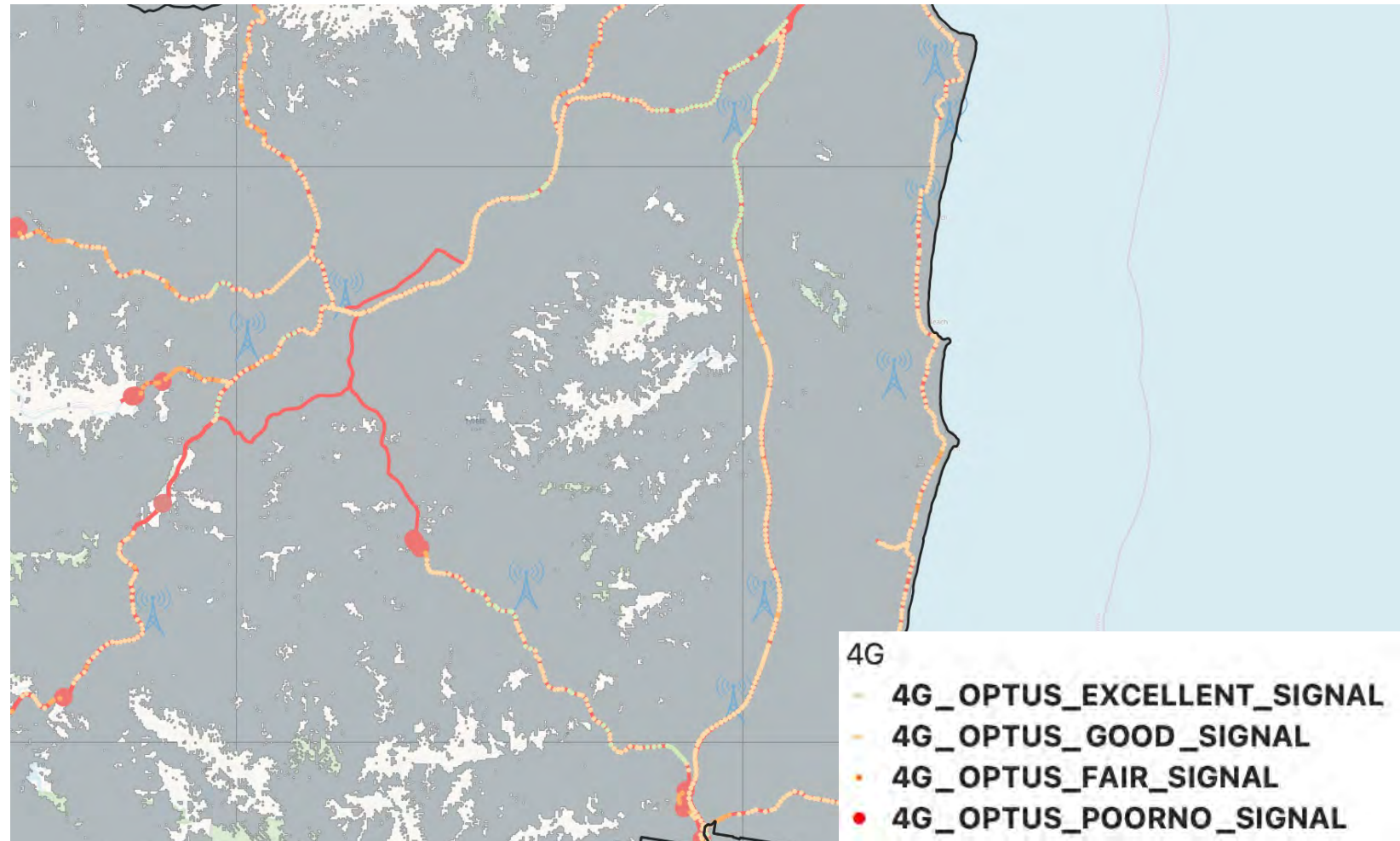
Tweed Shire Analysis

Tweed Valley Way



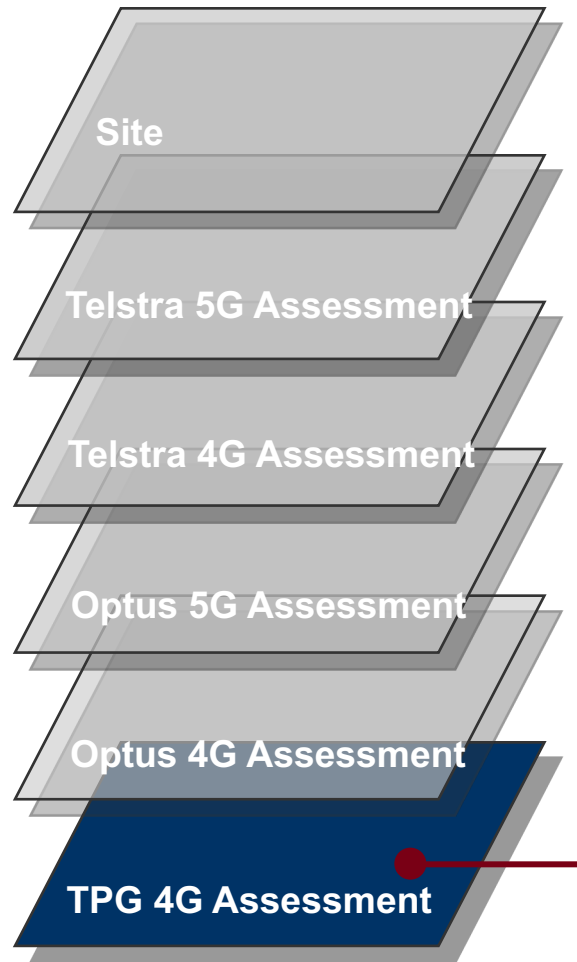
Assessment - Good 4G coverage with some blackspots near Burrinbar

Action – Optus / Fed Govt – up to 1 new 4G Tower sites



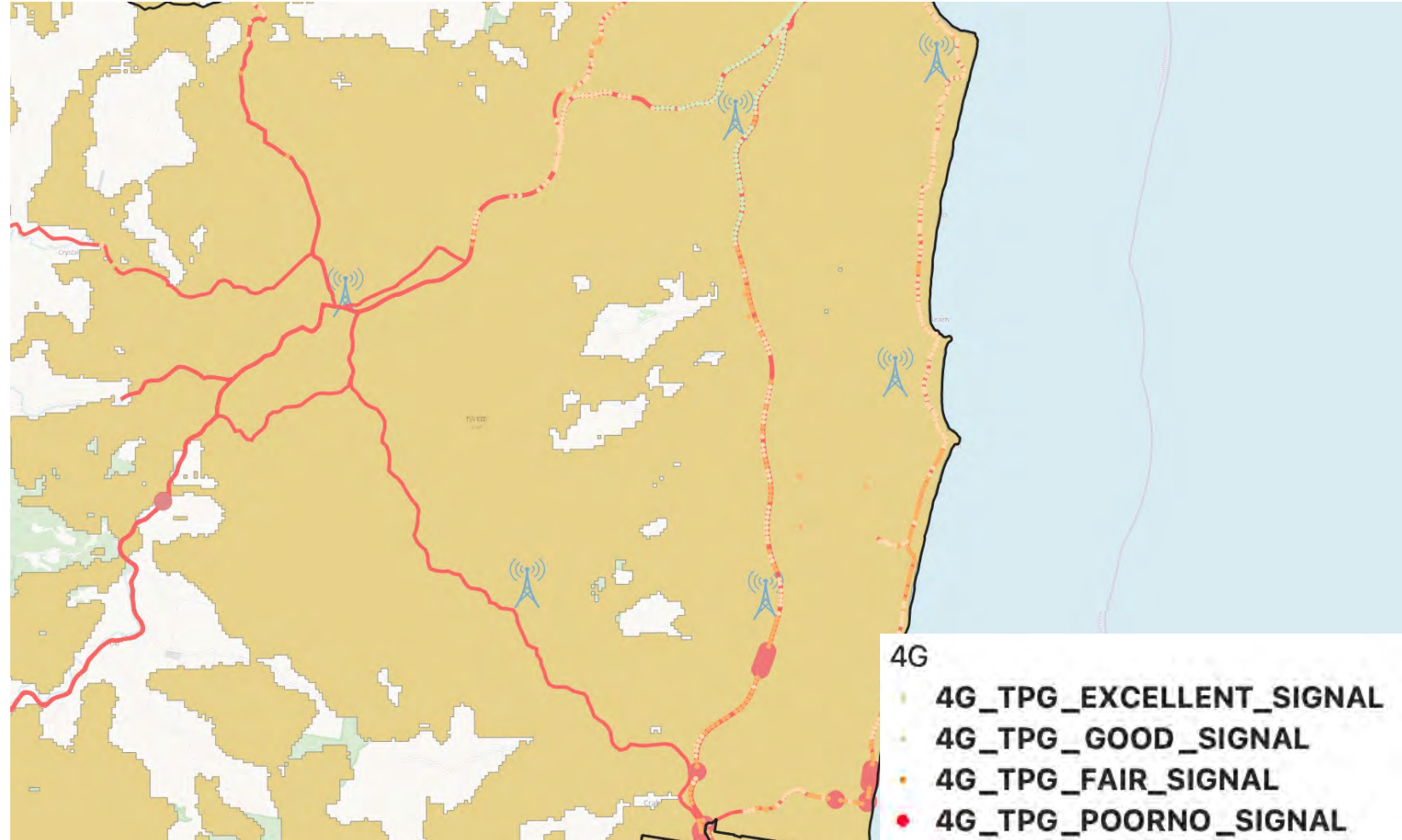
Tweed Shire Analysis

Tweed Valley Way



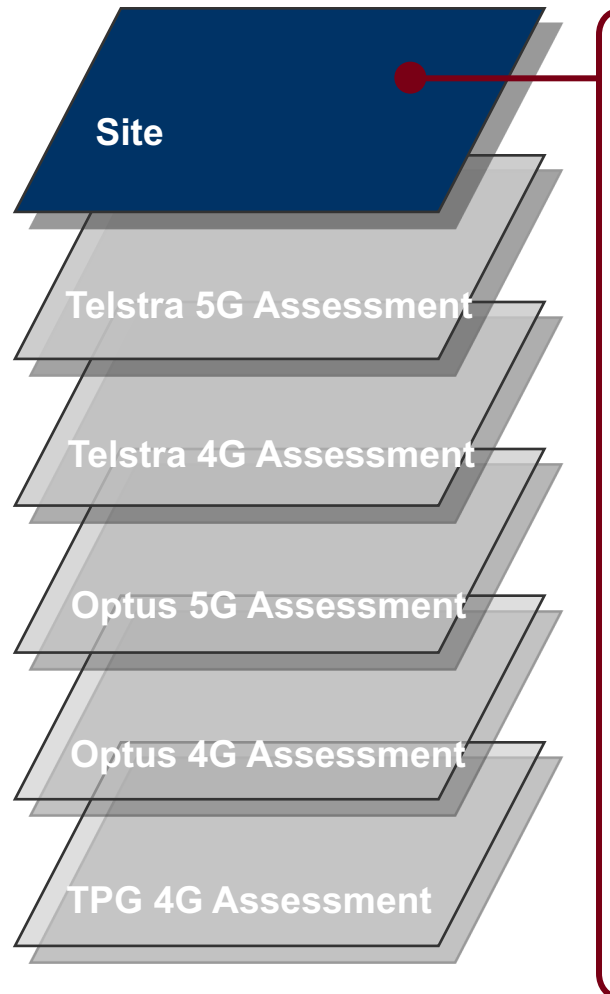
Assessment - Broad 4G blackspot areas east and south of Murwillumbah

Action – TPG – Upgrade 2 x Sites with 4G midband and TPG/ Fed Govt (MBSP) – up to 4 new 4G Tower sites



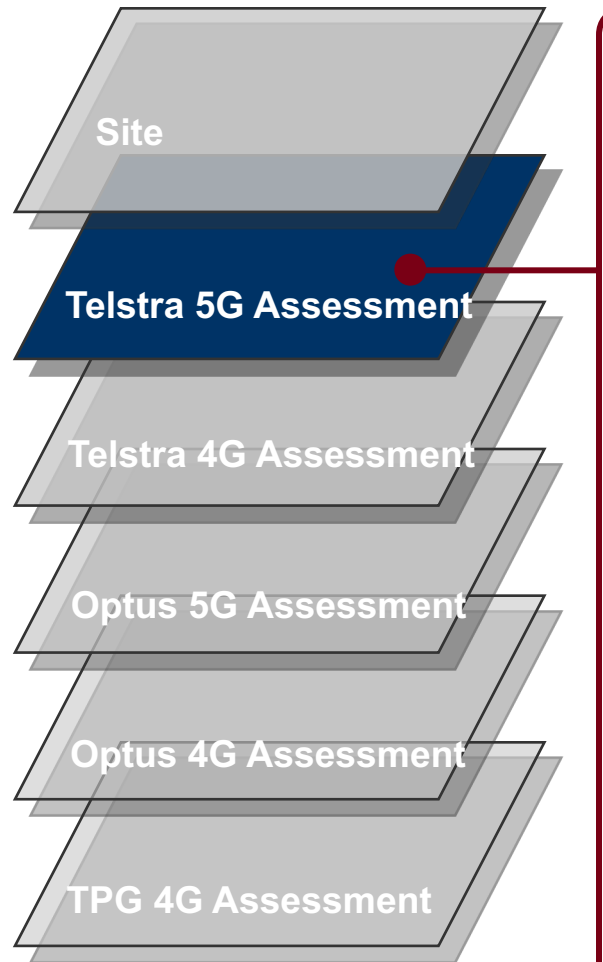
Tweed Shire Analysis

Tomewin Road



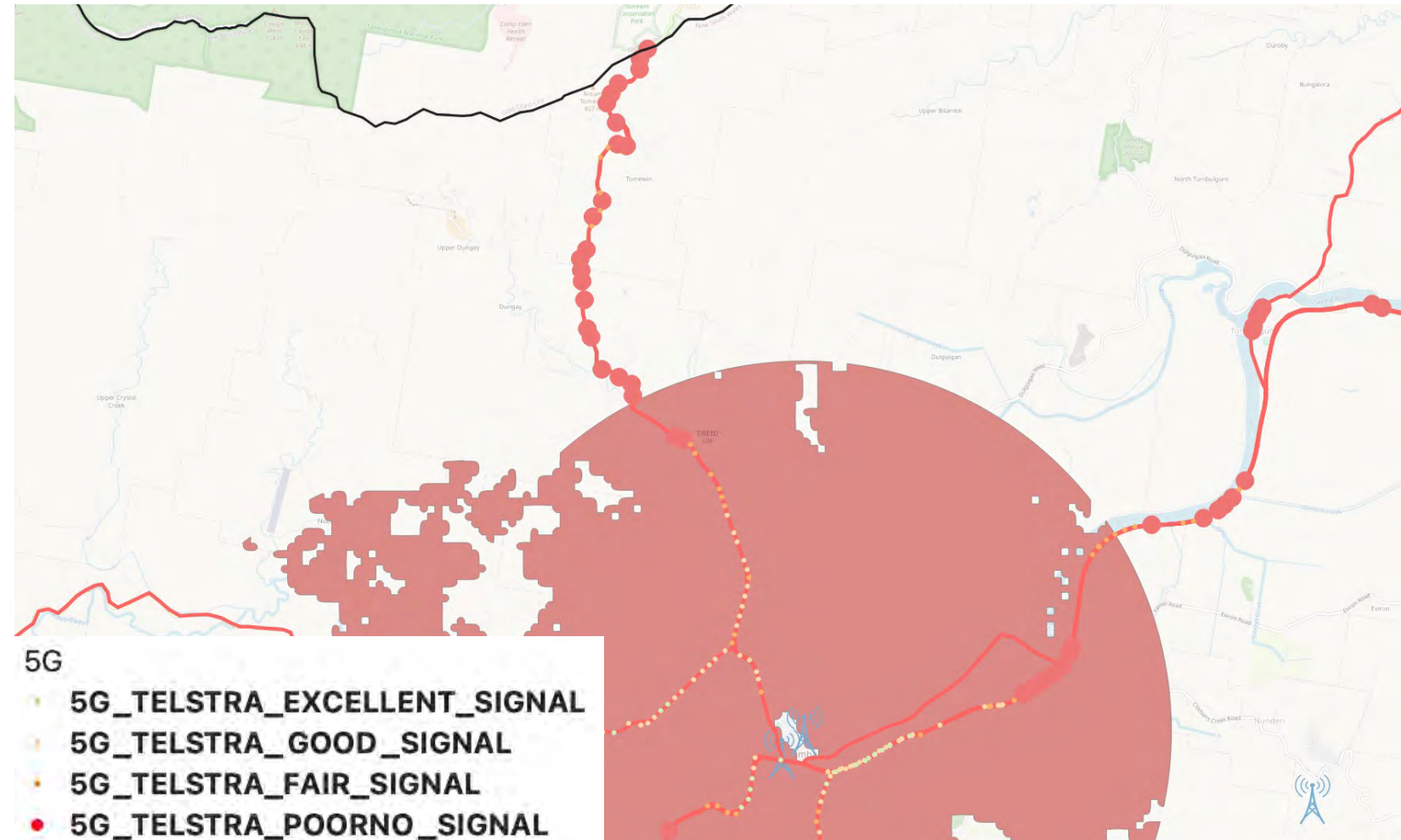
Tweed Shire Analysis

Tomewin Road



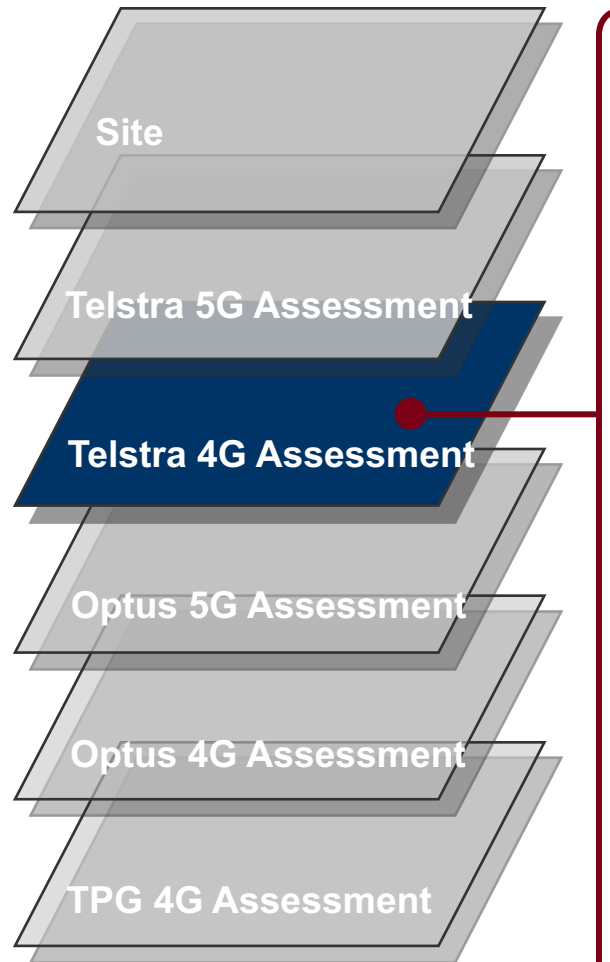
Assessment – Initial 5G coverage limited to Murwillumbah township and outskirts. Broad 5G blackspot areas.

Action – Telstra / Fed Govt (MBSP) – up to 1 new 4G Tower sites



Tweed Shire Analysis

Tomewin Road

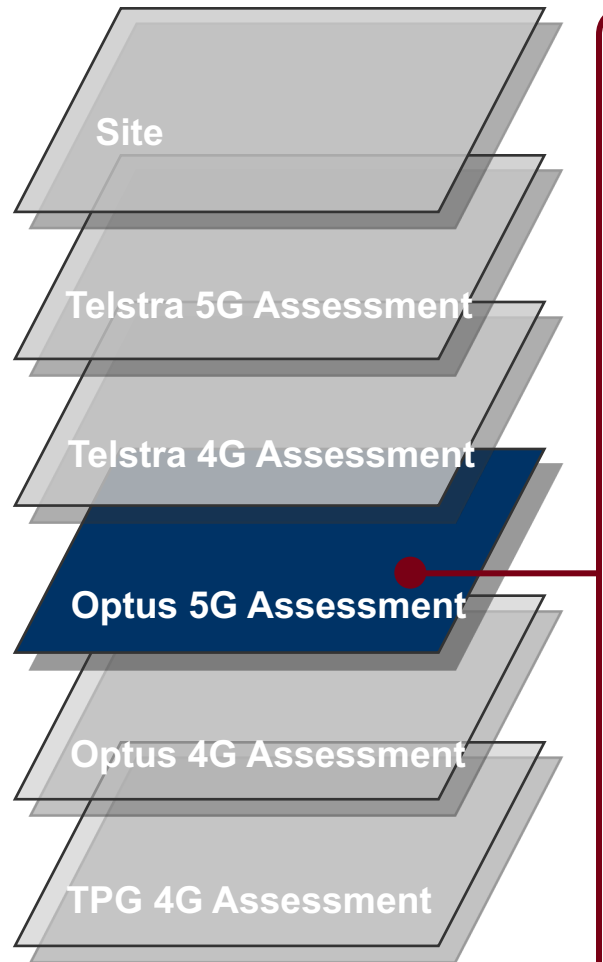


Assessment – Good 4G coverage with a number of 4G Blackspots near northern Shire boundary



Tweed Shire Analysis

Tomewin Road



Assessment - No current Optus 5G coverage

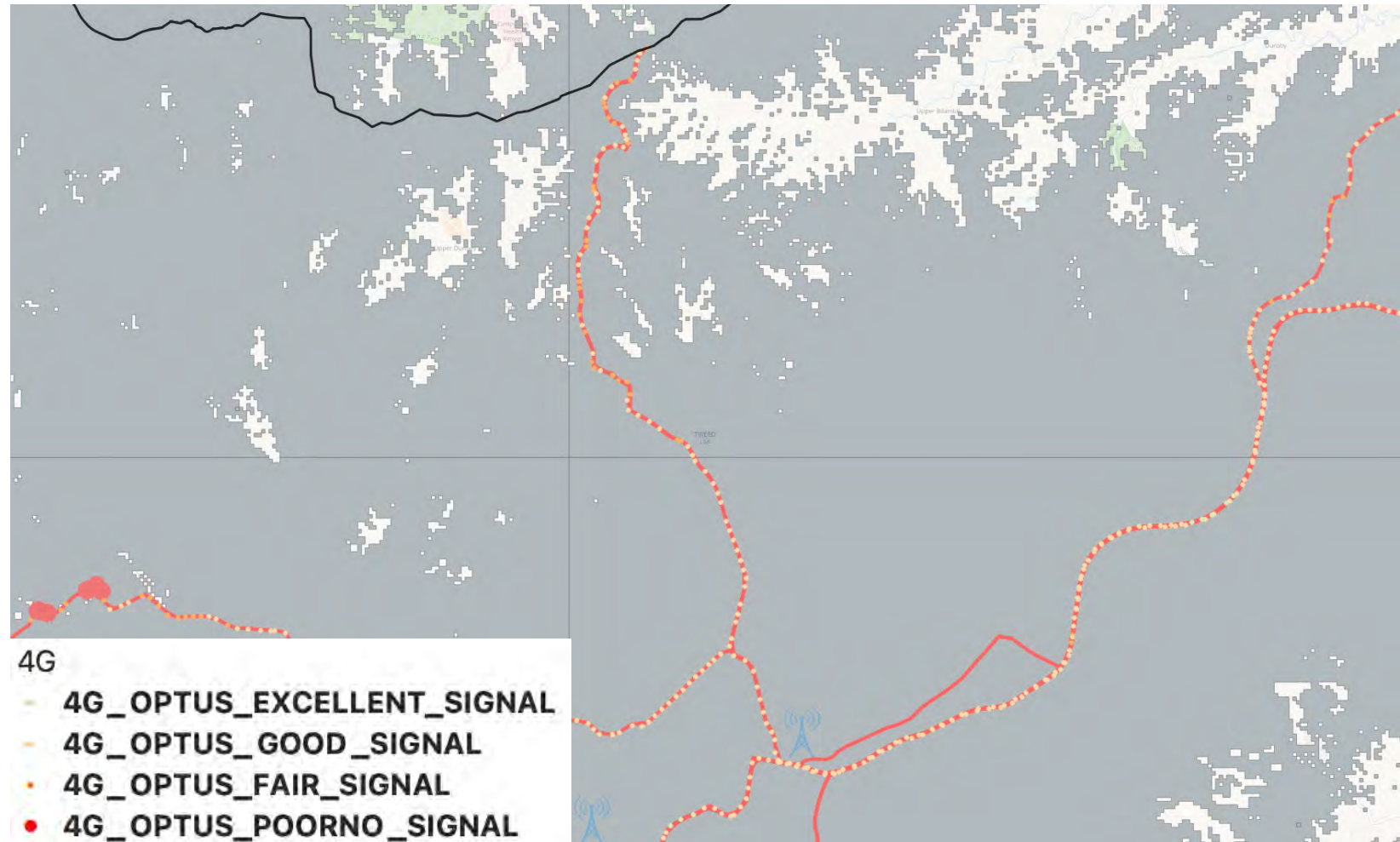
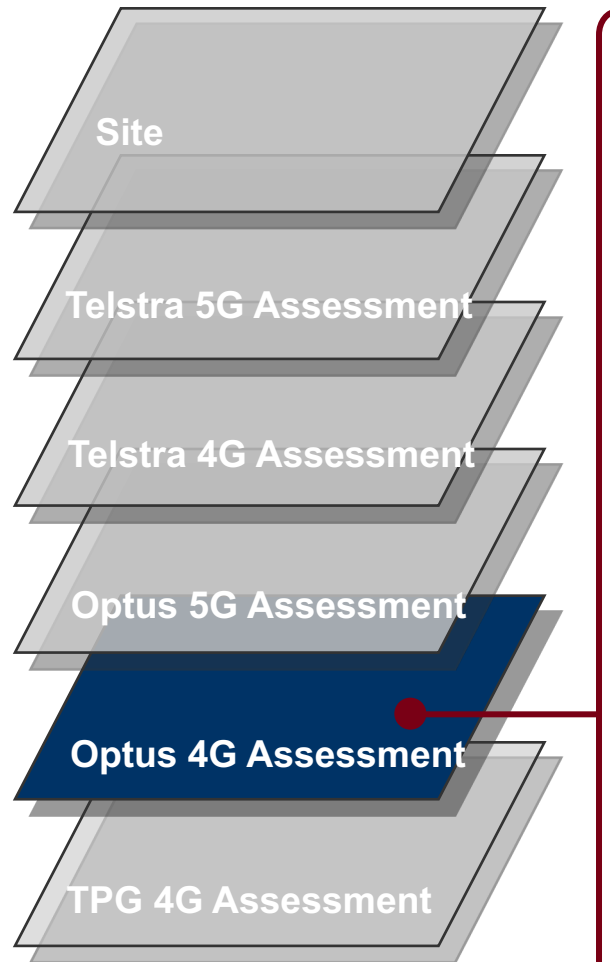
Action – Optus - Upgrade 1 x Optus Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



Tweed Shire Analysis

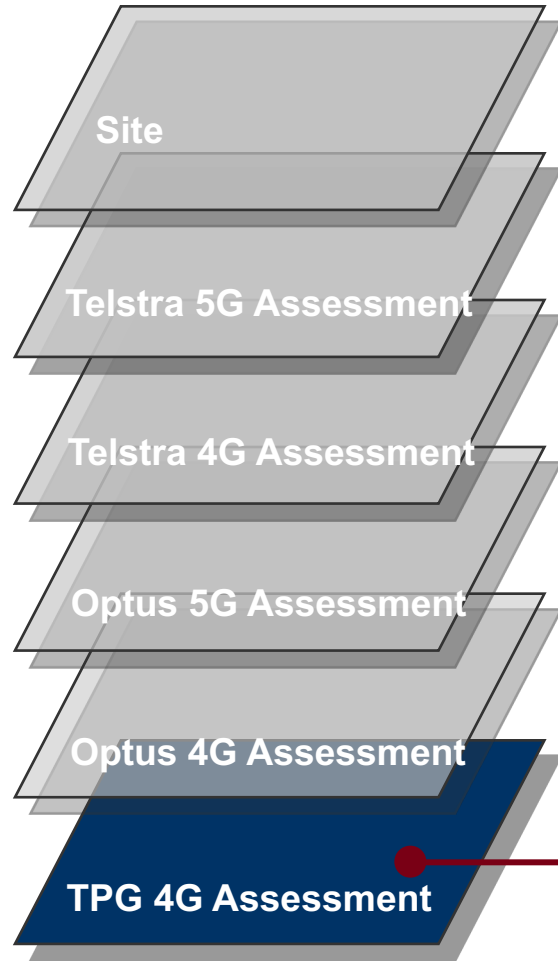
Tomewin Road

Assessment – Good 4G coverage



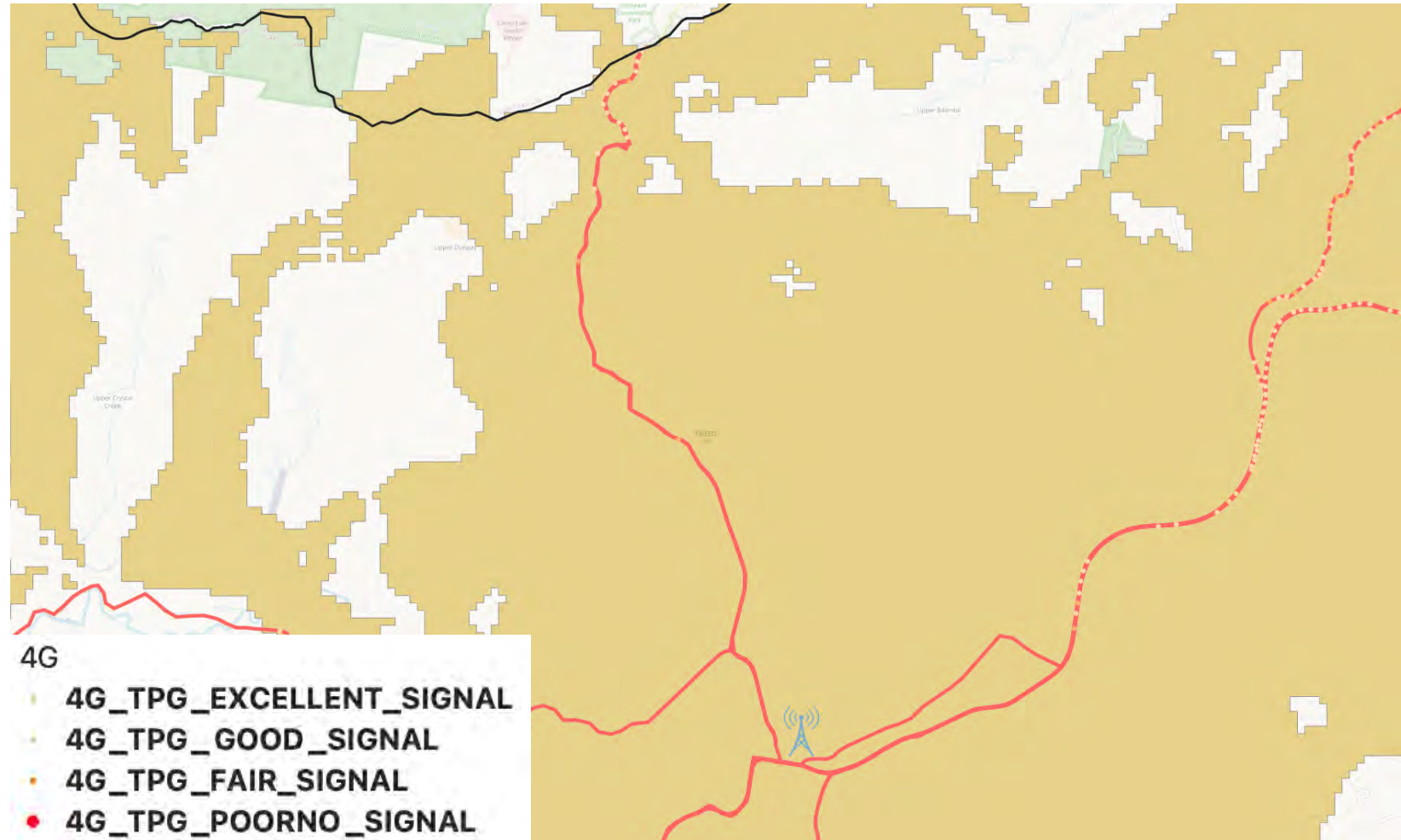
Tweed Shire Analysis

Tomewin Road



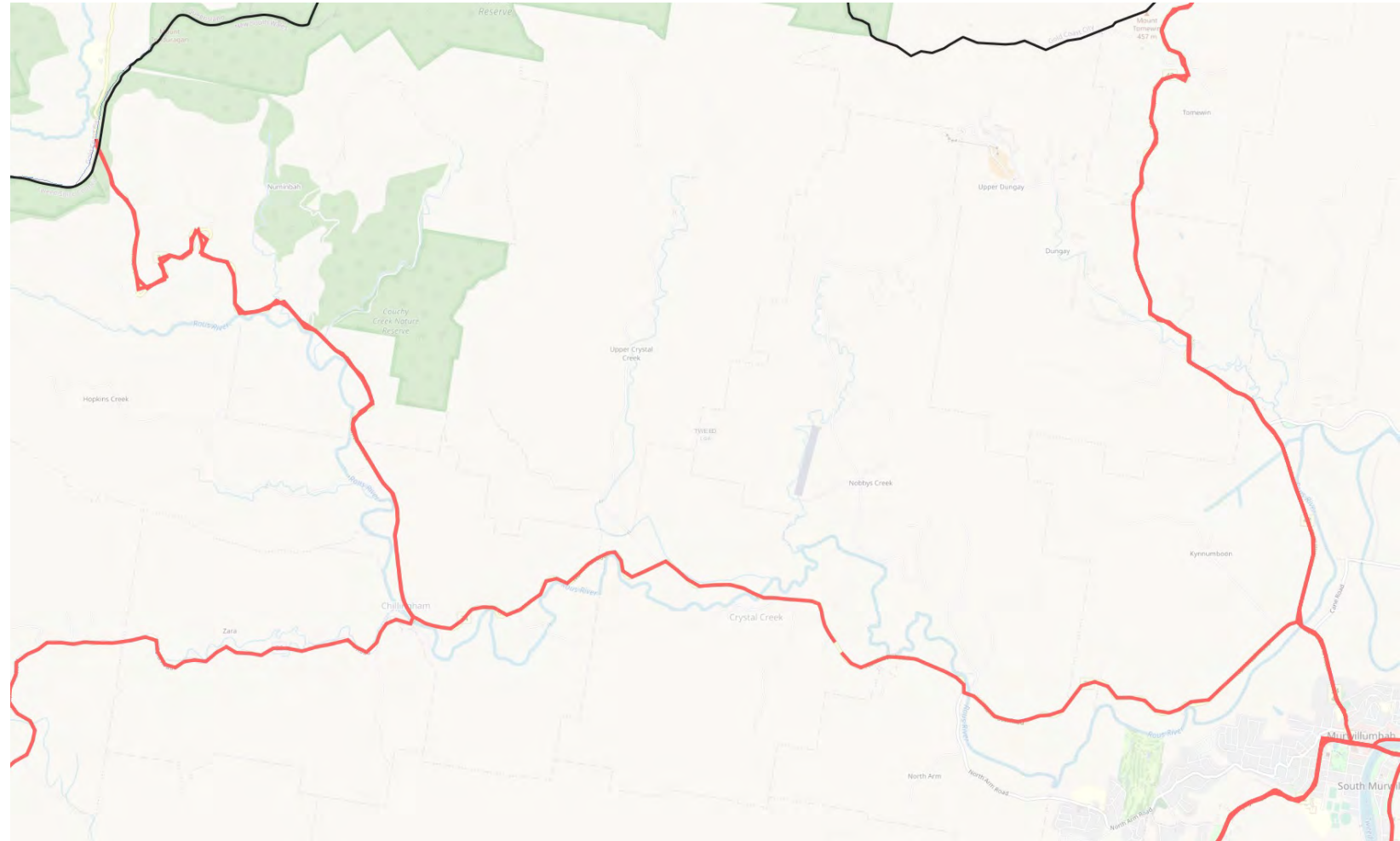
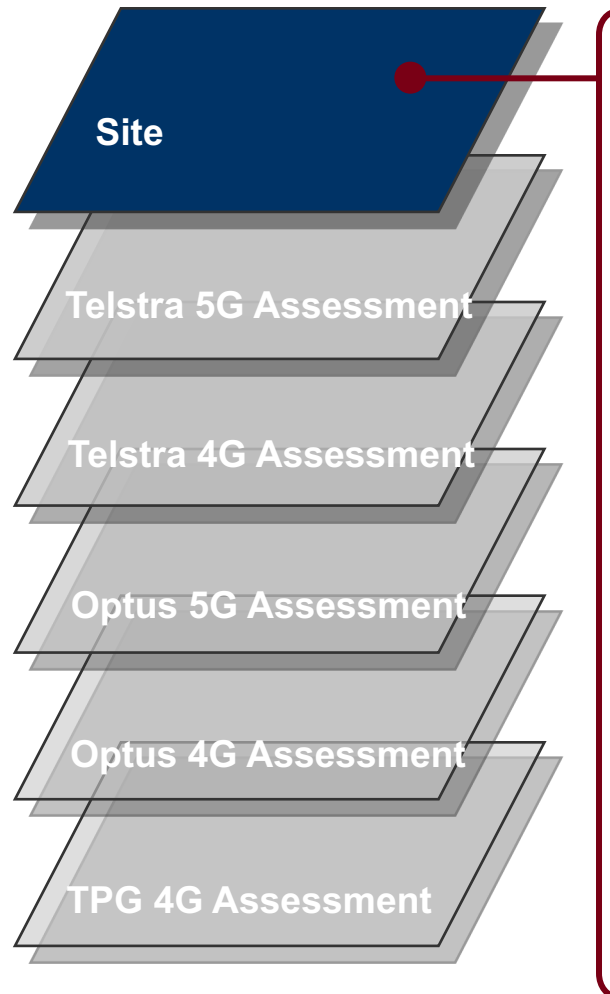
Assessment - Broad 4G blackspots

Action – Upgrade 1 x Sites with 4G midband and TPG/ Fed Govt (MBSP) – 1 new 4G Tower sites



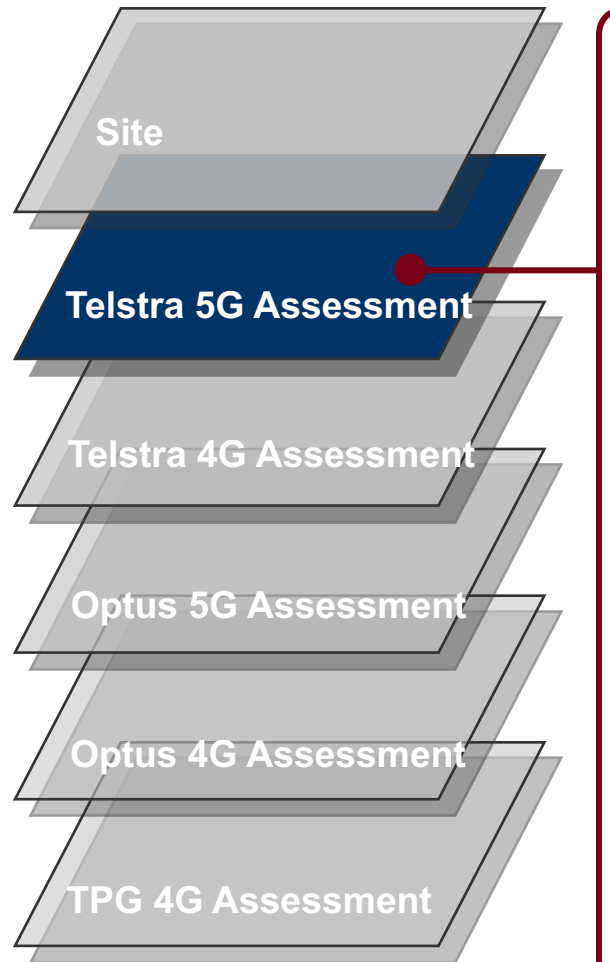
Tweed Shire Analysis

Numinbah Road



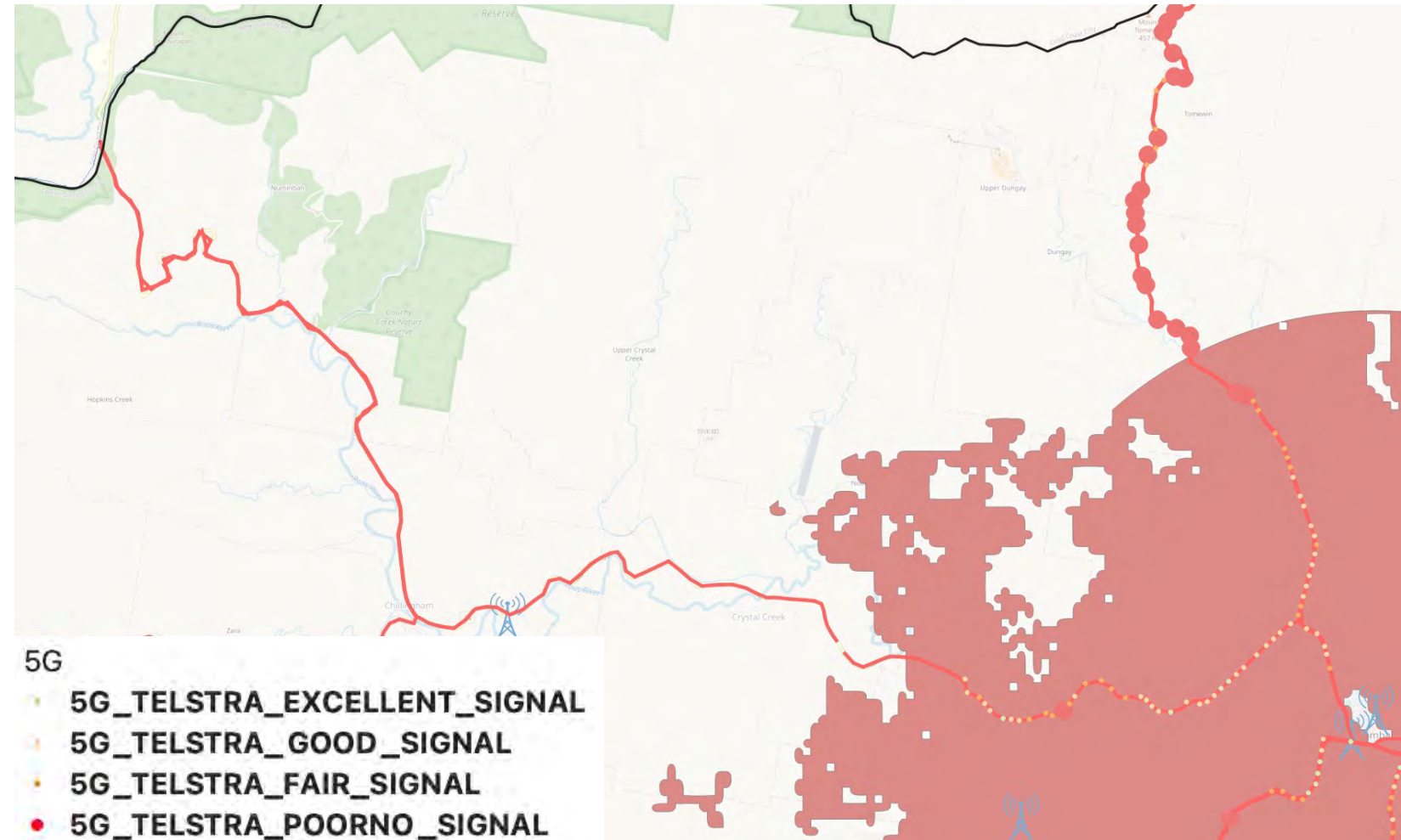
Tweed Shire Analysis

Numinbah Road



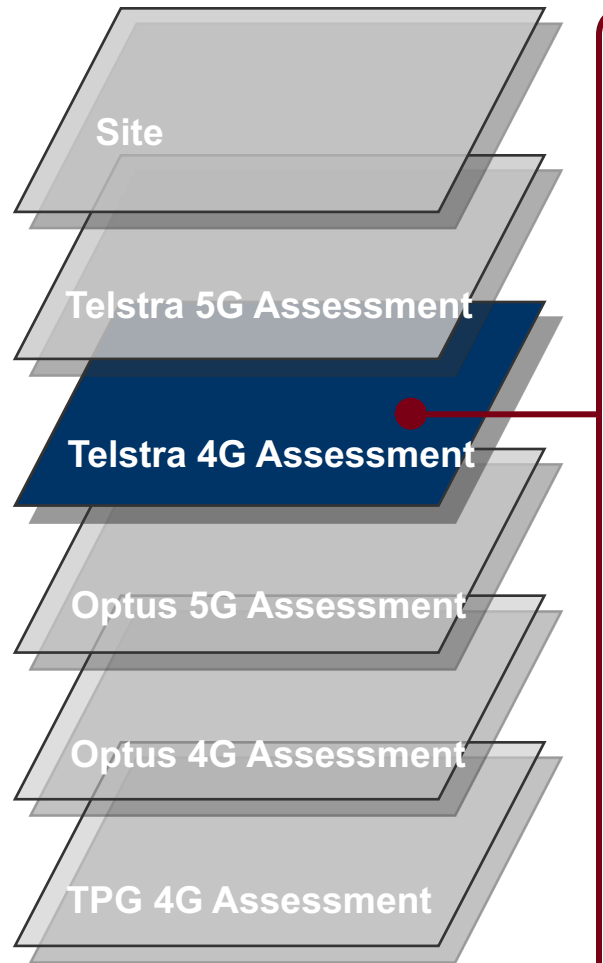
Assessment – Initial 5G coverage limited to Murwillumbah township and outskirts. Broad 5G blackspot areas.

Action – Telstra - Upgrade 1 x Site to 5G & Telstra / Fed Govt (MBSP) – up to 2 new 5G Tower sites



Tweed Shire Analysis

Numinbah Road



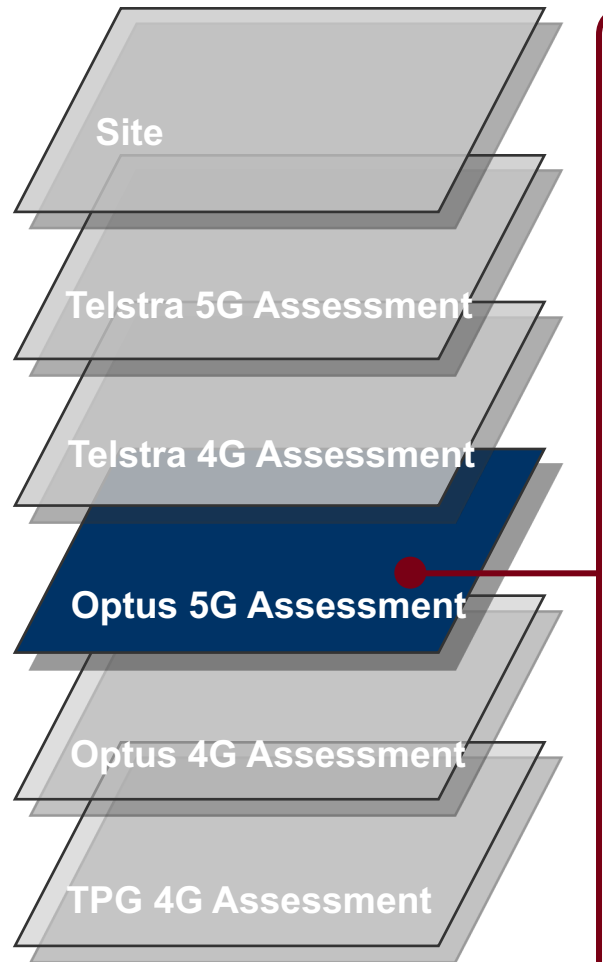
Assessment – Areas of good 4G coverage with a number of 4G Blackspots near Numinbah

Action - Telstra - Upgrade 1 x Site to 4G midband & Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



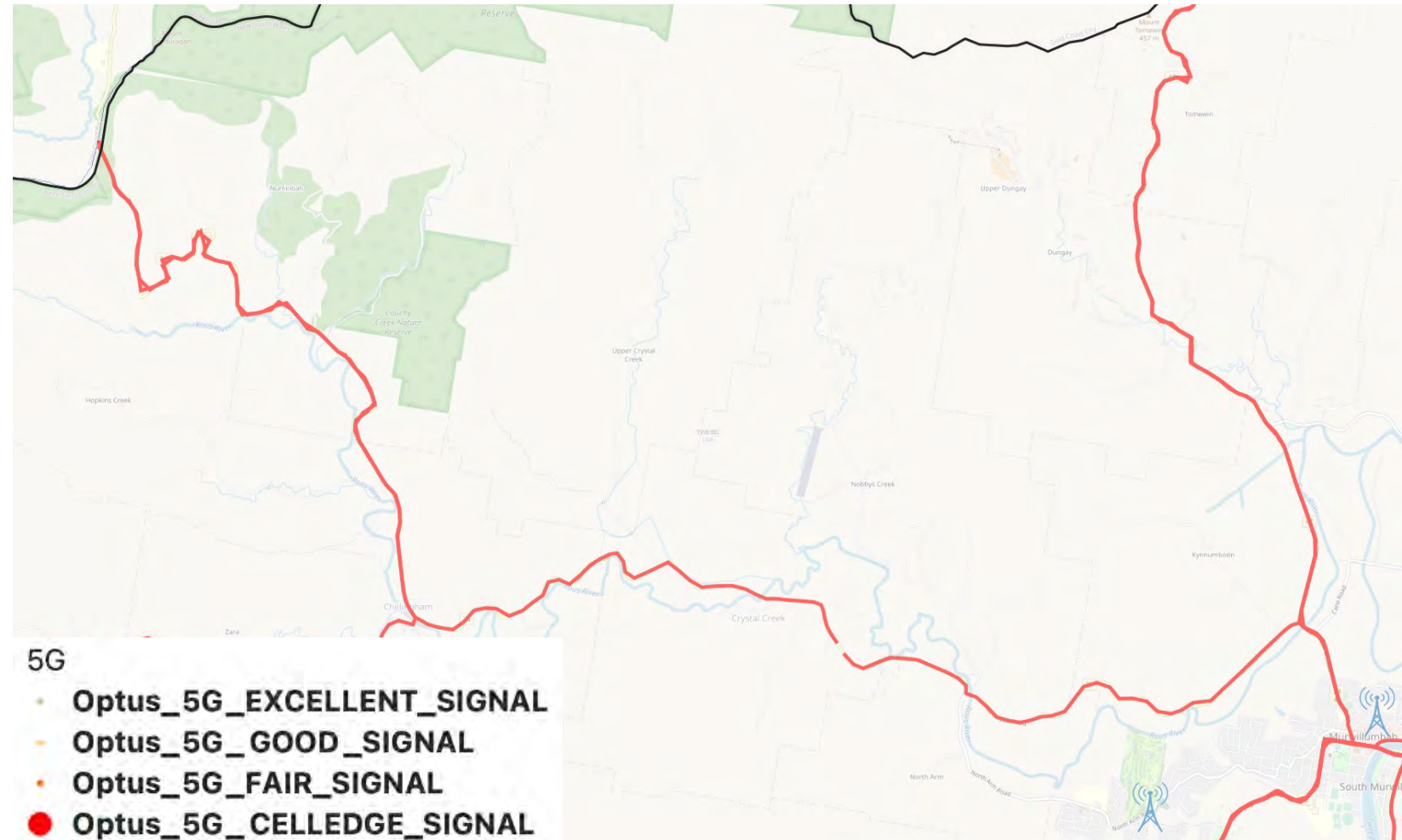
Tweed Shire Analysis

Numinbah Road



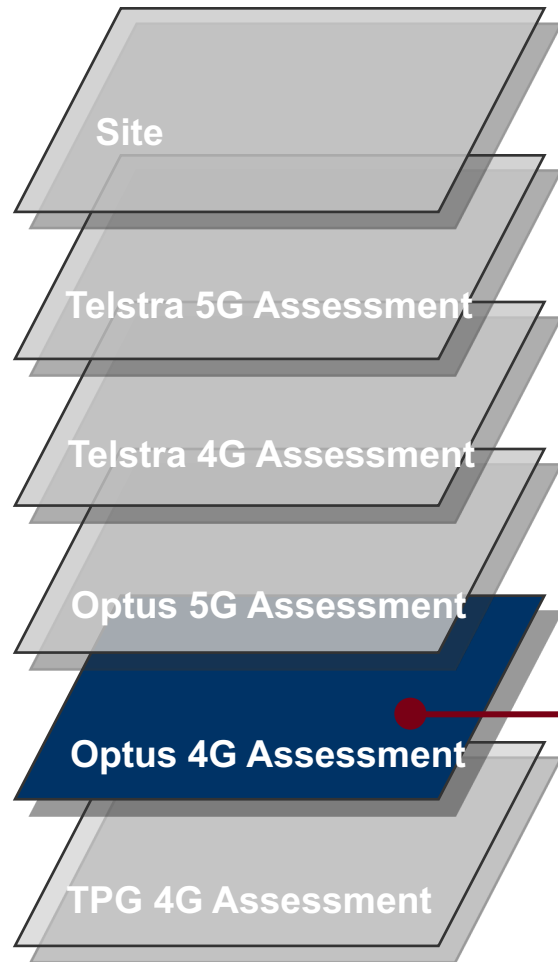
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 1 x Optus Site to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites



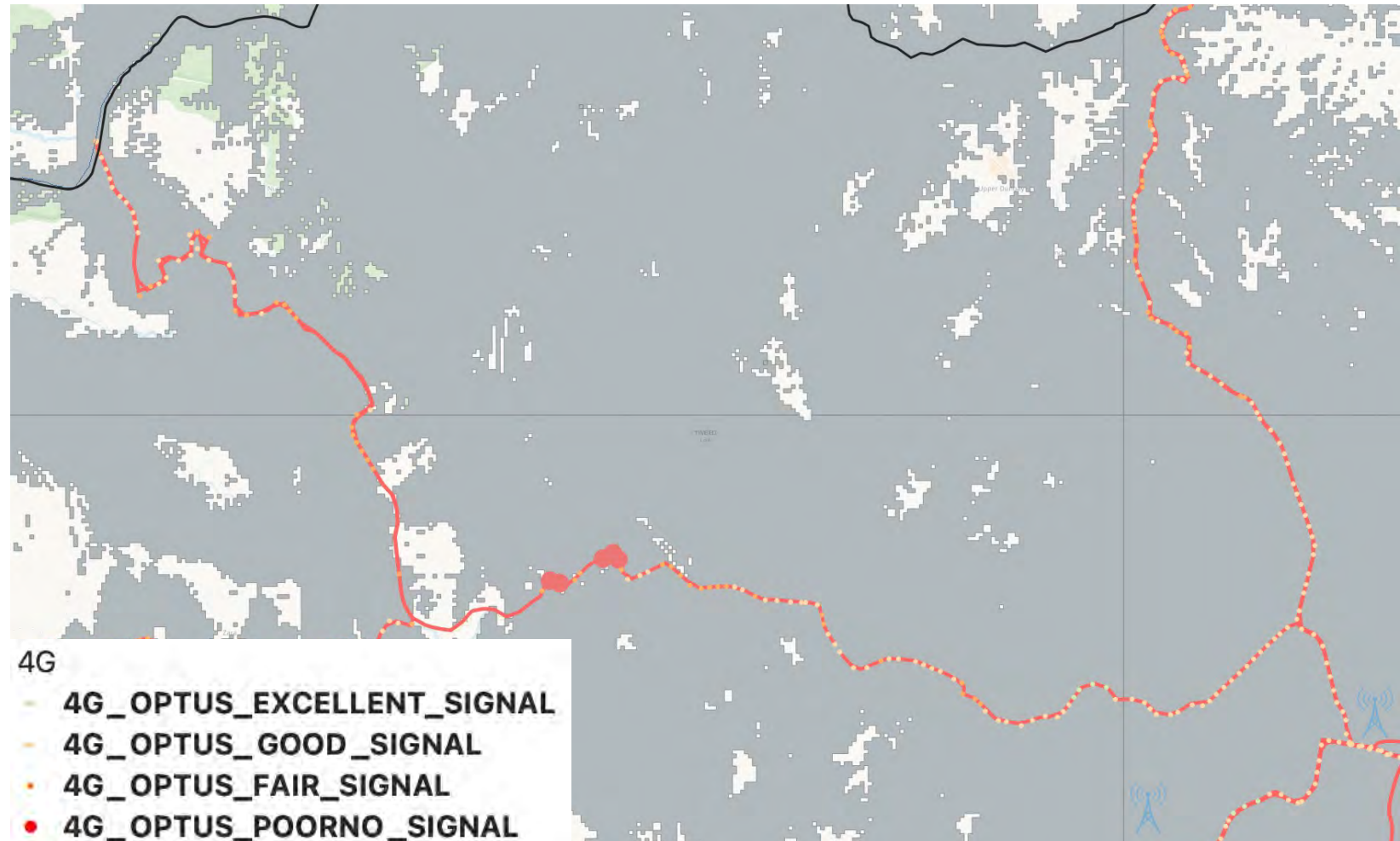
Tweed Shire Analysis

Numinbah Road



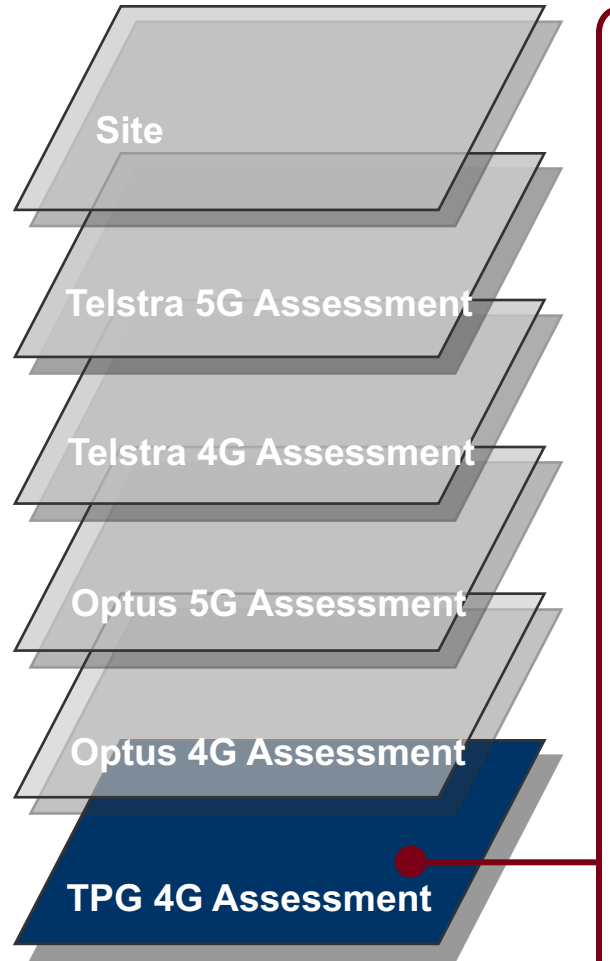
Assessment – Areas of good 4G coverage with a number of 4G Blackspots near Numinbah

Action - Optus/ Fed Govt (MBSP) – up to 2 new 4G Tower sites



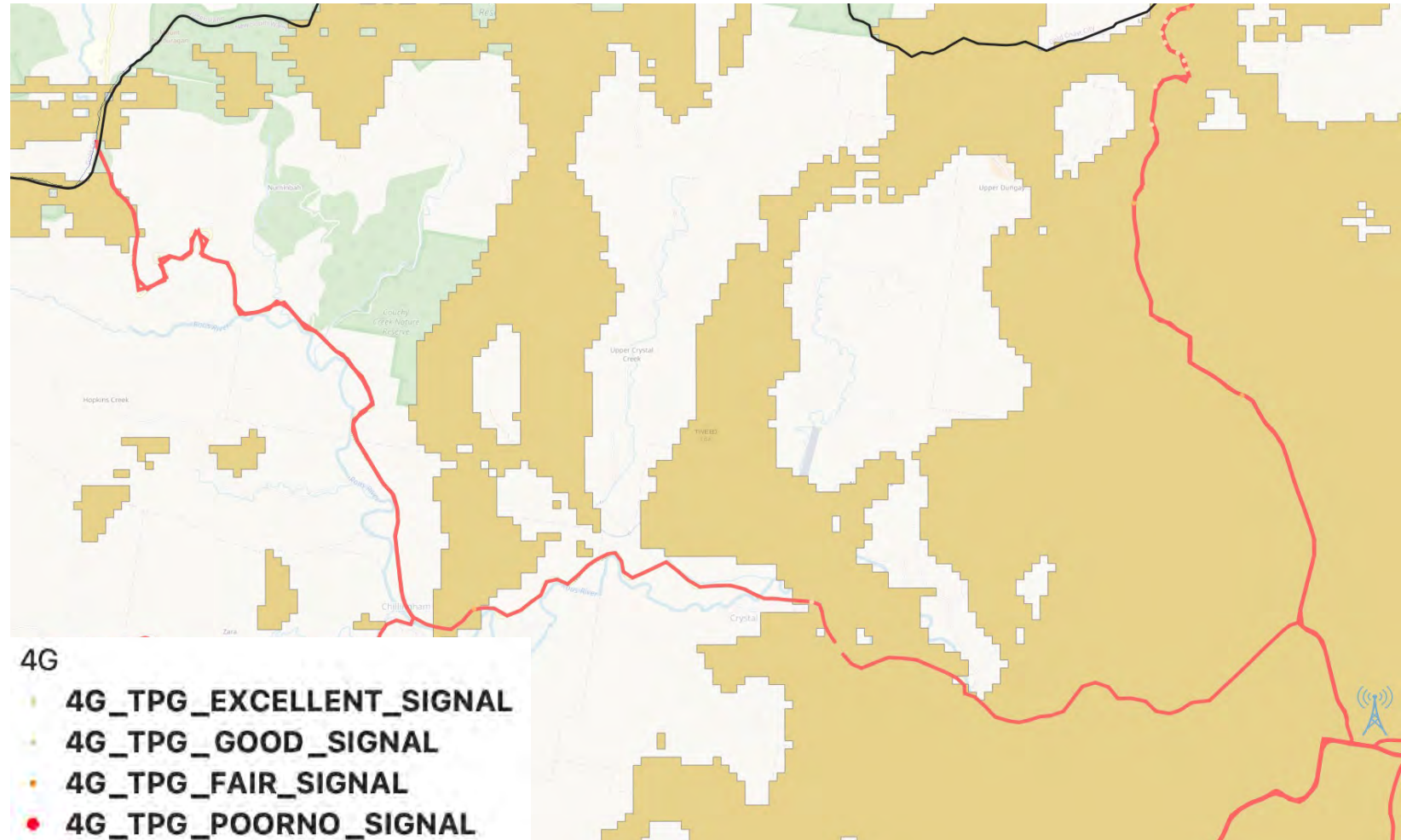
Tweed Shire Analysis

Numinbah Road



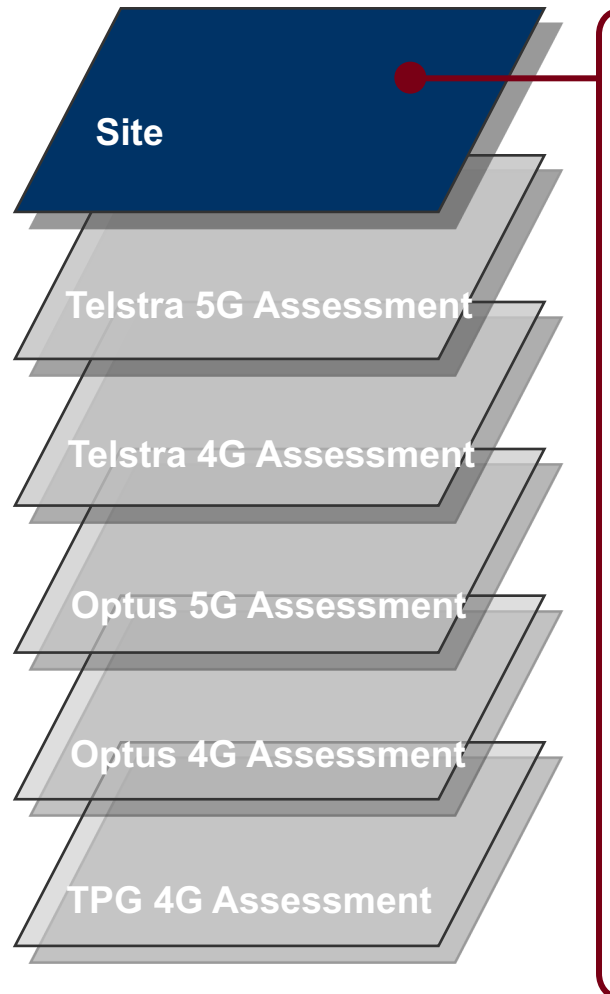
Assessment - Broad 4G blackspots

Action – Upgrade 1 x Sites with 4G midband and TPG/ Fed Govt (MBSP) – up to 3 new 4G Tower sites



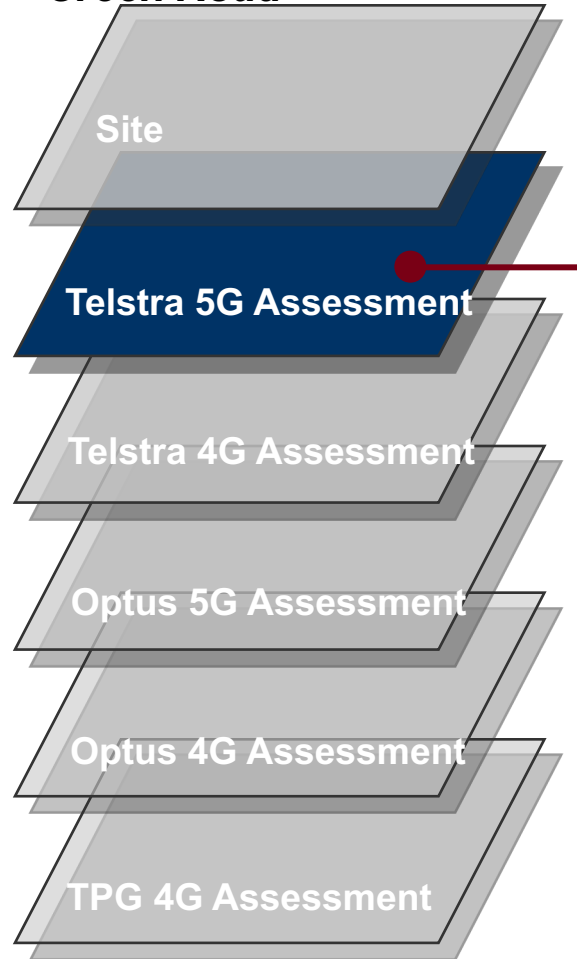
Tweed Shire Analysis

Limpinwood Road / Brays Creek Road



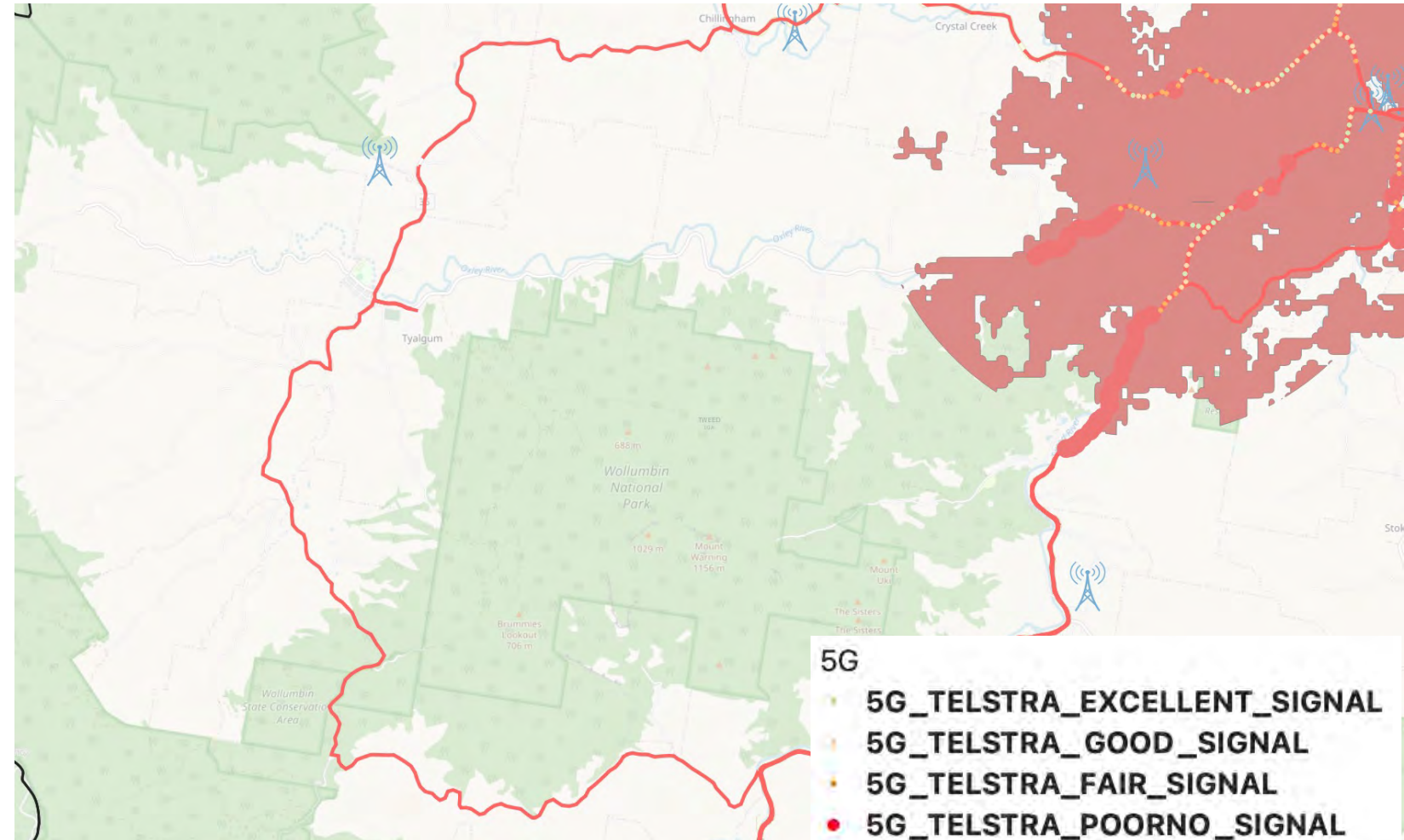
Tweed Shire Analysis

Limpinwood Road / Brays Creek Road



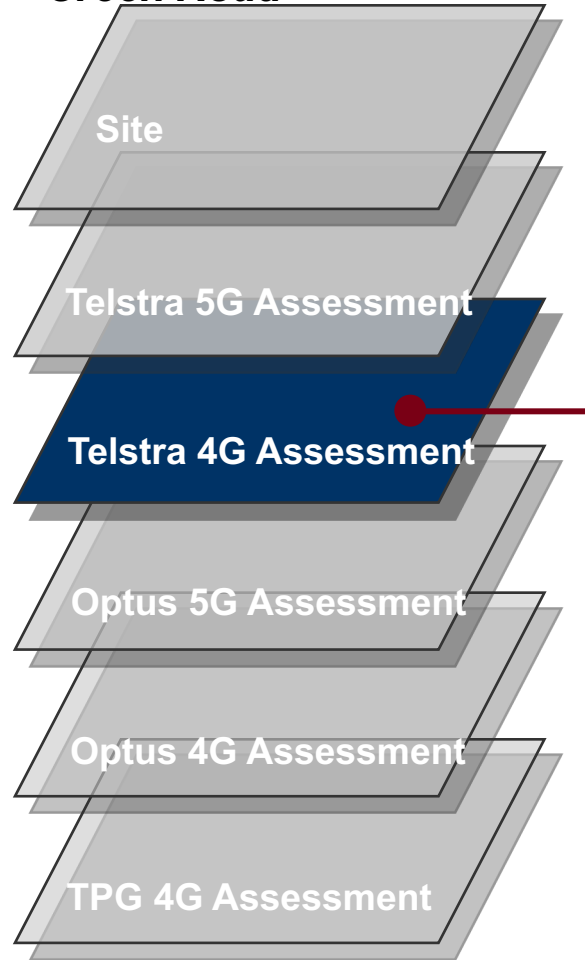
Assessment – No current 5G coverage.

Action – Telstra - Upgrade 2 x Tower Sites to 5G & Telstra / Fed Govt (MBSP) - up to 2 new 5G Tower sites



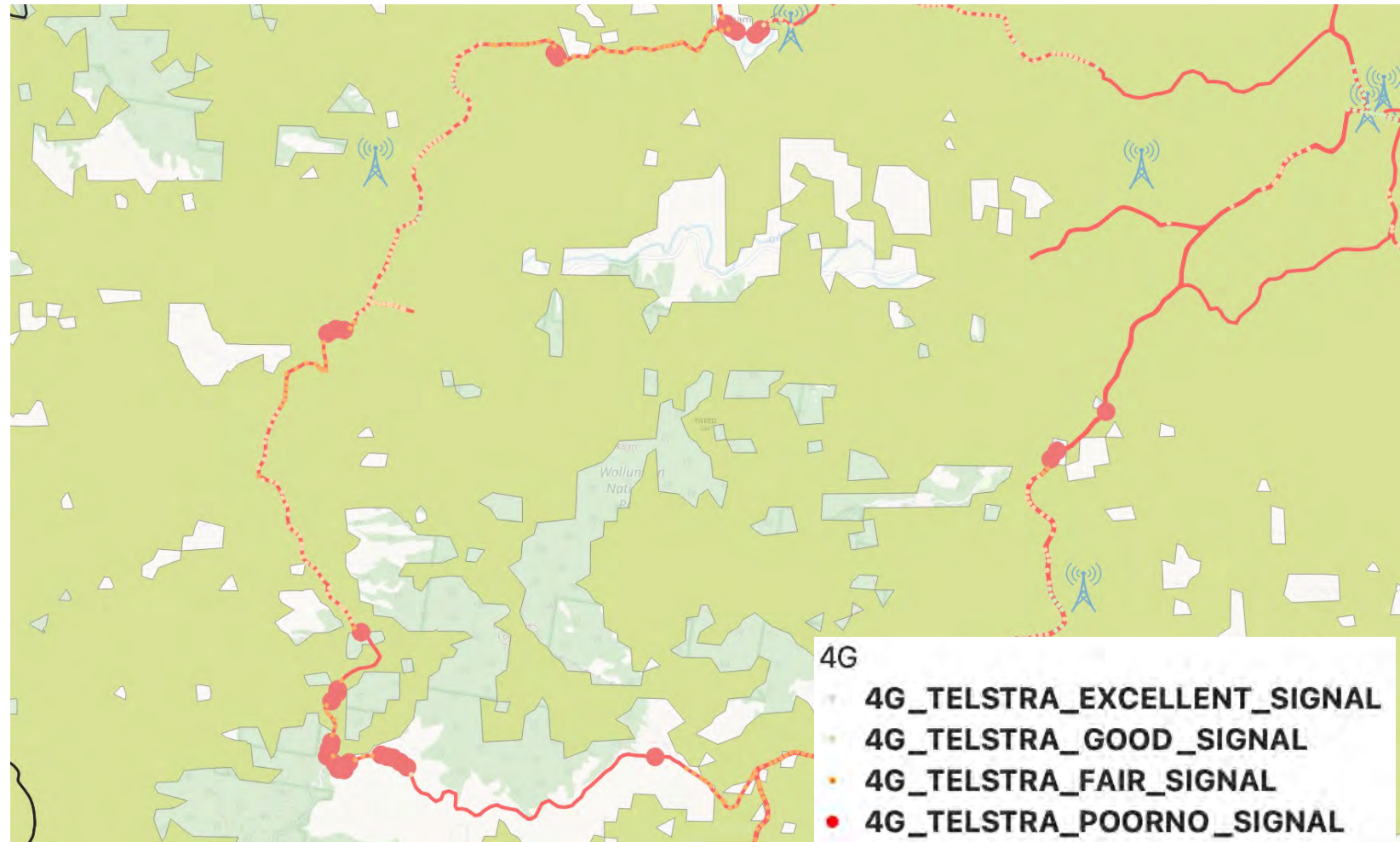
Tweed Shire Analysis

Limpinwood Road / Brays Creek Road



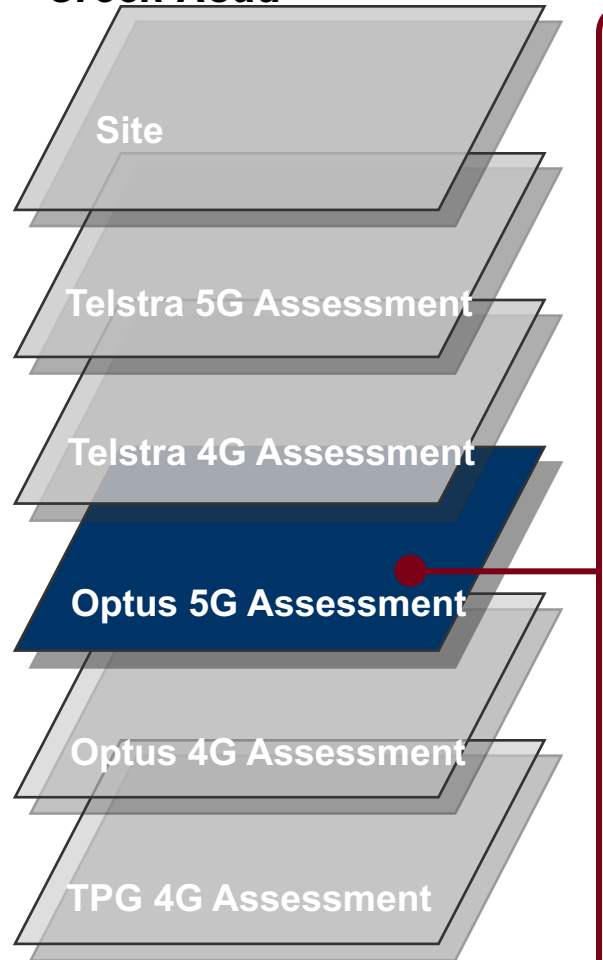
Assessment – Areas of good 4G coverage with broad 4G Blackspots on Brays Creek Road

Action - Telstra / Fed Govt (MBSP) – up to 3 new 4G Tower sites



Tweed Shire Analysis

Limpinwood Road / Brays Creek Road



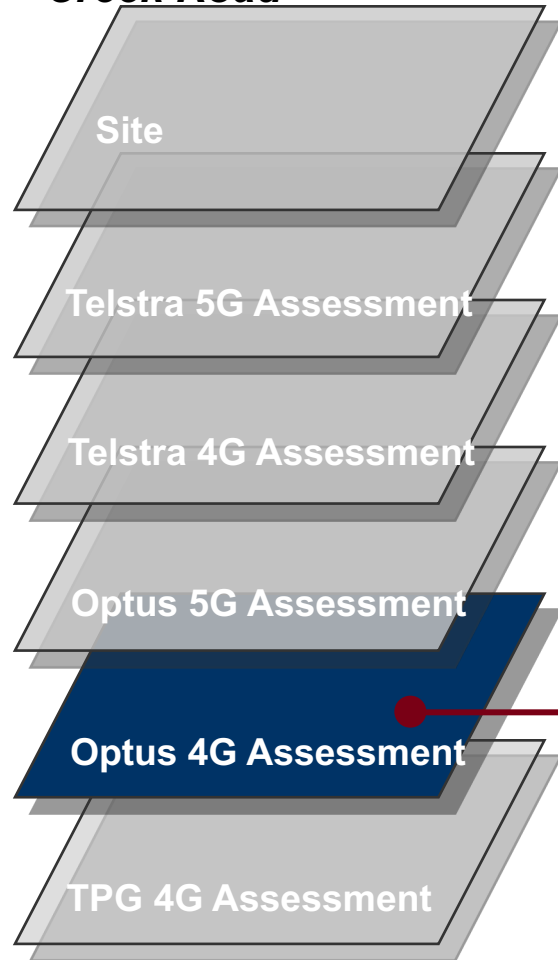
Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt – up to 4 new 5G Tower sites



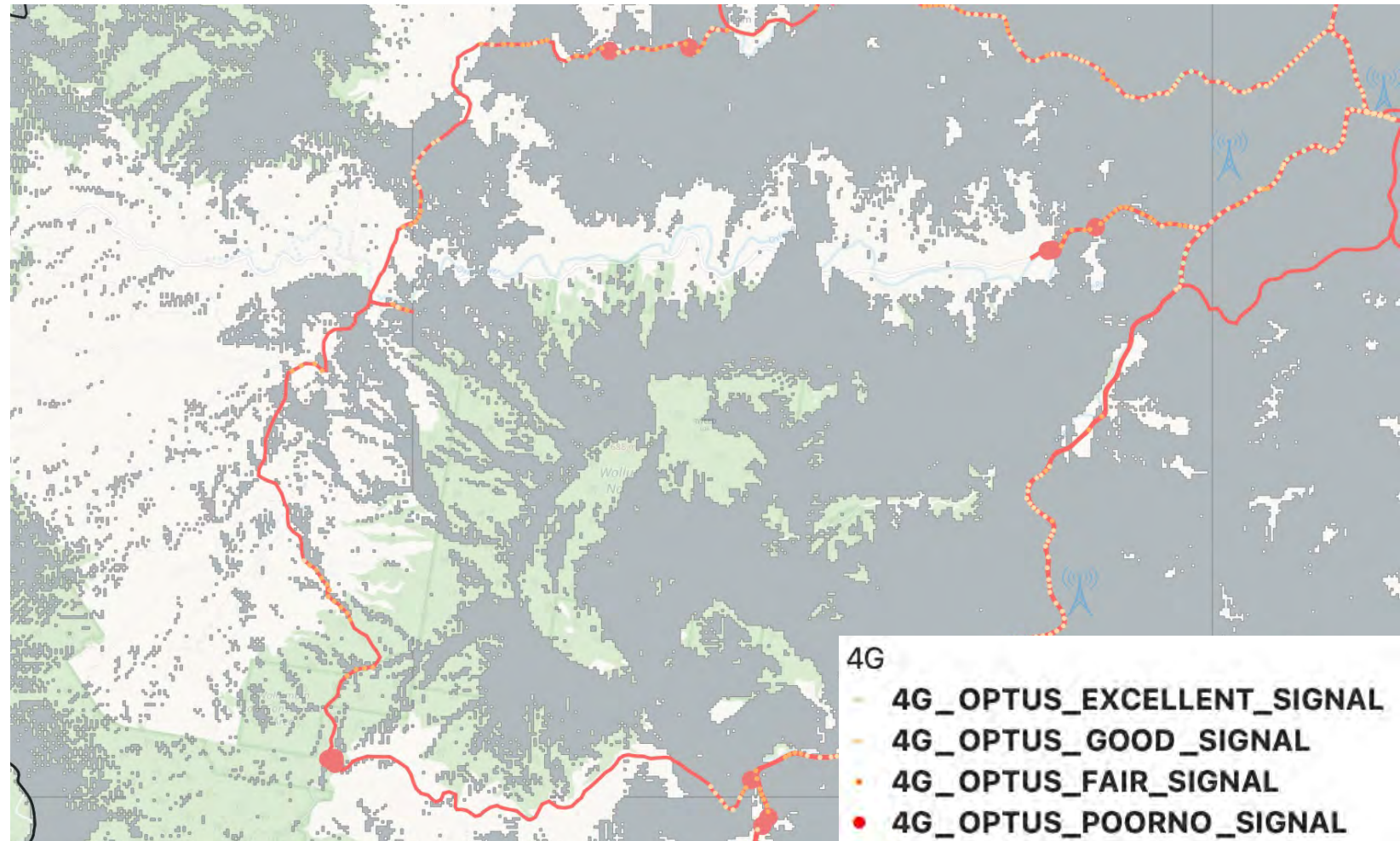
Tweed Shire Analysis

Limpinwood Road / Brays Creek Road



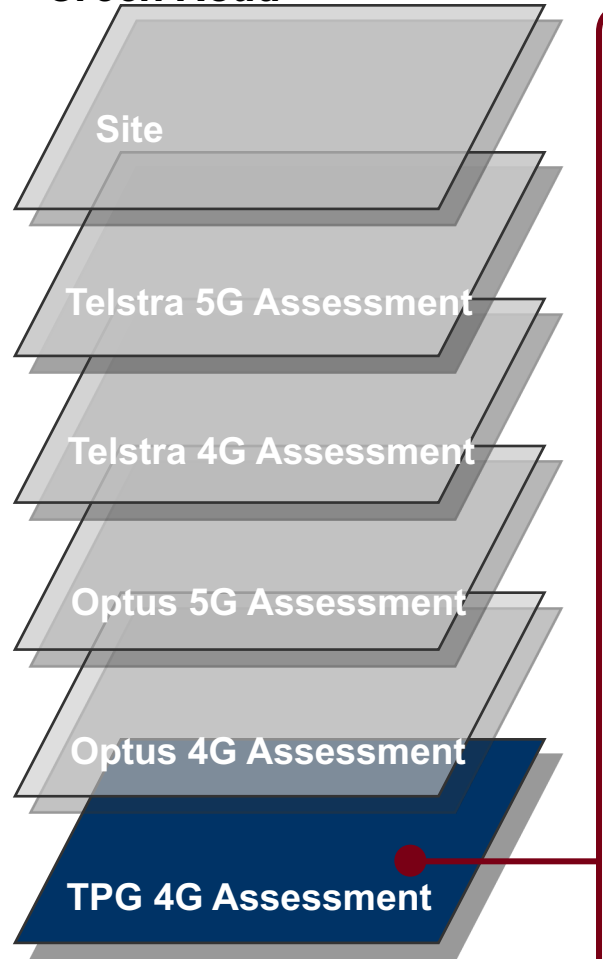
Assessment - Broad 4G blackspots areas

Action – Optus / Fed Govt – up to 4 new 4G Tower sites



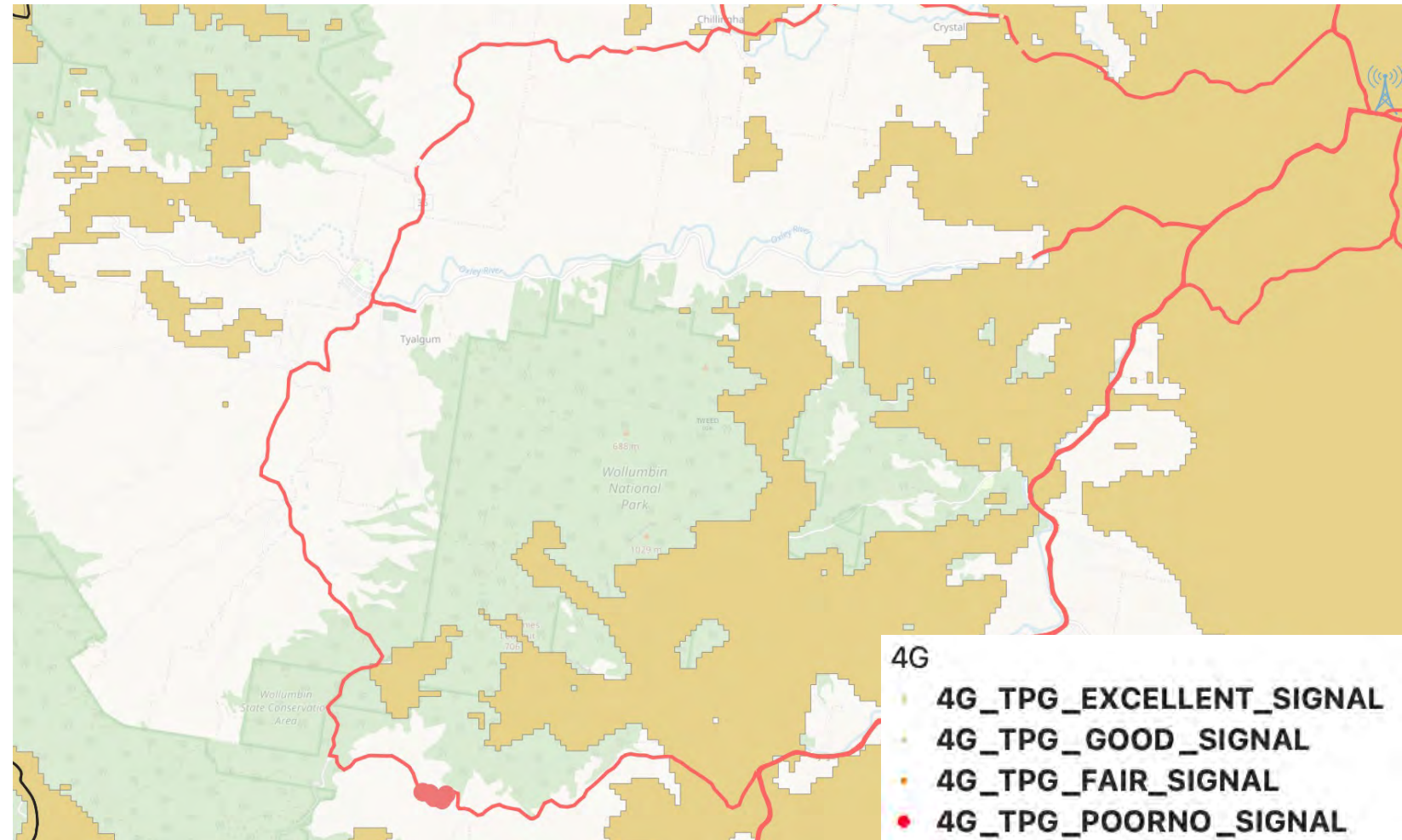
Tweed Shire Analysis

Limpinwood Road / Brays Creek Road



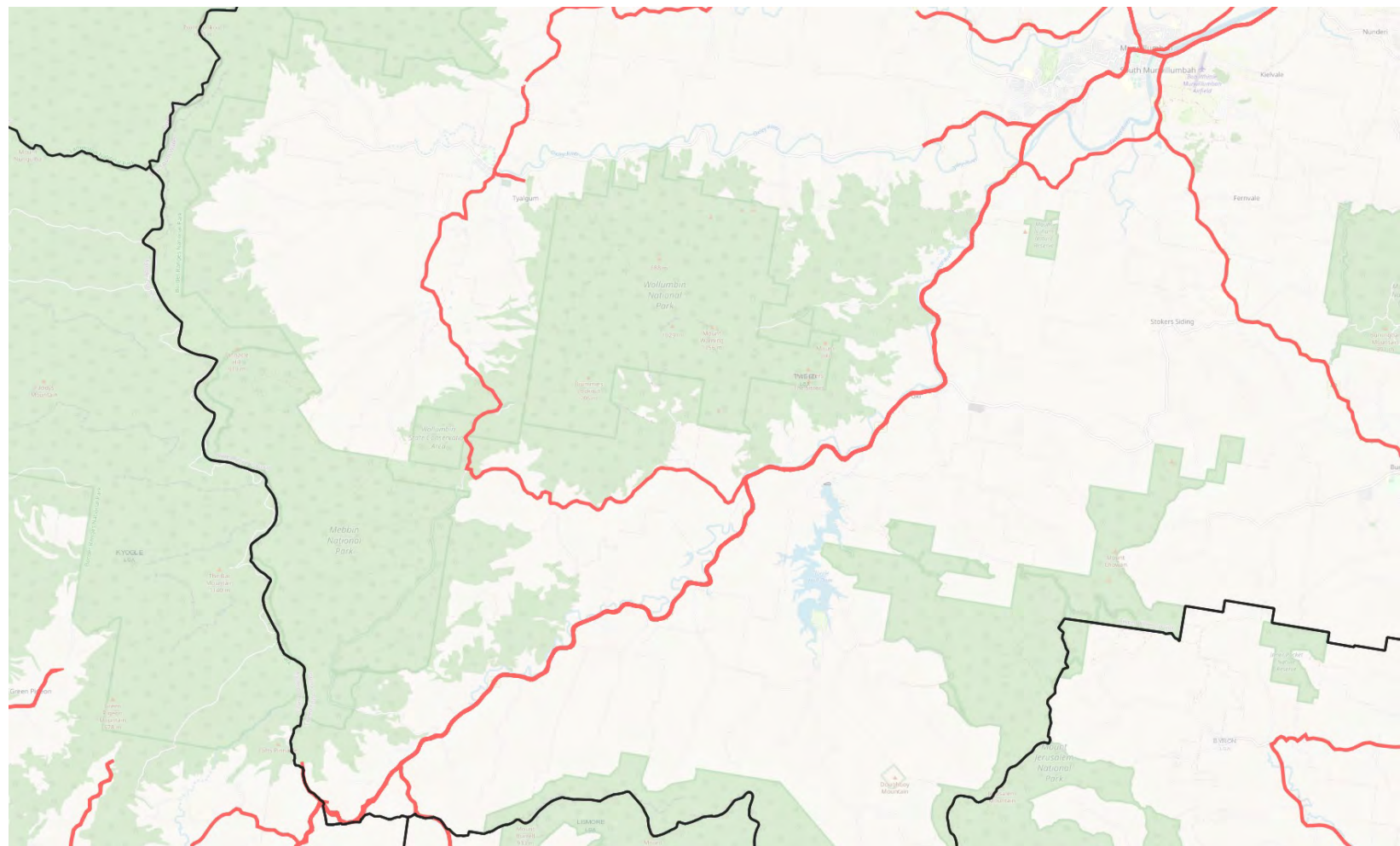
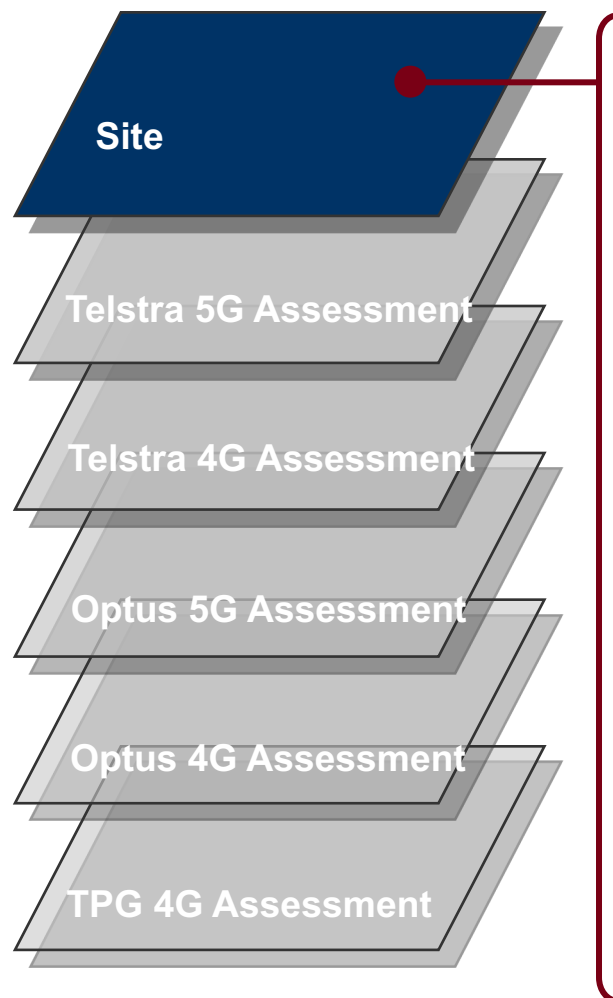
Assessment – No current 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 4 new 4G Tower sites



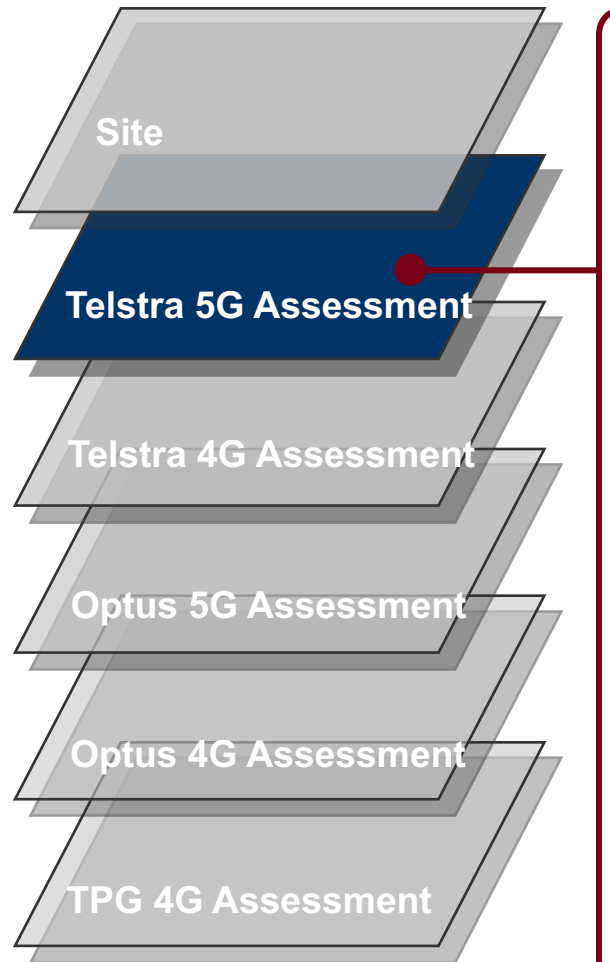
Tweed Shire Analysis

Kyogle Road



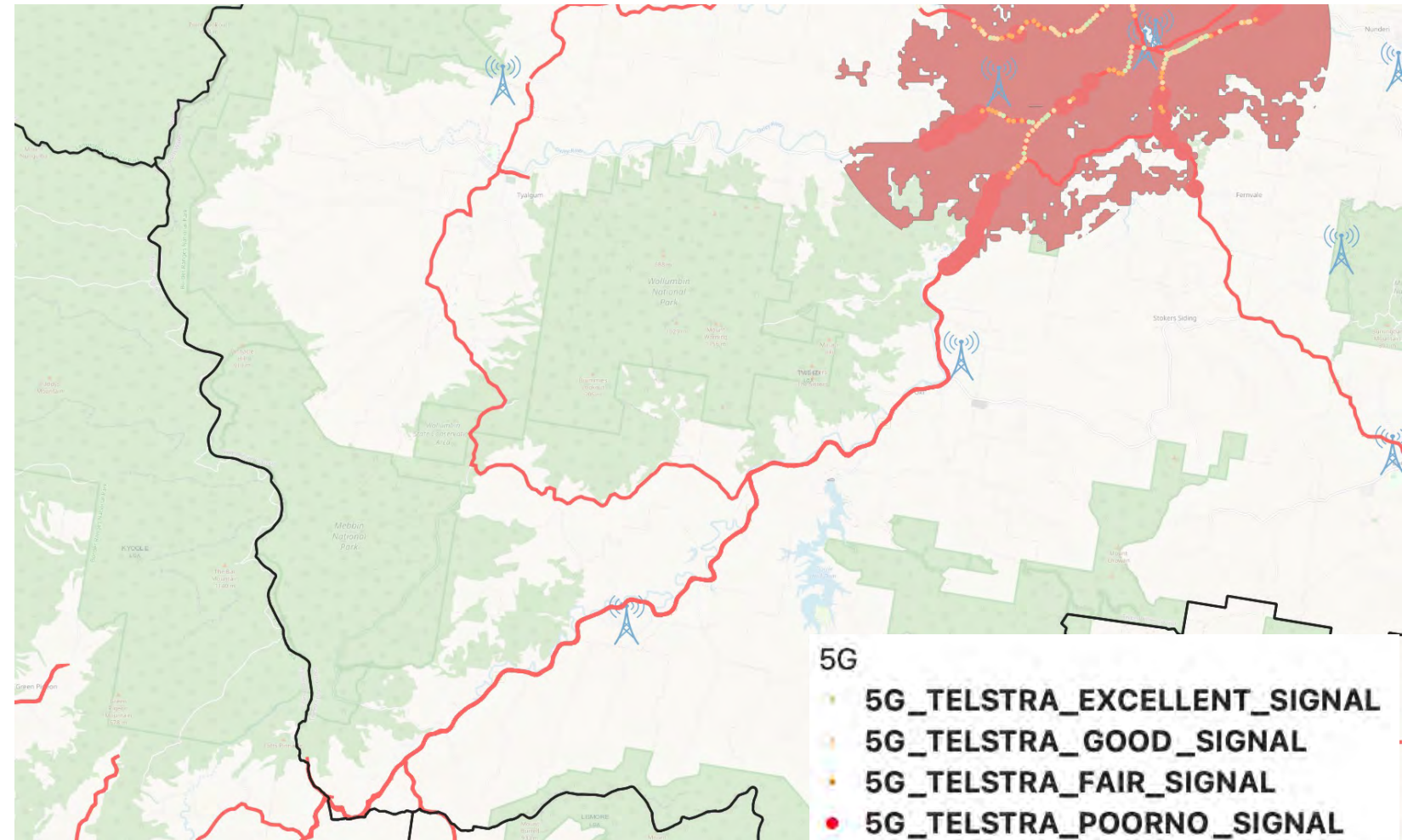
Tweed Shire Analysis

Kyogle Road



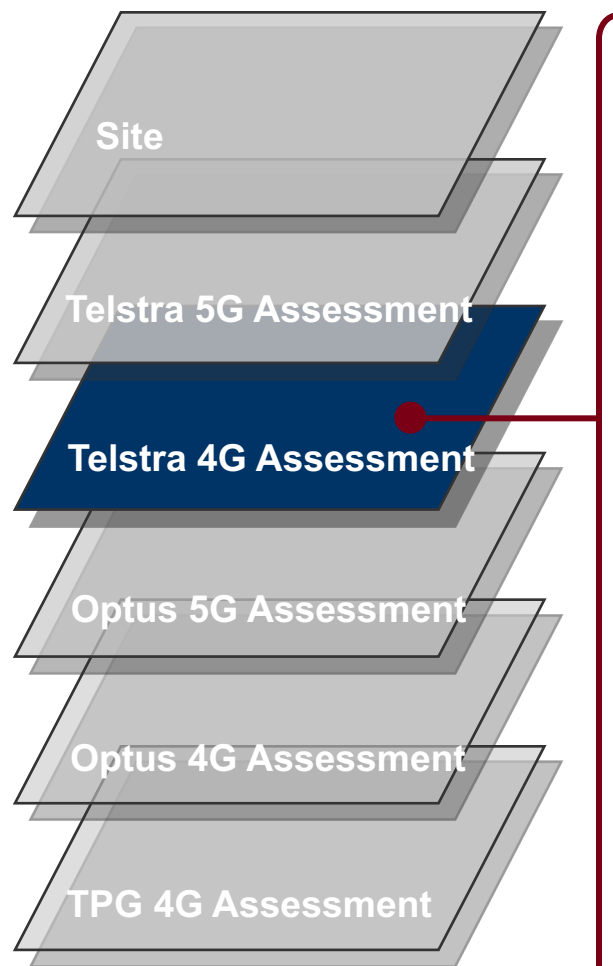
Assessment – Initial 5G coverage limited to Murwillumbah township and outskirts. Broad 5G blackspot areas.

Action – Telstra - Upgrade 2 x Site to 5G & Telstra / Fed Govt (MBSP) – up to 2 new 5G Tower sites



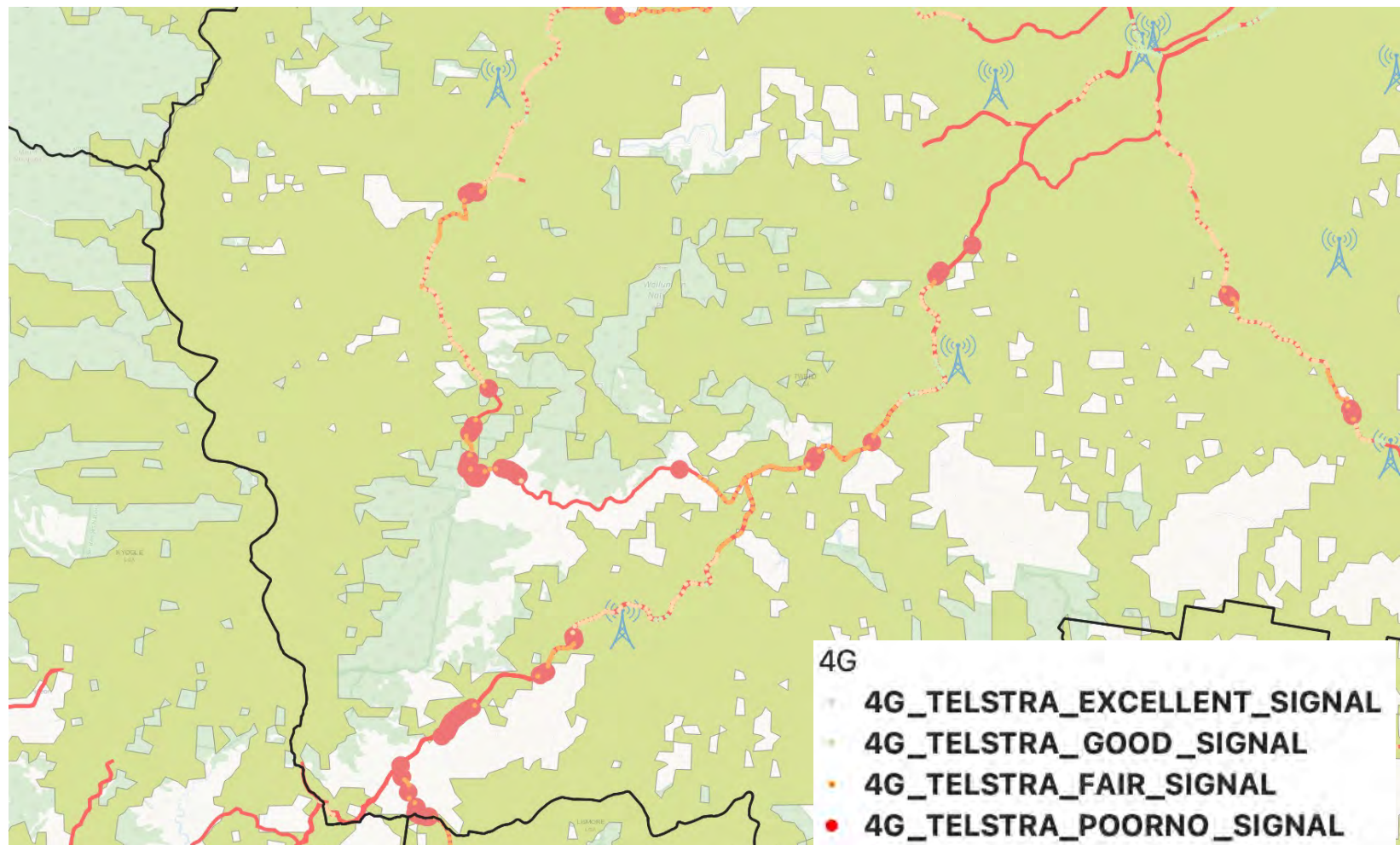
Tweed Shire Analysis

Kyogle Road



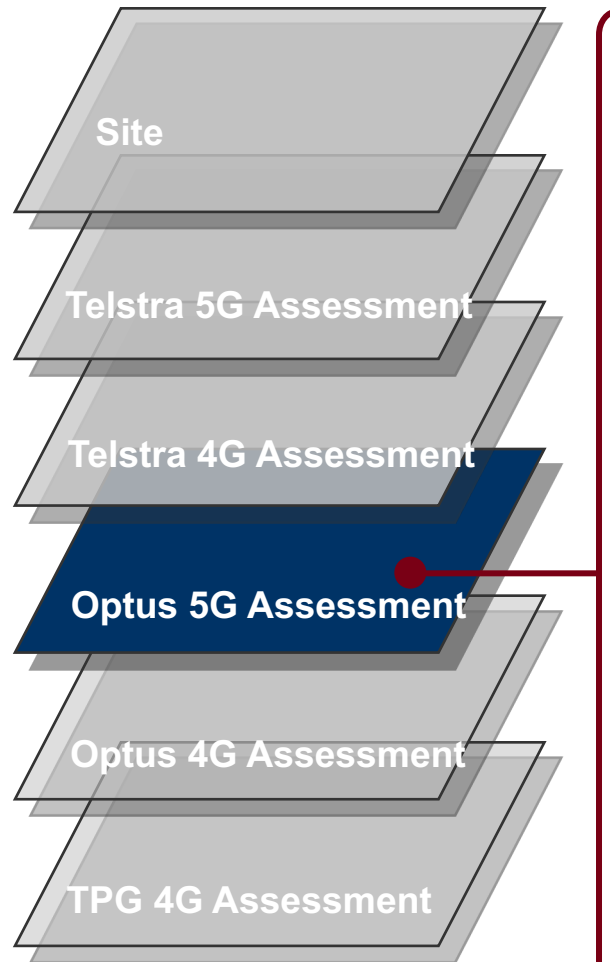
Assessment - Areas of good 4G coverage with broad 4G Blackspots near Shire boundary

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



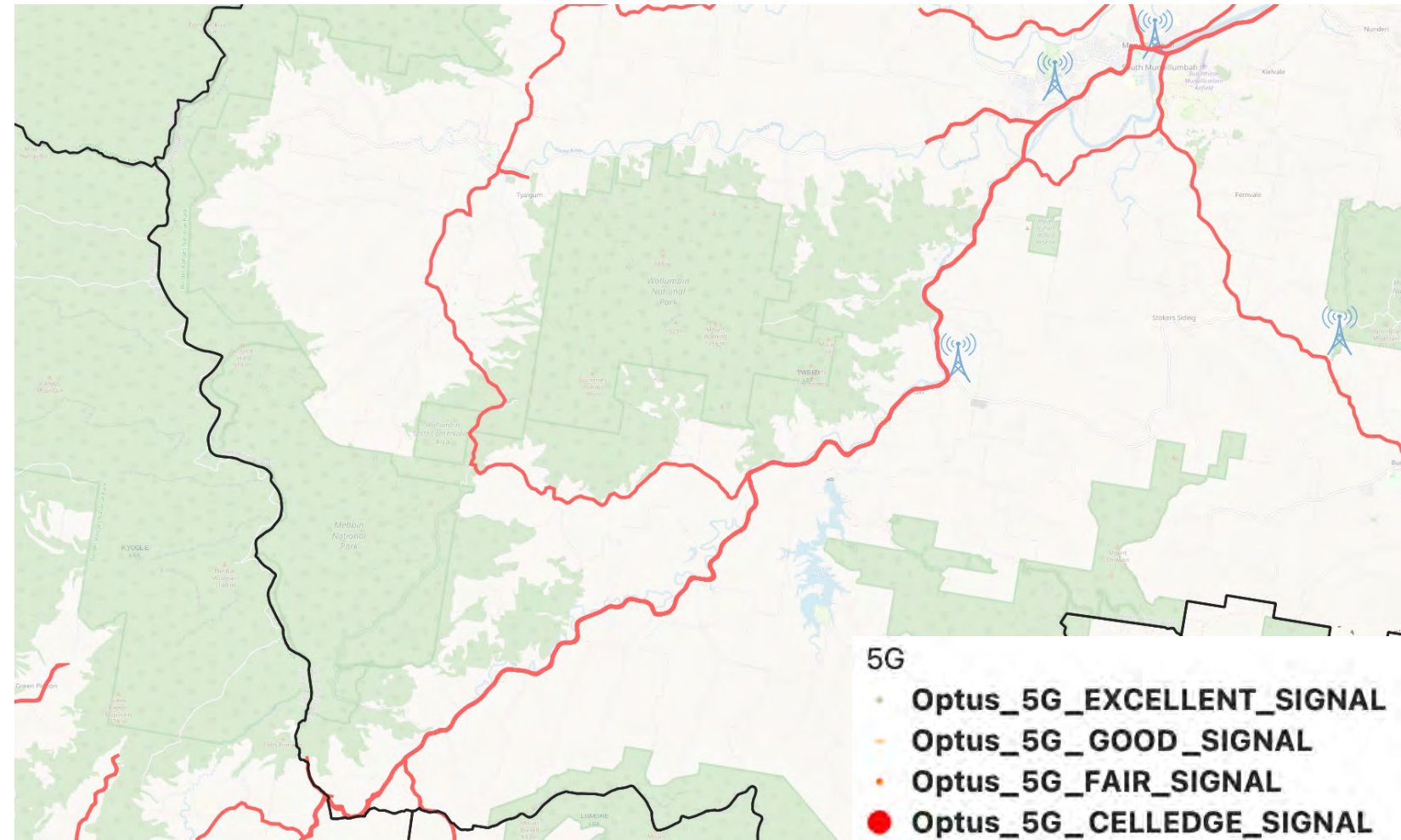
Tweed Shire Analysis

Kyogle Road



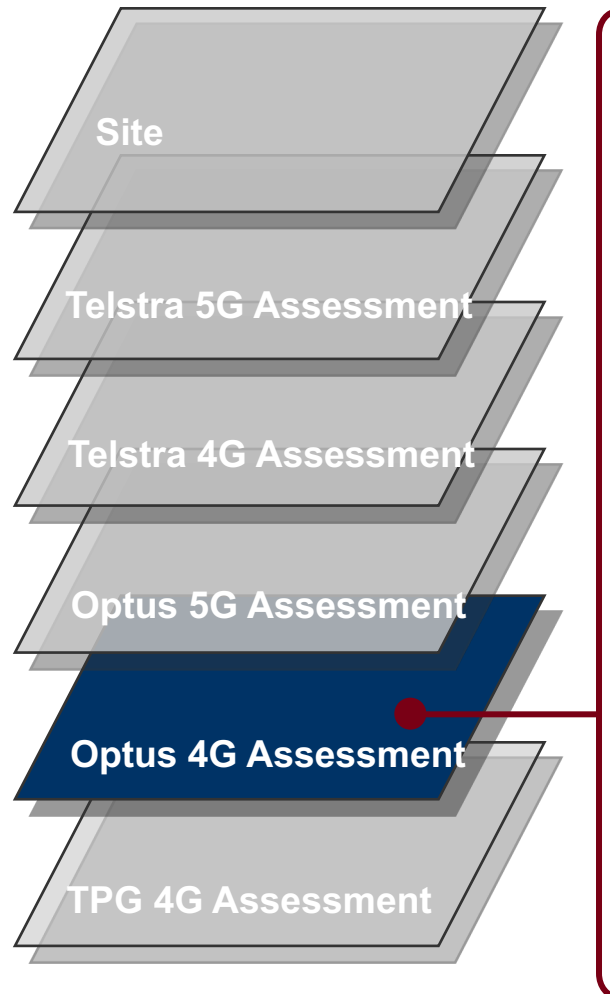
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 3 x Sites to 5G & Optus / Fed Govt – up to 4 new 5G Tower sites



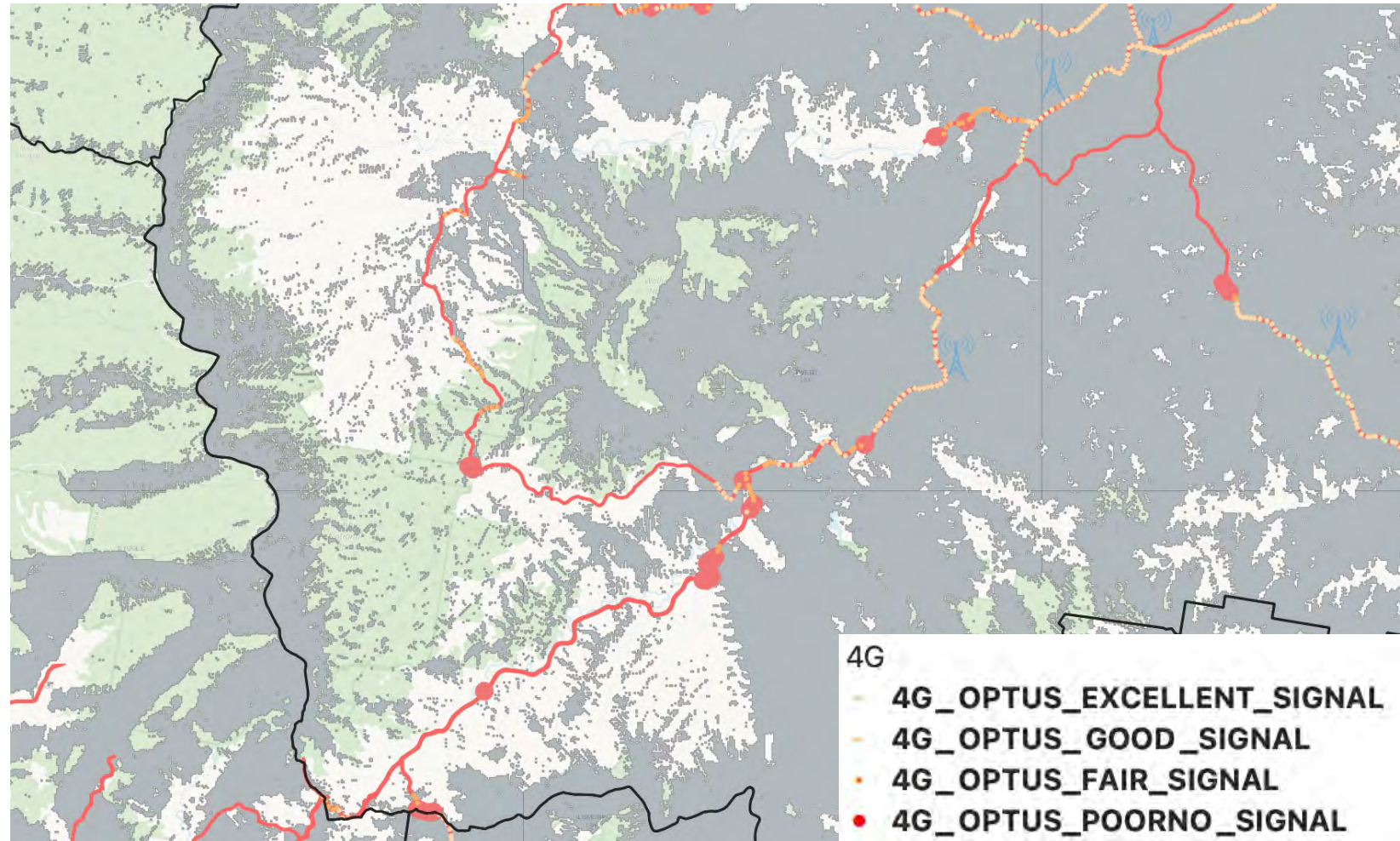
Tweed Shire Analysis

Kyogle Road



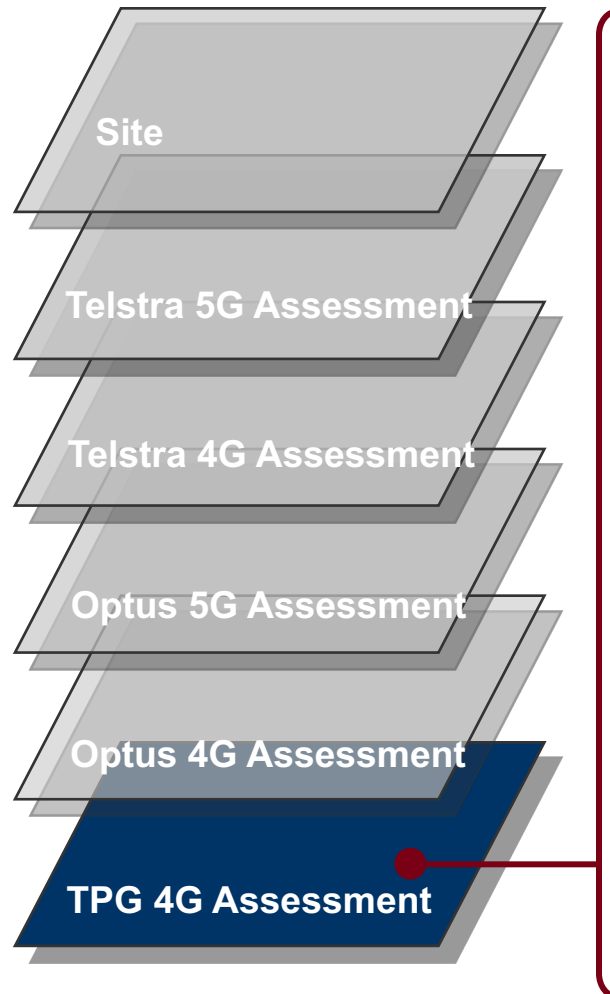
Assessment – Some areas of good 4G coverage with broad 4G Blackspots near Shire boundary

Action – Telstra / Fed Govt (MBSP) – up to 3 new 4G Tower sites



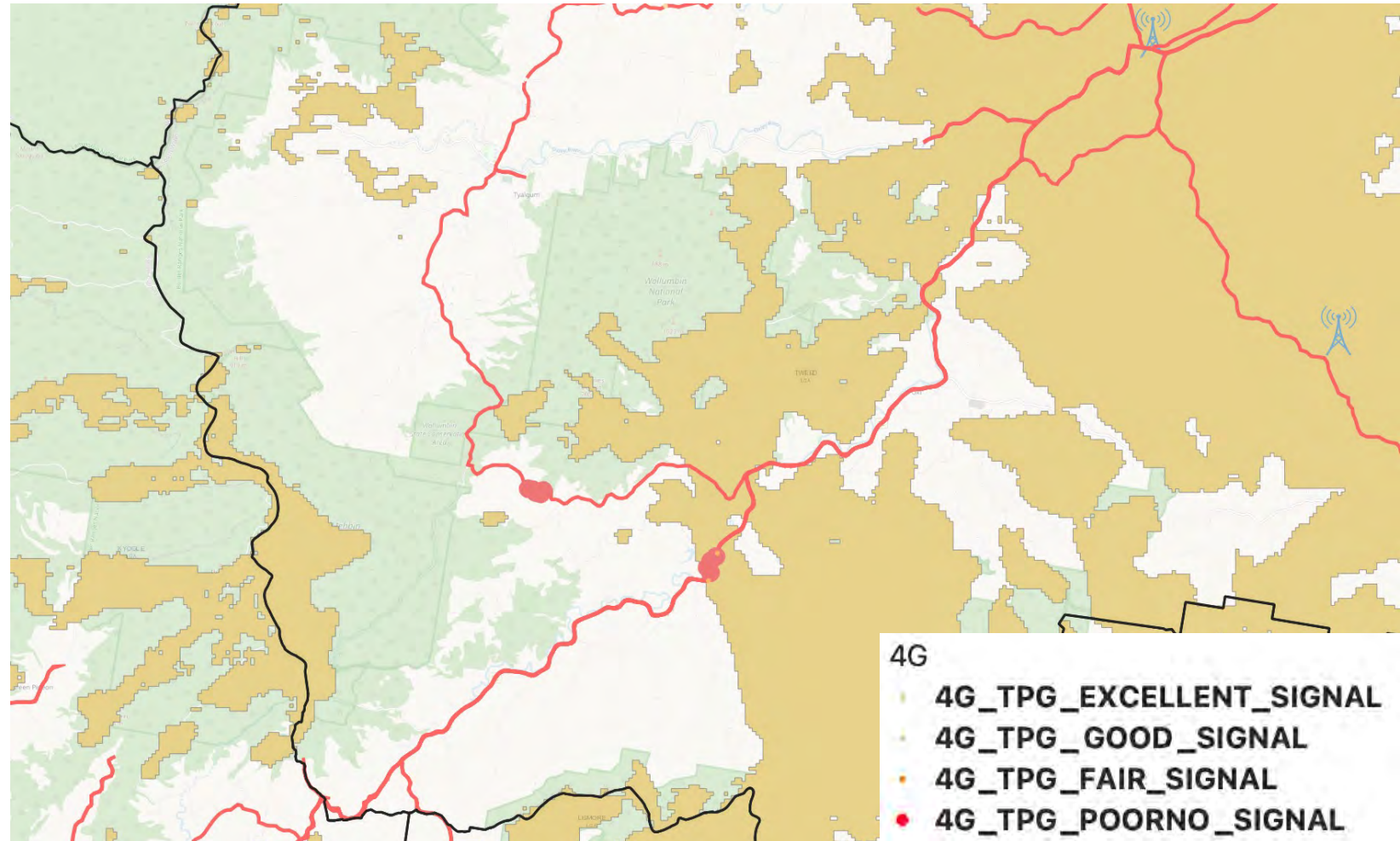
Tweed Shire Analysis

Kyogle Road



Assessment – No current 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 6 new 4G Tower sites



1. Kyogle Shire Analysis

Kyogle Shire Analysis

Signal Testing:

Road name	From	To	Approx Distance
Summerland Way	QLD NSW Border	Shire Boundary - South	85km
Clarence Way	Woodenbong	Sandilands	72km
Bruxner Highway	East boundary	West boundary	30km
Afterlee Road / Peacock Creek Road	Kyogle	Bonalbo	40kms
Kyogle Road	Kyogle	Shire boundary	20kms
Bentley Road	Cedar Point	Shire boundary	12kms
Fawcetts Plain Road	Kyogle		20kms
Collins Creek Road	Kyogle		8kms
Gradys Creek	Summerland Way		10kms
Cawongla Road	Kyogle Road	Shire Boundary	15kms

Network Bandwidth Point Tests:

- Kyogle
- Woodenbong
- Bonalbo

This section provides an analysis of the change in Mobile Network Operator sites in the Kyogle Shire from 2018 to 2022.

Total Number of Sites by MNO

Kyogle Shire	2018	2022
Optus	2	3
Telstra	11	17
TPG	1	2

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Kyogle Shire	2018	2022
Optus 900 MHz 2100 MHz	2 1	3 1
Telstra 850 MHz 2100 MHz	10 -	12 -
TPG 900 MHz 2100 MHz	1 1	

Note – A single site may host multiple spectrum bands.

Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

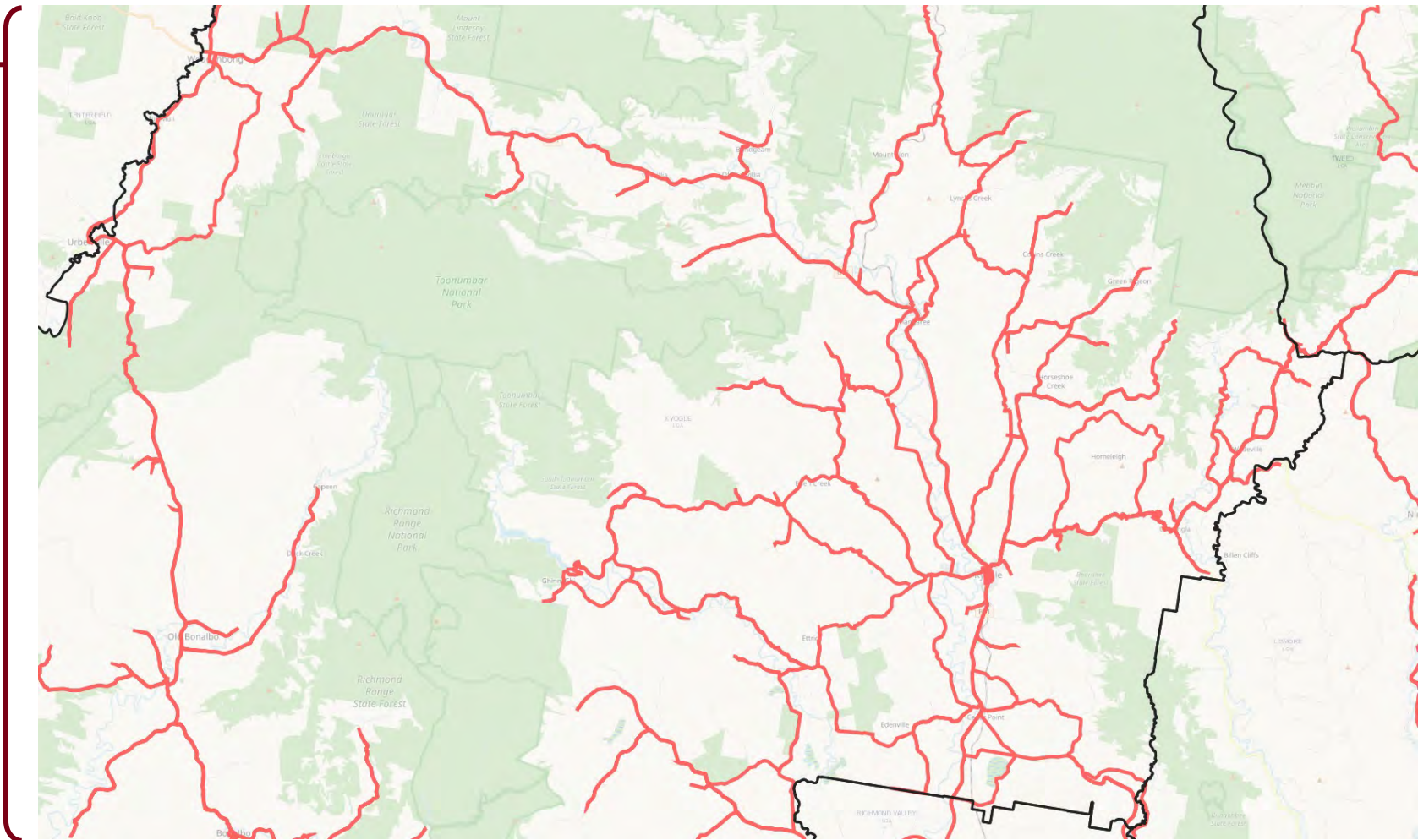
Kyogle Shire	2018	2022
Optus		
700 MHz	2	3
900 MHz	-	-
1800 MHz	1	1
2100 MHz	-	-
2300 MHz	-	-
2600 MHz	1	1
3500 MHz	-	-
Telstra		
700 MHz	7	13
900 MHz	-	-
1800 MHz	2	2
2100 MHz	-	-
2600 MHz	-	-
TPG		
700 MHz	-	-
850 MHz	1	2
1800 MHz	-	-
2100 MHz	-	-
2600 MHz	-	-

26000 MHz	-	-
Telstra		
850 MHz	-	-
2600 MHz	-	-
3600 MHz	-	1
TPG		
700 MHz	-	-
3600 MHz	-	-

Total Number of 5G Sites by MNO

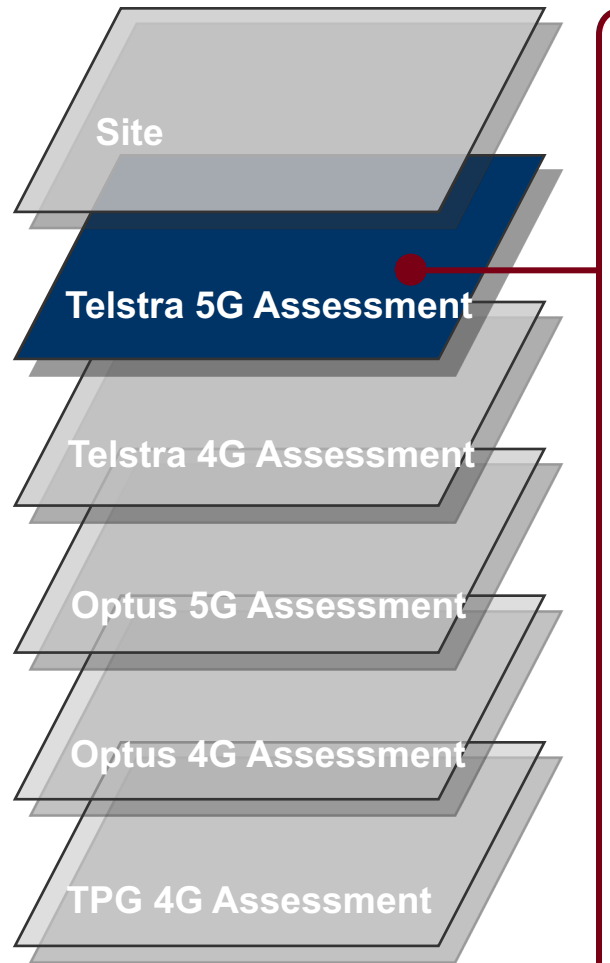
Kyogle Shire	2018	2022
Optus		
2100 MHz	-	-
2300 MHz	-	-
3500 MHz	-	-

Summerland Way



Kyogle Shire Analysis

Summerland Way



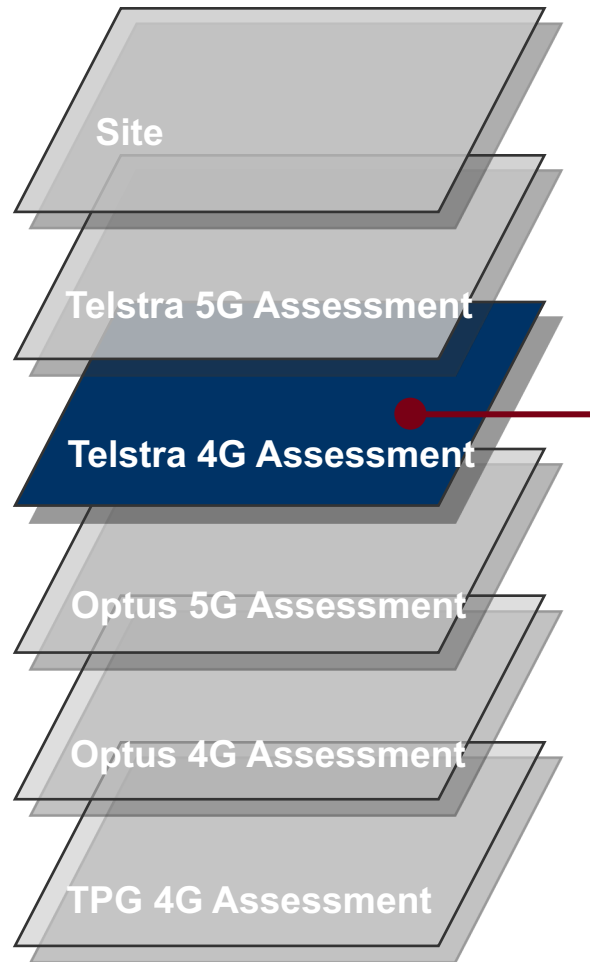
Assessment – Initial 5G coverage limited to Kyogle township and outskirts.

Action – Upgrade 4 x Telstra Tower Sites with 3.6Ghz 5G



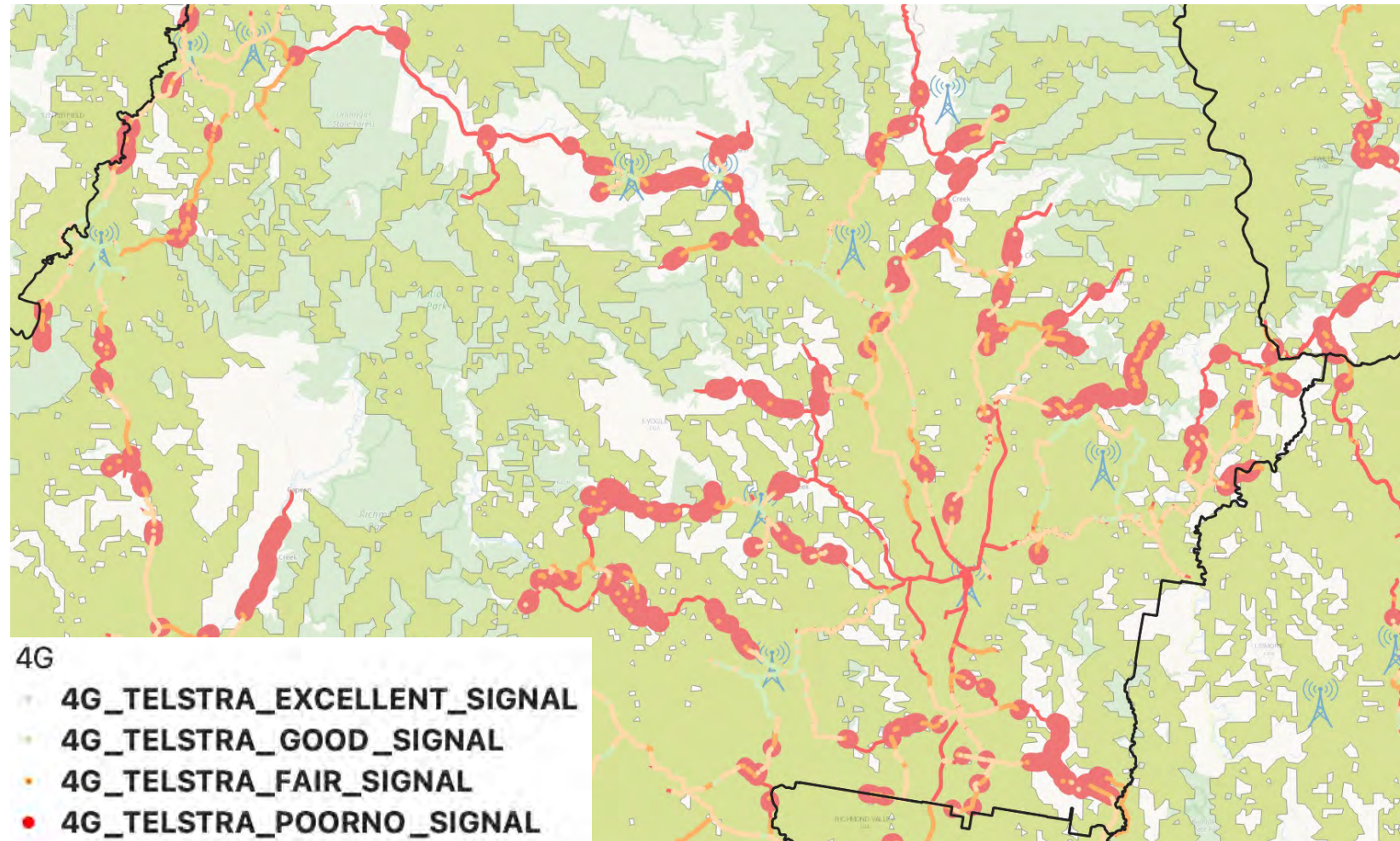
Kyogle Shire Analysis

Summerland Way



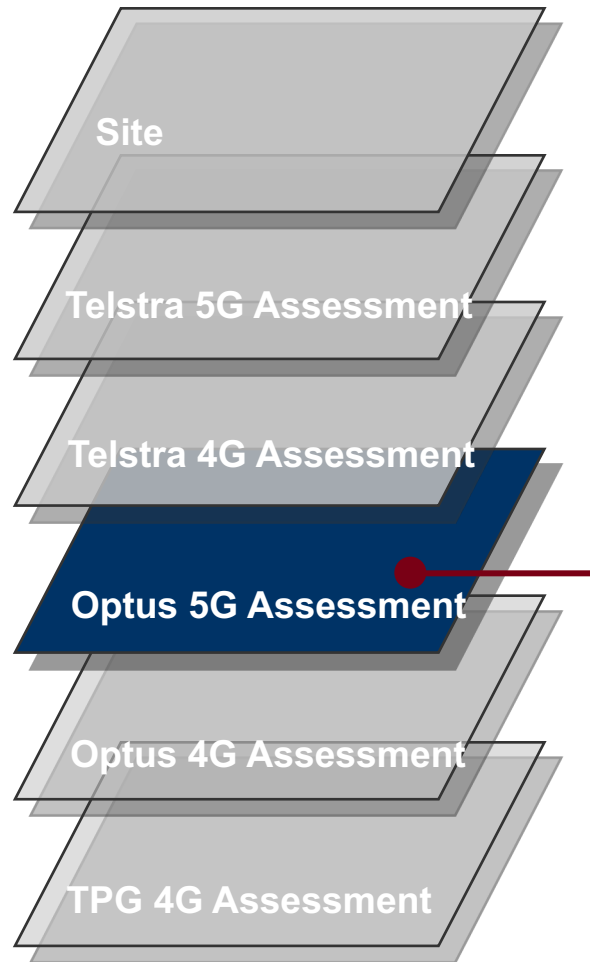
Assessment - Broad 4G blackspots located between Woodenbong and Wangaree

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



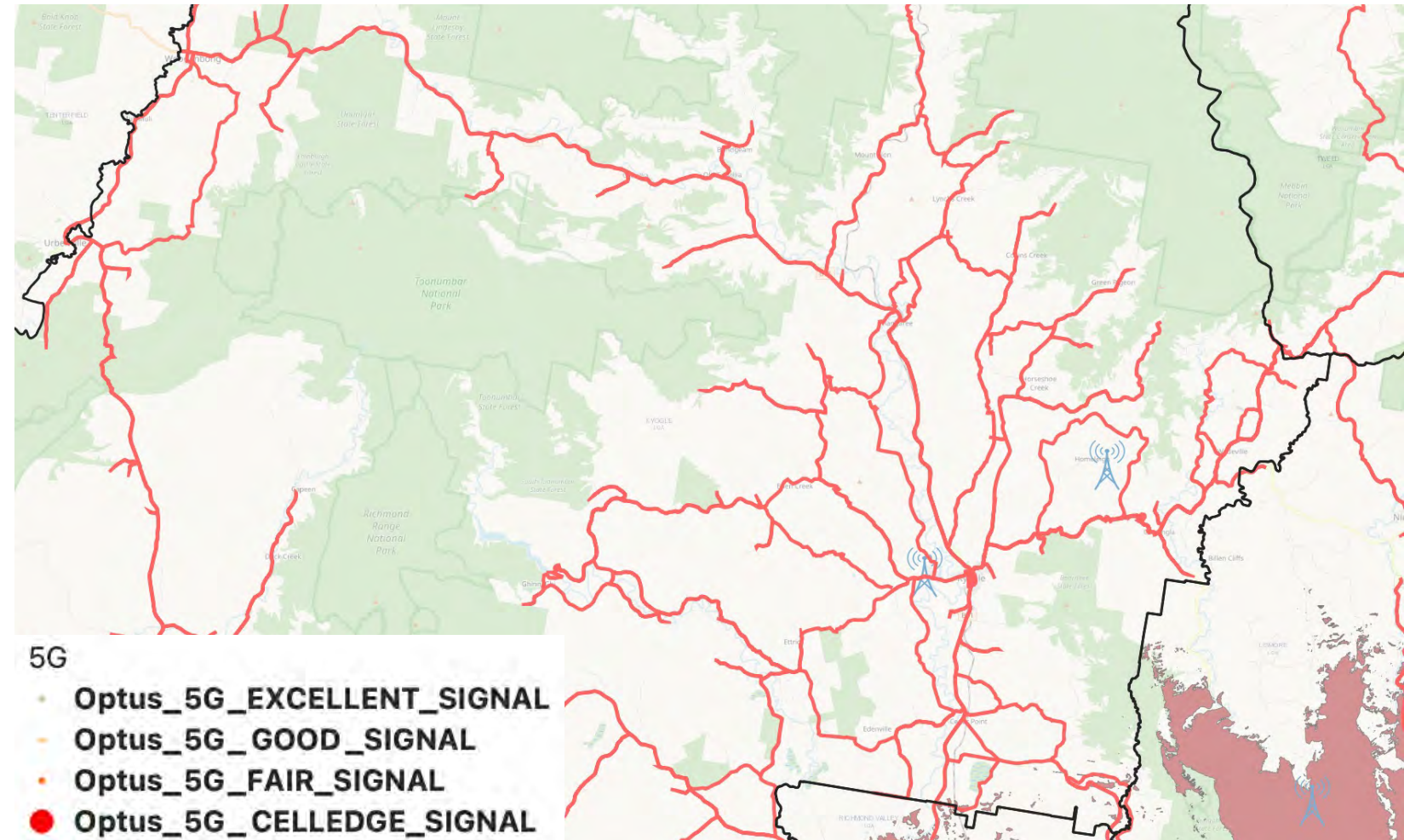
Kyogle Shire Analysis

Summerland Way



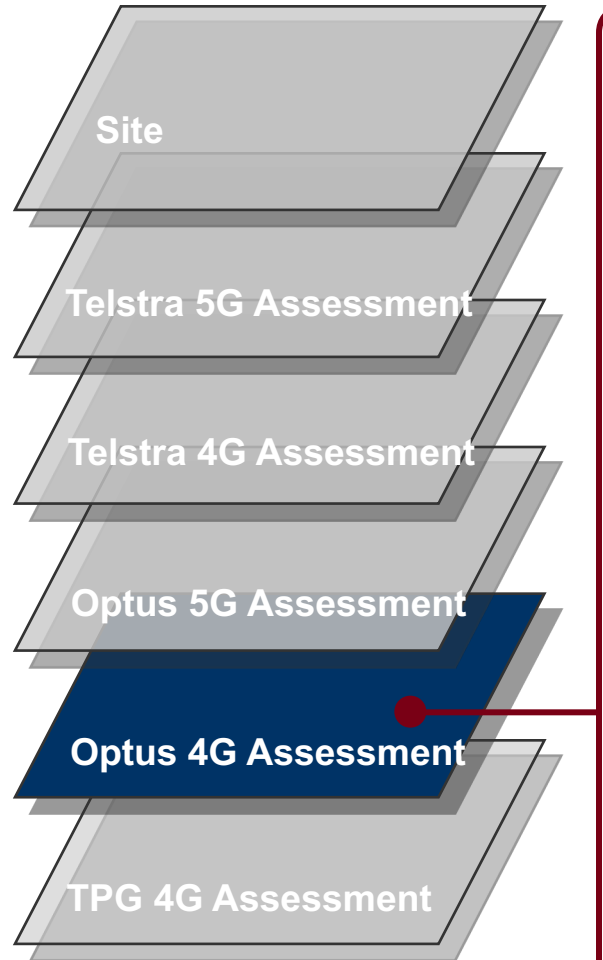
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade Kyogle Optus Site to 5G & Optus / Fed Govt – up to 4 new 5G Tower sites



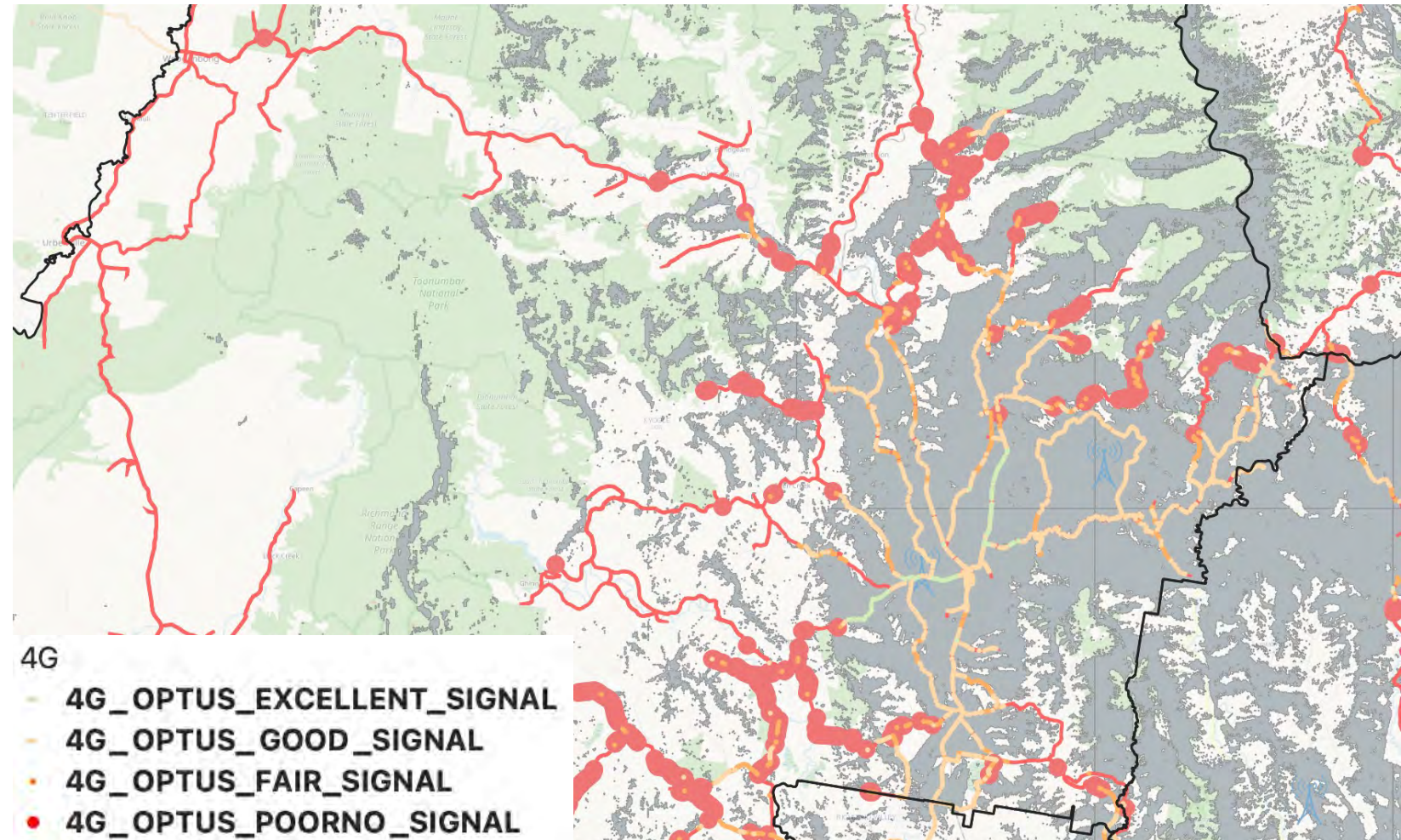
Kyogle Shire Analysis

Summerland Way



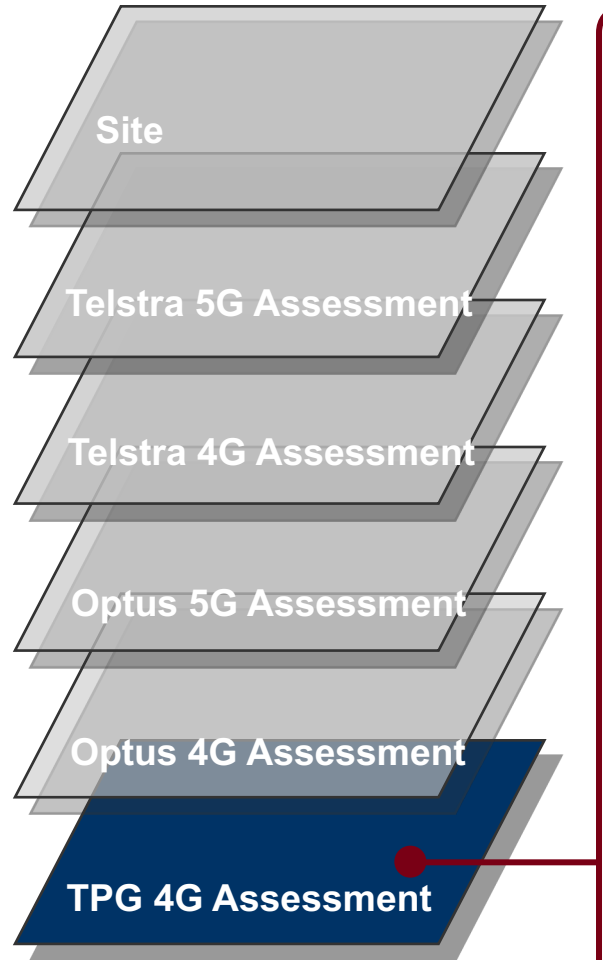
Assessment - Broad 4G blackspots located between Woodenbong and Wiangaree

Action – Optus / Fed Govt – up to 4 new 4G Tower sites



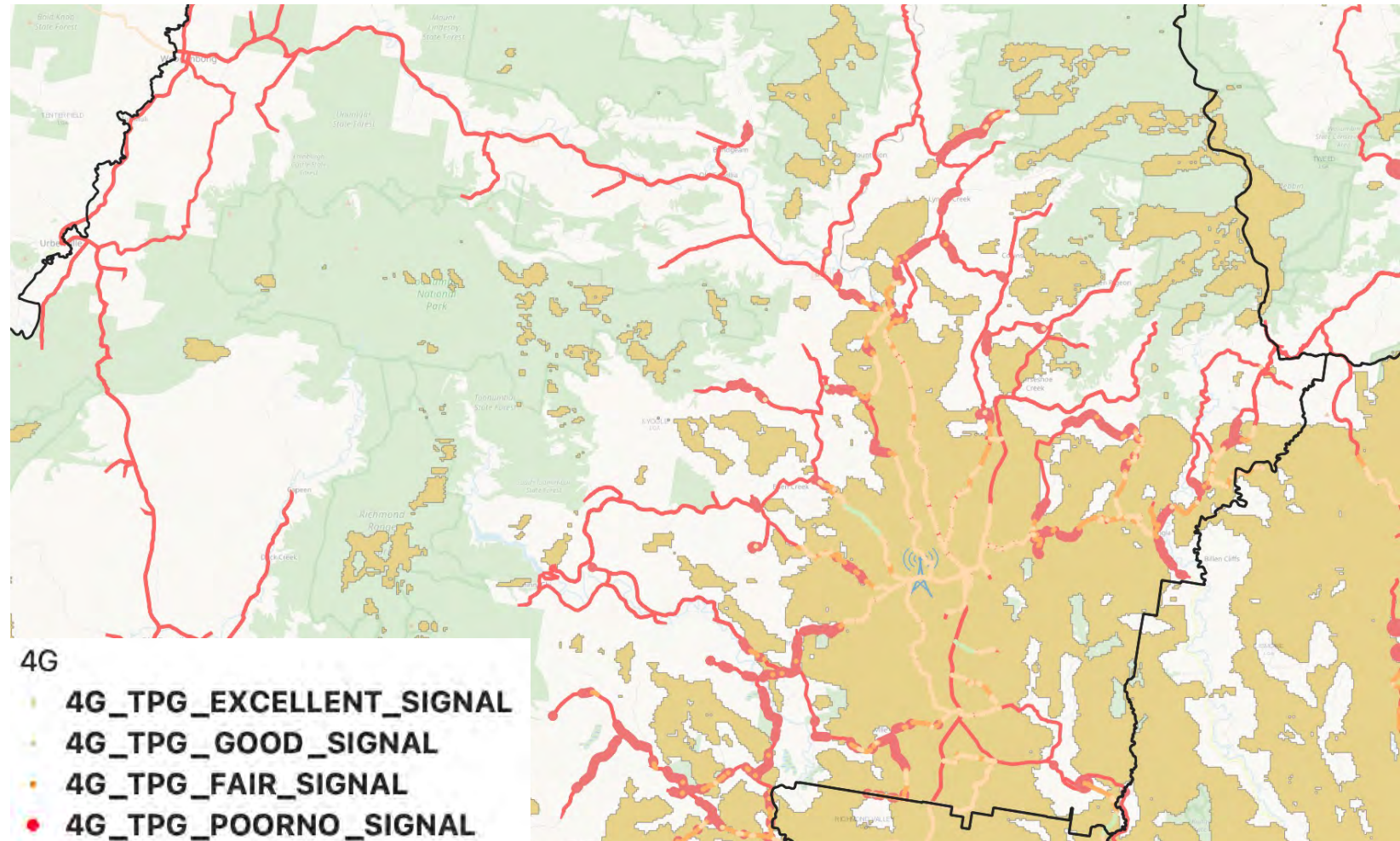
Kyogle Shire Analysis

Summerland Way



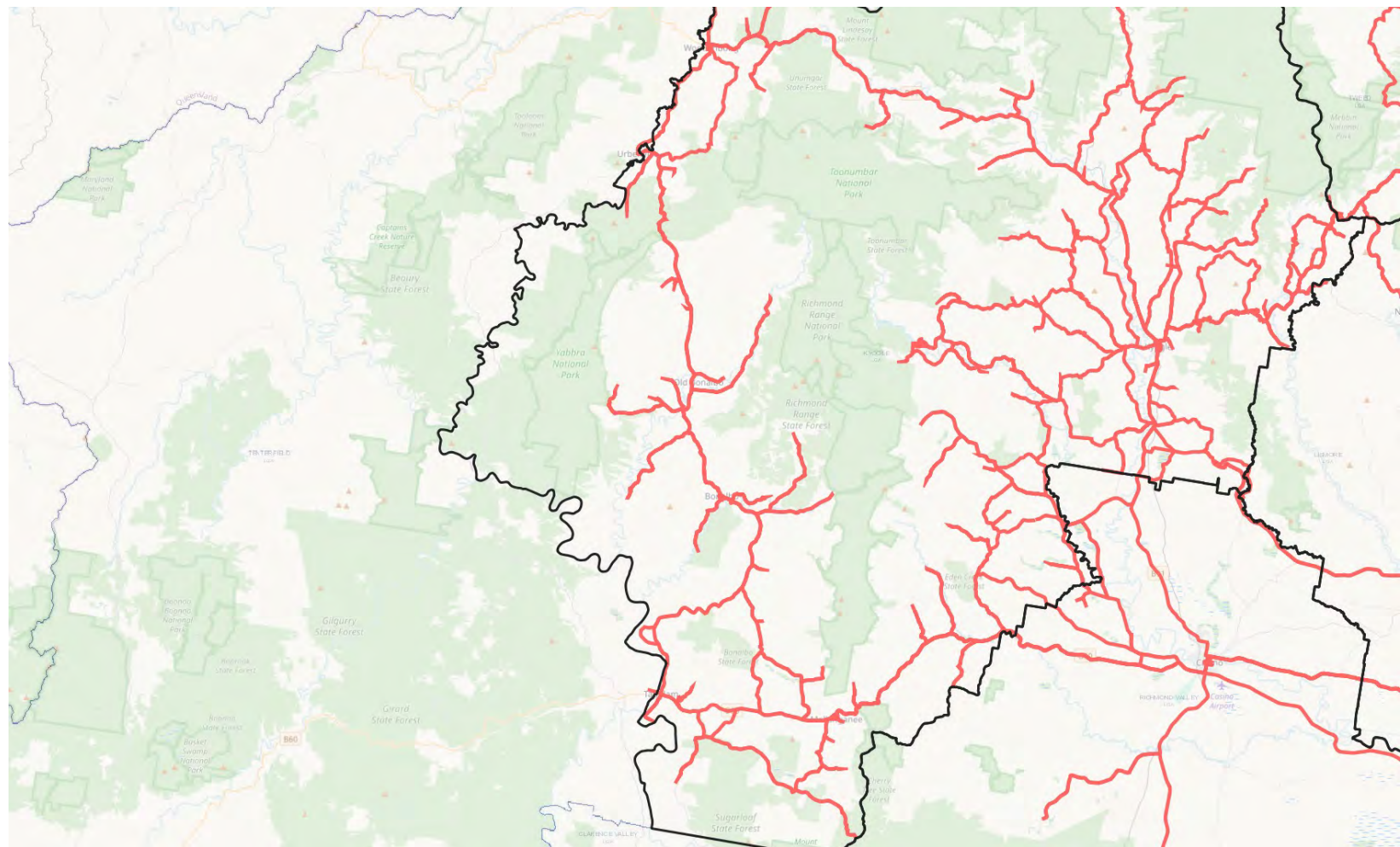
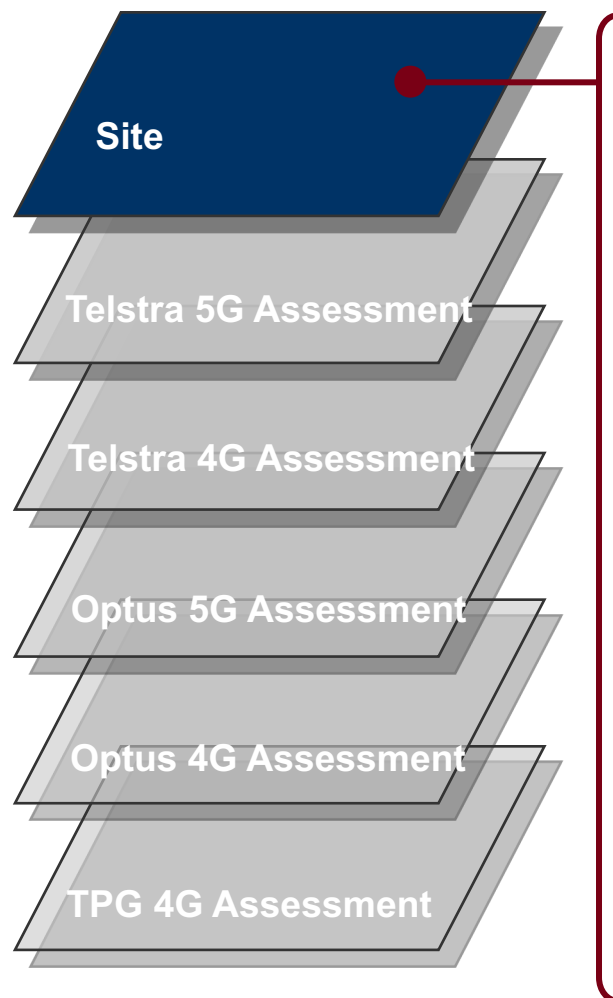
Assessment - Broad 4G blackspots located between Woodenbong and Wangaree

Action – TPG / Fed Govt (MBSP) – up to 4 new 4G Tower sites



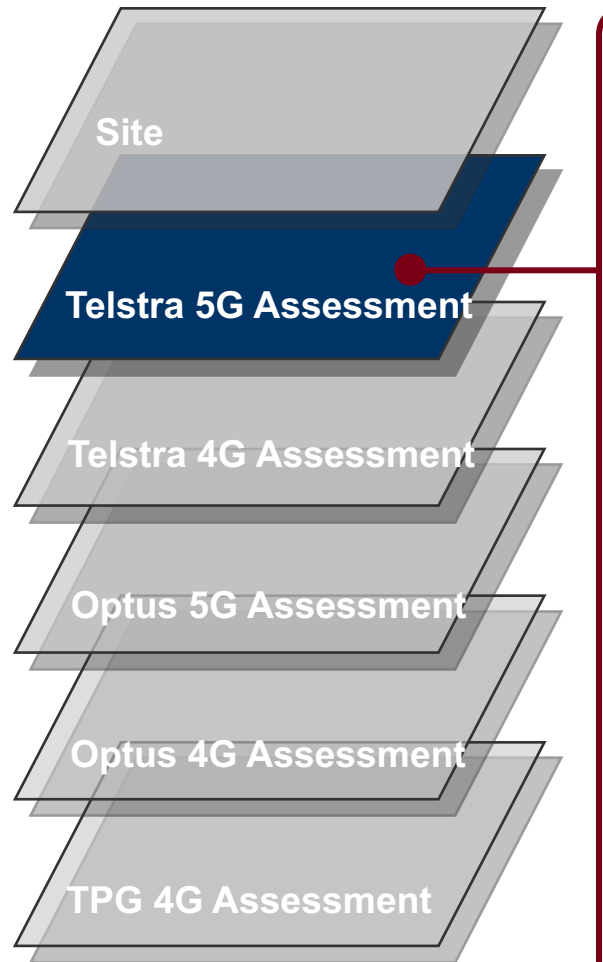
Kyogle Shire Analysis

Clarence Way



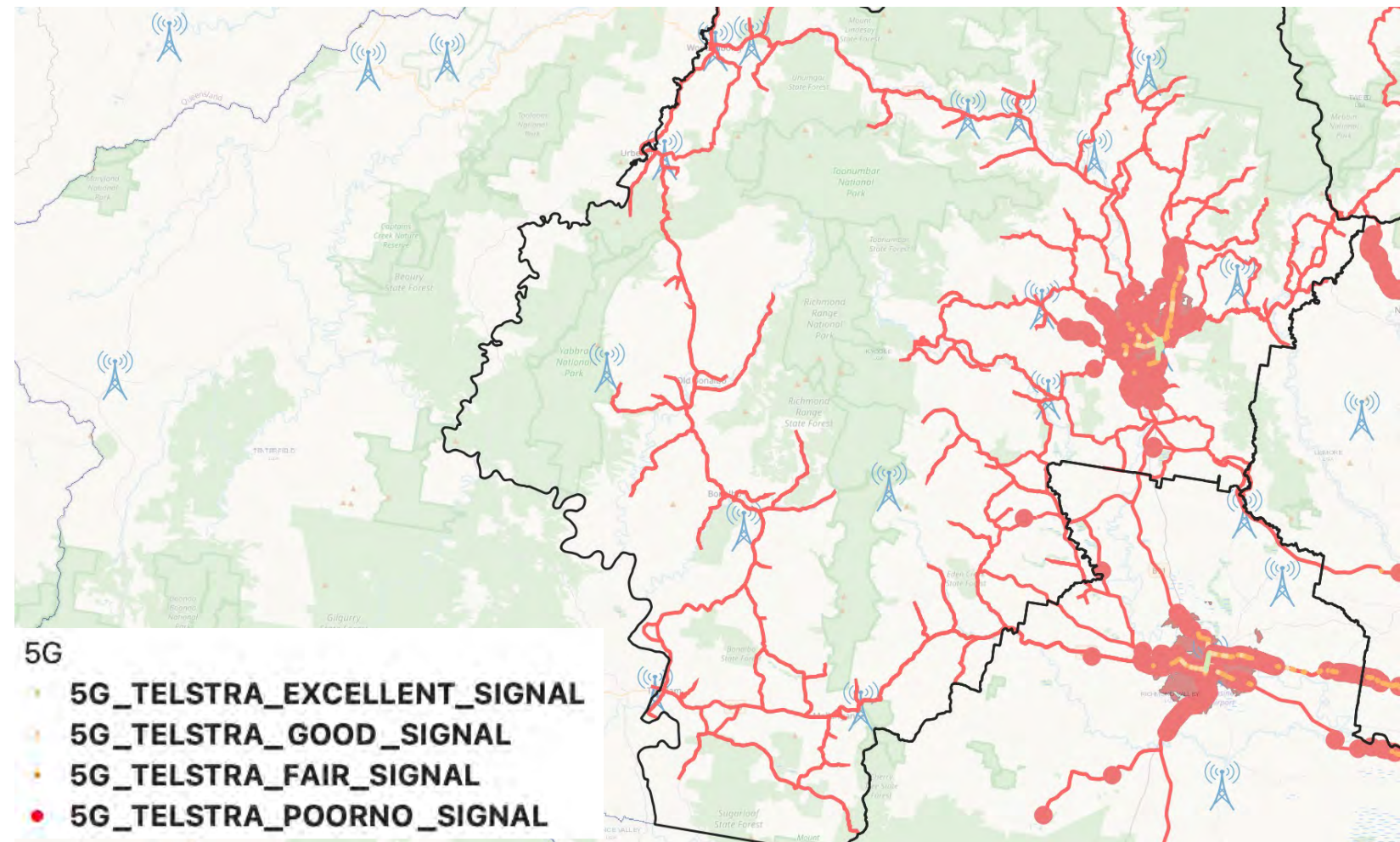
Kyogle Shire Analysis

Clarence Way



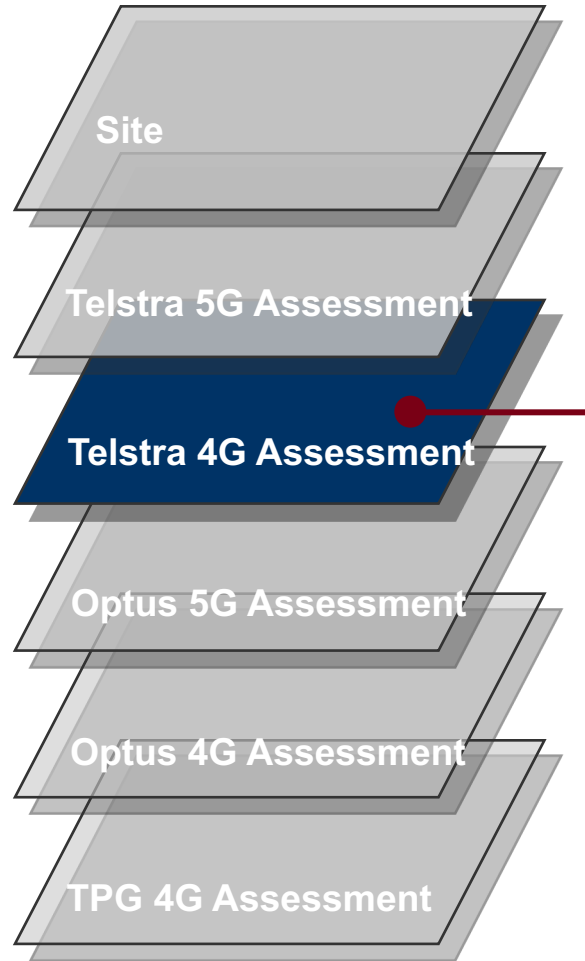
Assessment - No current Telstra 5G coverage

Action – Telstra - Upgrade 5 x Sites to 3.6Ghz 5G & Telstra / Fed Govt – up to 5 new 5G Tower sites required



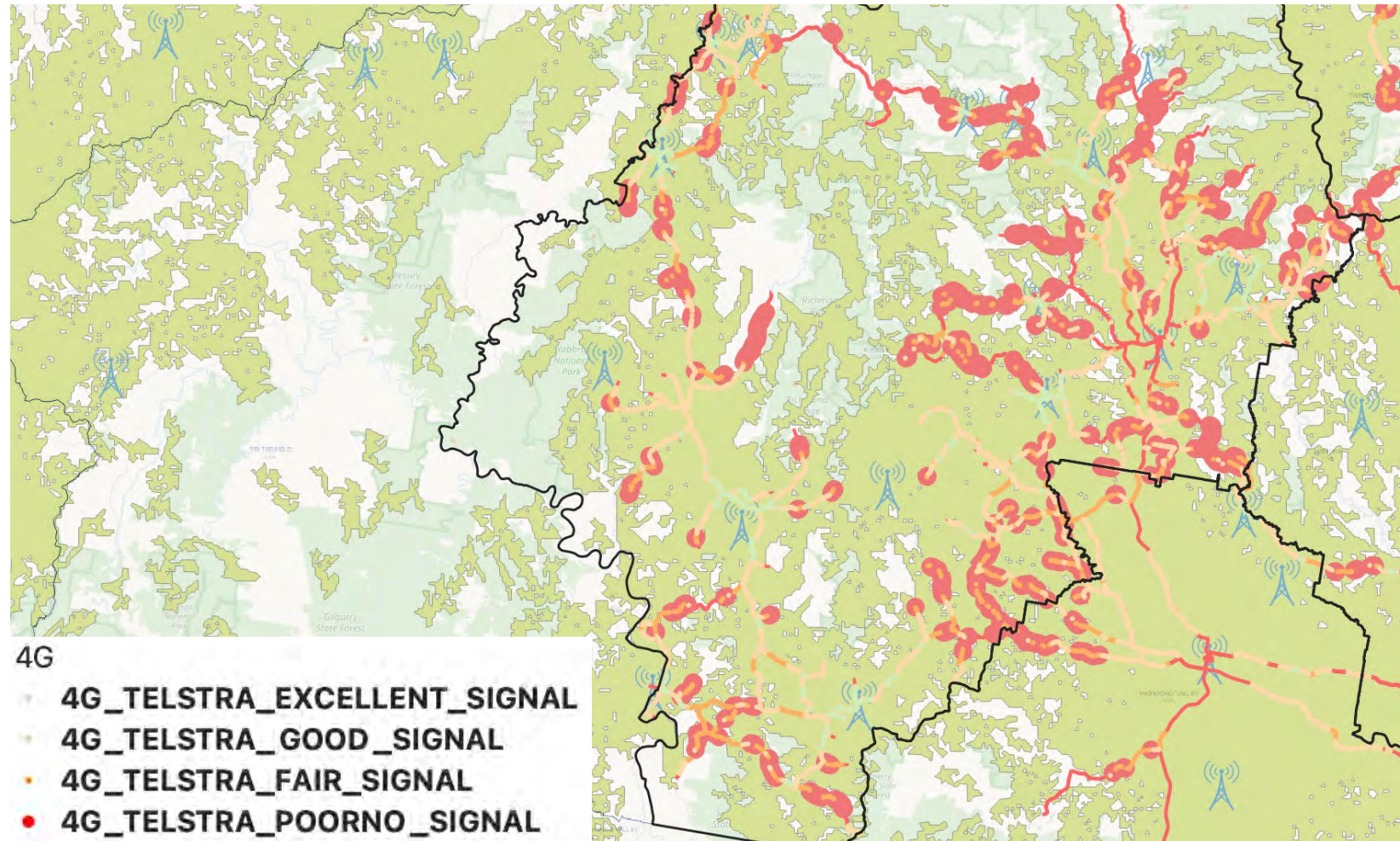
Kyogle Shire Analysis

Clarence Way



Assessment - Broad 4G blackspots located between Woodenbong and Old Bonalbo

Action - Telstra / Fed Govt (MBSP) – up to 3 new 4G Tower sites required

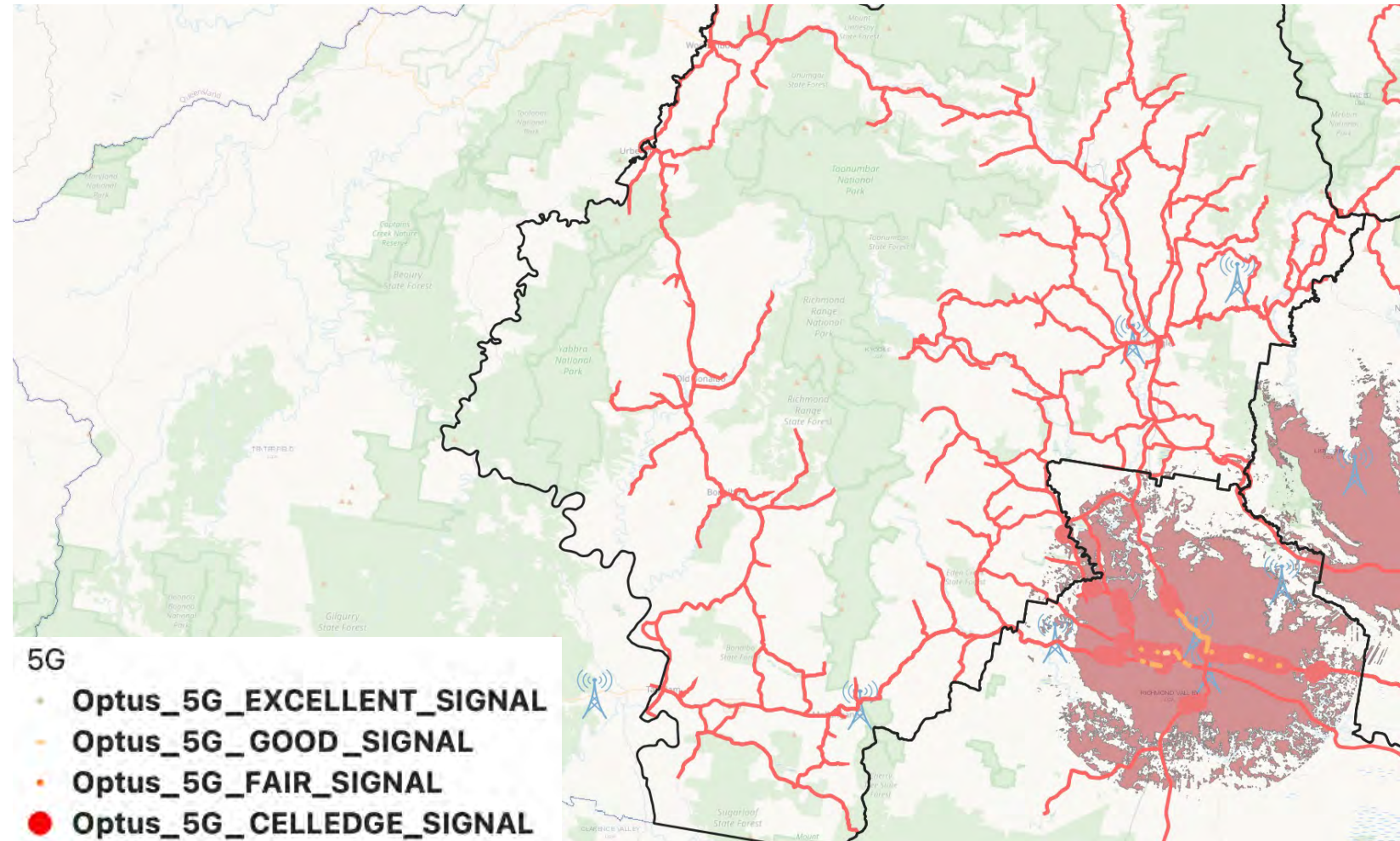
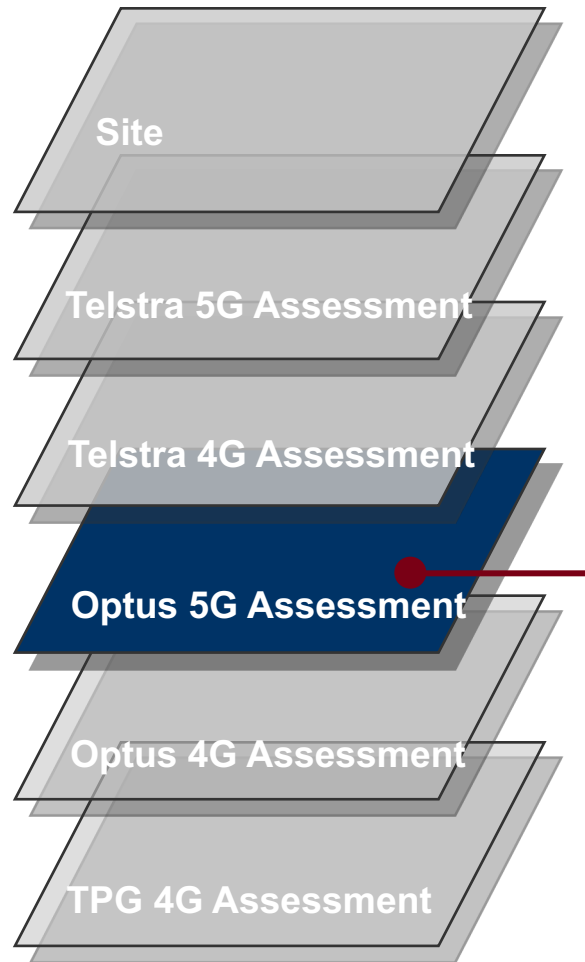


Kyogle Shire Analysis

Clarence Way

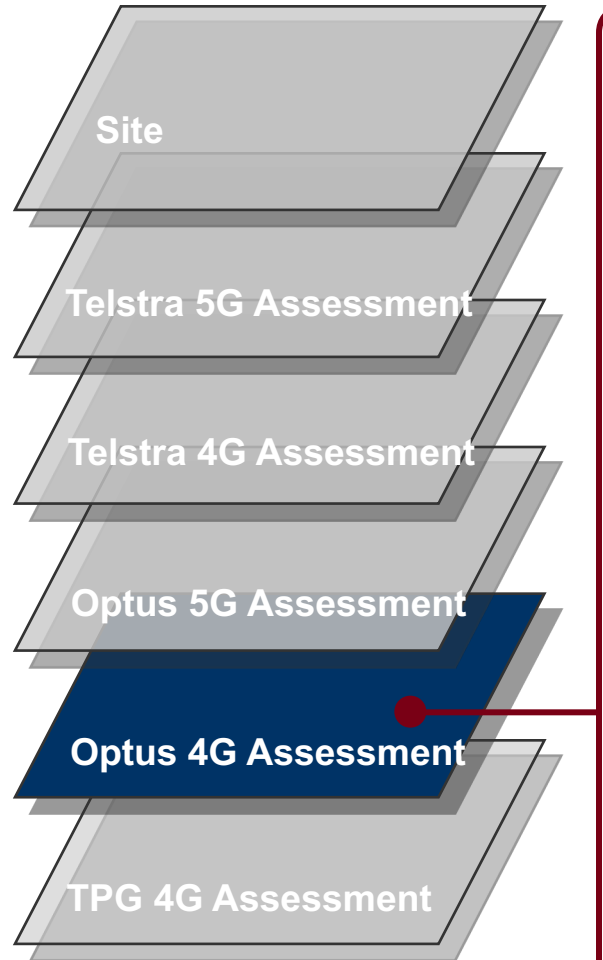
Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt (MBSP) – up to 5 new 5G Tower sites with initial priority for Woodenbong & Bonalbo



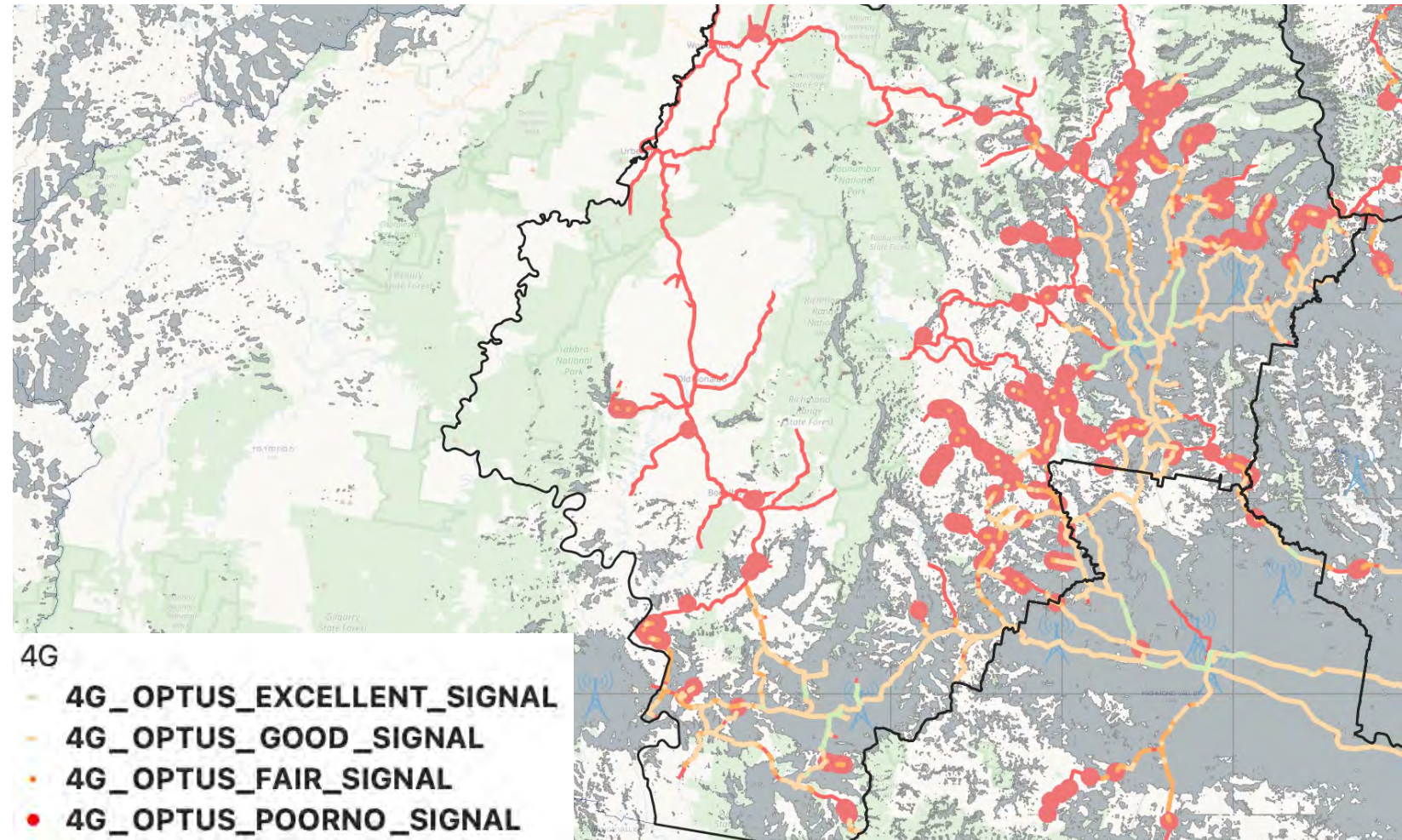
Kyogle Shire Analysis

Clarence Way



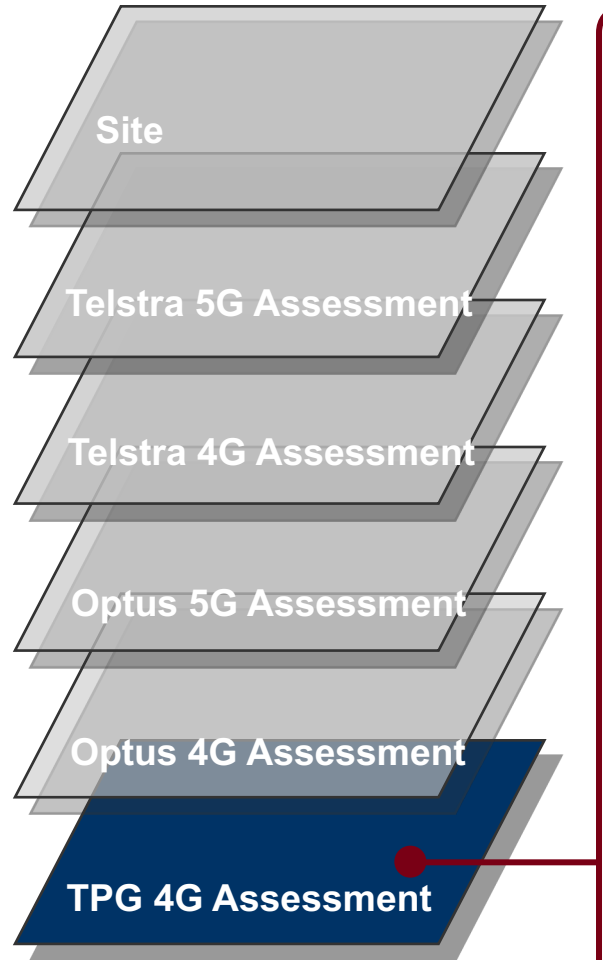
Assessment – Broad areas of no 4G coverage

Action –Optus / Fed Govt (MBSP) – up to 5 new 4G Tower sites with initial priority for Woodenbong & Bonalbo



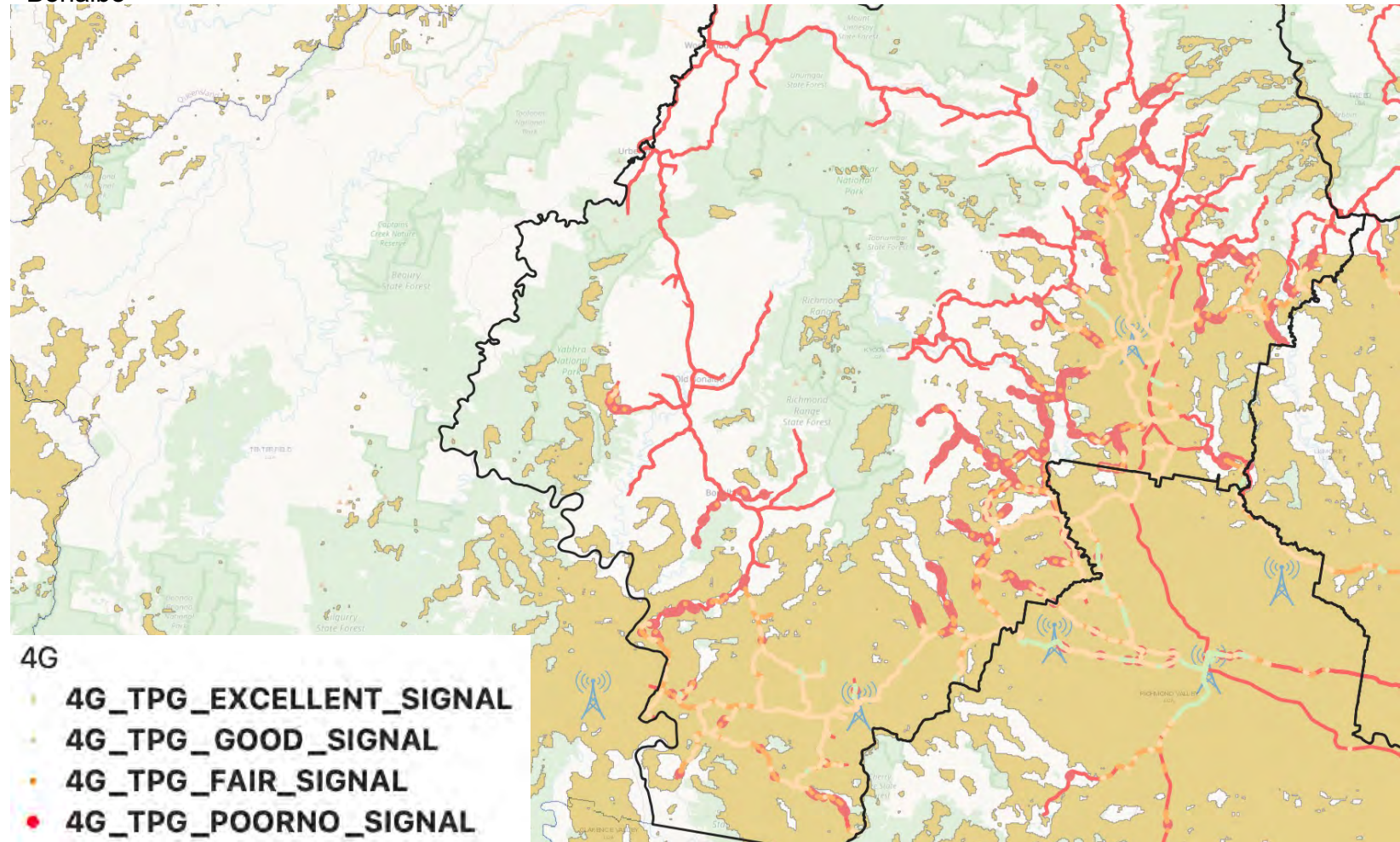
Kyogle Shire Analysis

Clarence Way



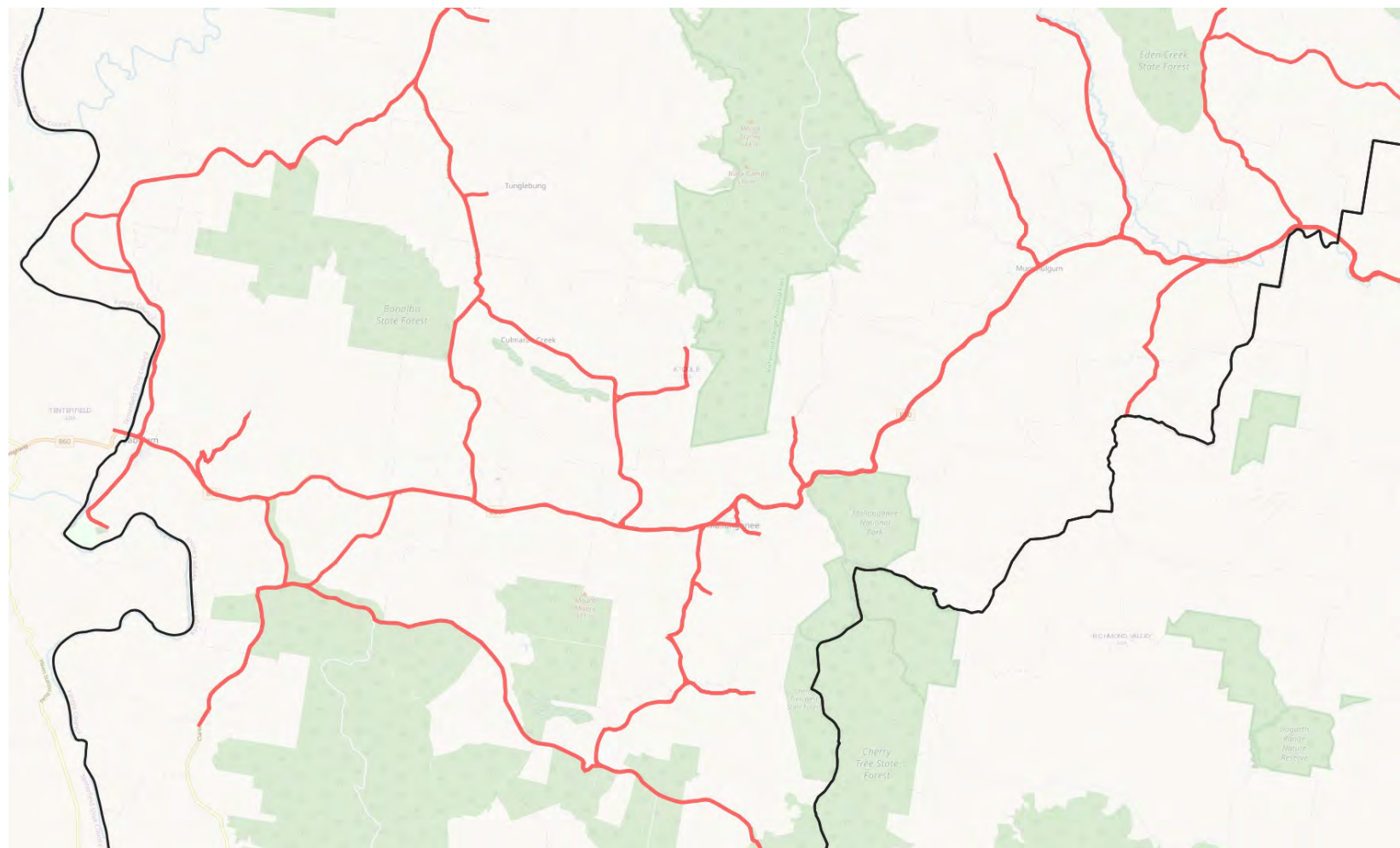
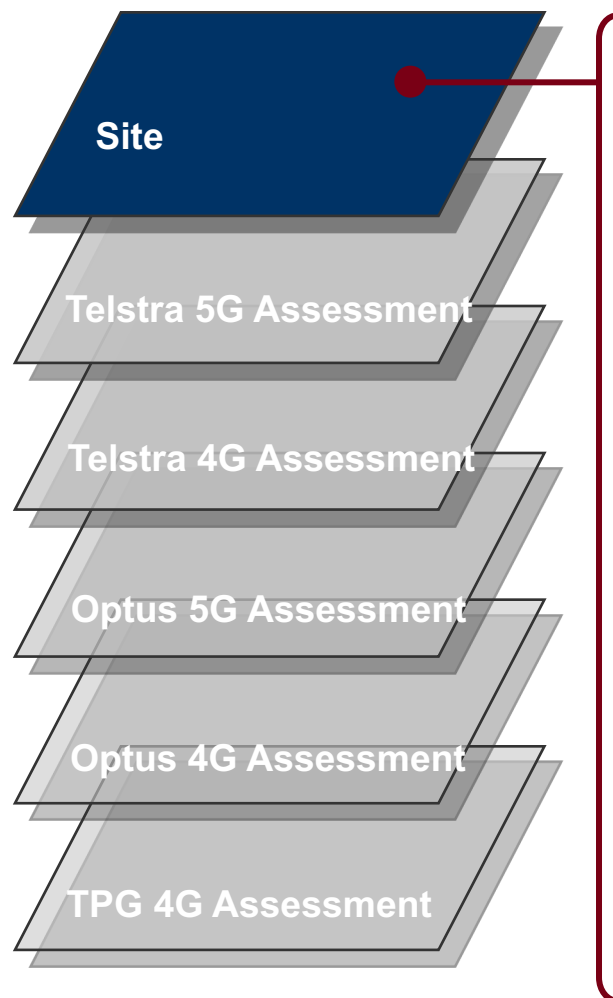
Assessment – Broad areas of no 4G coverage

Action –Optus / Fed Govt (MBSP) – up to 5 new 4G Tower sites required with initial priority for Woodenbong & Bonalbo



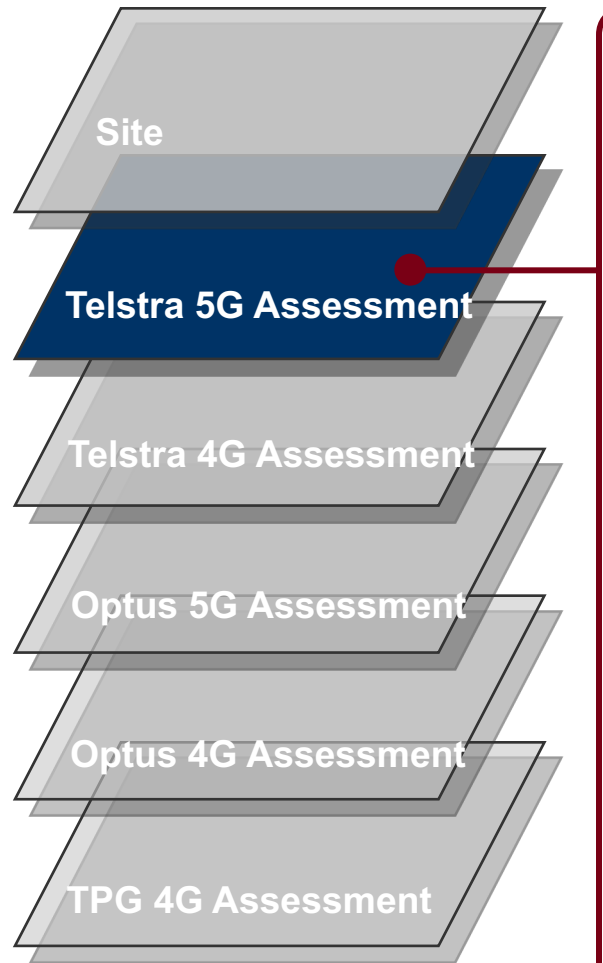
Kyogle Shire Analysis

Bruxner Highway



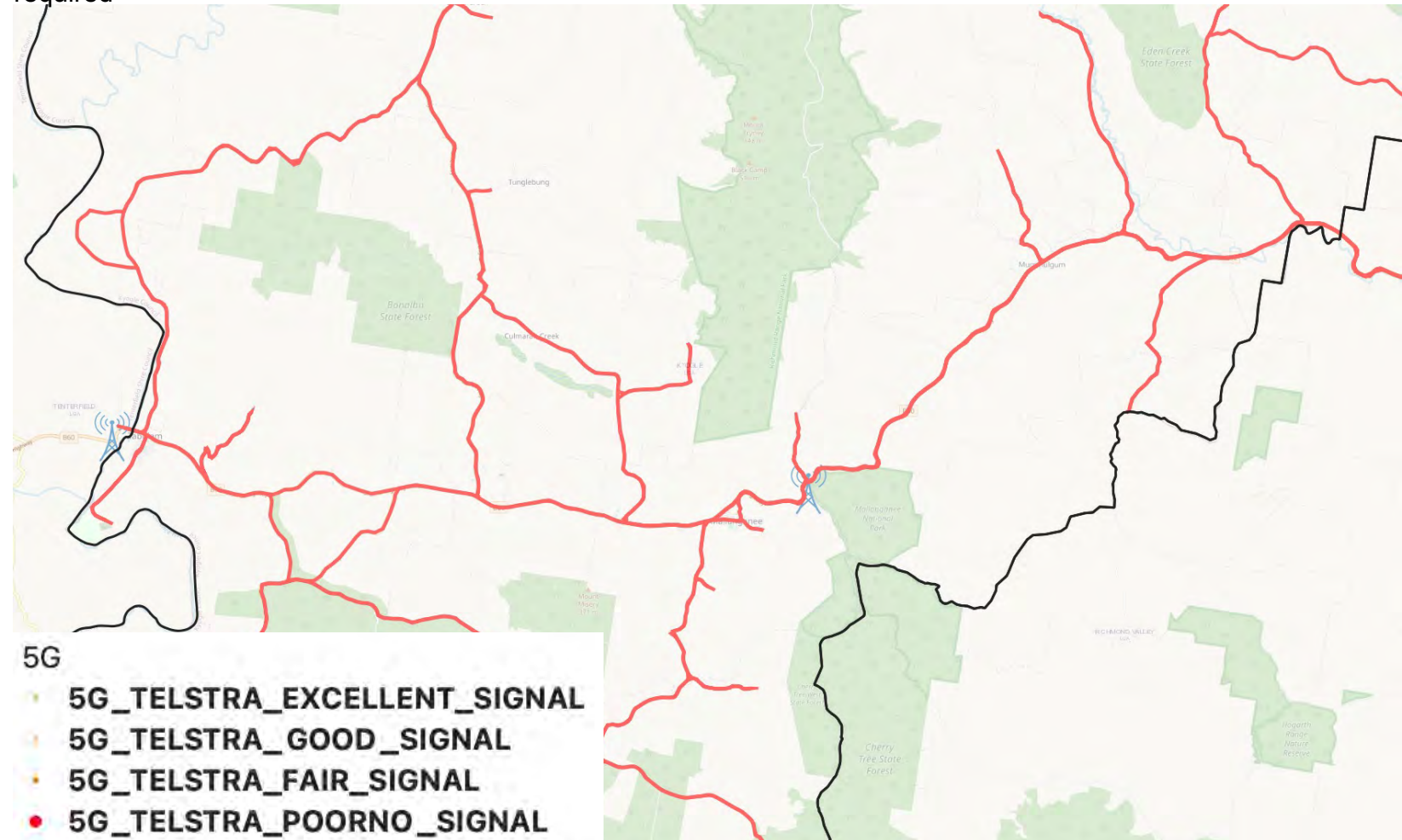
Kyogle Shire Analysis

Bruxner Highway



Assessment - No current Telstra 5G coverage

Action – Telstra – Upgrade 2 x Sites to 3.6Ghz 5G & Telstra / Fed Govt (MBSP) – up to 2 new 5G Tower sites required

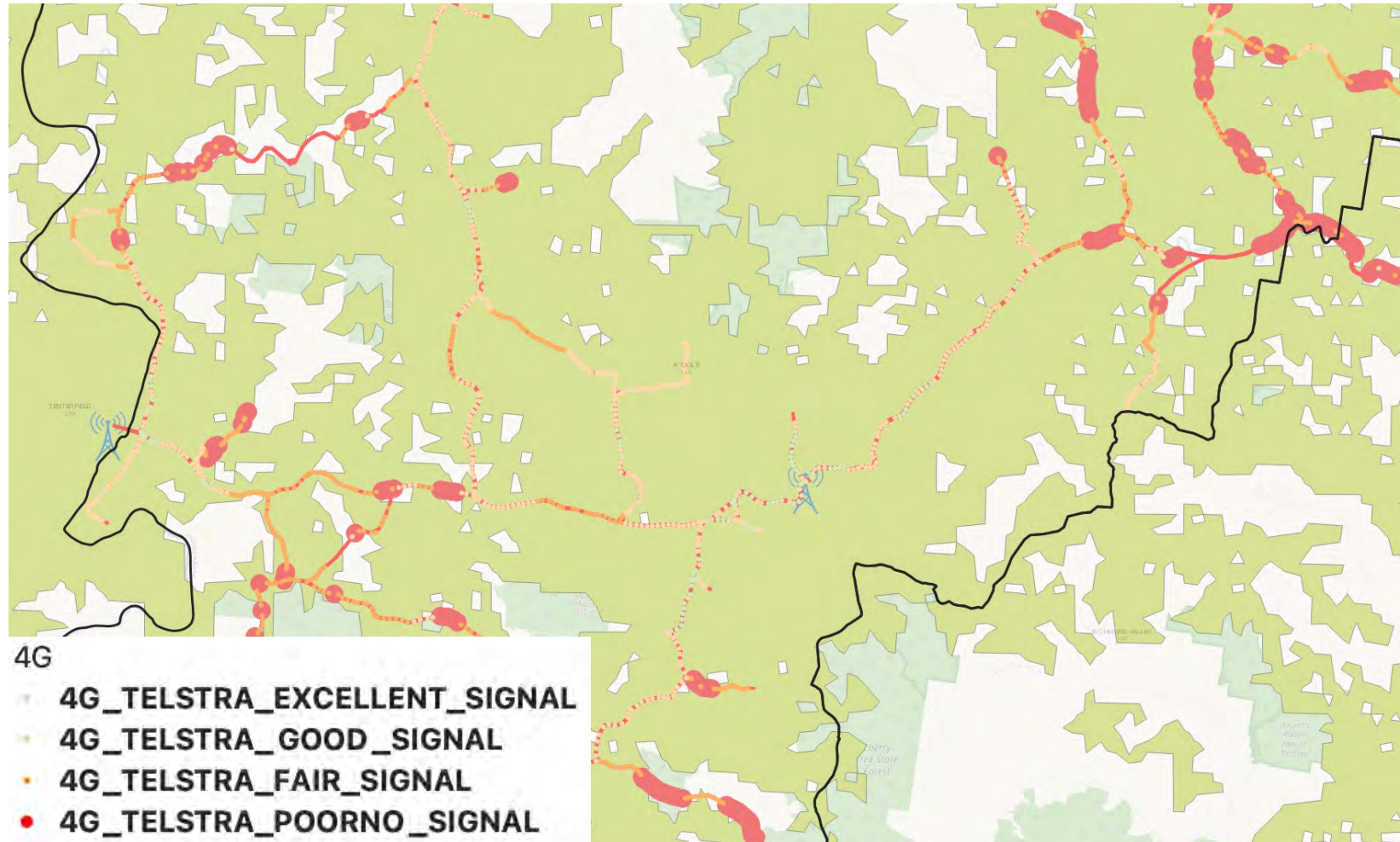
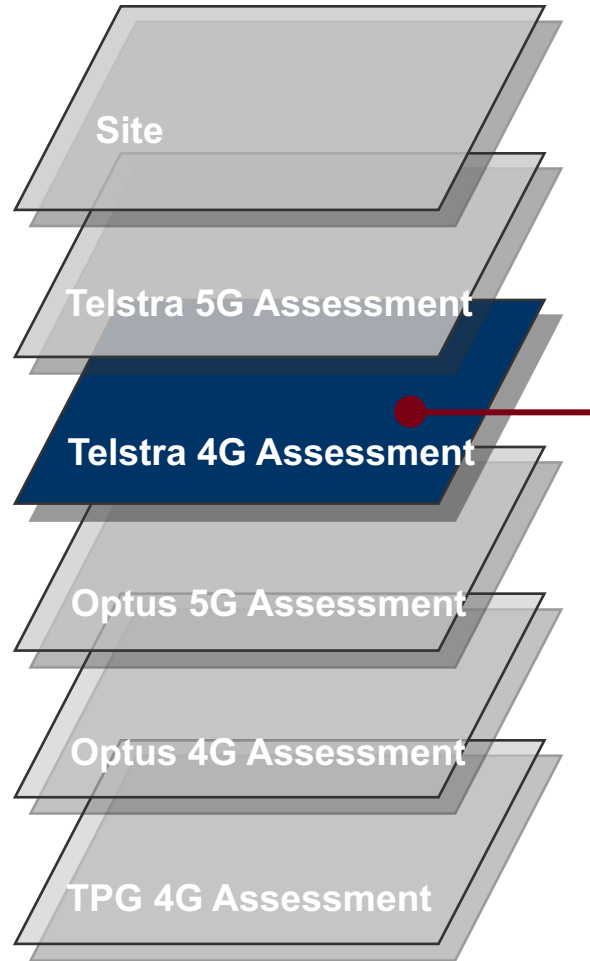


Kyogle Shire Analysis

Bruxner Highway

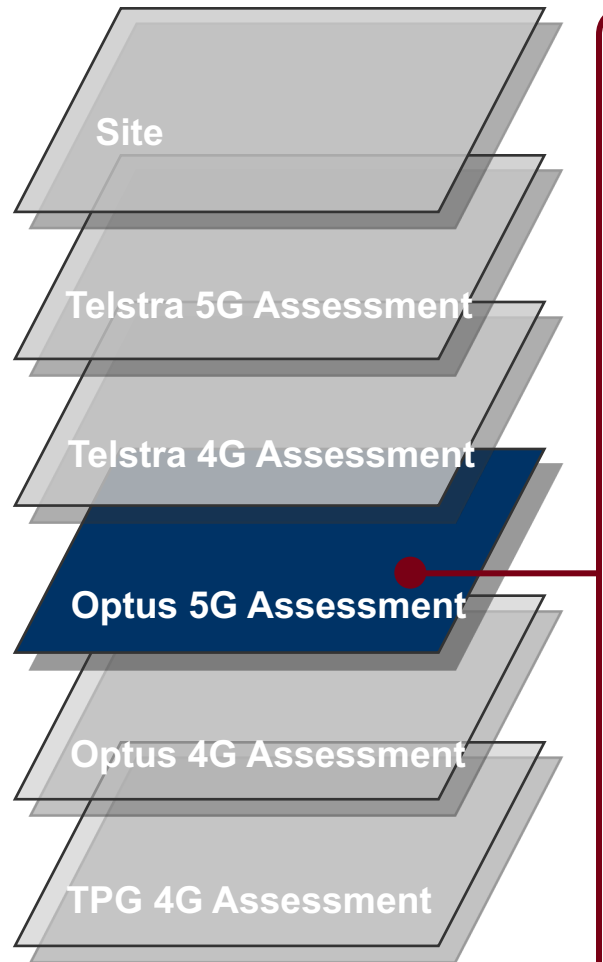
Assessment – Telstra 4G Blackspots around Tabulam and Eastern Shire Boundary

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites required



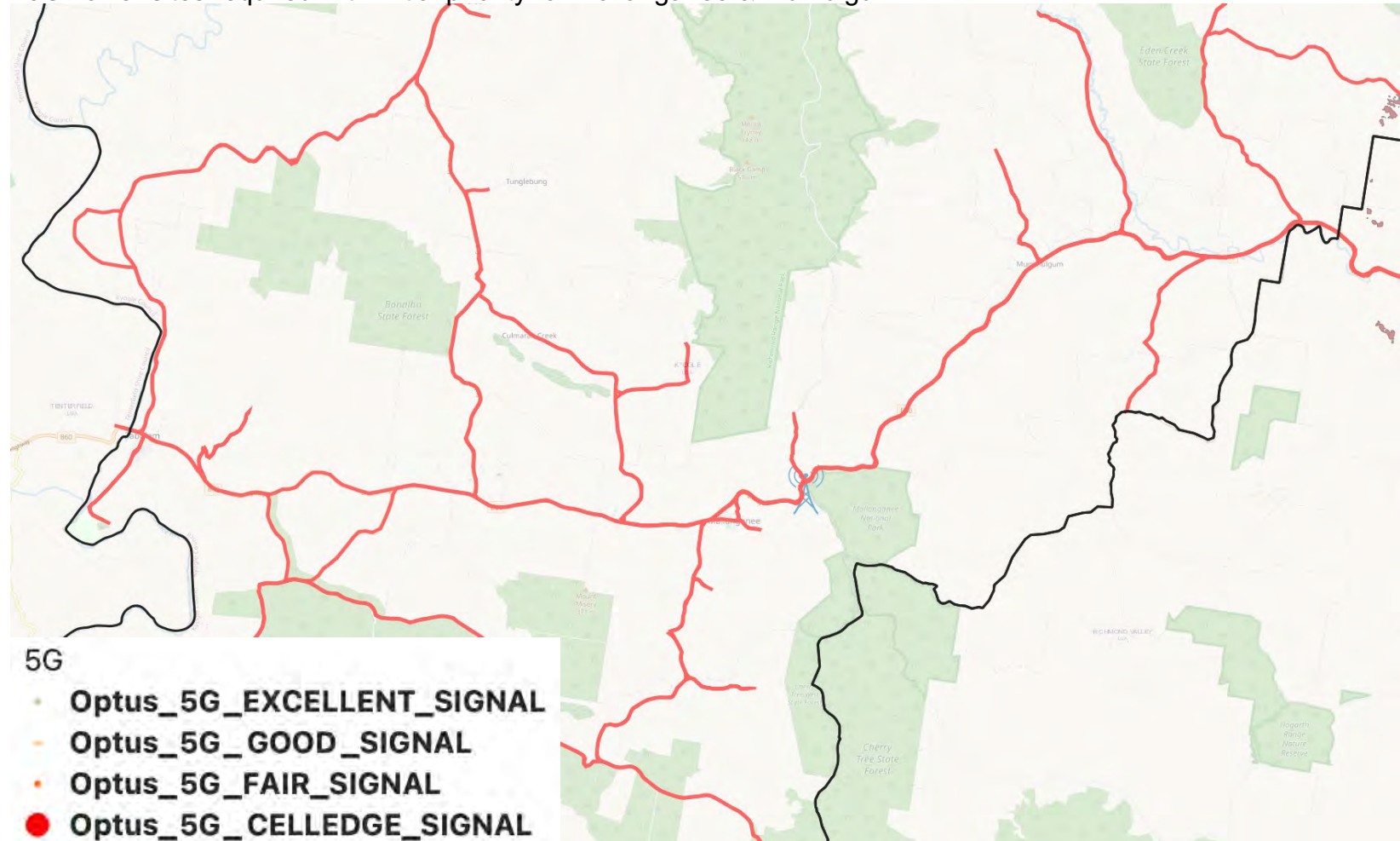
Kyogle Shire Analysis

Bruxner Highway



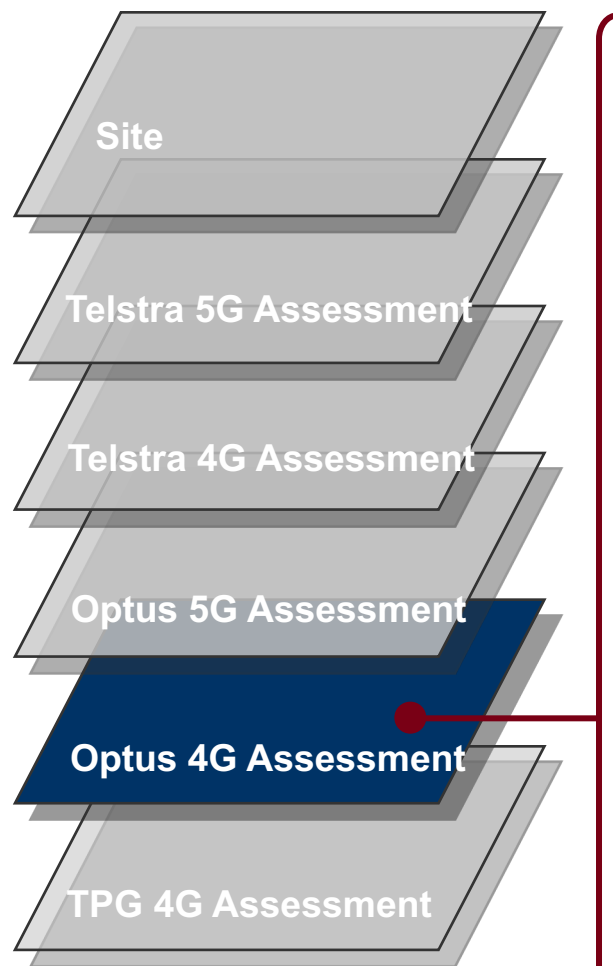
Assessment - No current Optus 5G coverage

Action – Optus – Upgrade 1 x Sites to 3.5Ghz 5G & Optus / Fed Govt – up to 3 new 5G Tower sites required with initial priority for Mallanganee & Mumulgum



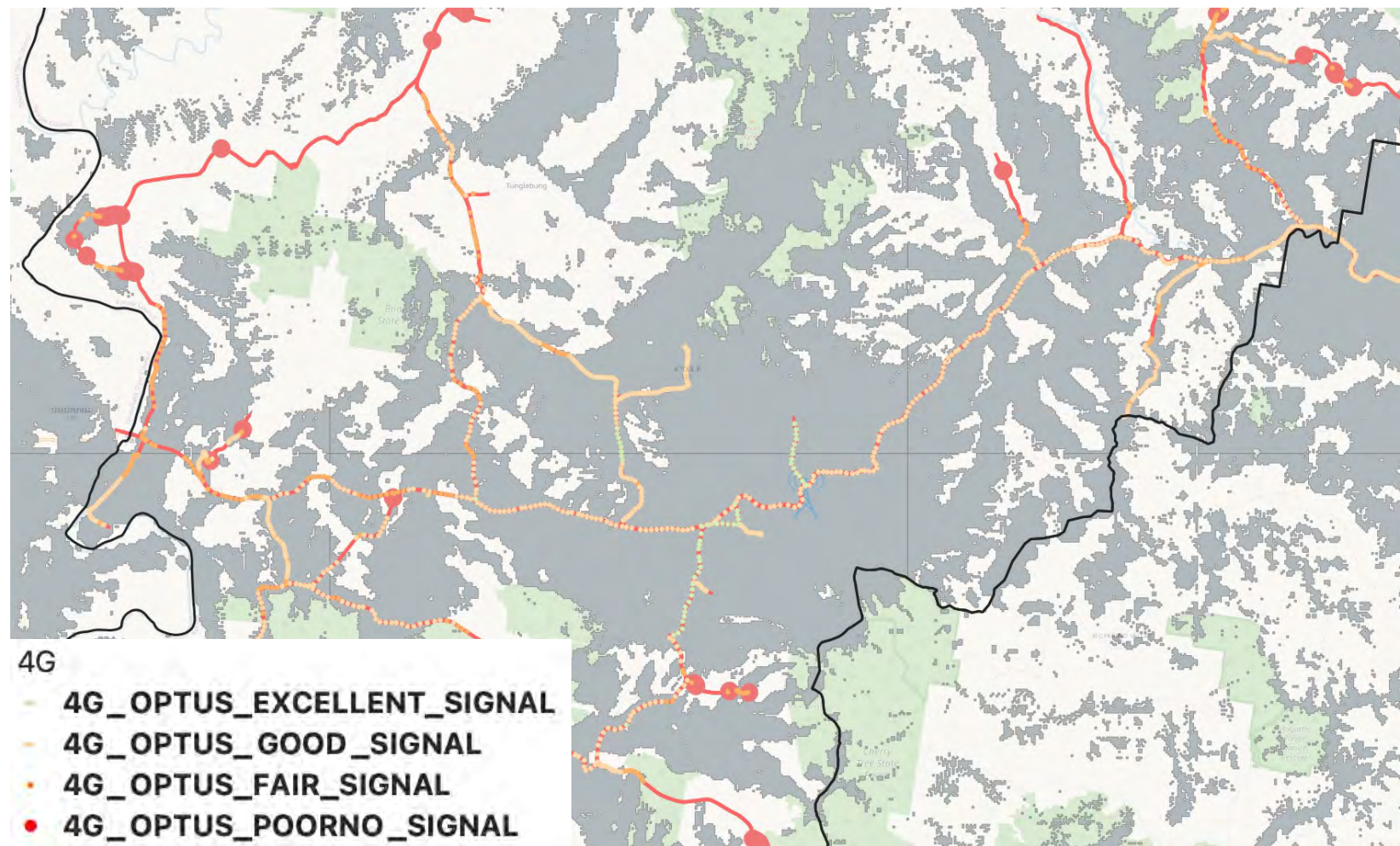
Kyogle Shire Analysis

Bruxner Highway



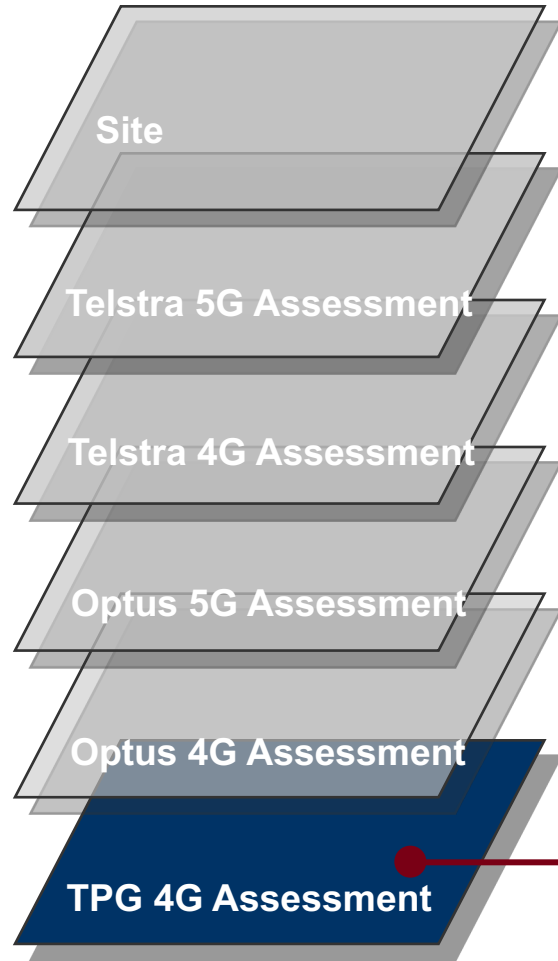
Assessment – Optus 4G Blackspots around Tabulam

Action – Optus / Fed Govt – up to 2 new 4G Tower sites required



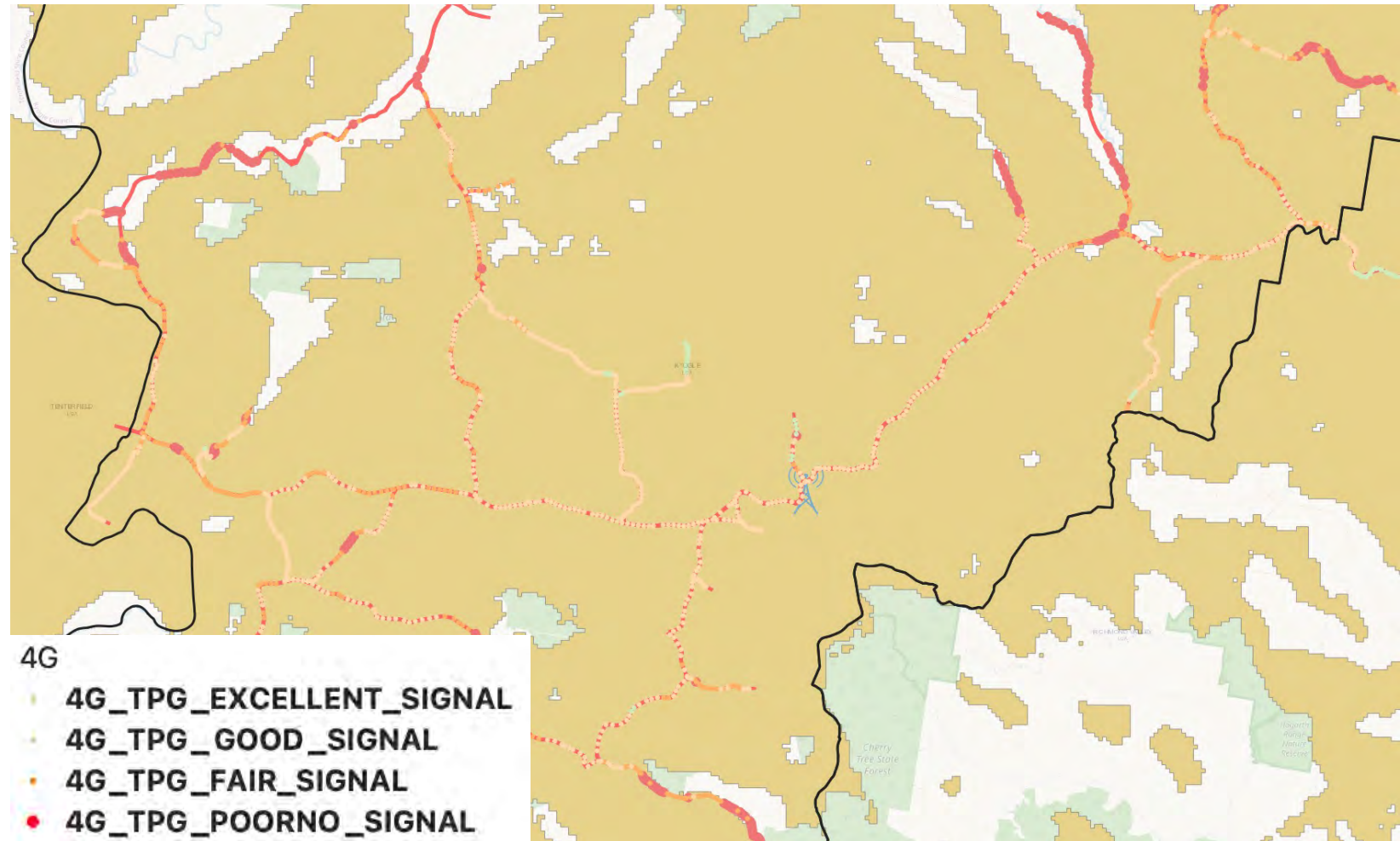
Kyogle Shire Analysis

Bruxner Highway



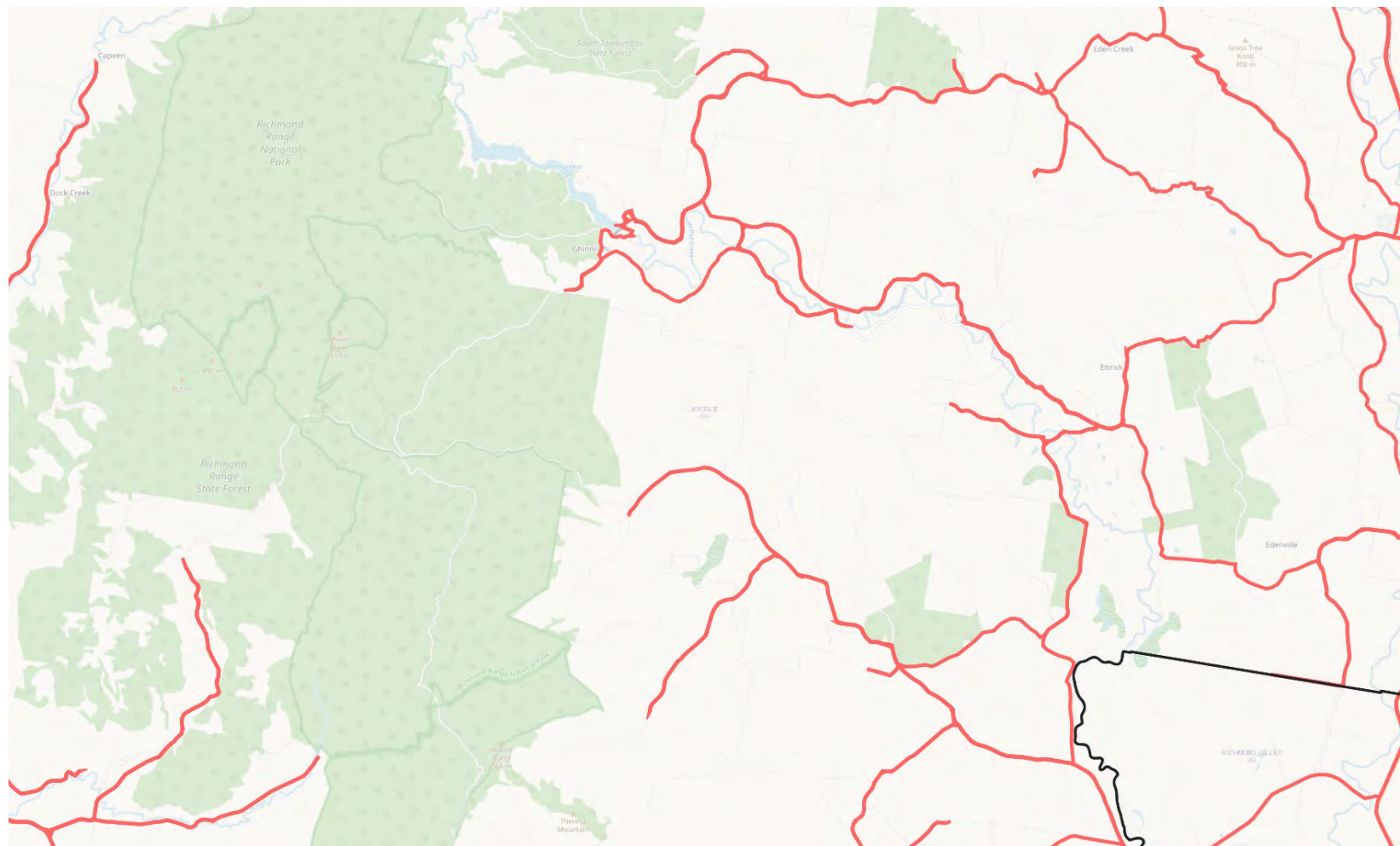
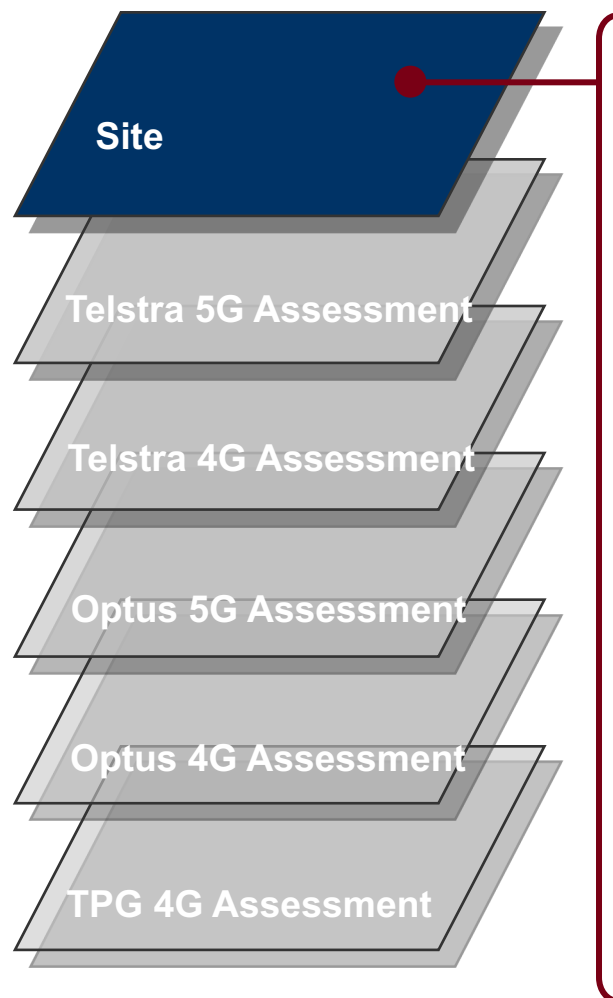
Assessment – TPG 4G Blackspots around Tabulam

Action – TPG / Fed Govt – up to 2 new 4G Tower sites required



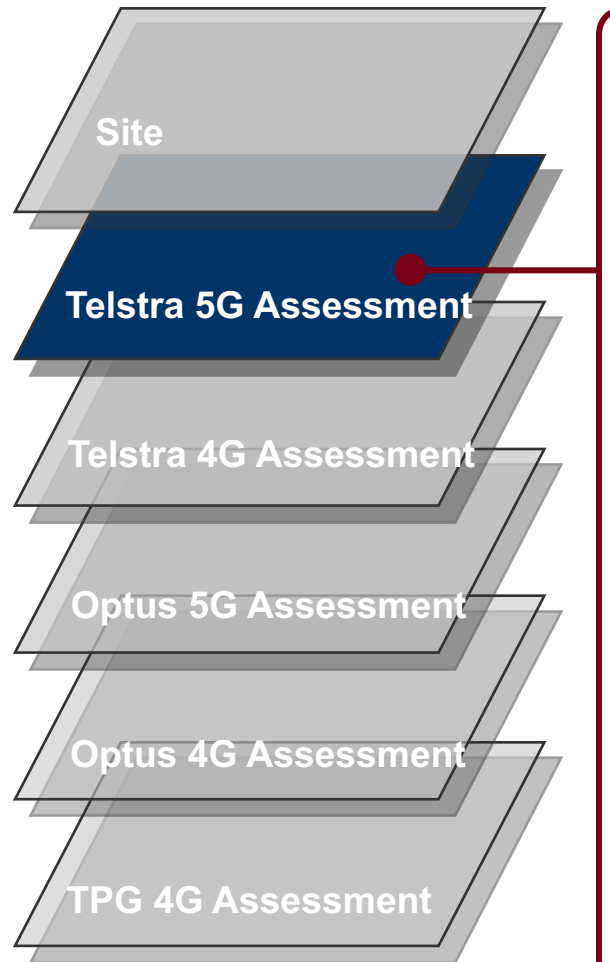
Kyogle Shire Analysis

Afterlee Road / Peacock Creek Road



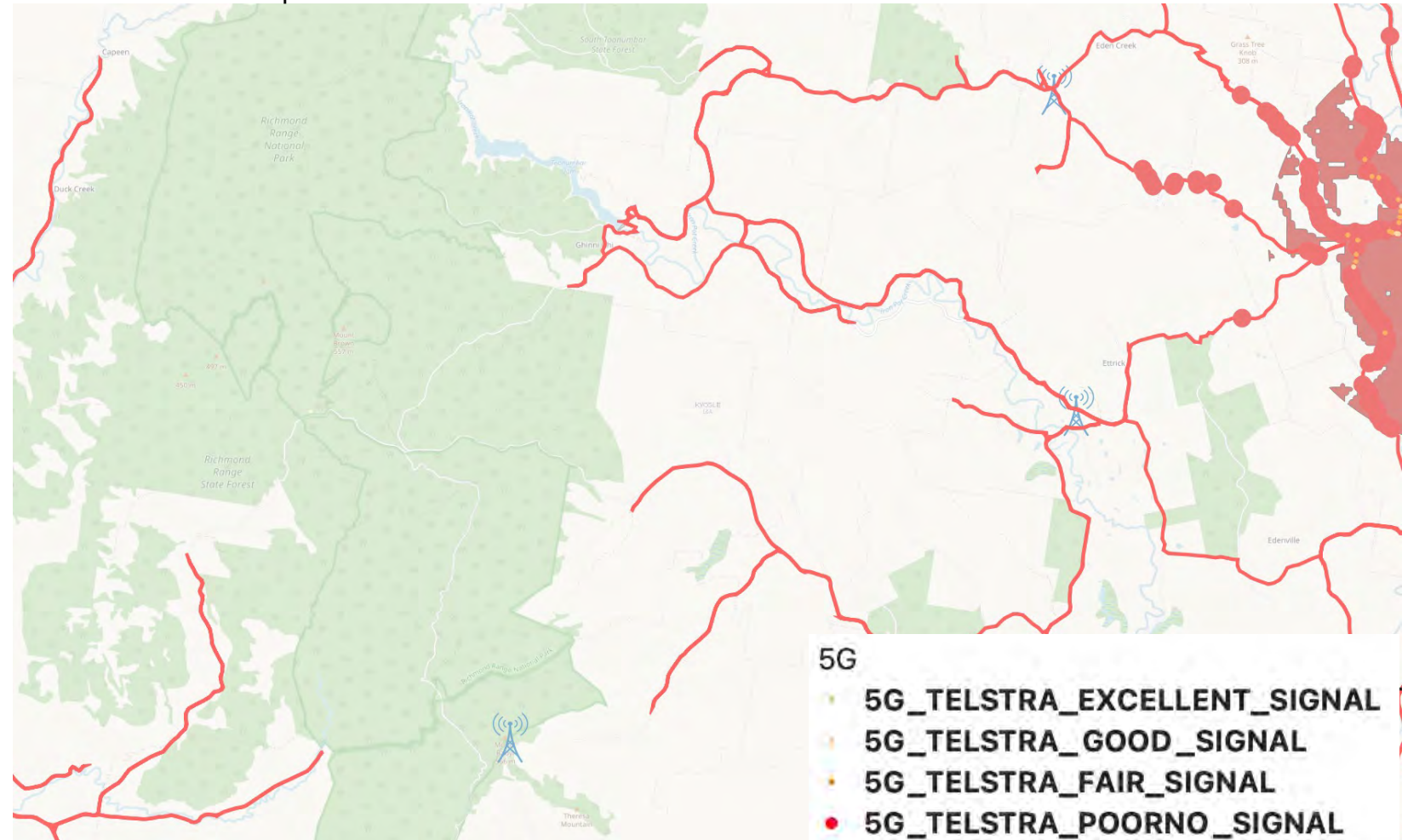
Kyogle Shire Analysis

Afterlee Road / Peacock Creek Road



Assessment - No current Telstra 5G coverage

Action – Telstra – Upgrade 1 x Sites to 3.6Ghz 5G & Telstra / Fed Govt – up to 4 new 5G Tower sites required

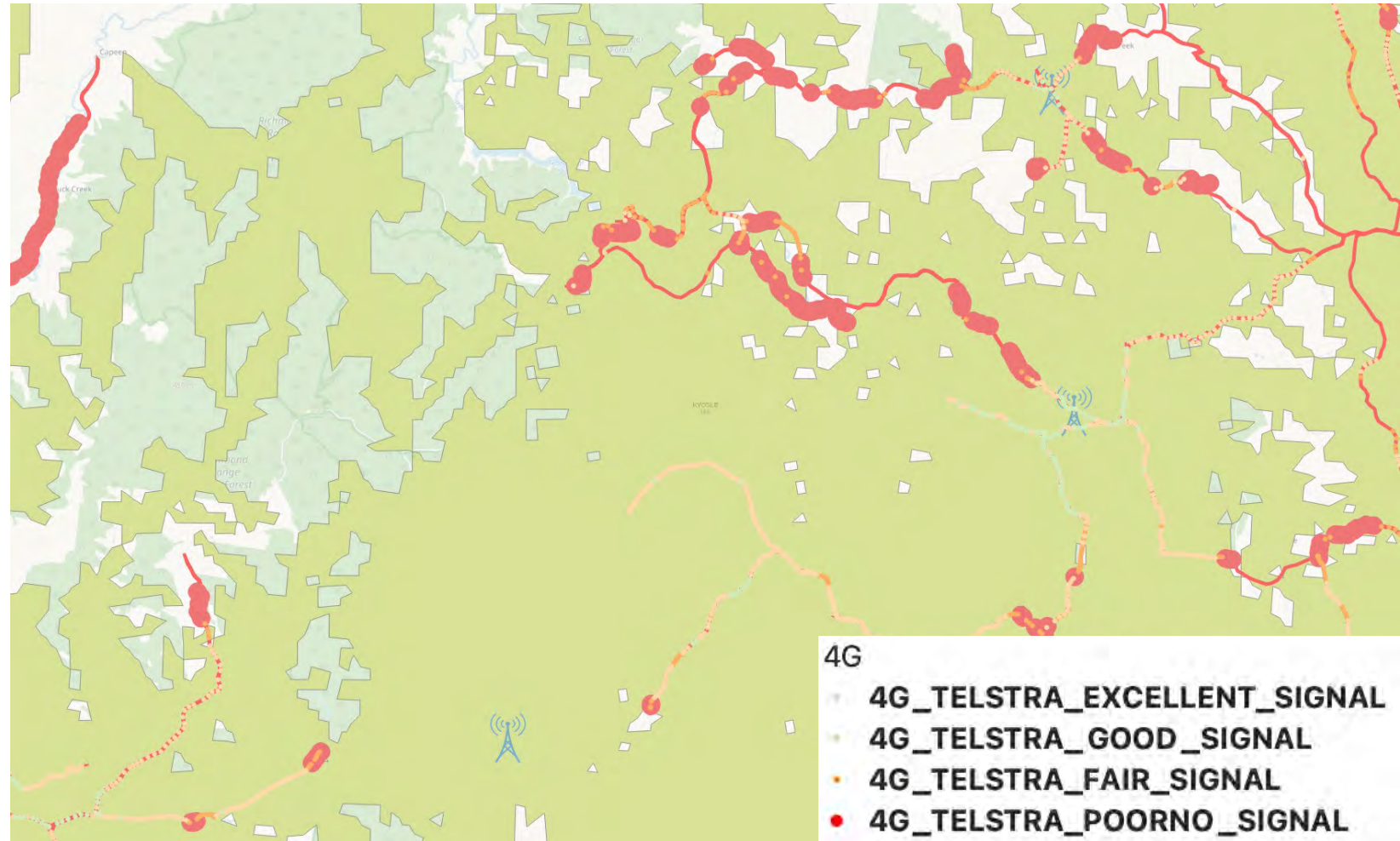
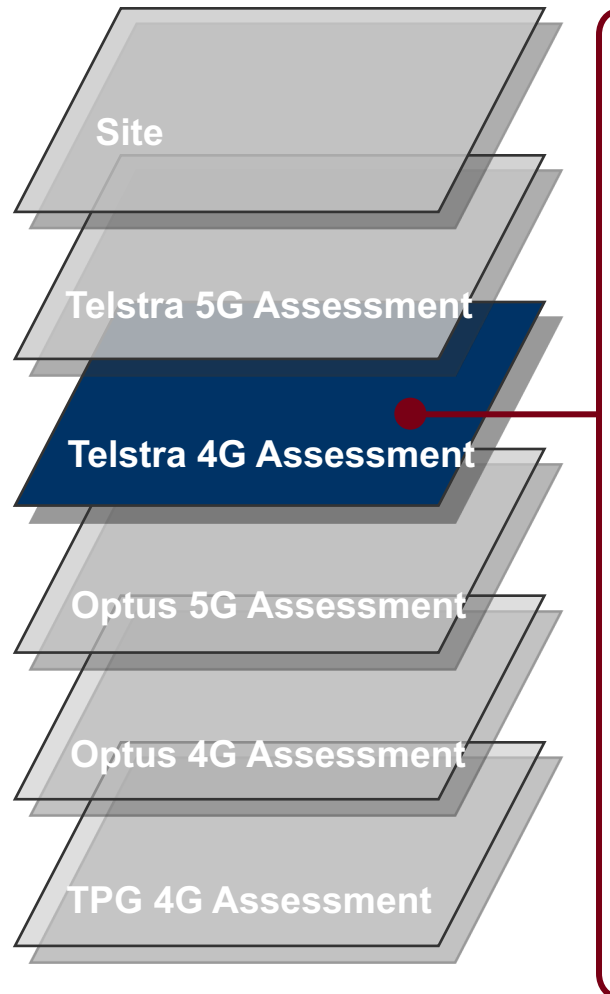


Kyogle Shire Analysis

Afterlee Road / Peacock Creek Road

Assessment – Broad Telstra 4G Blackspots on Afterlee Road

Action – Telstra / Fed Govt – up to 4 new 4G Tower sites required

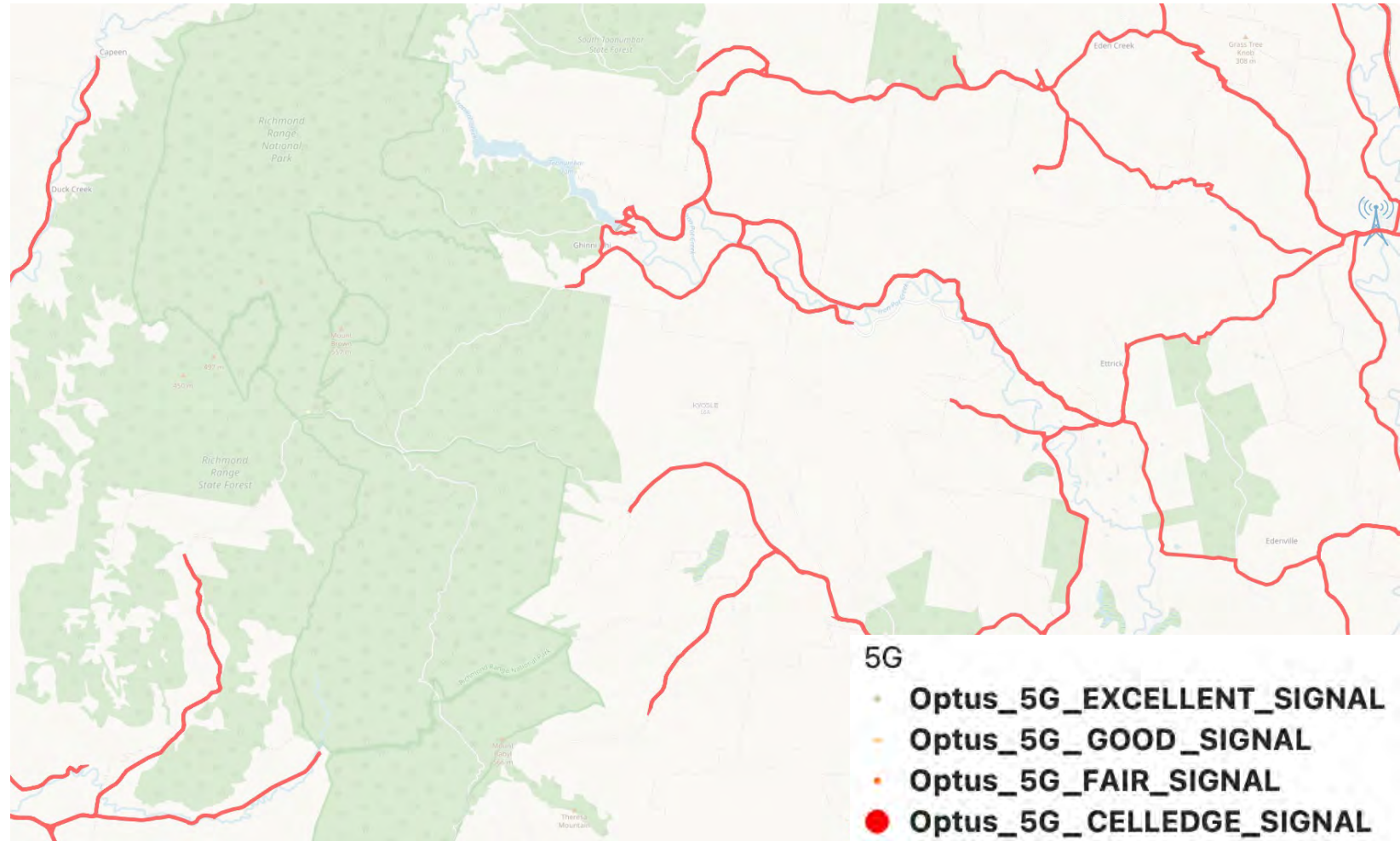
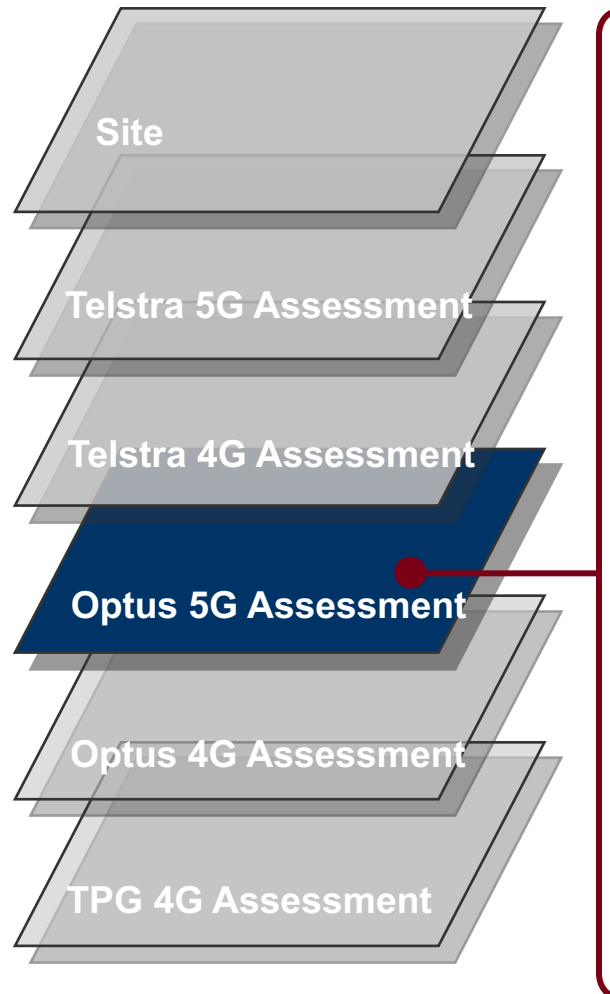


Kyogle Shire Analysis

Afterlee Road / Peacock Creek Road

Assessment - No current Optus 5G coverage

Action – Optus / Fed Govt – up to 4 new 5G Tower sites required

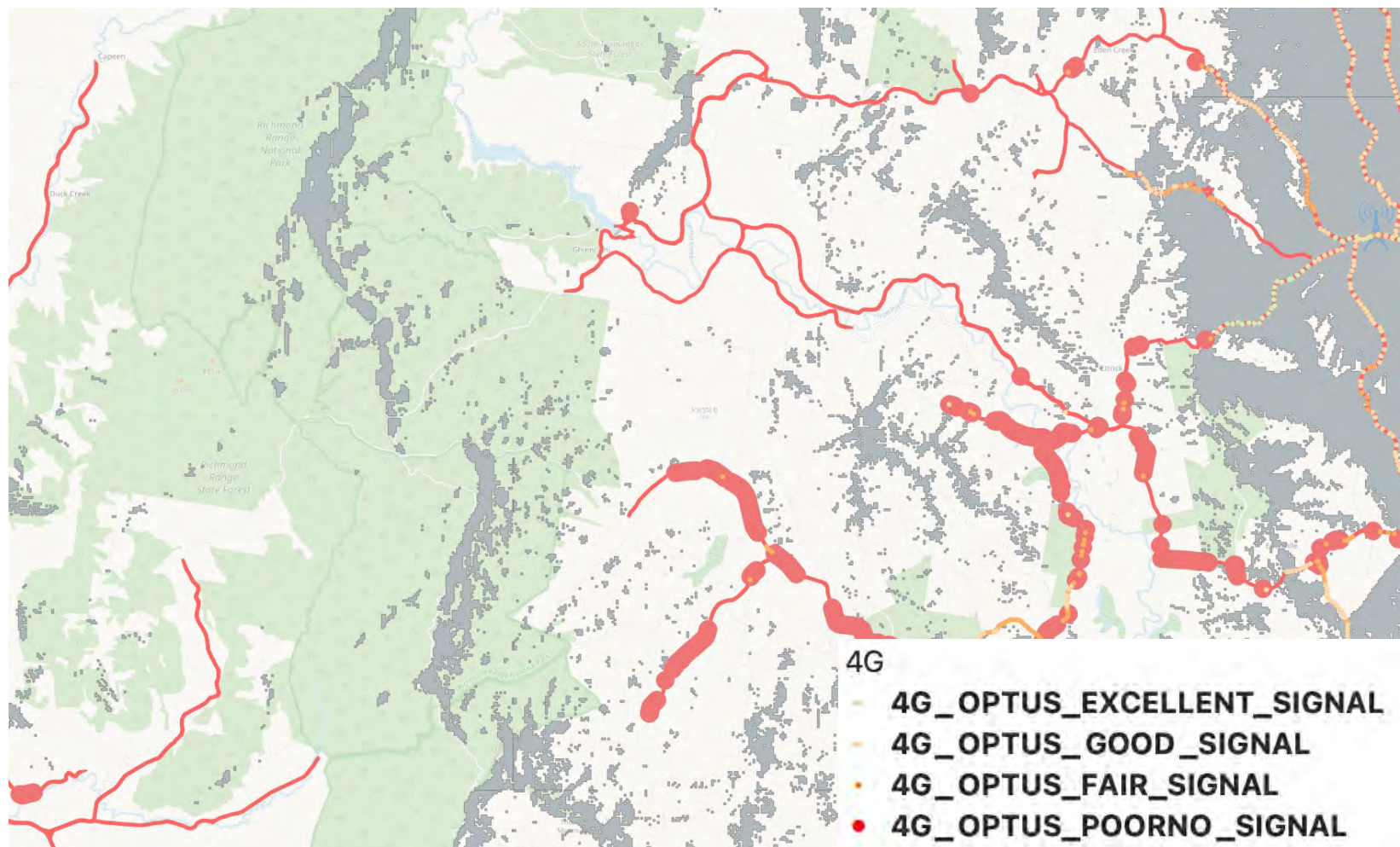
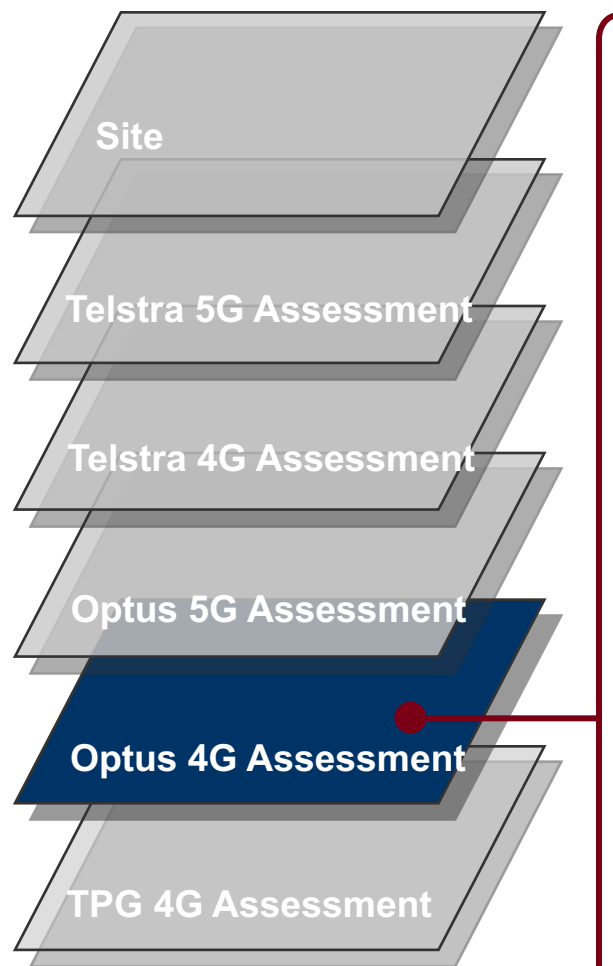


Kyogle Shire Analysis

Afterlee Road / Peacock Creek Road

Assessment - No current Optus 4G coverage

Action –Optus / Fed Govt – up to 4 new 4G Tower sites required

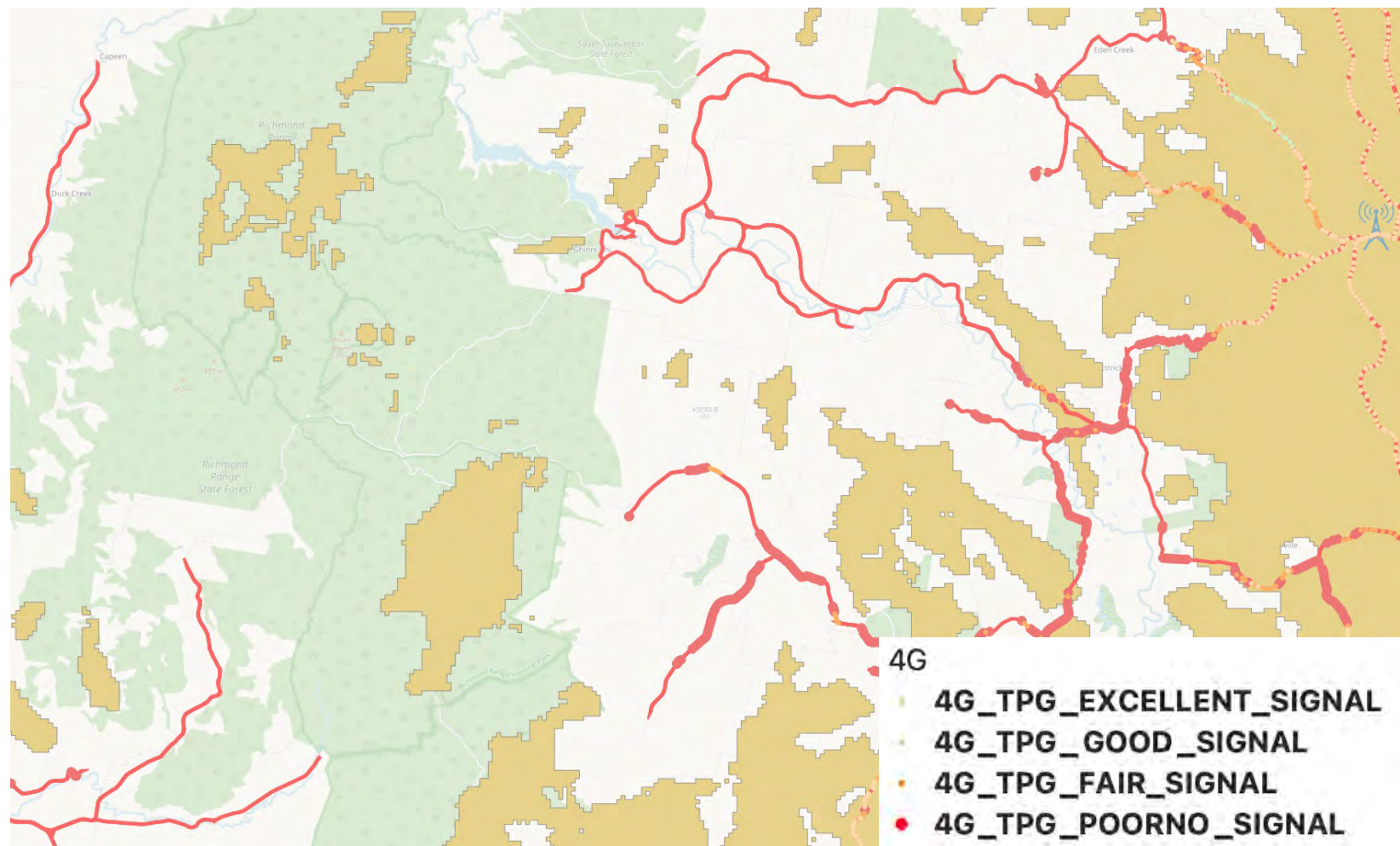
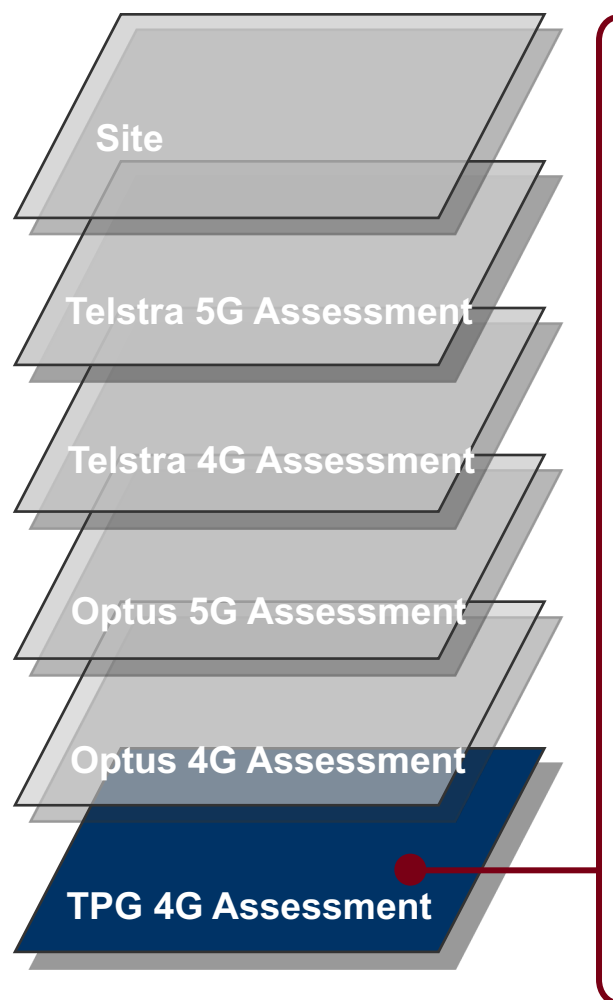


Kyogle Shire Analysis

Afterlee Road / Peacock Creek Road

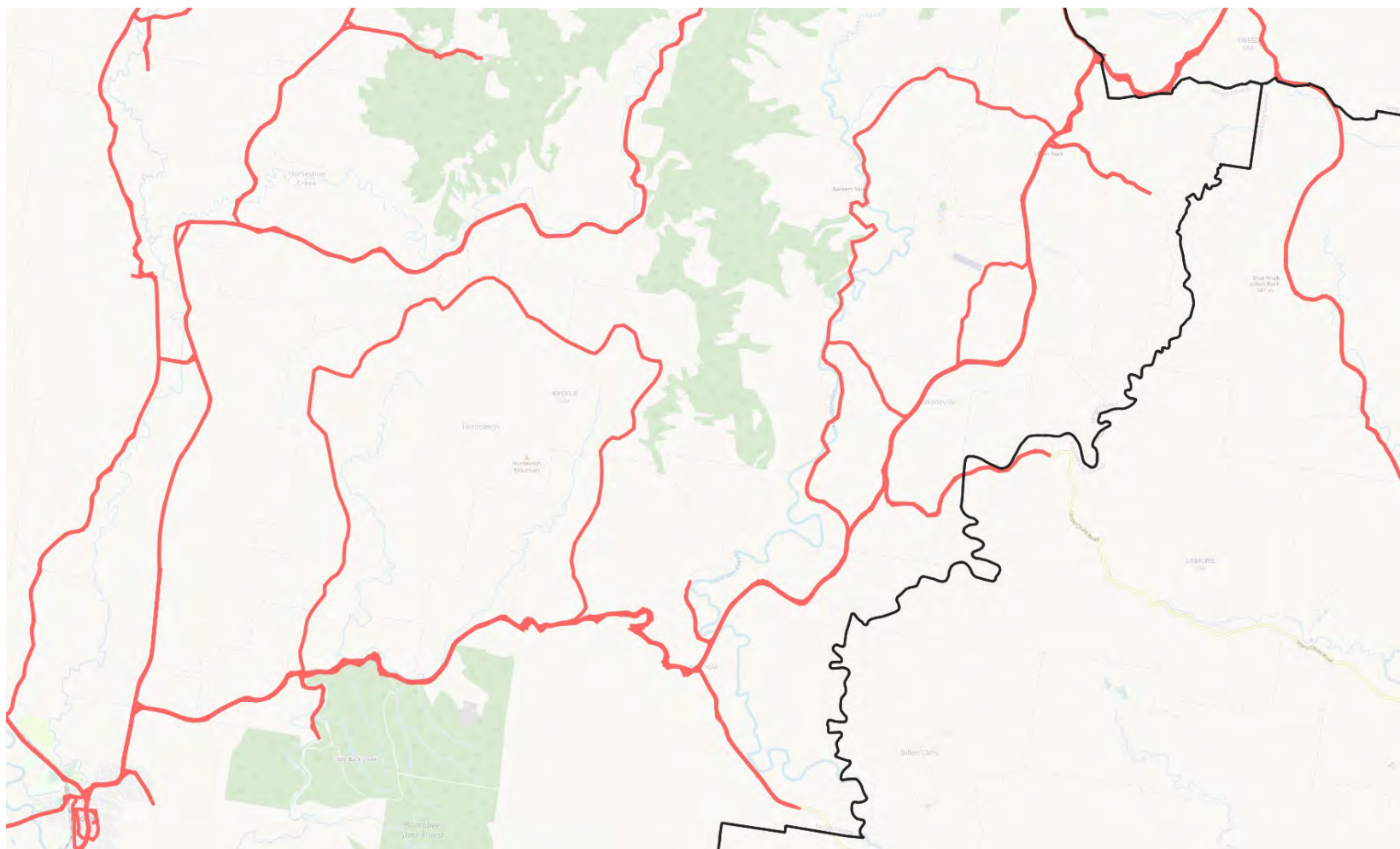
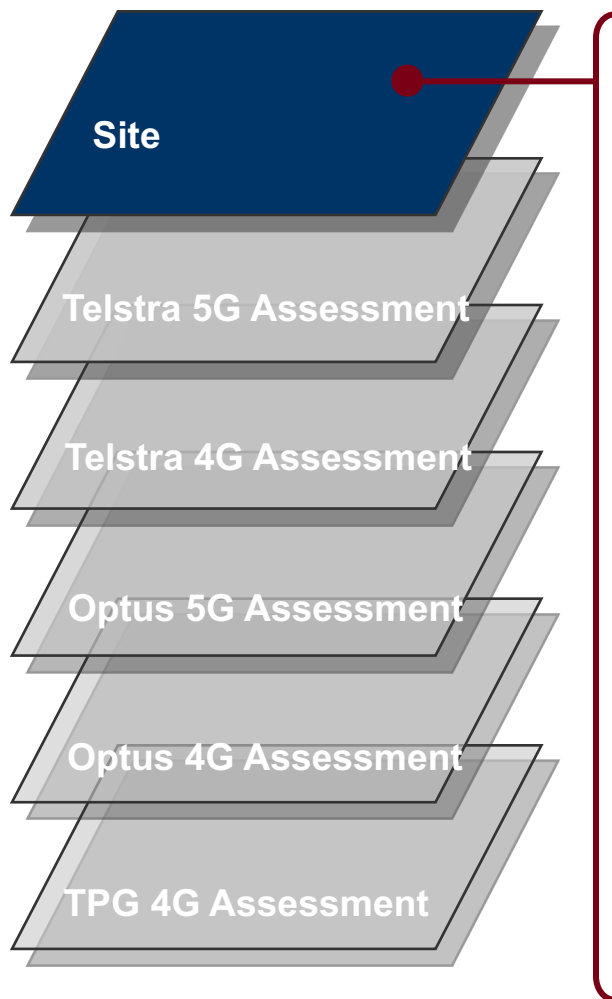
Assessment - No current TPG 4G coverage

Action –TPG / Fed Govt – up to 4 new 4G Tower sites required



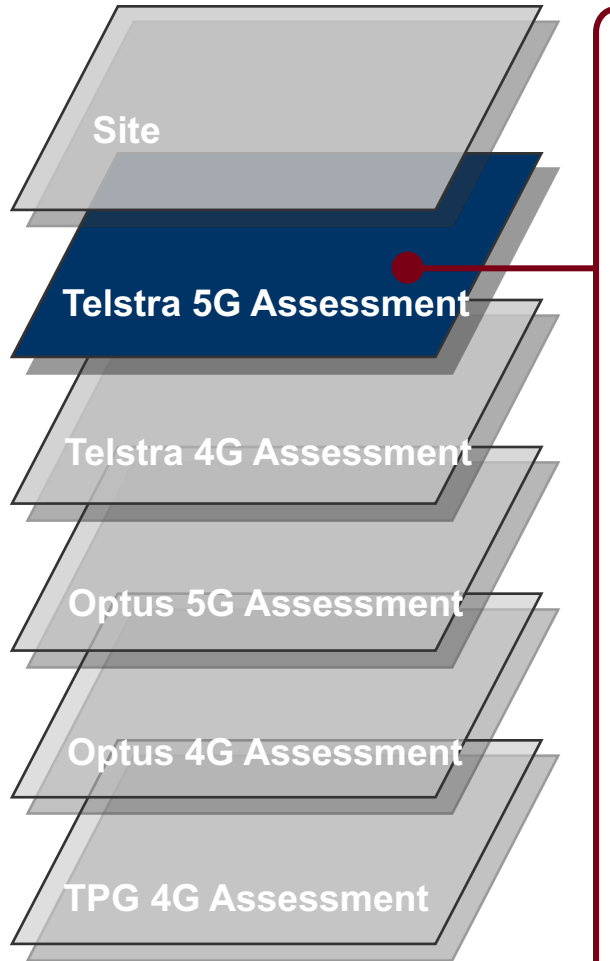
Kyogle Shire Analysis

Kyogle Road



Kyogle Shire Analysis

Kyogle Road



Assessment – Limited Telstra 5G coverage near Kyogle only – no other current 5G coverage

Action – Telstra – upgrade 1 x Telstra Tower Site to 3.6Ghz & 5G Telstra / Fed Govt – up to 3 new 5G Tower sites required with initial priority for Cawongla

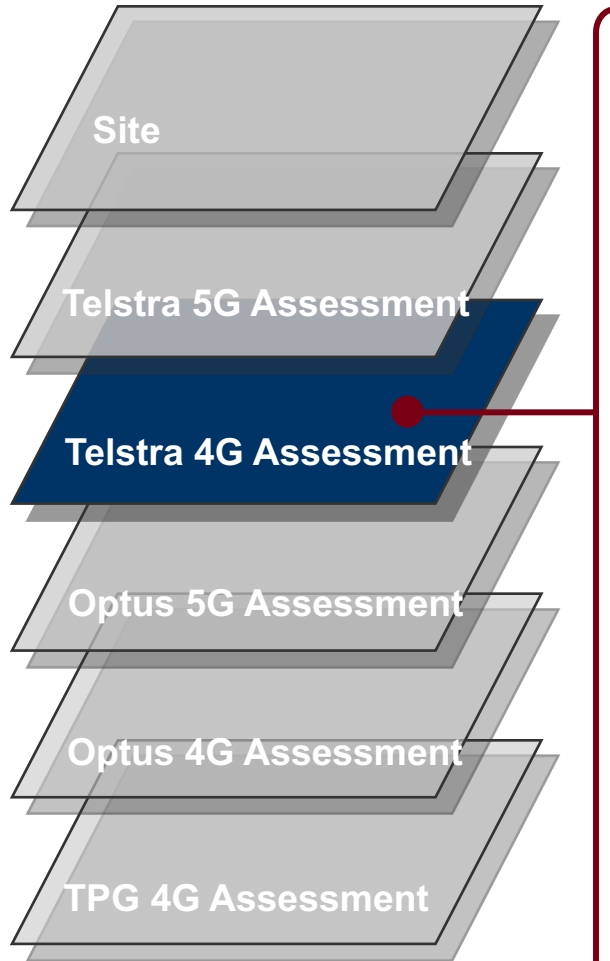
5G

- 5G_TELSTRA_EXCELLENT_SIGNAL
- 5G_TELSTRA_GOOD_SIGNAL
- 5G_TELSTRA_FAIR_SIGNAL
- 5G_TELSTRA_POORNO_SIGNAL



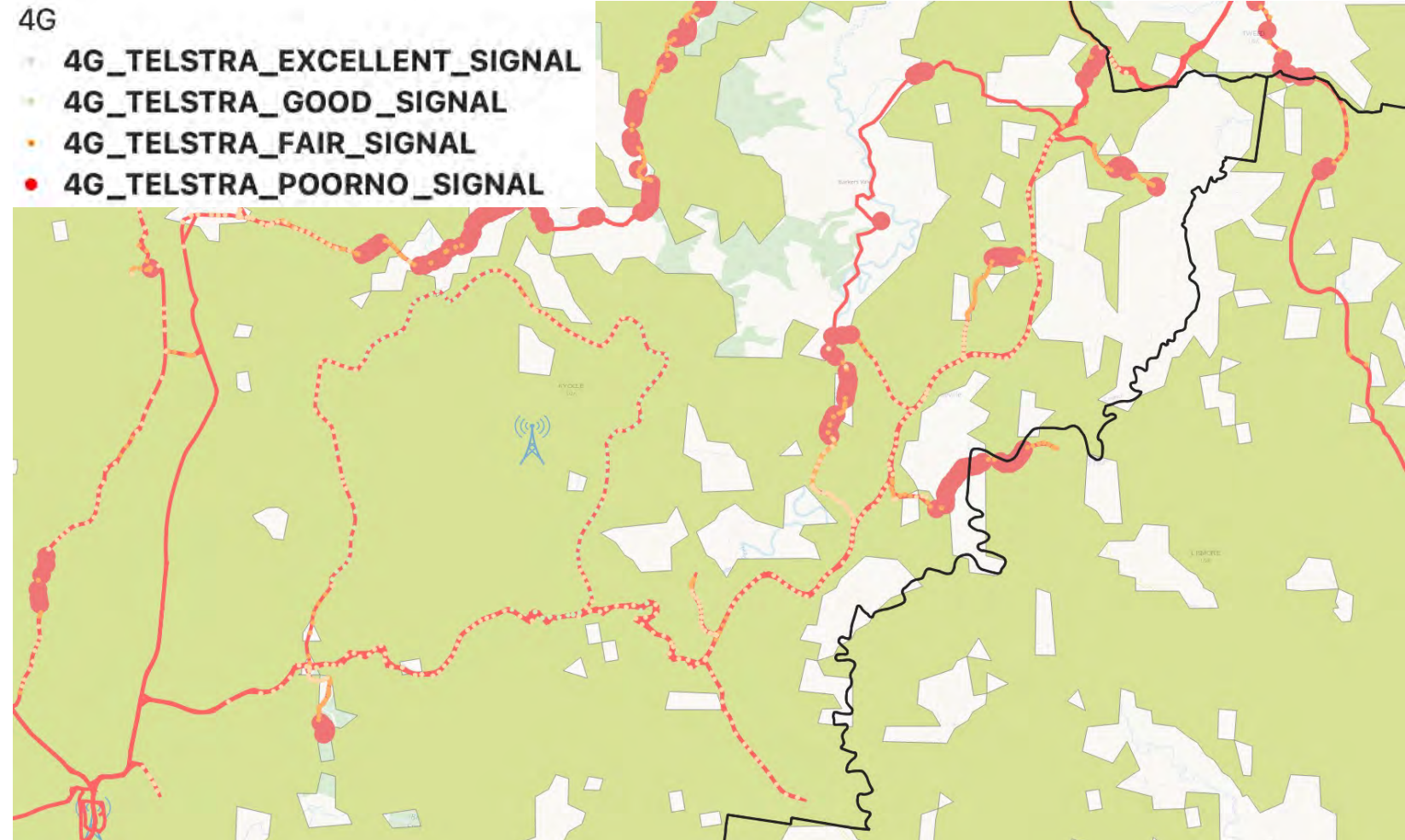
Kyogle Shire Analysis

Kyogle Road



Assessment – 4G blackspots near Shire boundary

Action – Telstra / Fed Govt – up to 2 new 4G Tower sites required for additional coverage and capacity



Kyogle Road

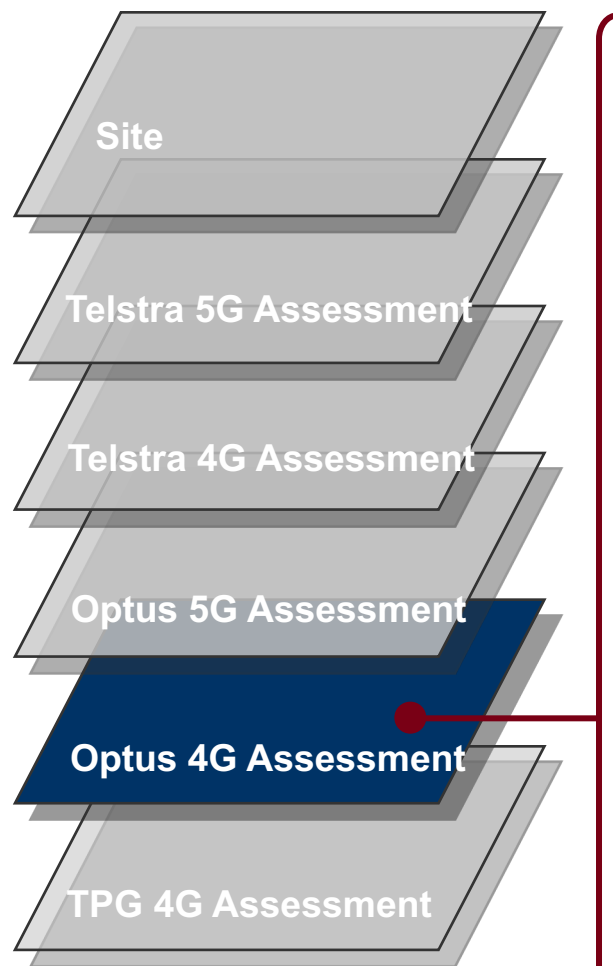


5G

-

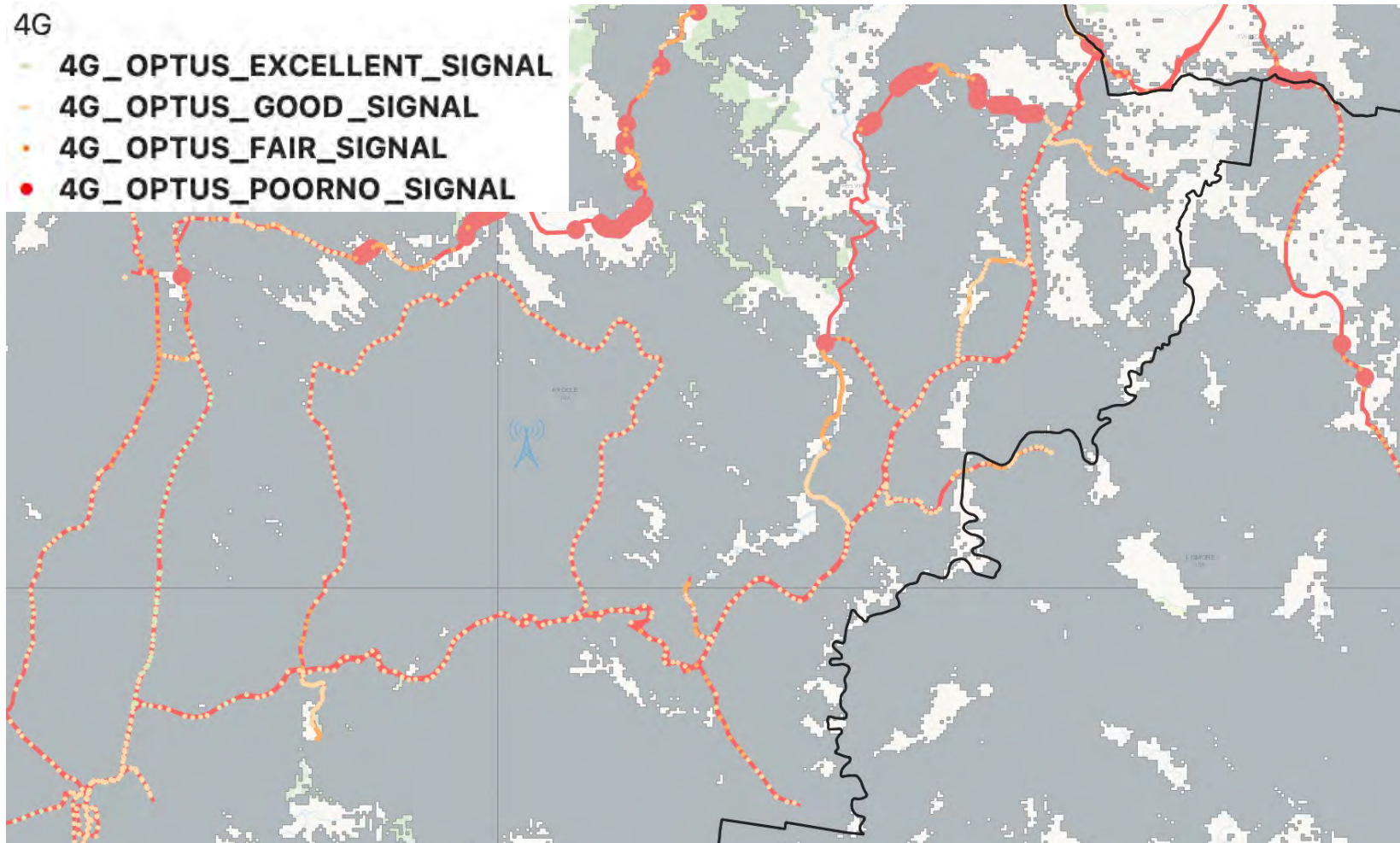
Kyogle Shire Analysis

Kyogle Road



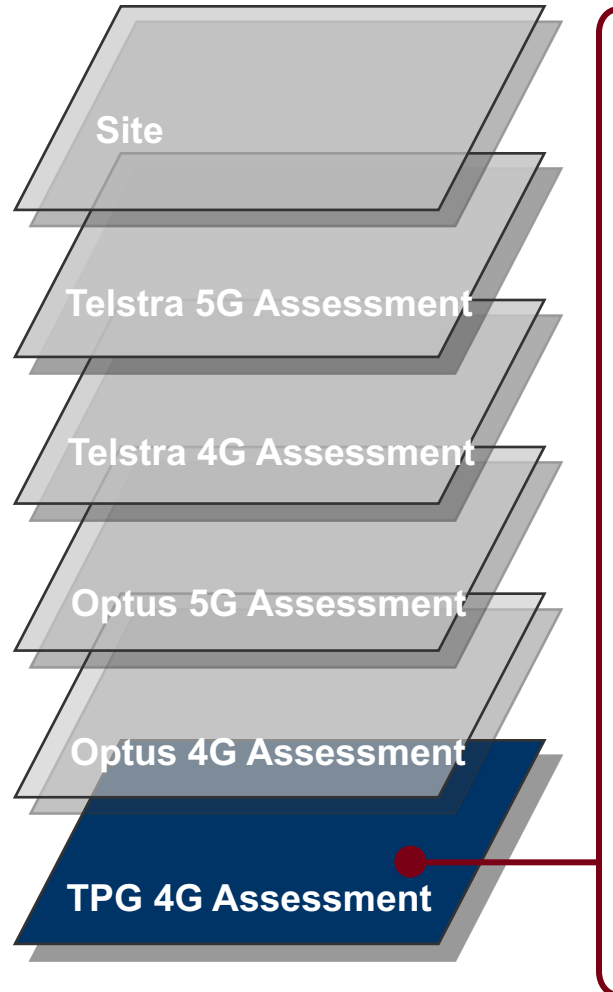
Assessment – 4G blackspots near Shire boundary

Action – Optus / Fed Govt (MBSP) – up to 2 new 4G Tower sites required for additional coverage and capacity



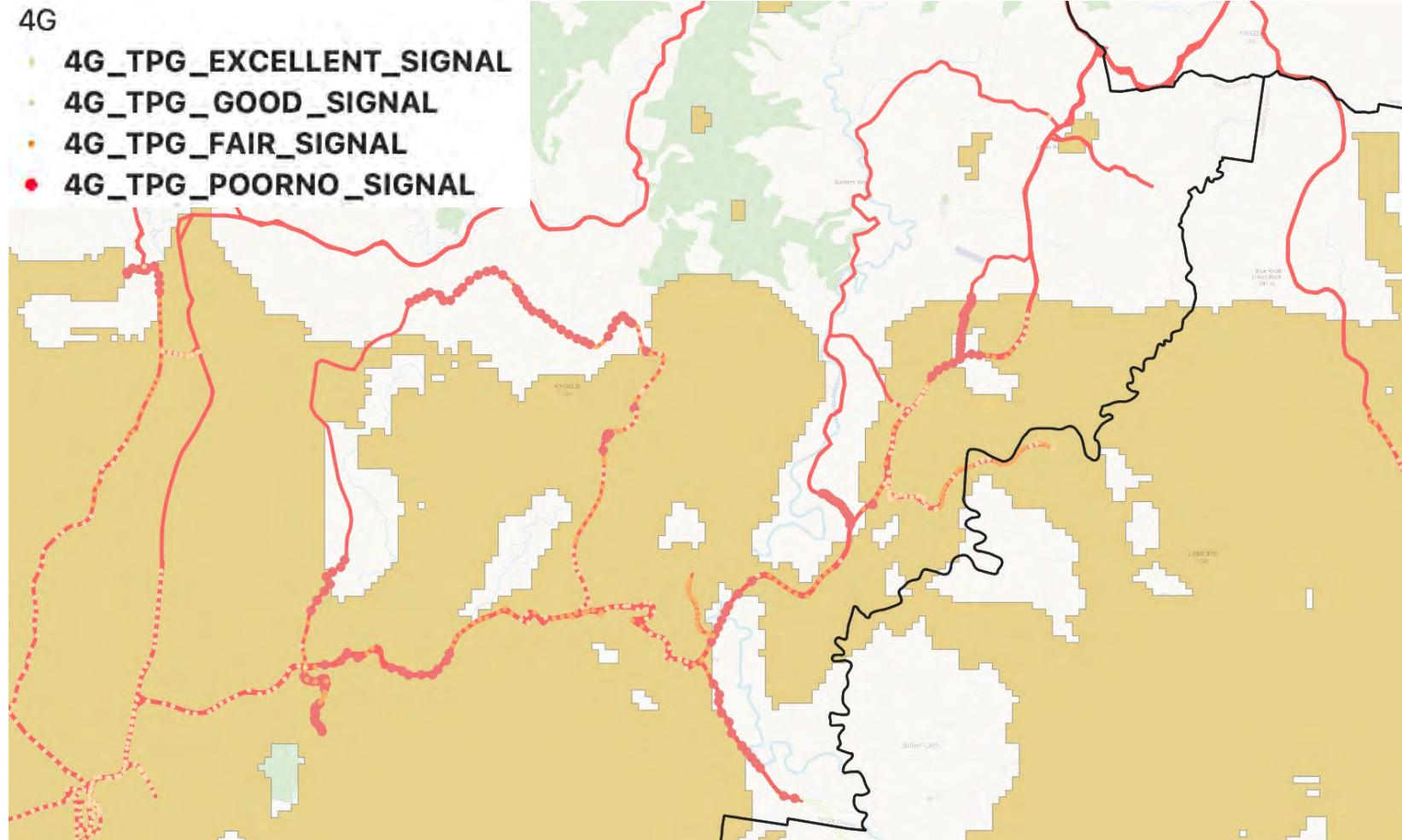
Kyogle Shire Analysis

Kyogle Road



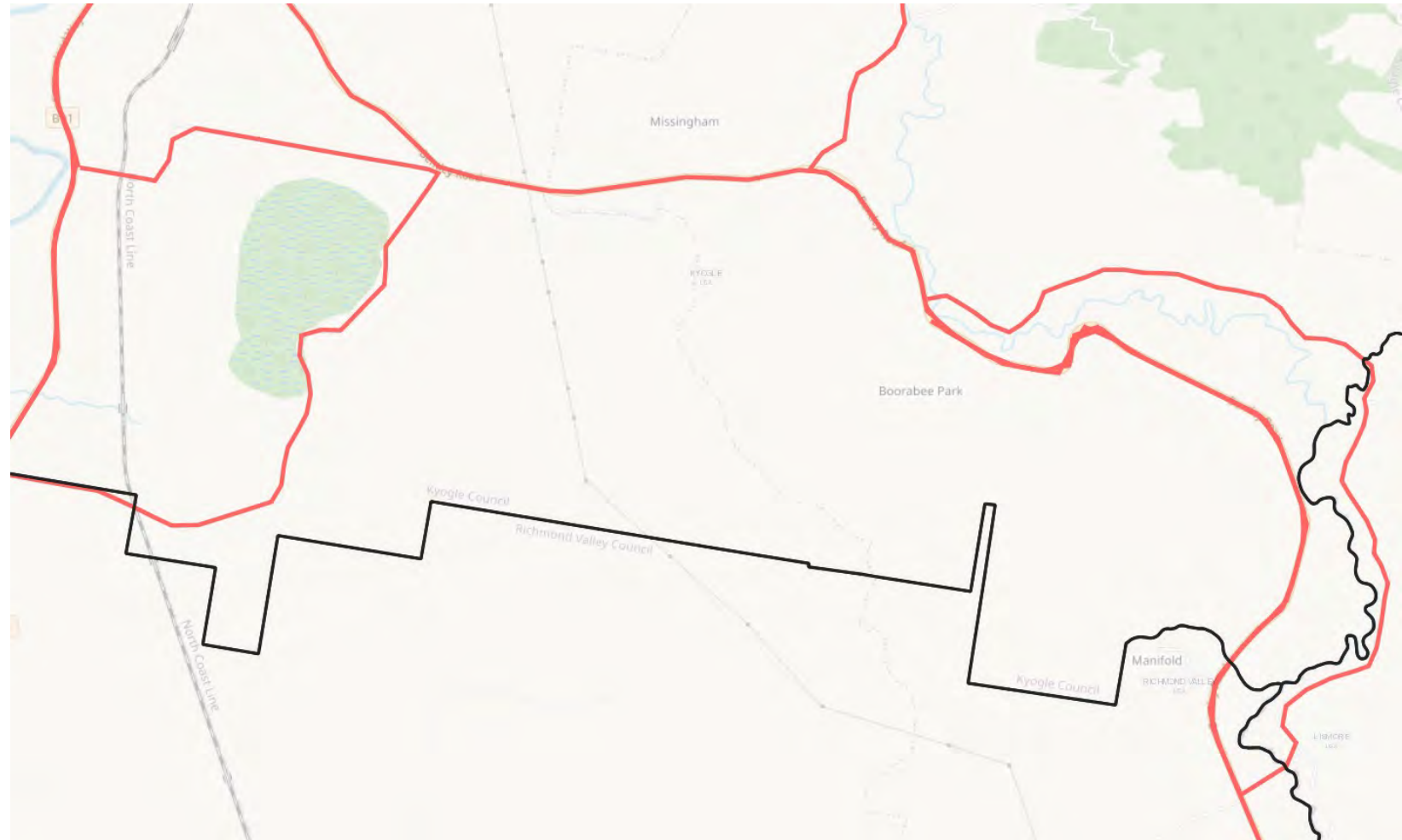
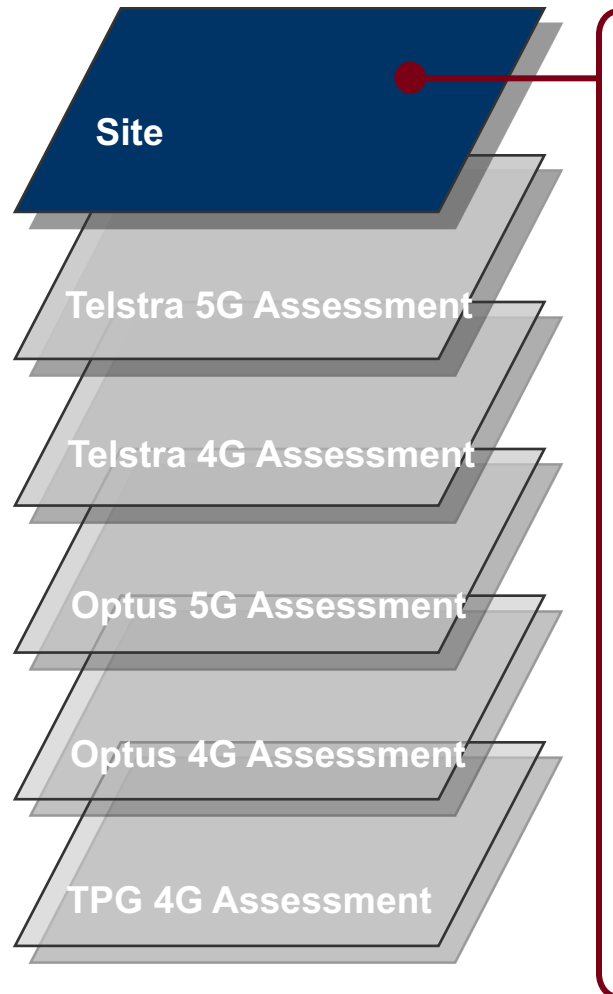
Assessment – Broad 4G blackspot areas

Action – TPG / Fed Govt (MBSP) – up to 4 new 4G Tower sites required for additional coverage and capacity



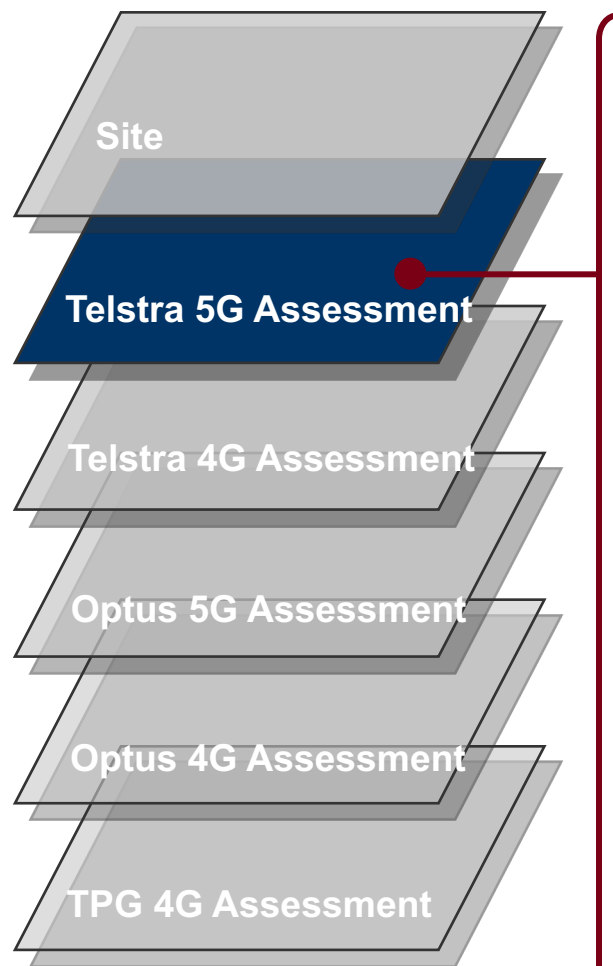
Kyogle Shire Analysis

Bentley Road



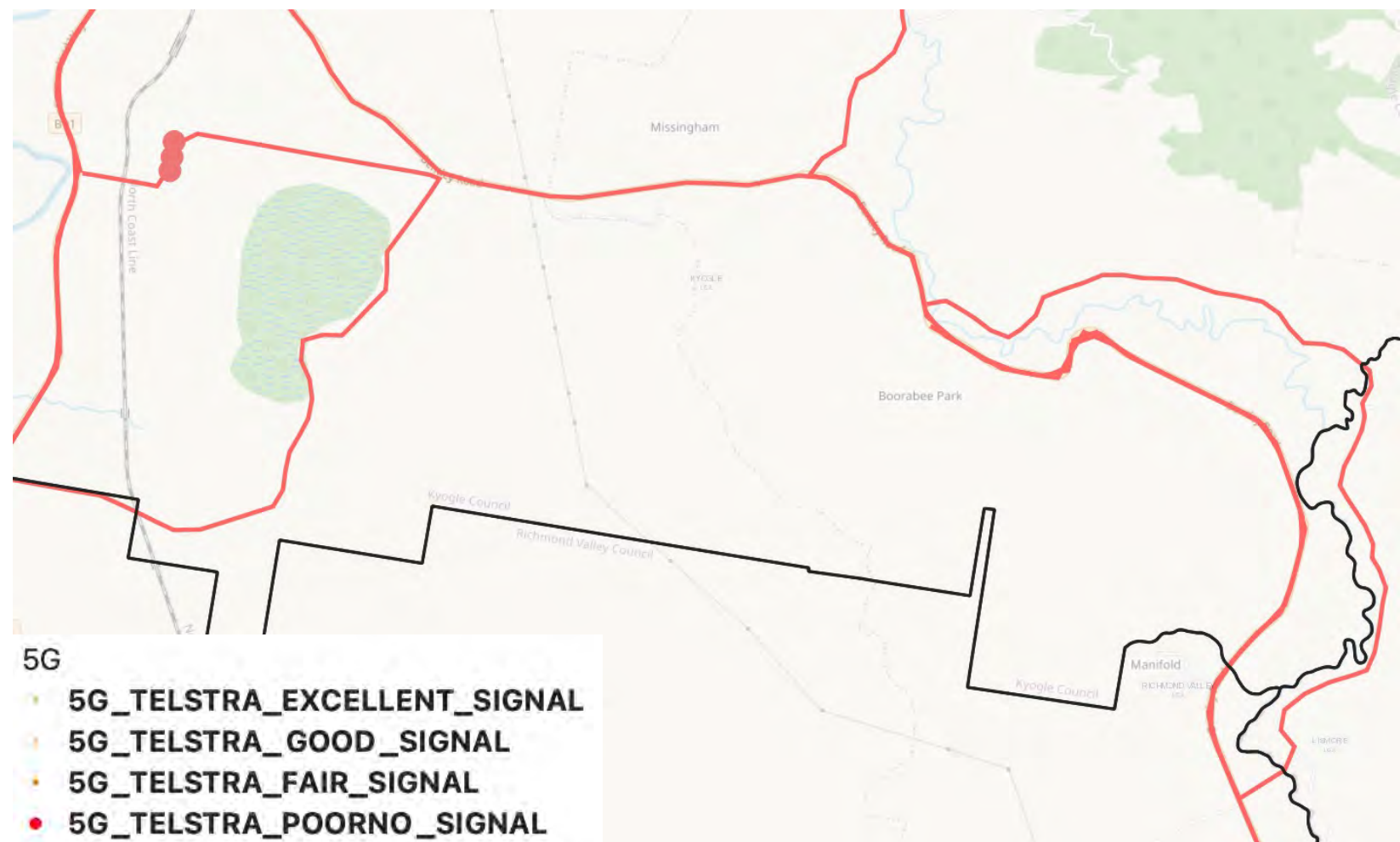
Kyogle Shire Analysis

Bentley Road



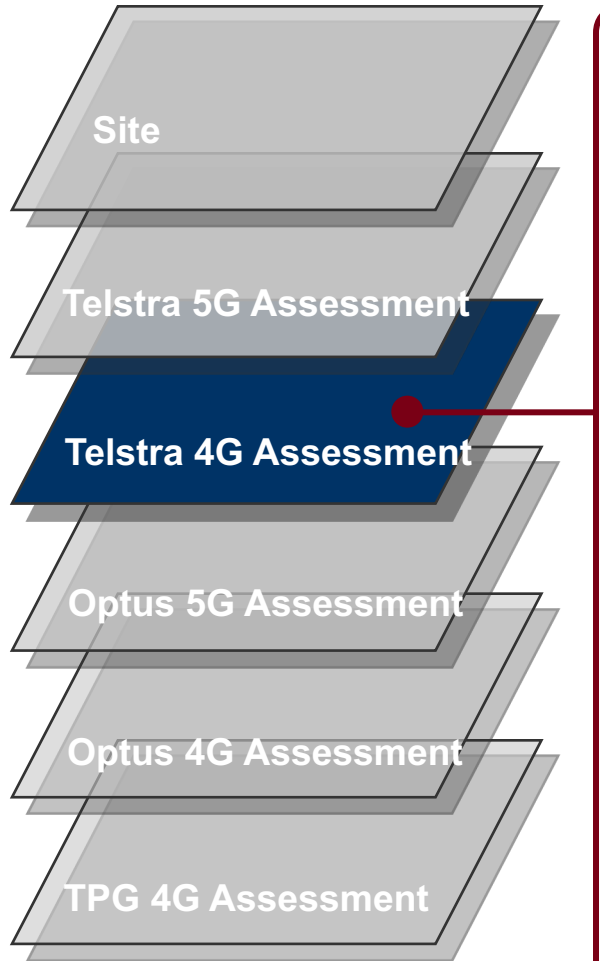
Assessment - No current Telstra 5G coverage

Action –Telstra / Fed Govt (MBSP) – 1 new 5G Tower sites required



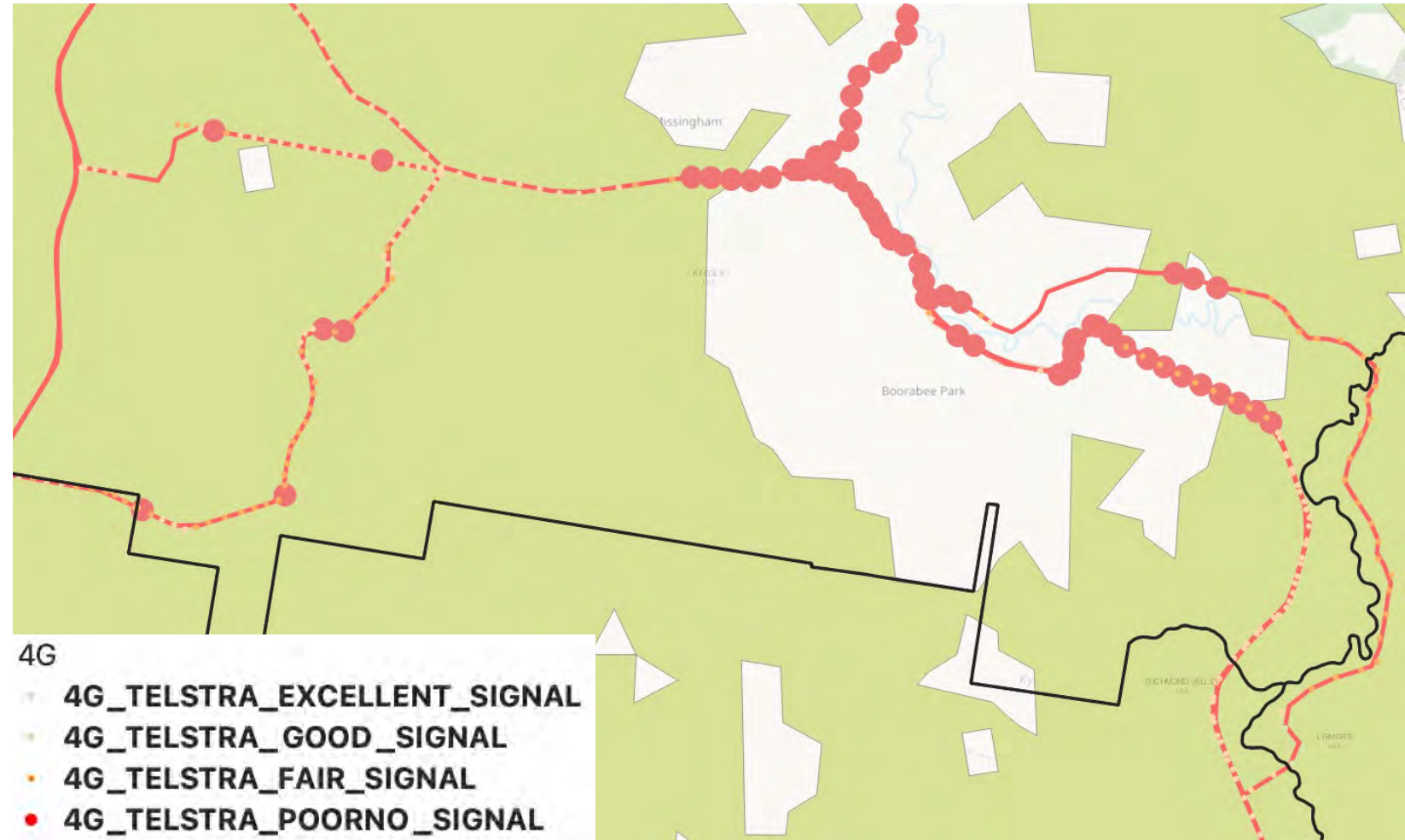
Kyogle Shire Analysis

Bentley Road



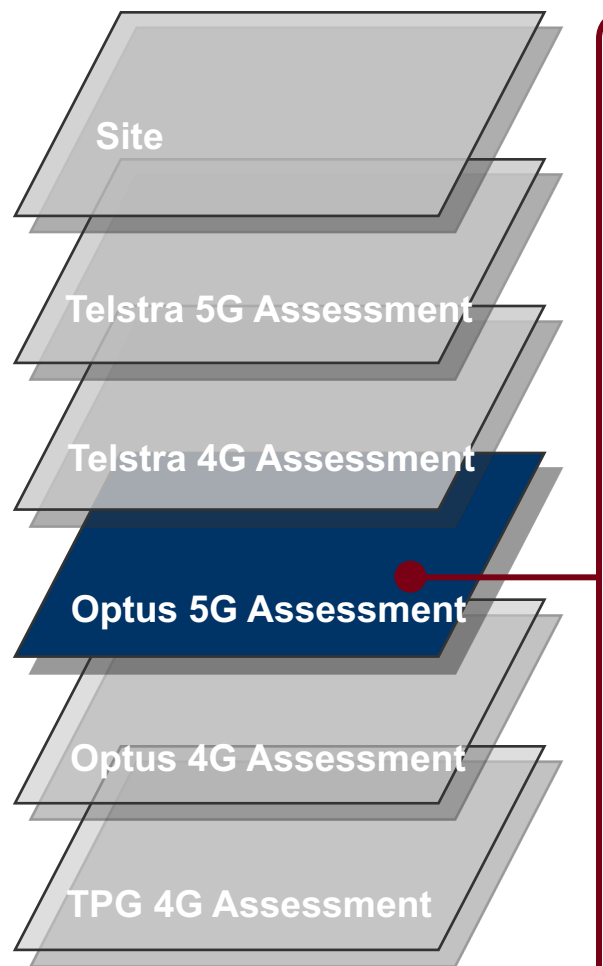
Assessment – Broad 4G blackspot areas

Action – Telstra / Fed Govt (MBSP) – 1 new 4G Tower sites required



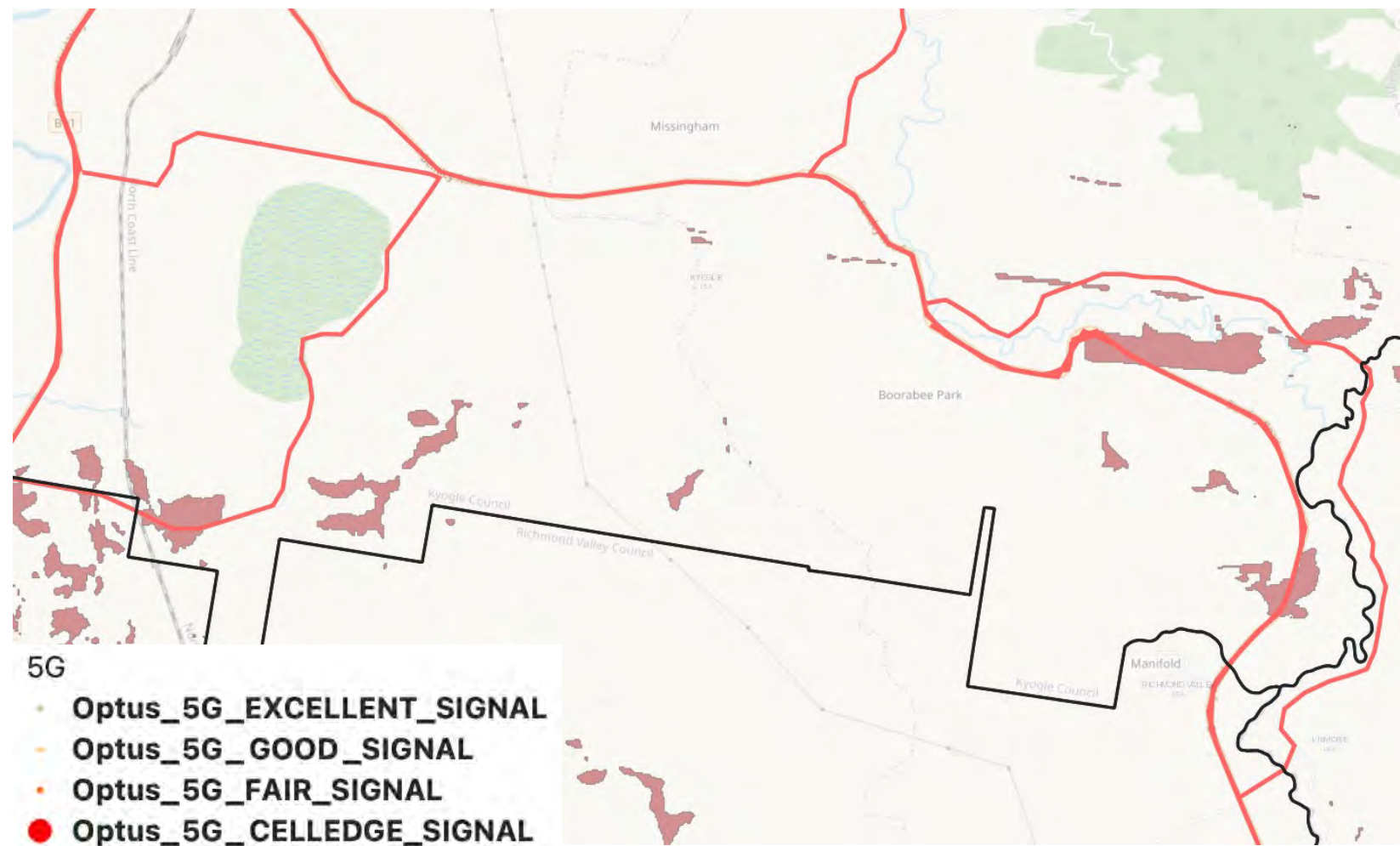
Kyogle Shire Analysis

Bentley Road



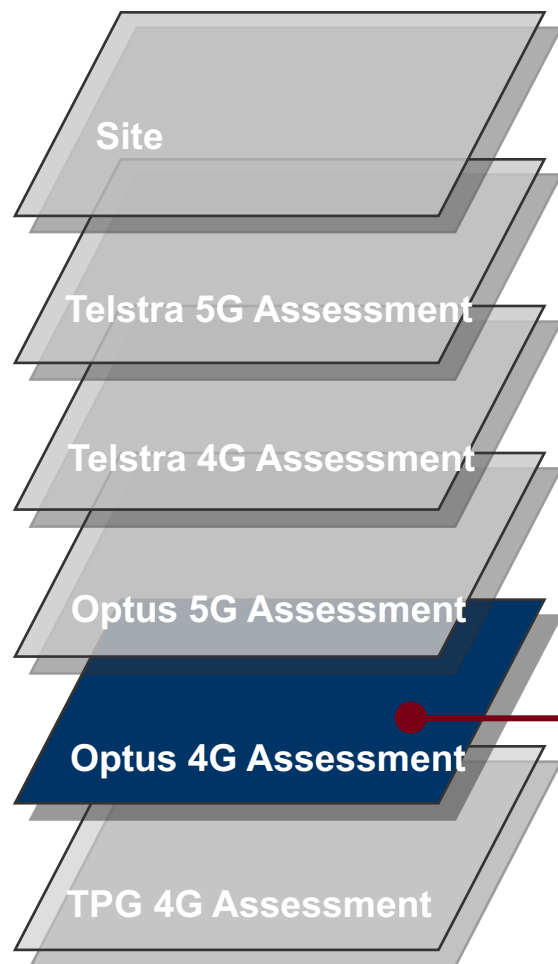
Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt (MBSP) – 1 new 5G Tower site required



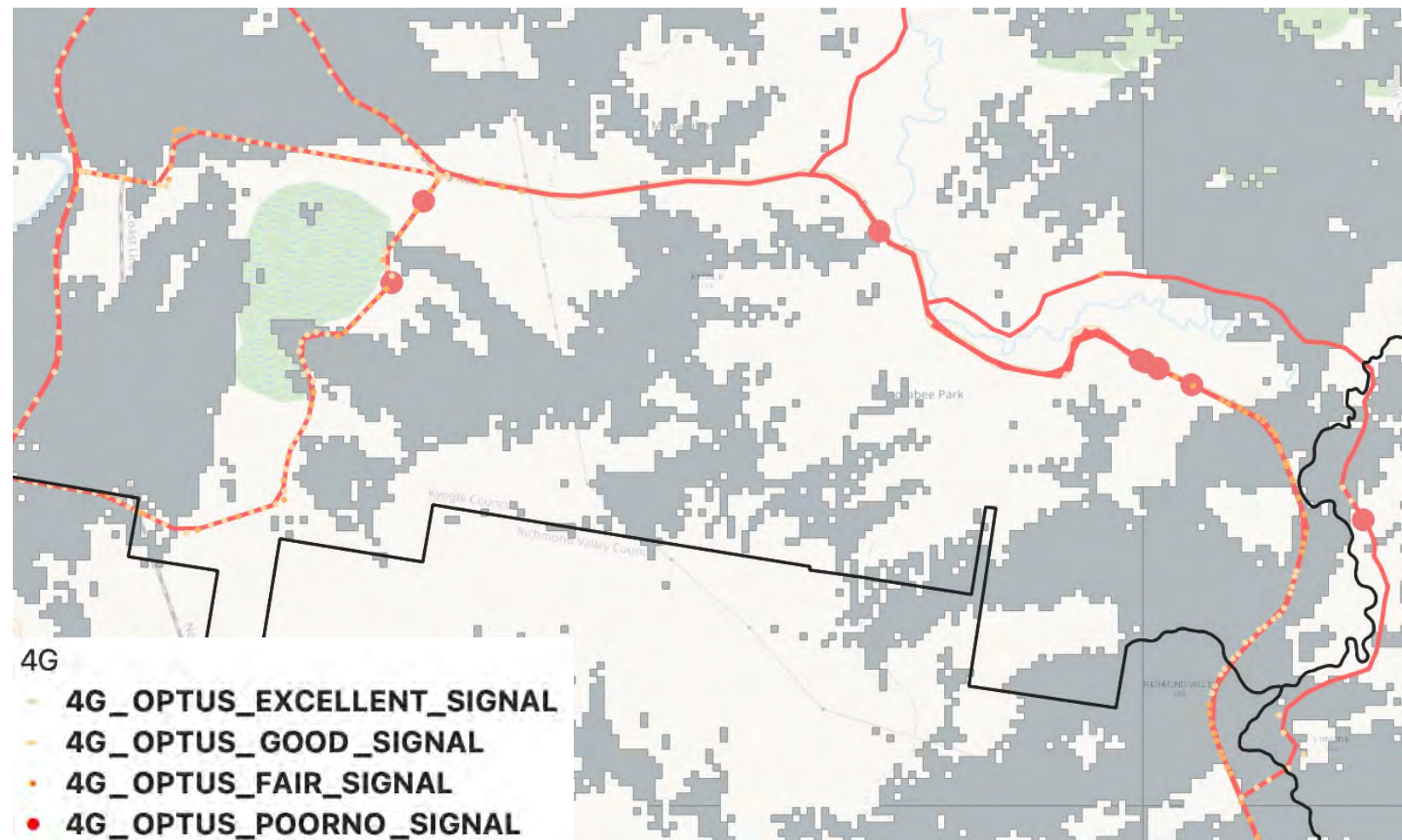
Kyogle Shire Analysis

Bentley Road



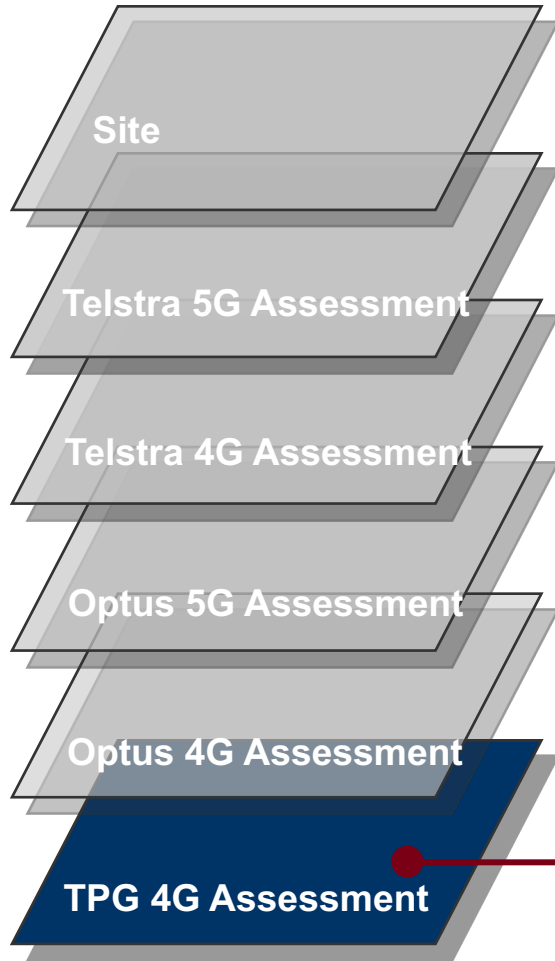
Assessment – Broad 4G blackspot areas

Action – Optus / Fed Govt (MBSP) – 1 new 4G Tower sites required



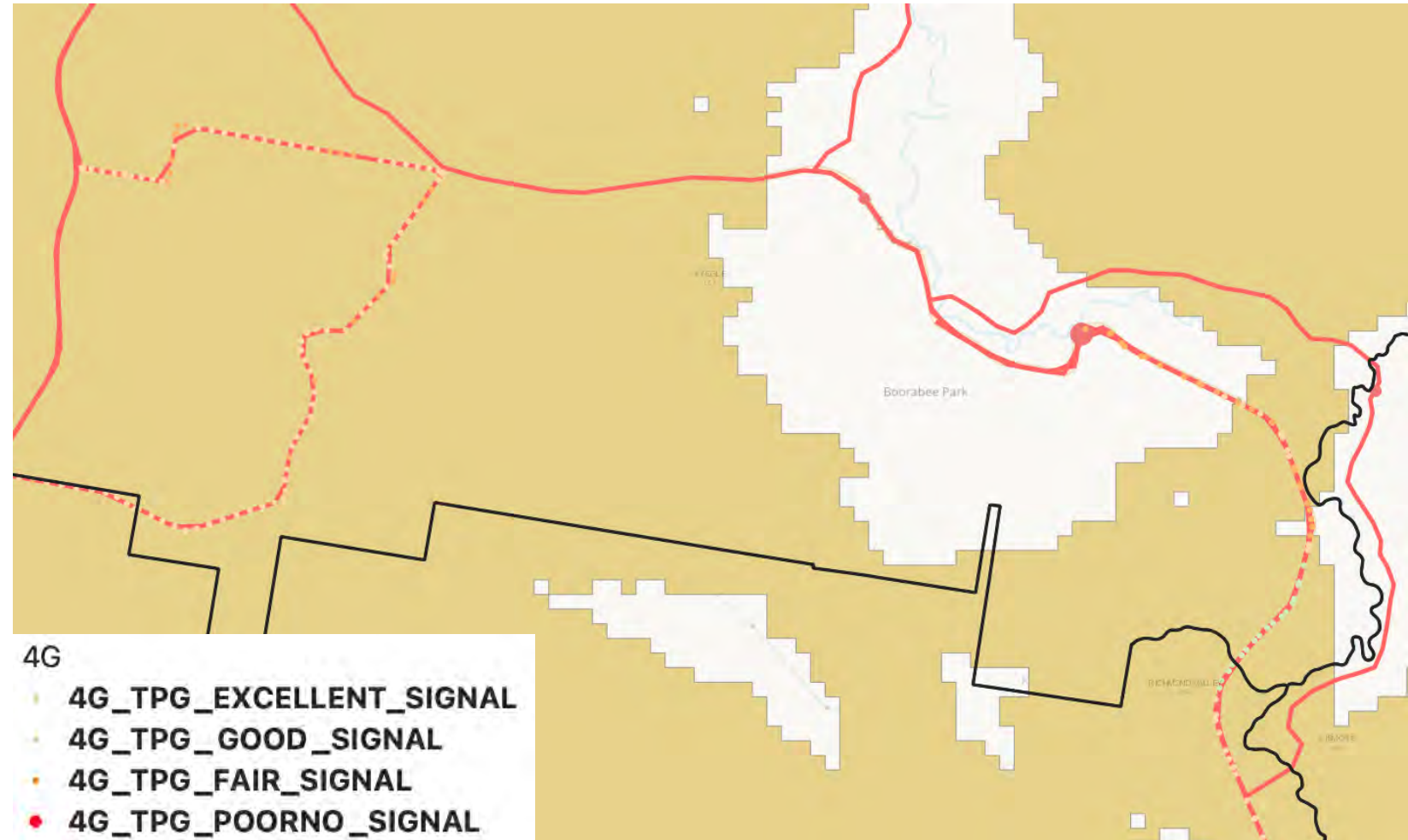
Kyogle Shire Analysis

Bentley Road



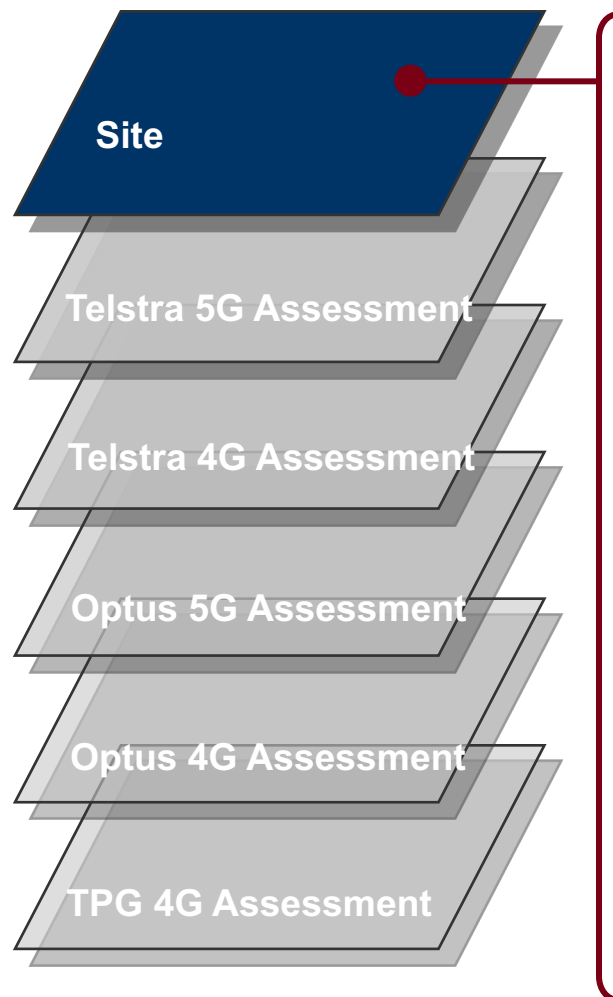
Assessment – Broad 4G blackspot areas

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites required



Kyogle Shire Analysis

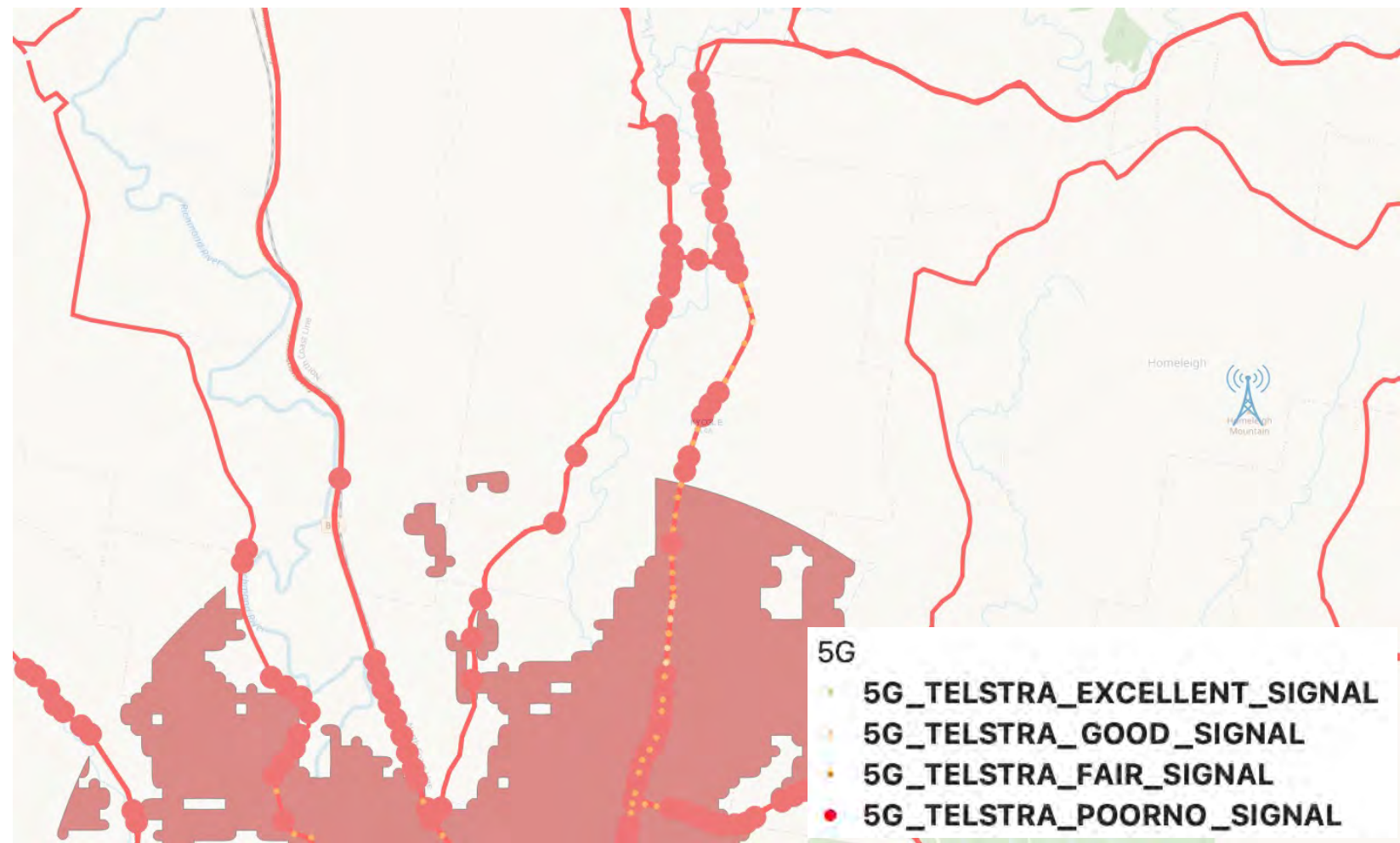
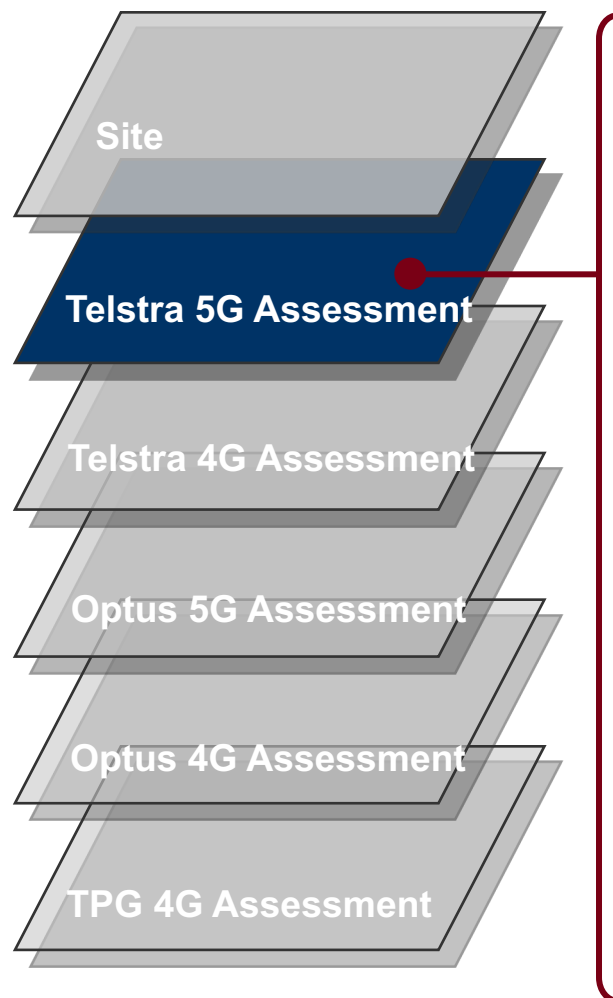
Fawcetts Plain Road



Kyogle Shire Analysis

Fawcetts Plain Road

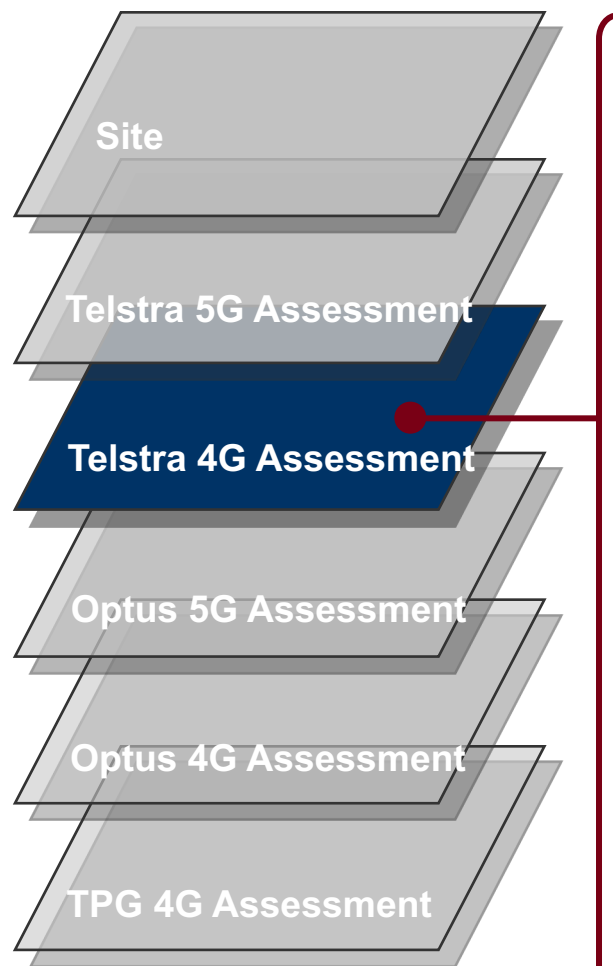
Assessment –Telstra 5G coverage near Kyogle only – no other current 5G coverage



Kyogle Shire Analysis

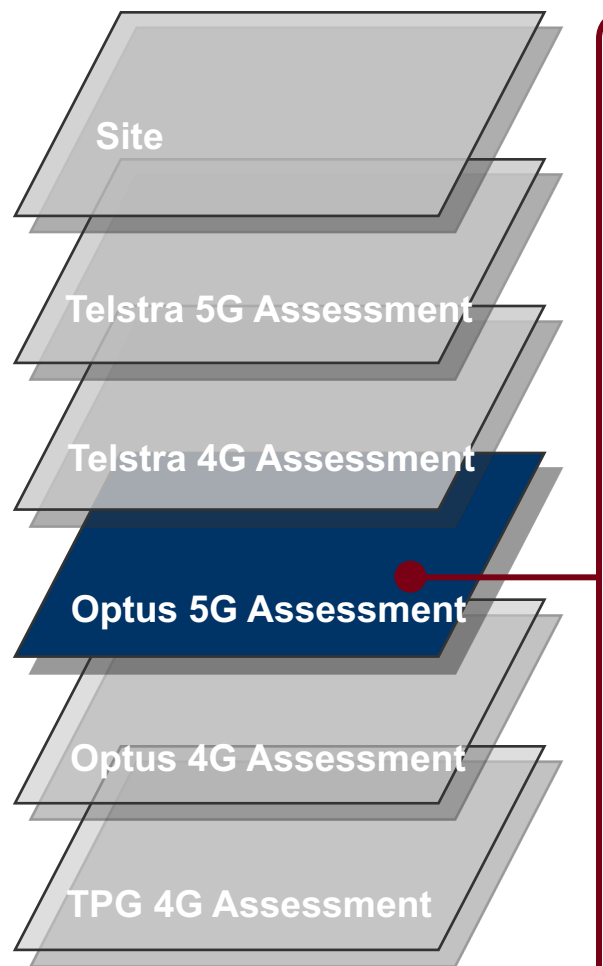
Fawcetts Plain Road

Assessment –Good 4G coverage



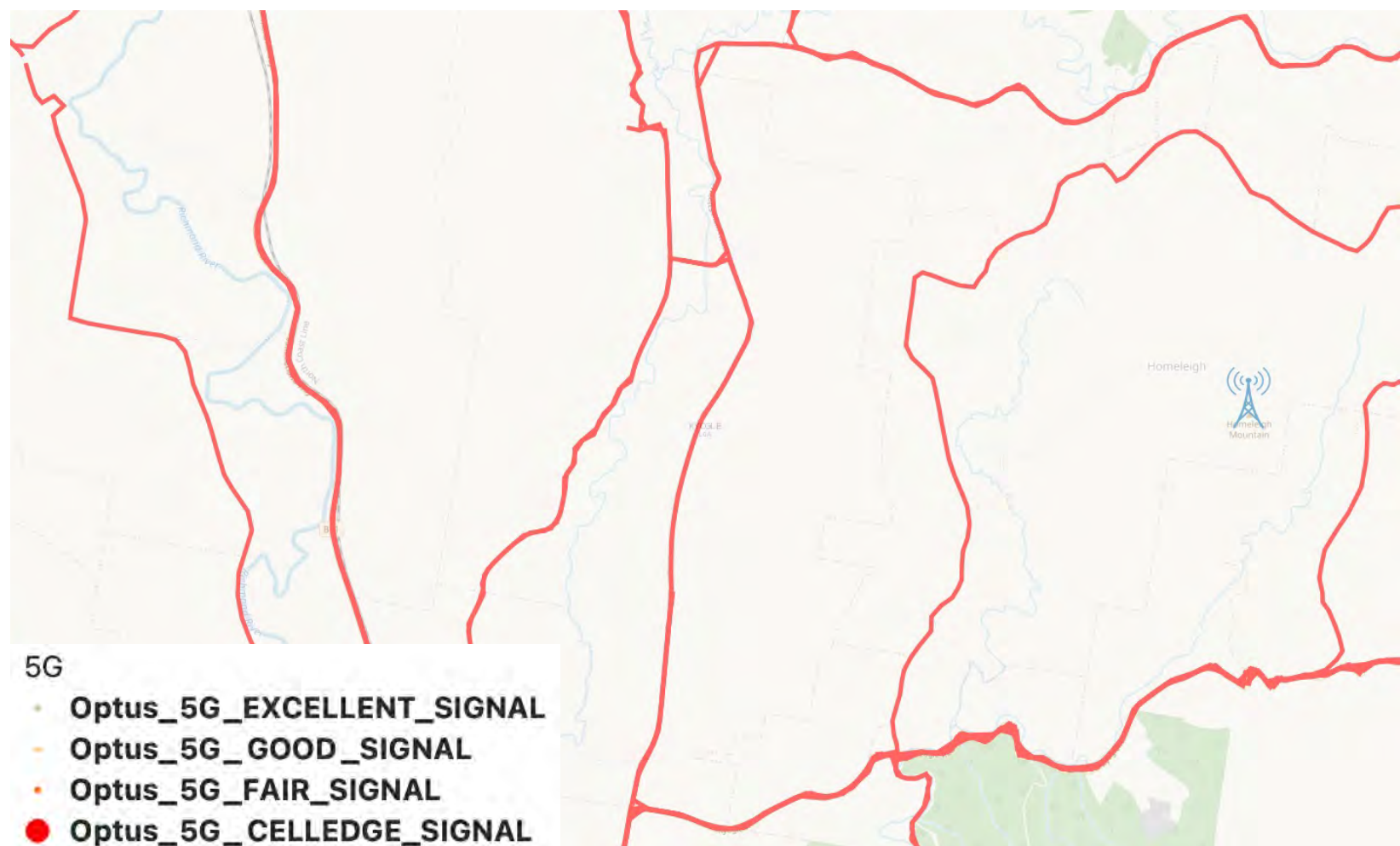
Kyogle Shire Analysis

Fawcetts Plain Road



Assessment - No current Optus 5G coverage

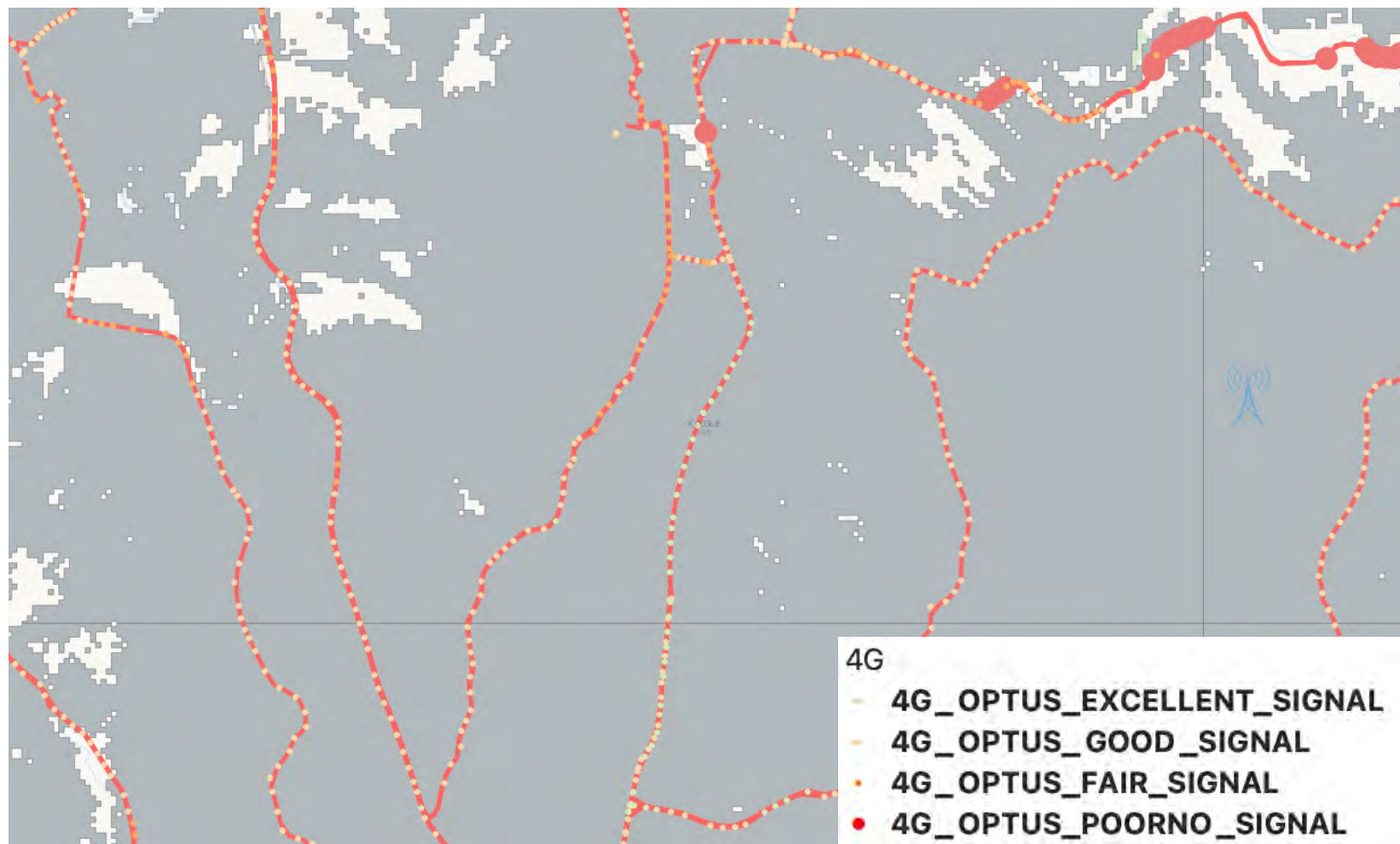
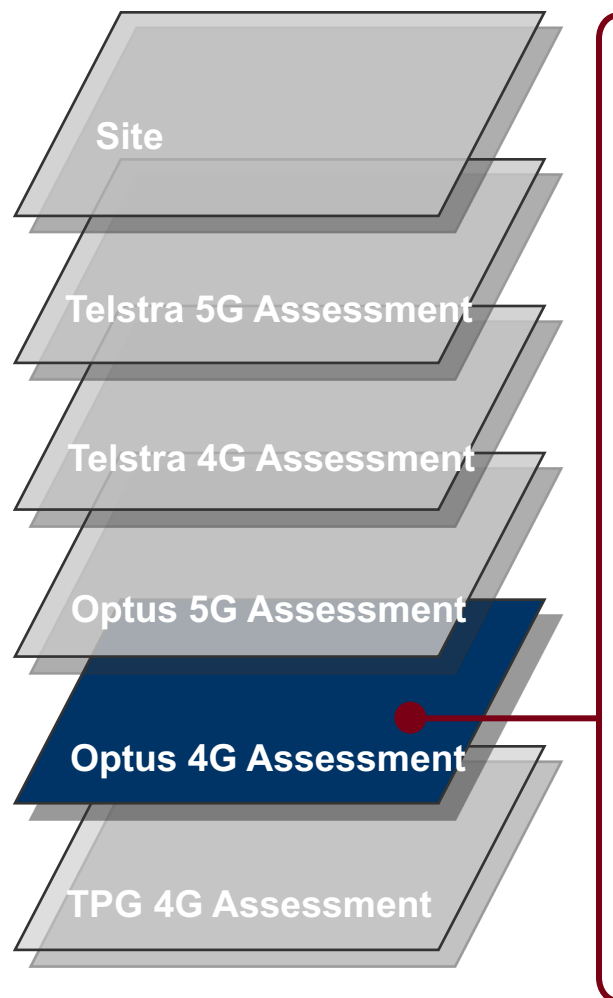
Action –Optus - Upgrade Kyogle Optus Tower Site to 3.5Ghz 5G



Kyogle Shire Analysis

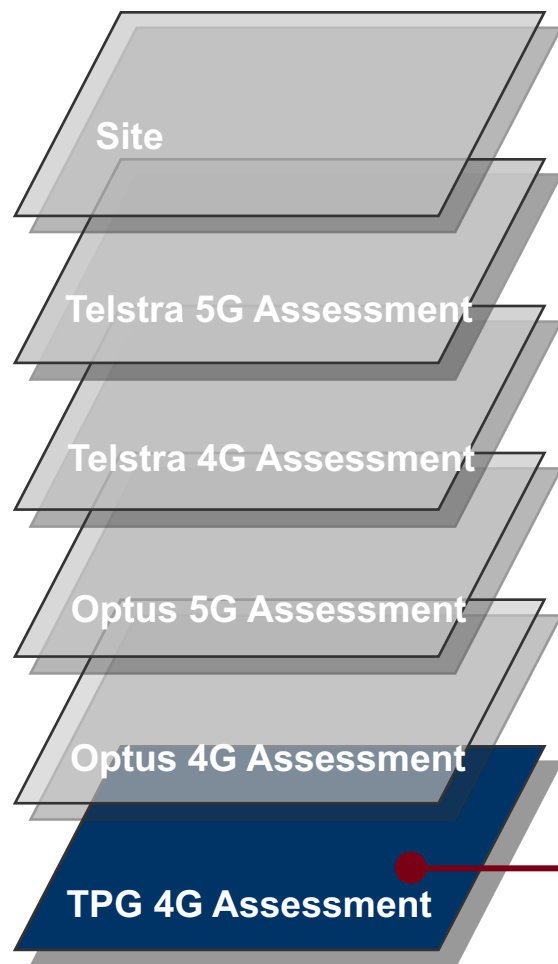
Fawcetts Plain Road

Assessment – Small 4G Blackspot area otherwise good 4G coverage



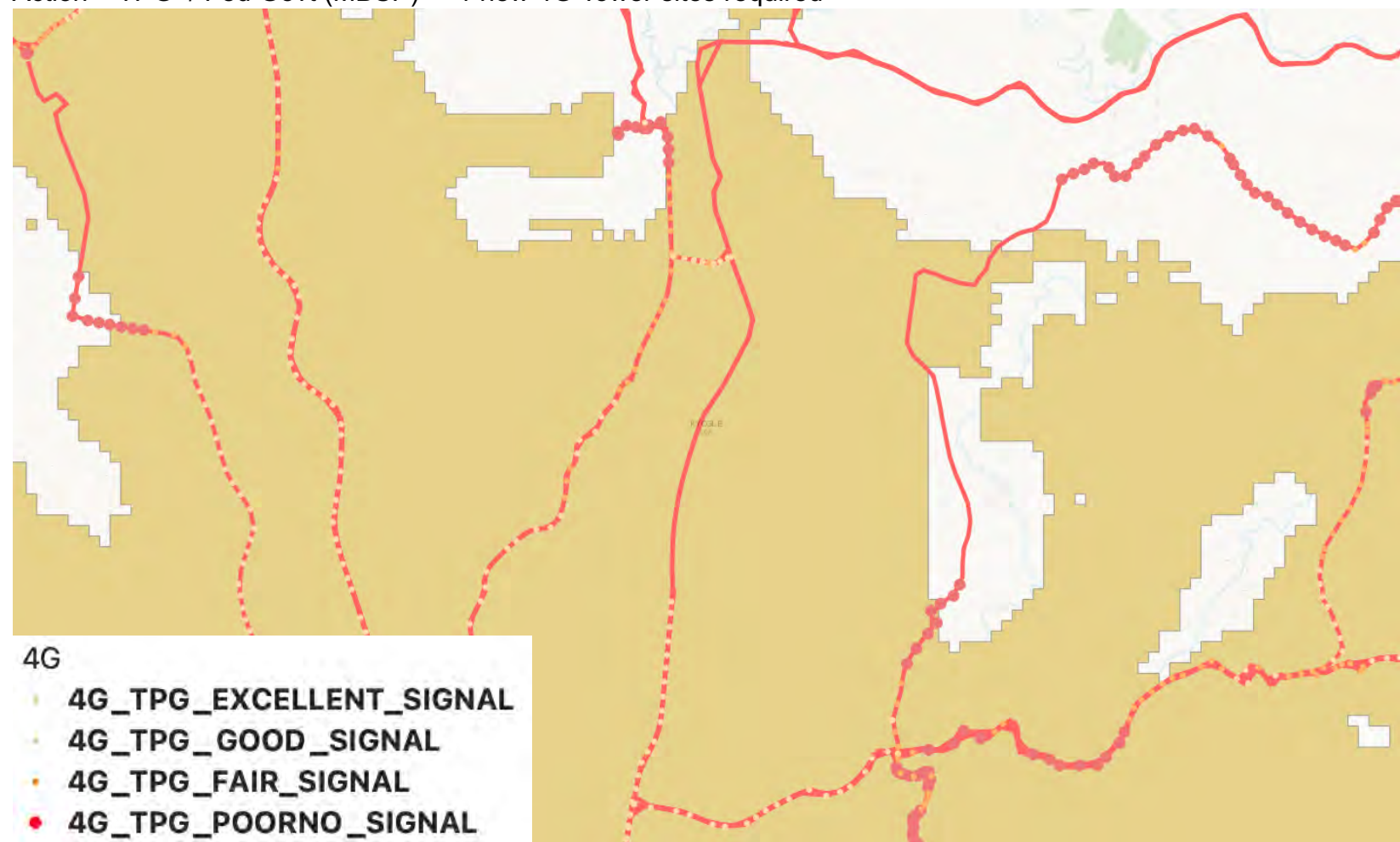
Kyogle Shire Analysis

Fawcetts Plain Road

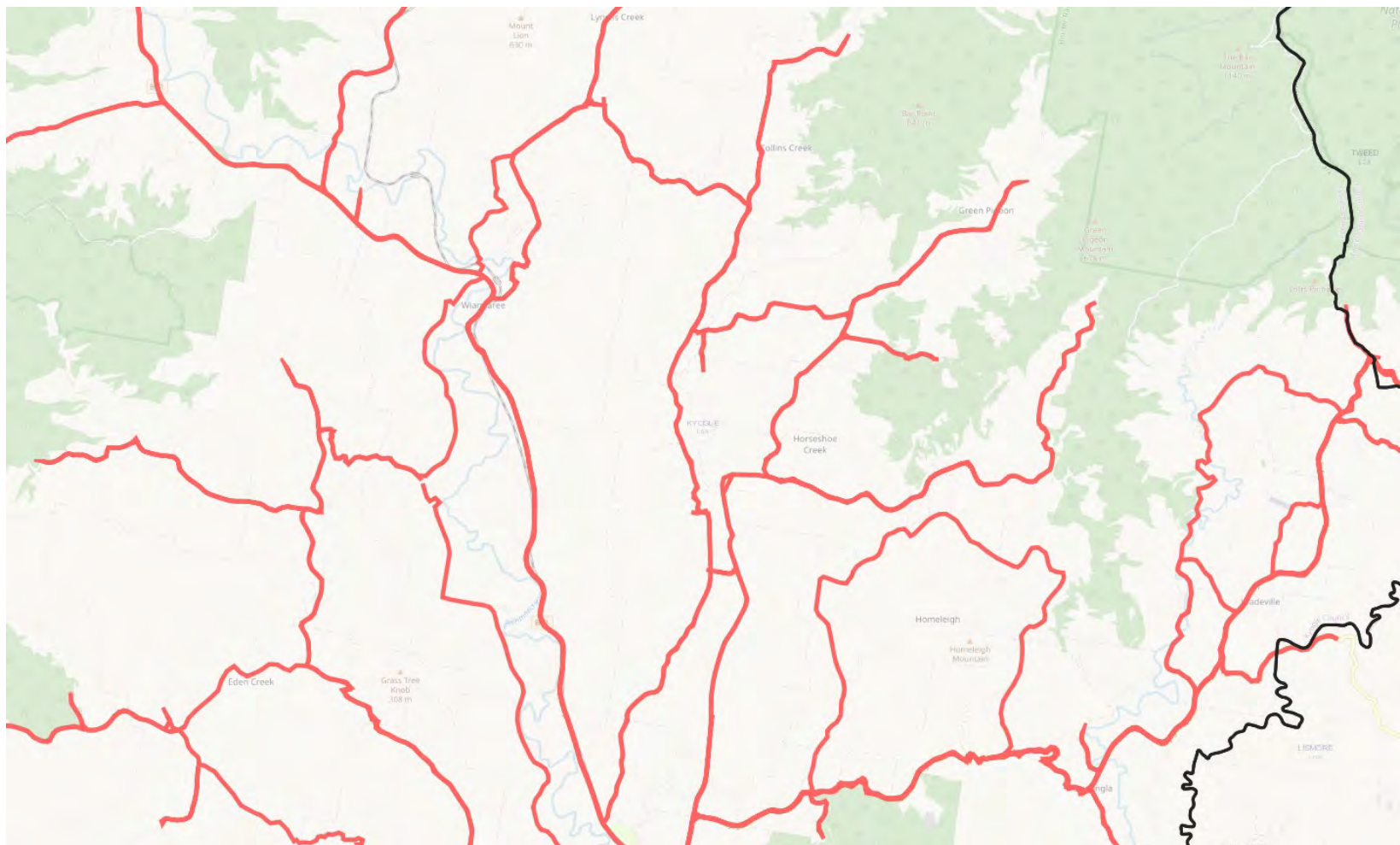


Assessment – Broad 4G blackspot areas outside of Kyogle

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites required

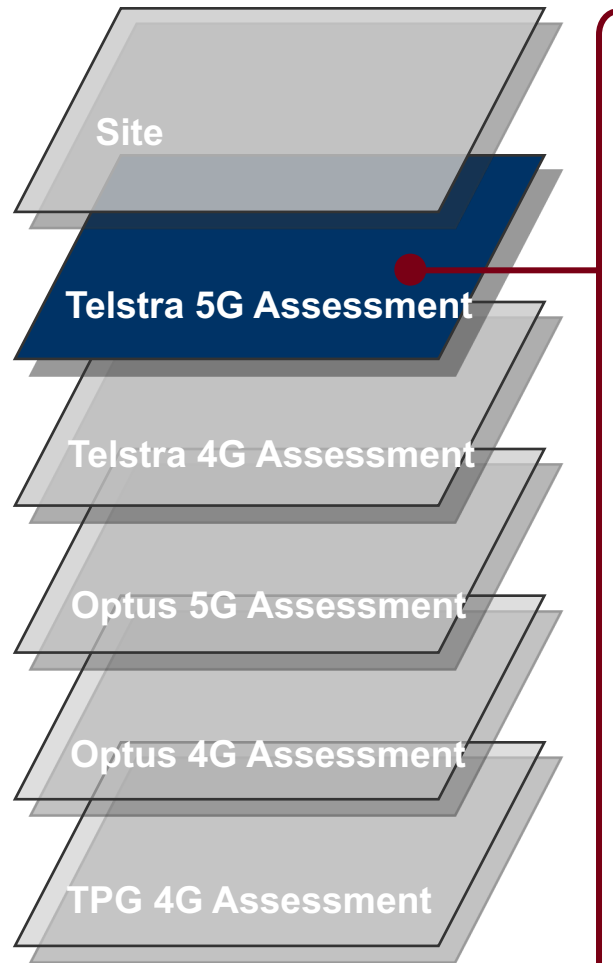


Collins Creek Road



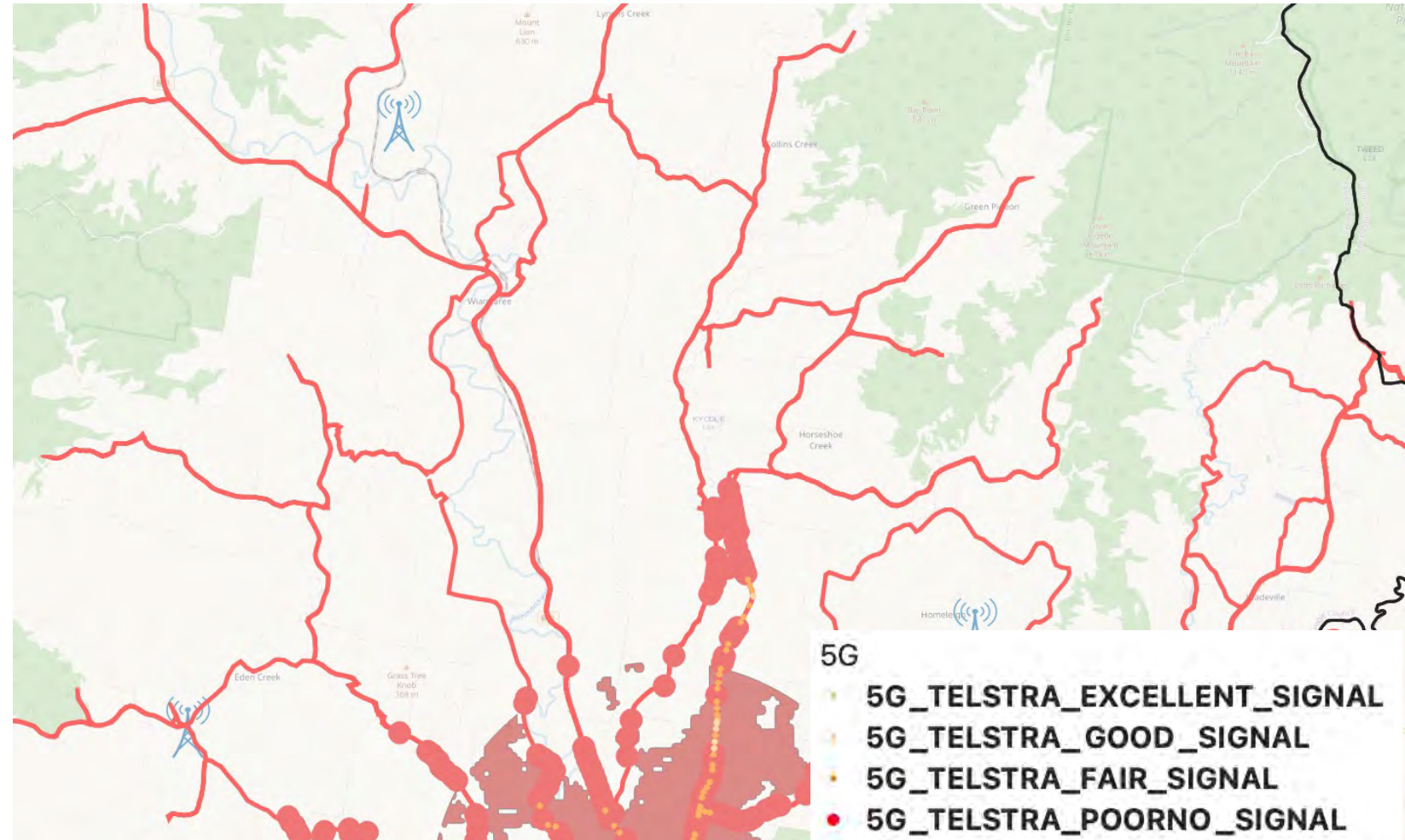
Kyogle Shire Analysis

Collins Creek Road



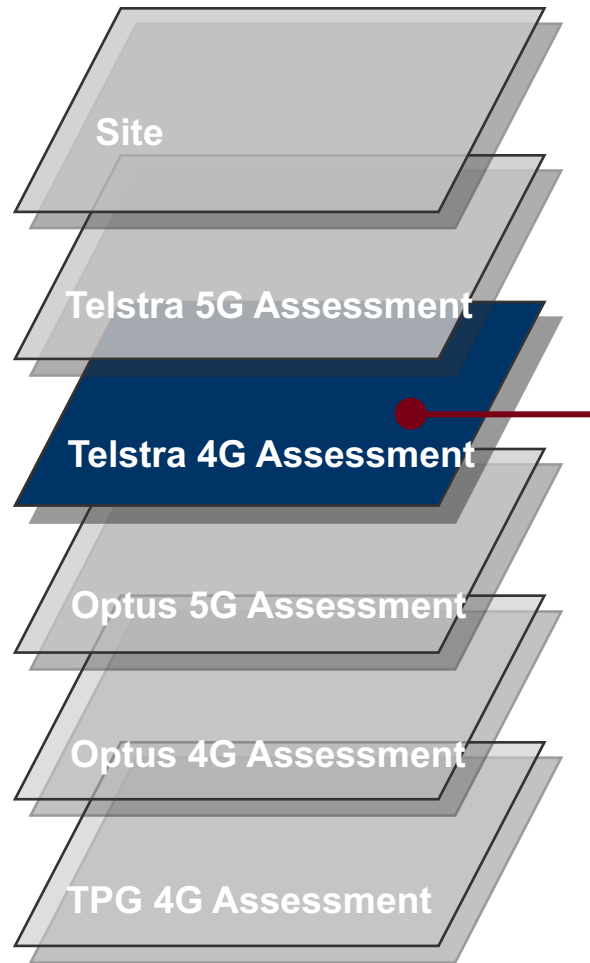
Assessment - No current Telstra 5G coverage

Action –Telstra / Fed Govt (MBSP) – 1 new 5G Tower sites required



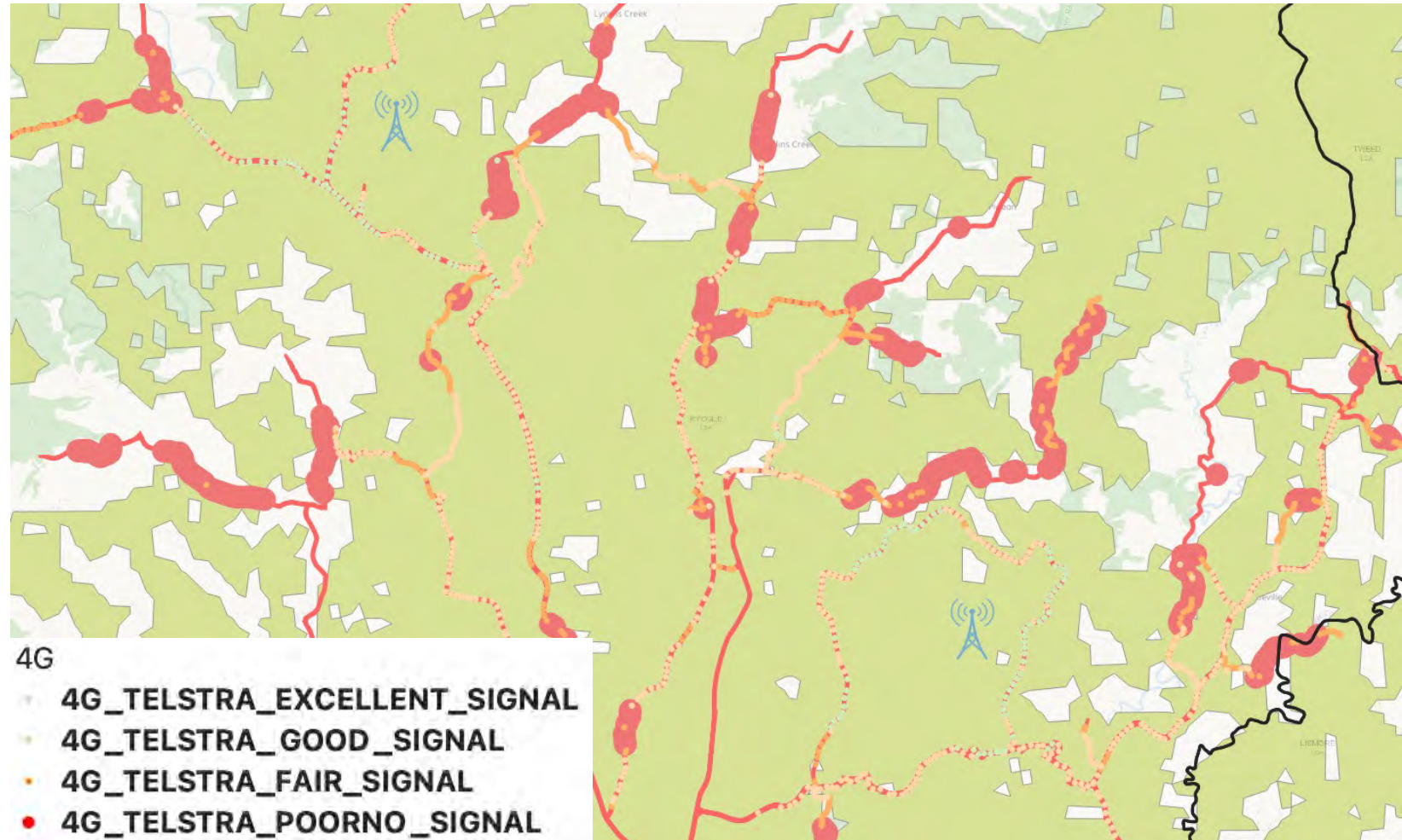
Kyogle Shire Analysis

Collins Creek Road



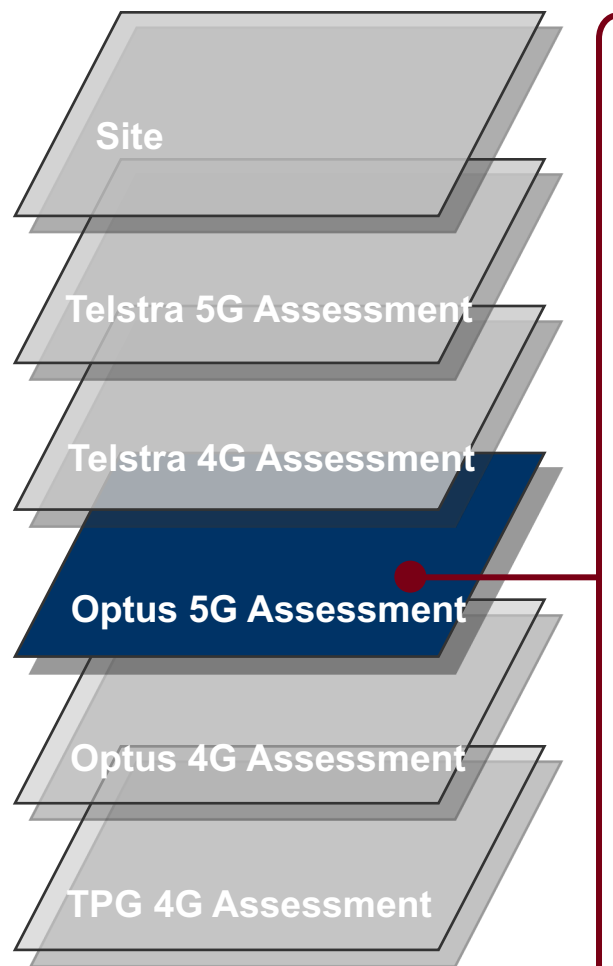
Assessment – 4G blackspots at northern extents of Collins Creek Road

Action – Telstra / Fed Govt – 1 new 4G Tower sites required for additional coverage and capacity



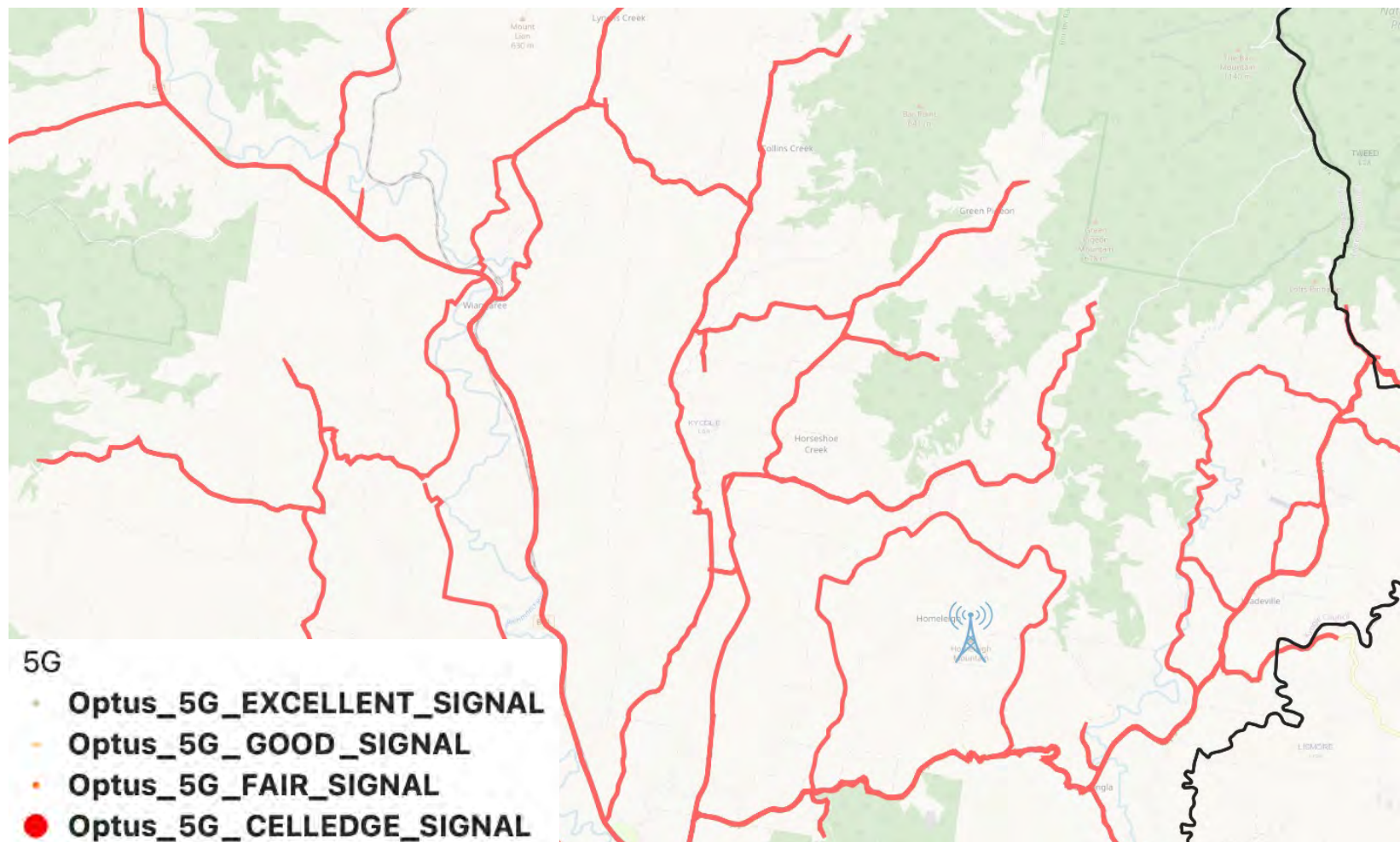
Kyogle Shire Analysis

Collins Creek Road



Assessment - No current Optus 5G coverage

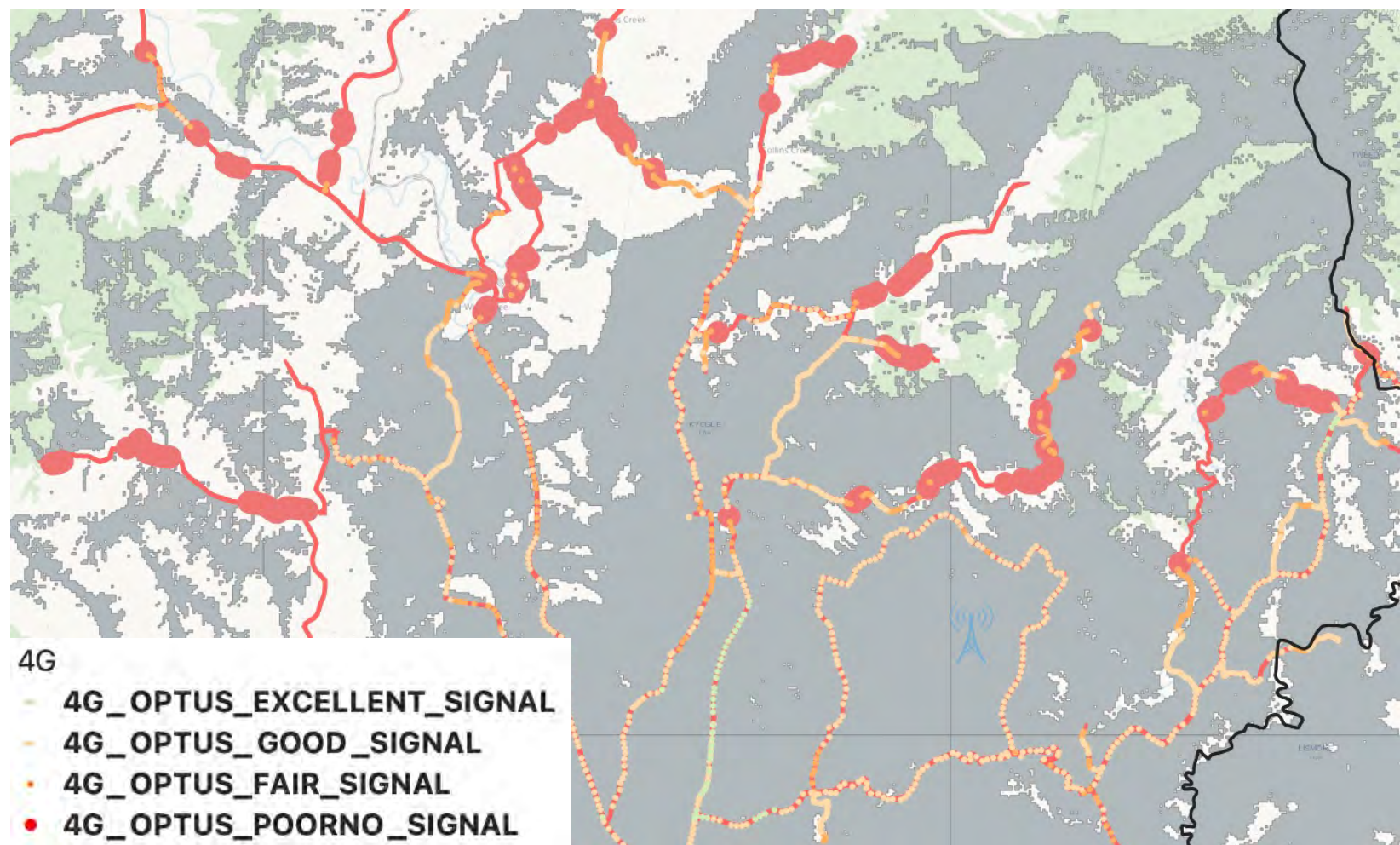
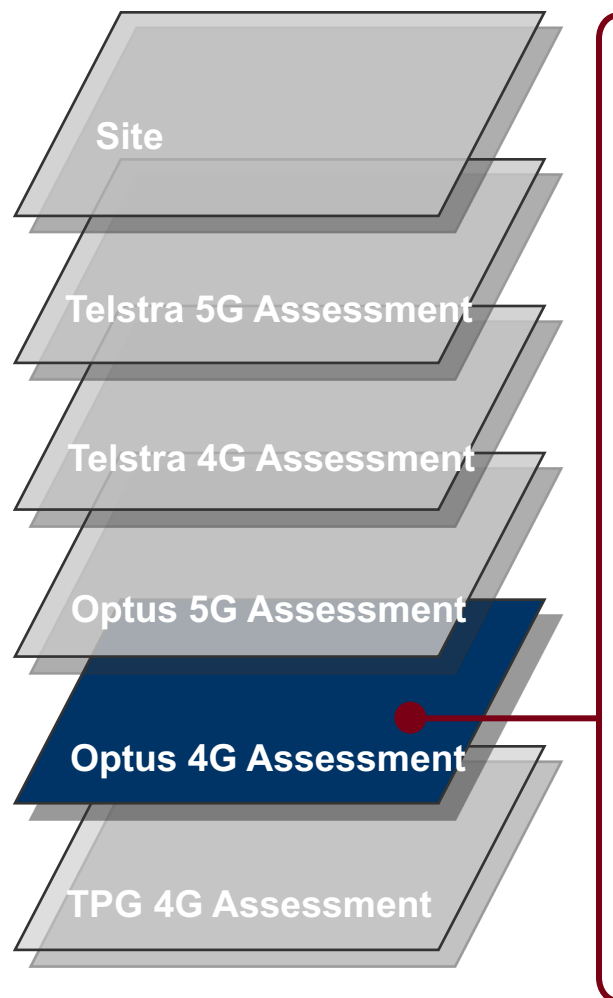
Action –Optus / Fed Govt (MBSP) – 1 new 5G Tower site required



Kyogle Shire Analysis

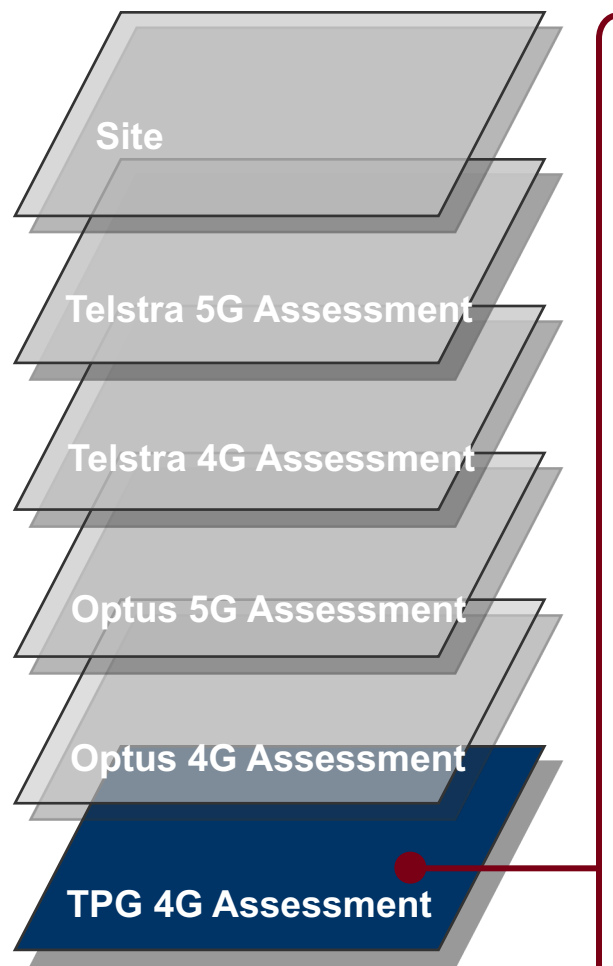
Collins Creek Road

Assessment – 4G Blackspot areas at the northern extents of Collins Creek Road



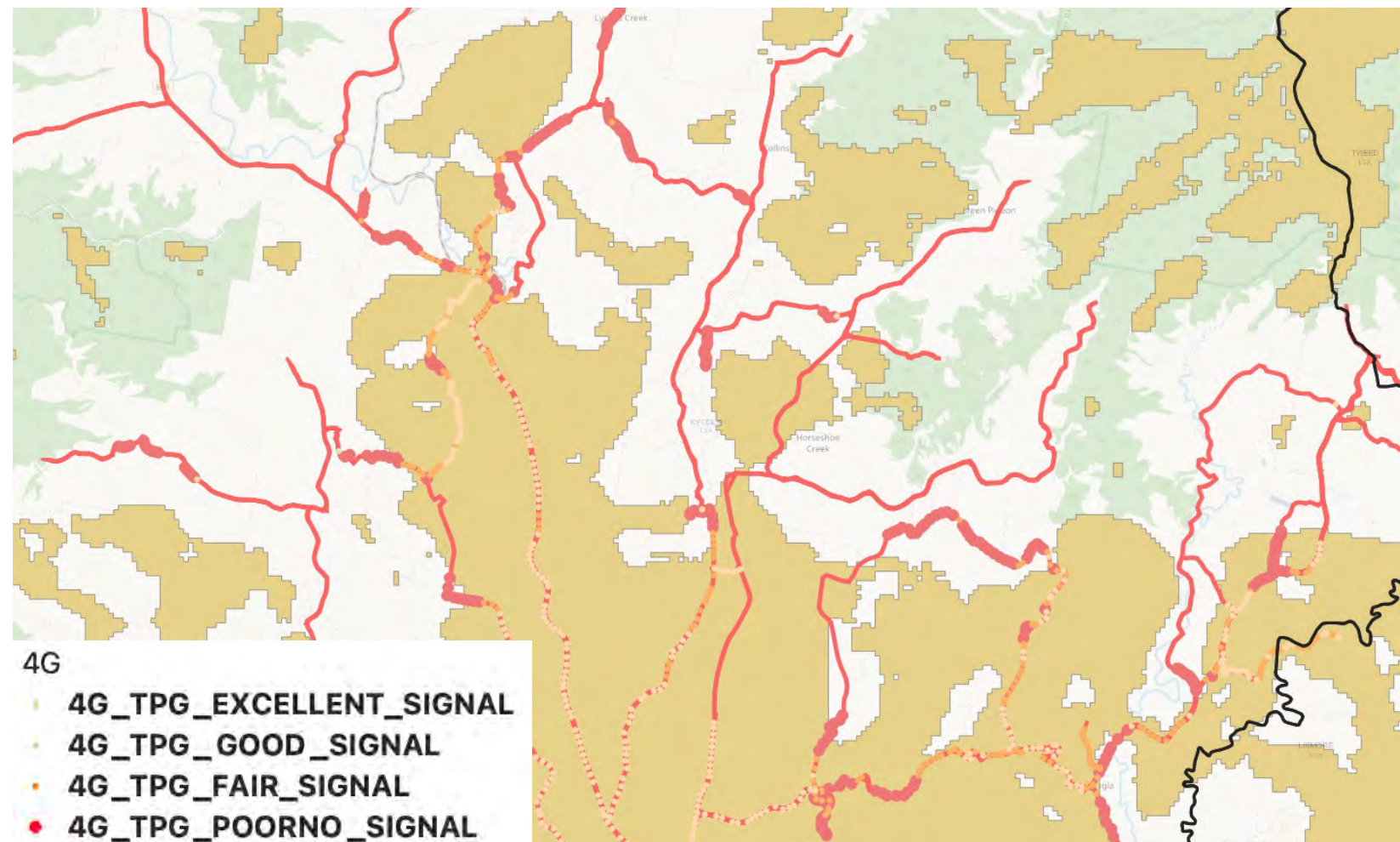
Kyogle Shire Analysis

Collins Creek Road



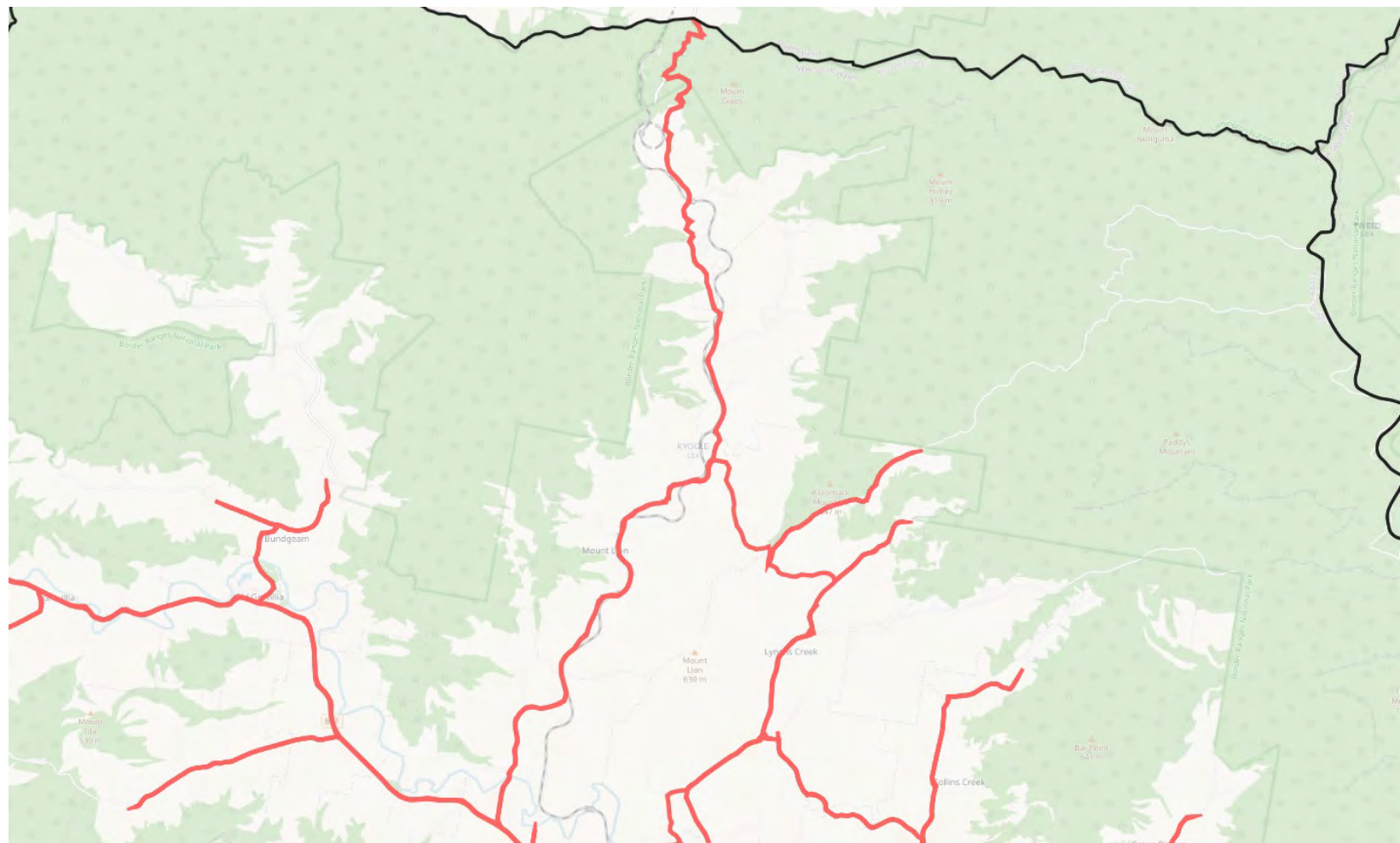
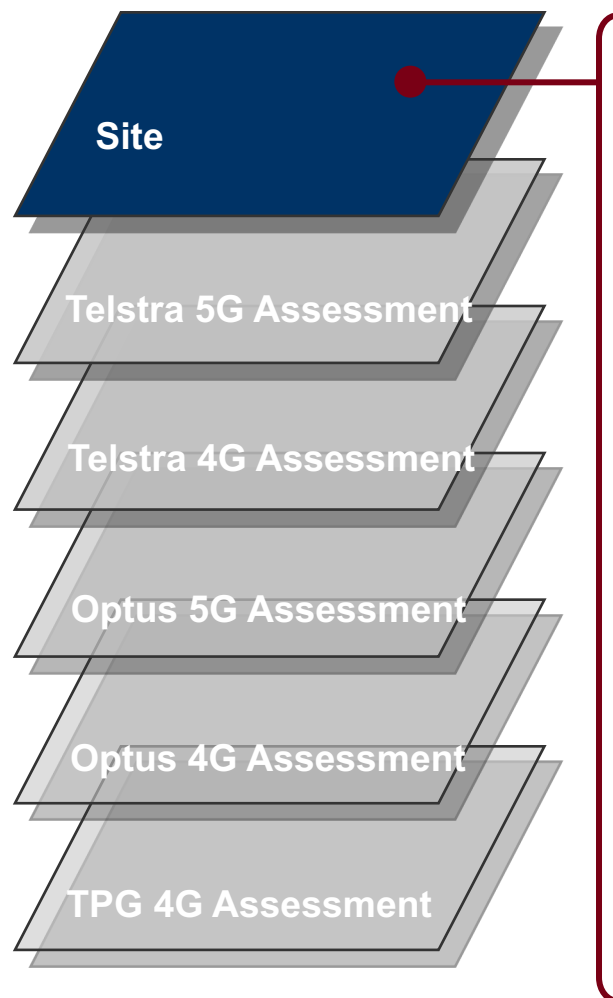
Assessment – Broad 4G Blackspot areas at the northern extents of Collins Creek Road

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites required



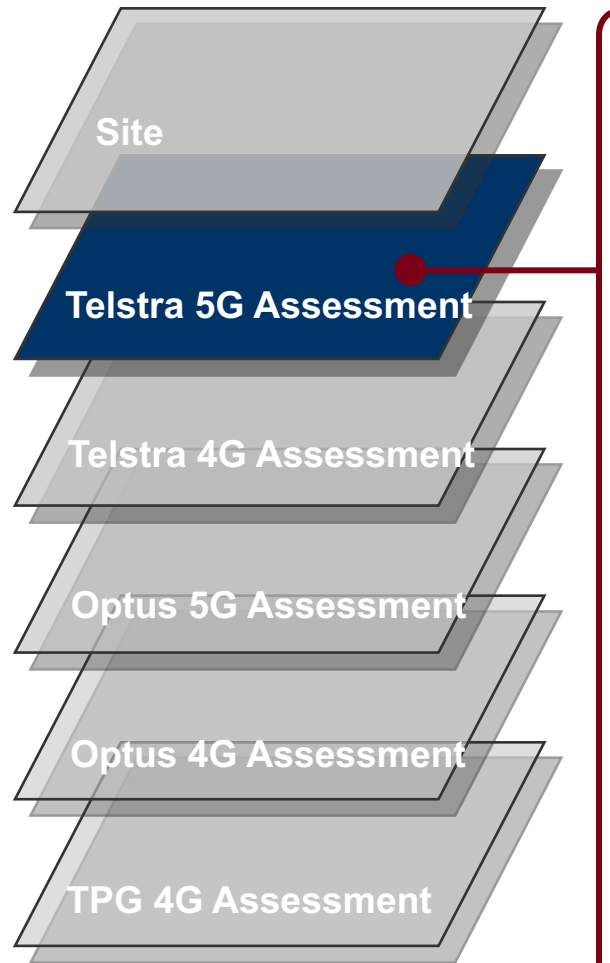
Kyogle Shire Analysis

Gradys Creek Road



Kyogle Shire Analysis

Gradys Creek Road

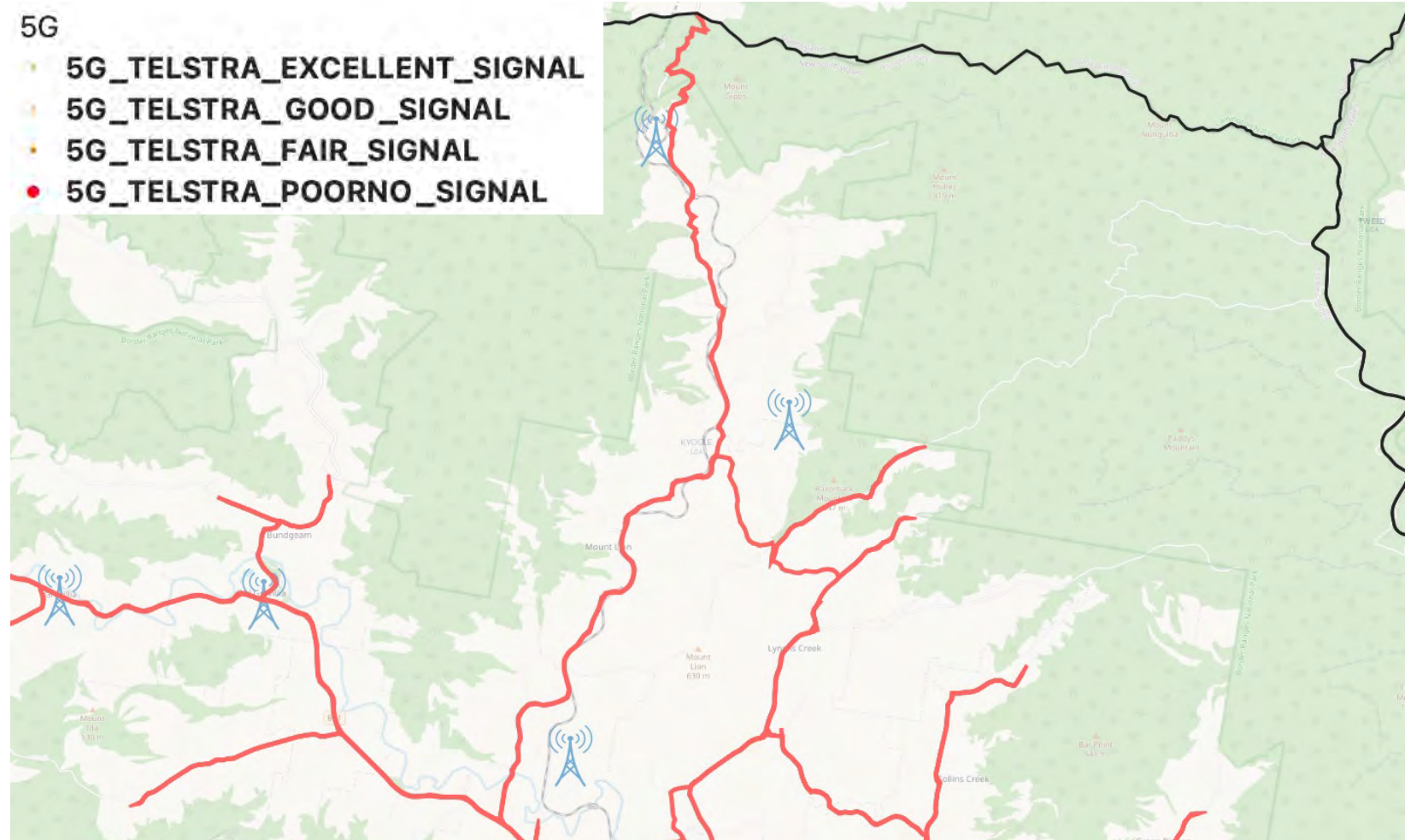


Assessment - No current Telstra 5G coverage

Action –Telstra - 3 x Telstra Tower Sites upgrade to 3.6Ghz 5G

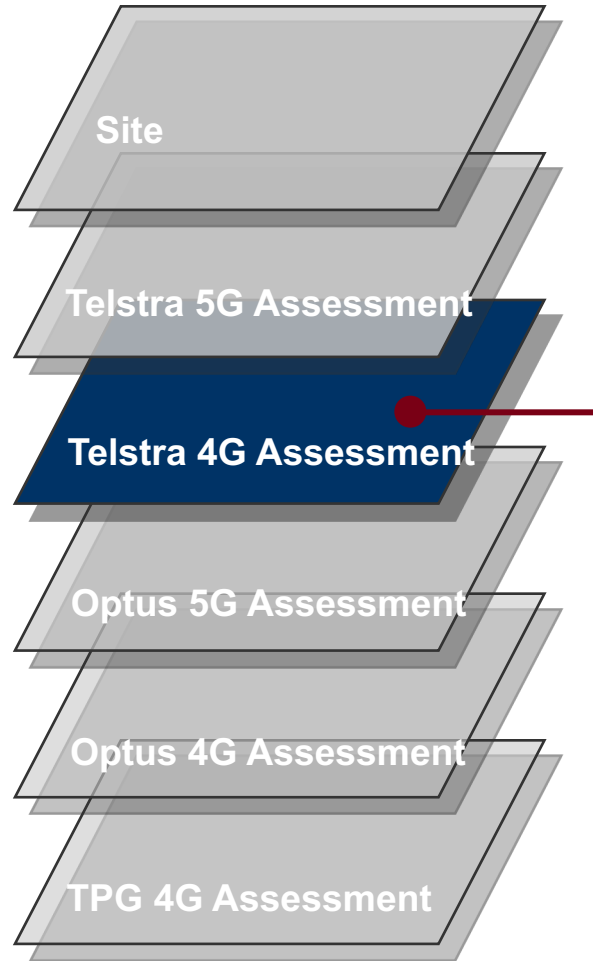
5G

- 5G_TELSTRA_EXCELLENT_SIGNAL
- 5G_TELSTRA_GOOD_SIGNAL
- 5G_TELSTRA_FAIR_SIGNAL
- 5G_TELSTRA_POORNO_SIGNAL



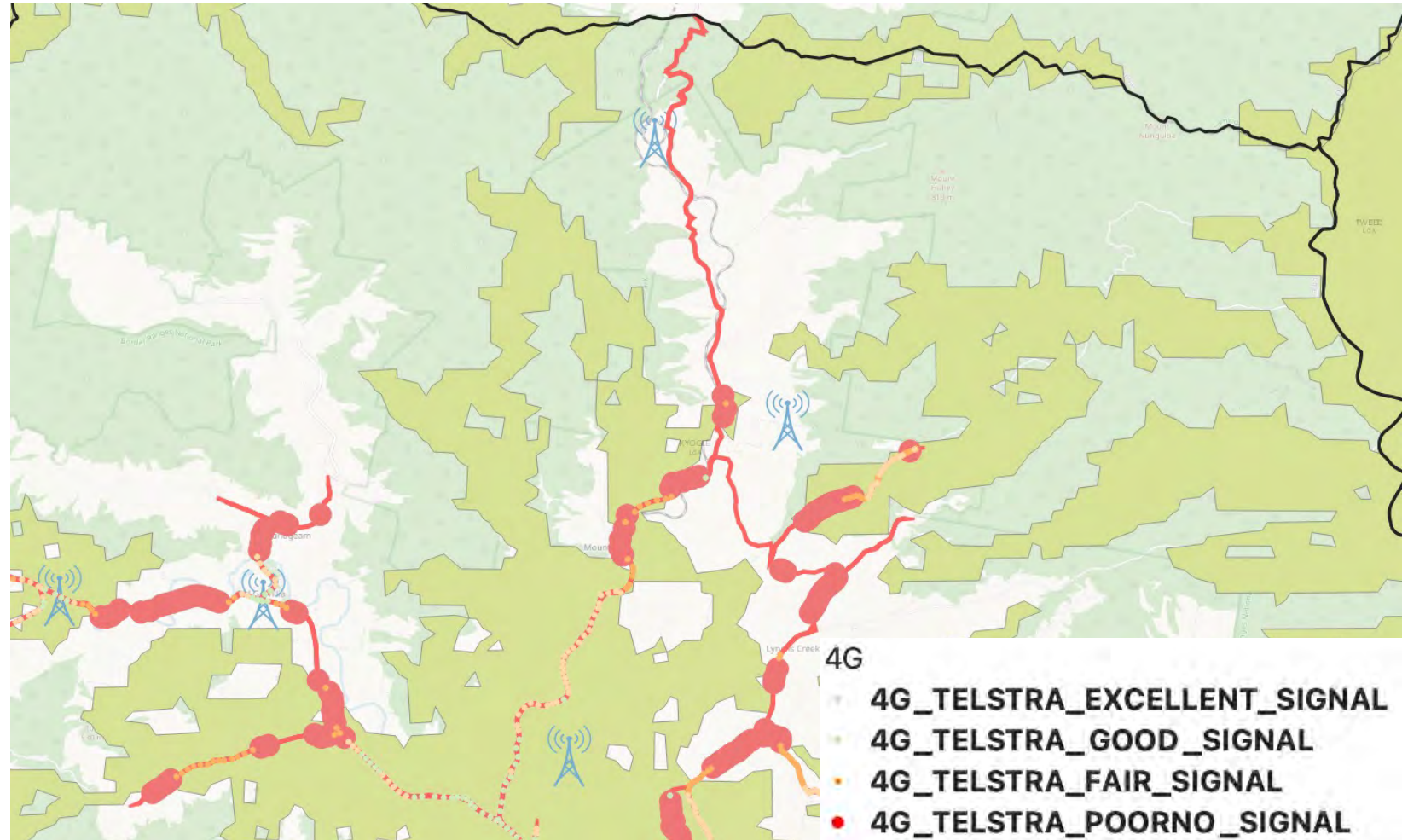
Kyogle Shire Analysis

Gradys Creek Road



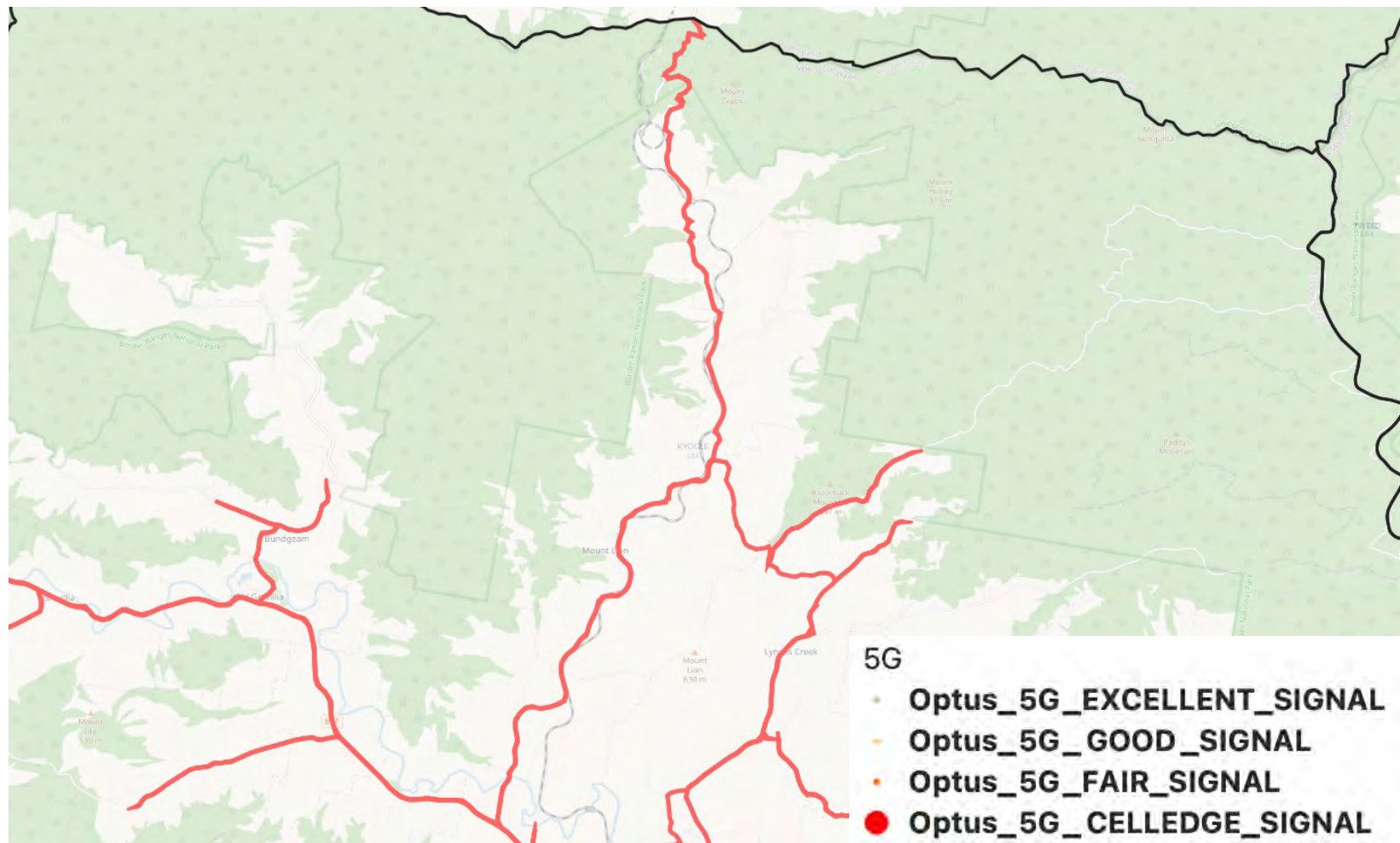
Assessment – Broad 4G blackspot areas in the northern extents of Gradys Creek Road

Action – Telstra – Upgrade 2 x Telstra Tower Sites to 700Mhz 4G



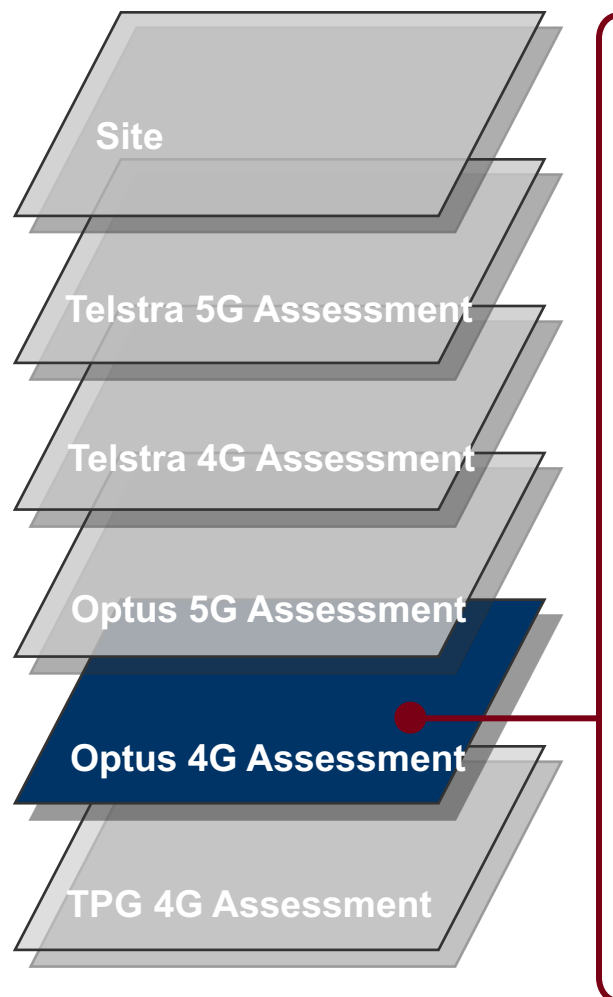
Gradys Creek Road

Action – Optus / Fed Govt (MBSP) – 3 new 5G Tower sites required



Kyogle Shire Analysis

Gradys Creek Road

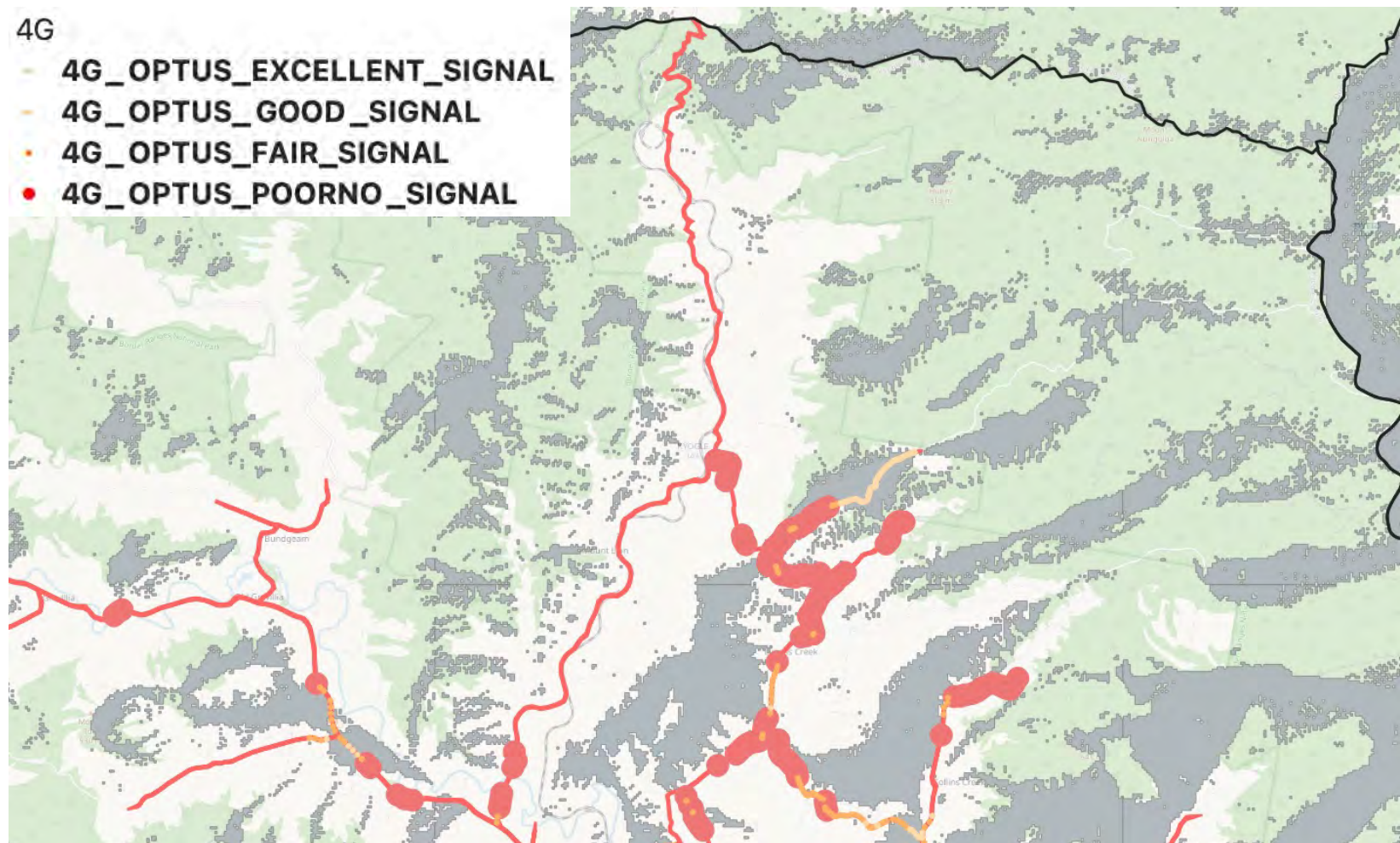


Assessment - No current Optus 4G coverage

Action –Optus / Fed Govt (MBSP) – 3 new 4G Tower sites required

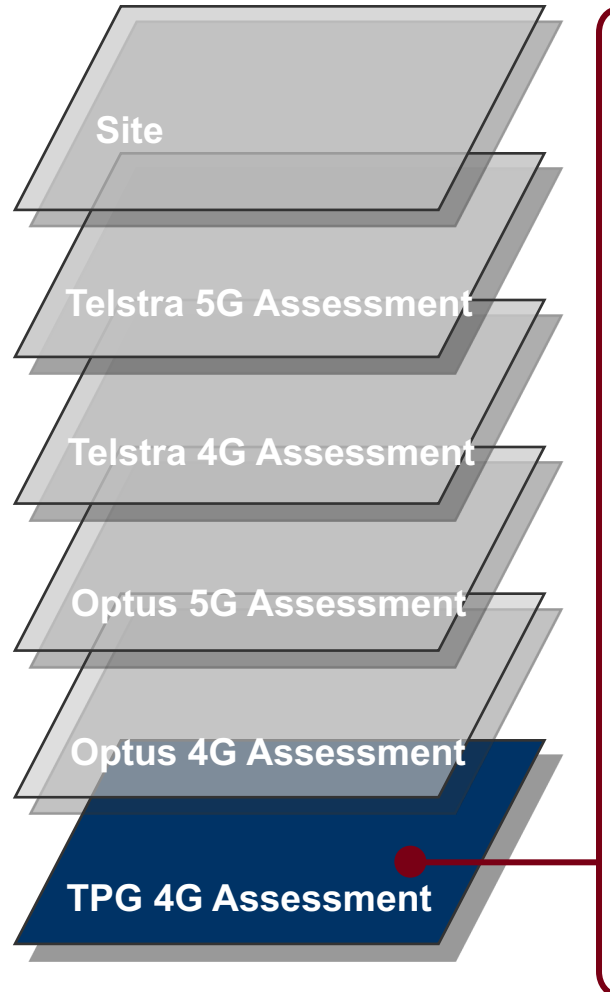
4G

- 4G_OPTUS_EXCELLENT_SIGNAL
- 4G_OPTUS_GOOD_SIGNAL
- 4G_OPTUS_FAIR_SIGNAL
- 4G_OPTUS_POORNO_SIGNAL



Kyogle Shire Analysis

Gradys Creek Road

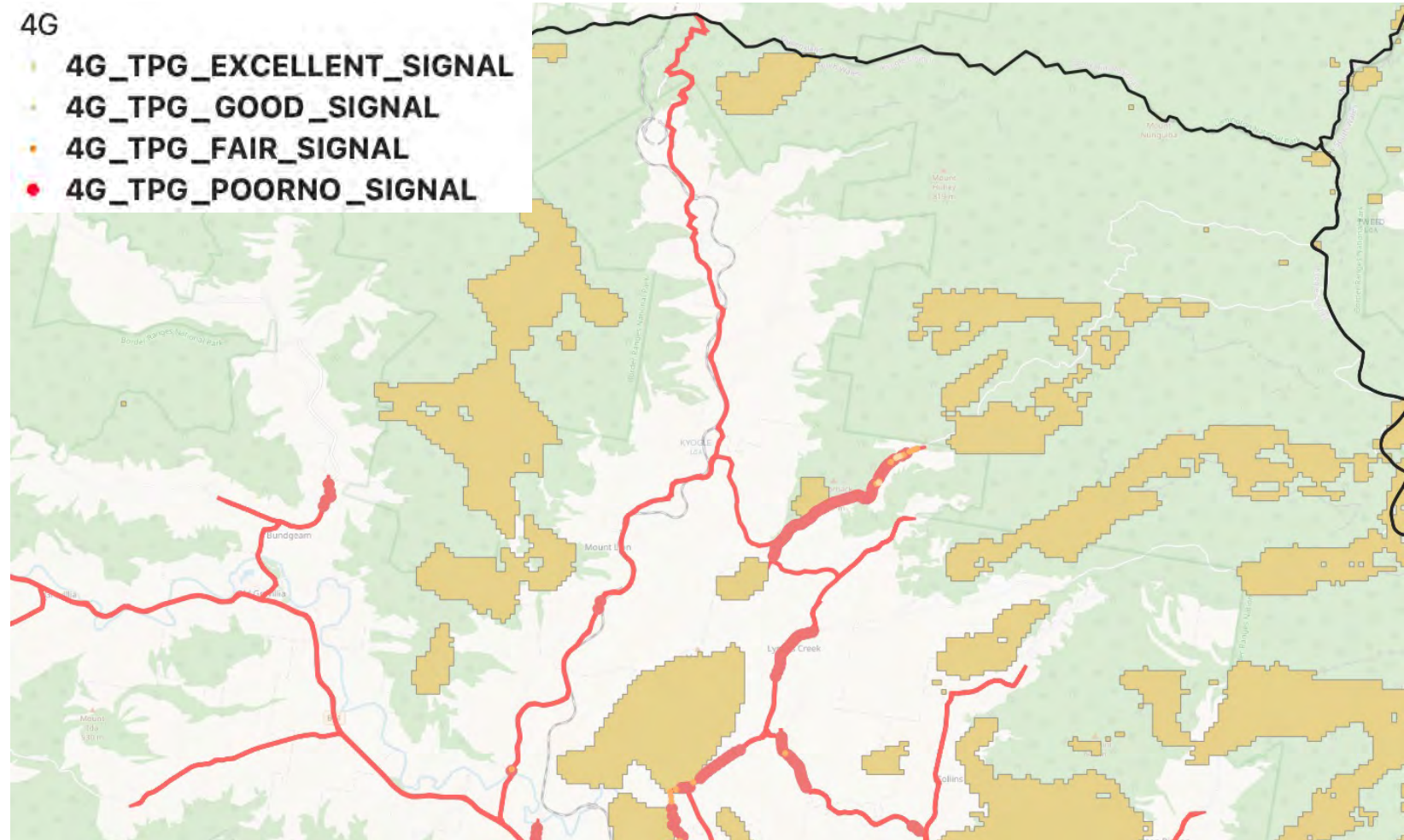


Assessment - No current TPG 4G coverage

Action – TPG / Fed Govt (MBSP) – 3 new 4G Tower sites required

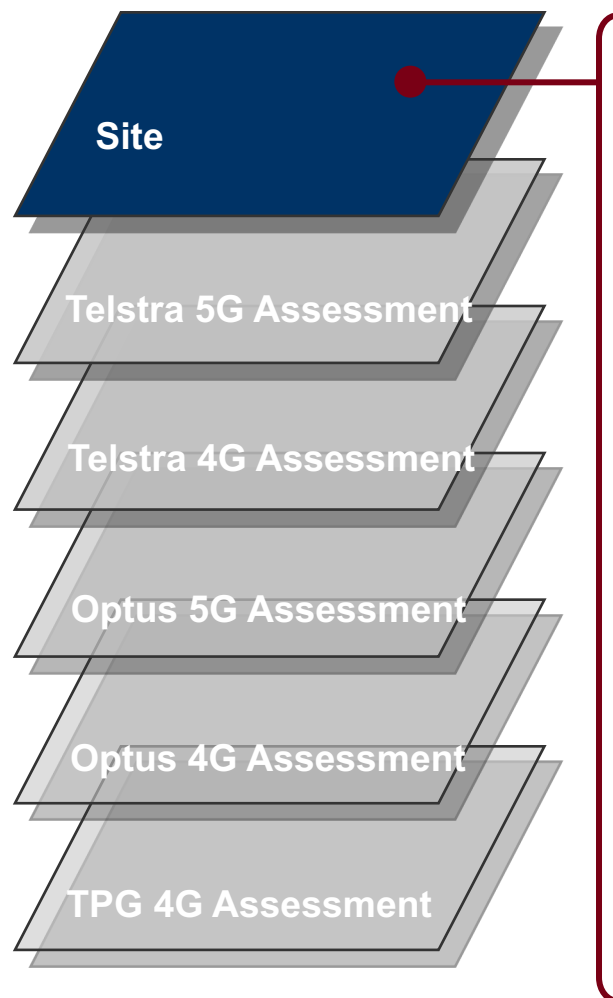
4G

- 4G_TPG_EXCELLENT_SIGNAL
- 4G_TPG_GOOD_SIGNAL
- 4G_TPG_FAIR_SIGNAL
- 4G_TPG_POORNO_SIGNAL



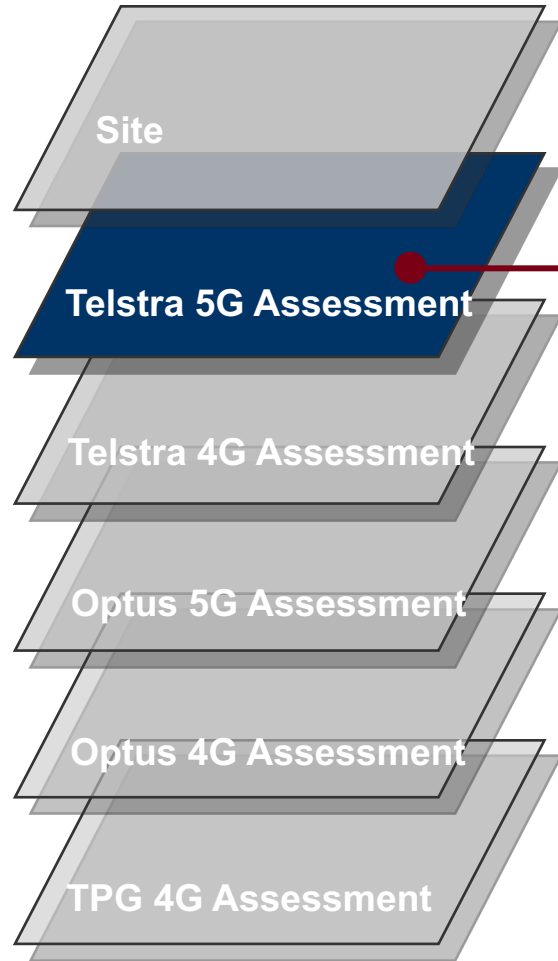
Kyogle Shire Analysis

Cawongla Road



Kyogle Shire Analysis

Cawongla Road



Assessment - No current Telstra 5G coverage

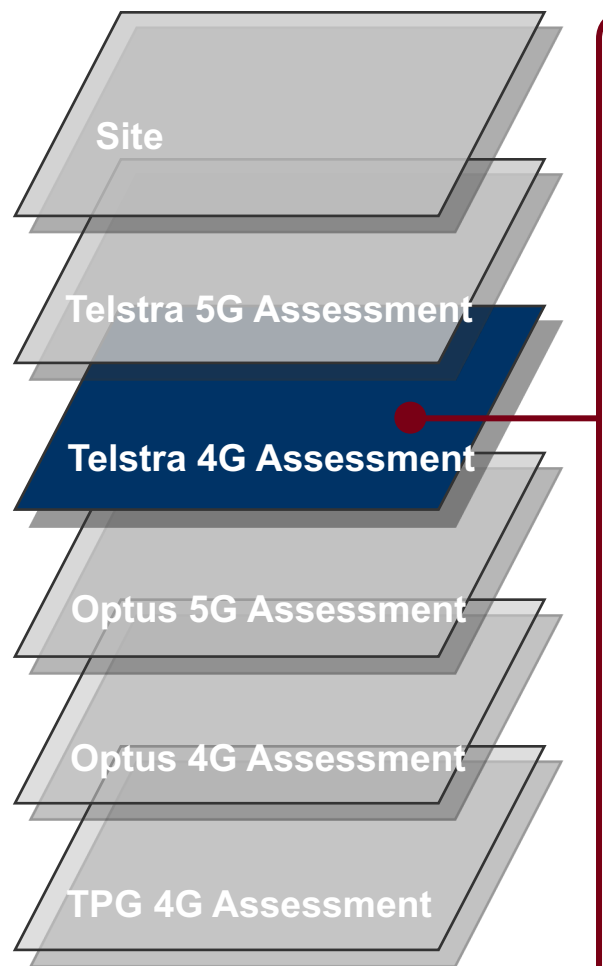
Action –Telstra - 1 x Telstra Tower Sites upgrade to 3.6Ghz 5G



Kyogle Shire Analysis

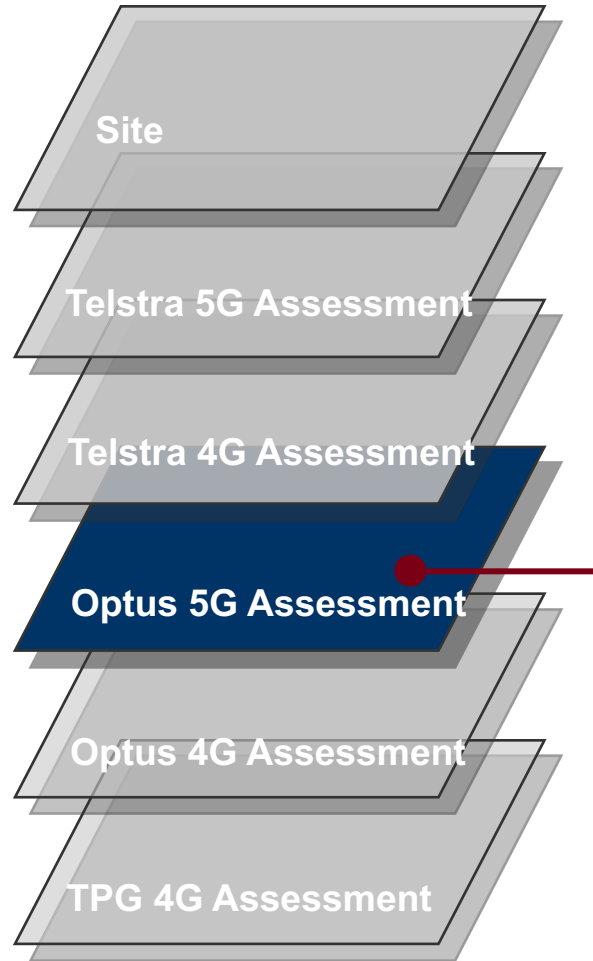
Cawongla Road

Assessment – Good 4G coverage



Kyogle Shire Analysis

Cawongla Road



Assessment - No current Optus 5G coverage

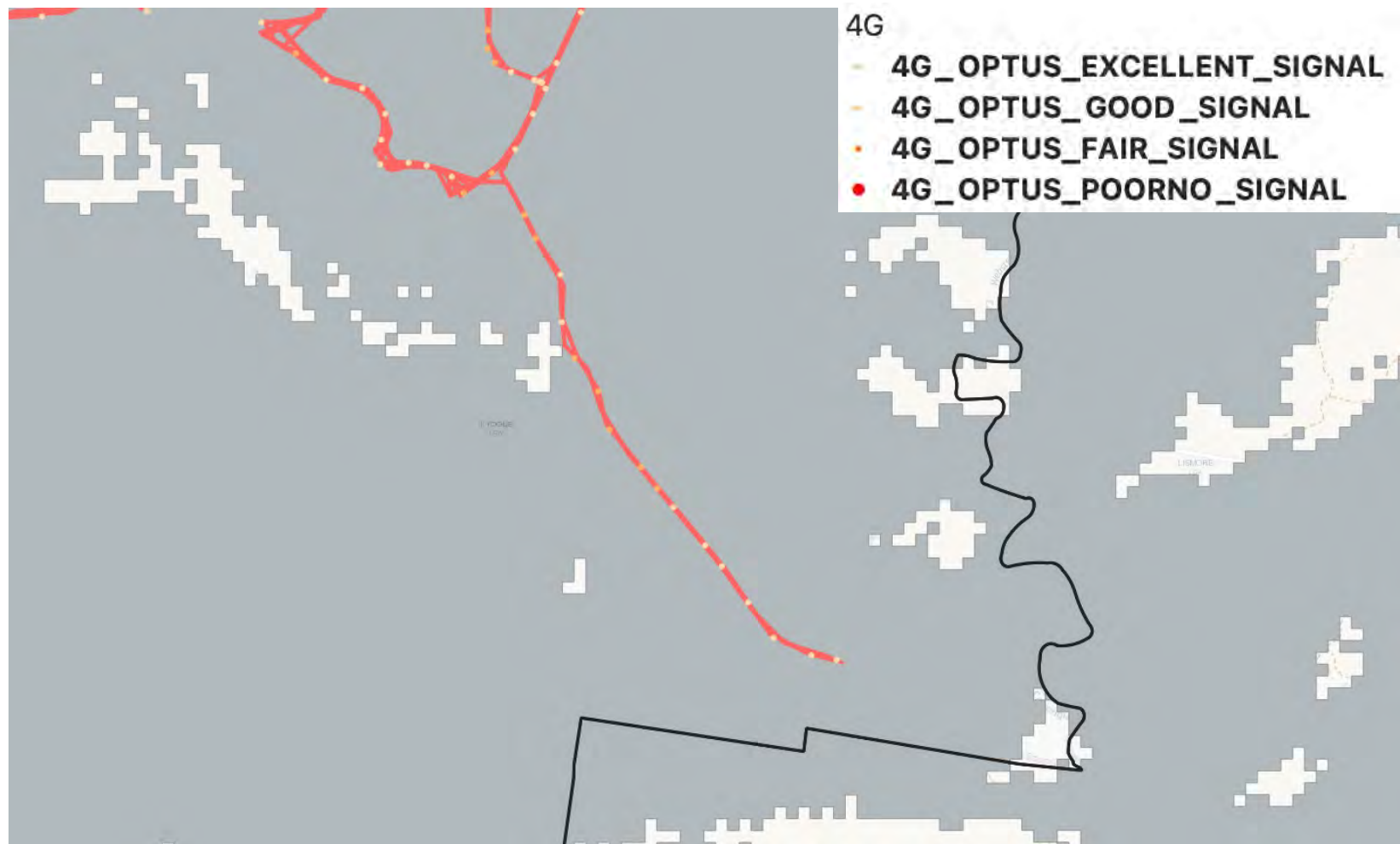
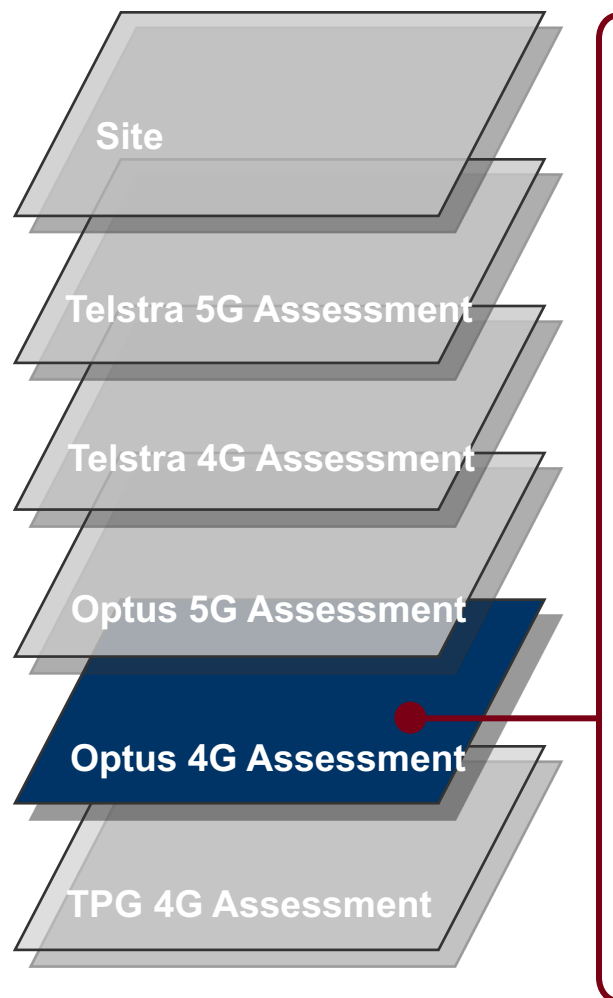
Action –Optus / Fed Govt (MBSP) – 1 new 5G Tower sites required



Kyogle Shire Analysis

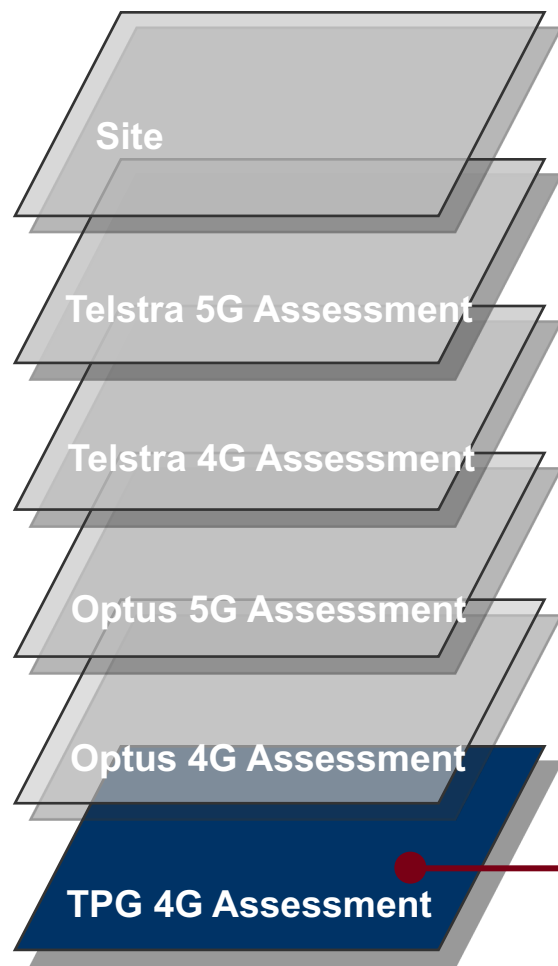
Cawongla Road

Assessment – Good 4G coverage



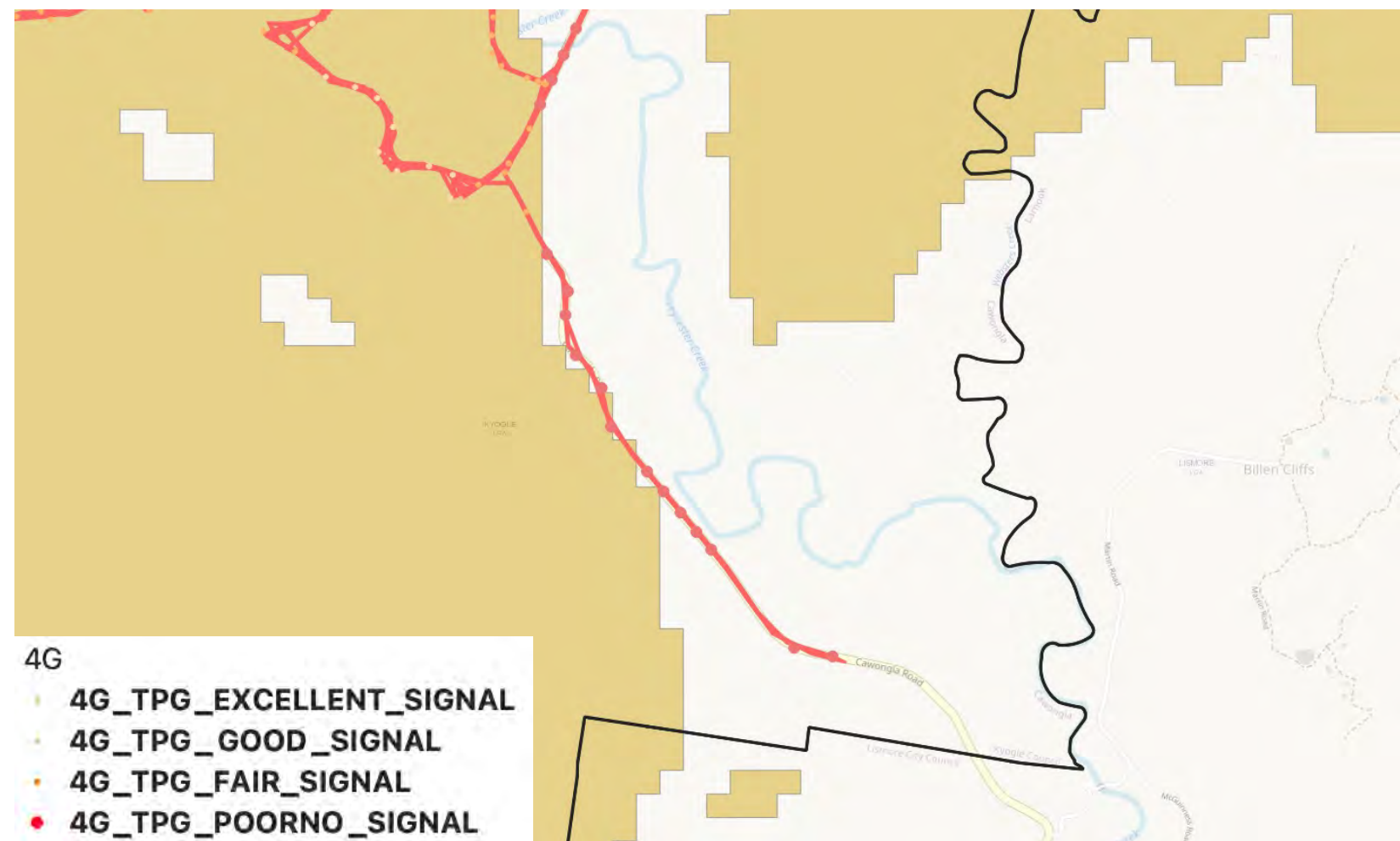
Kyogle Shire Analysis

Cawongla Road



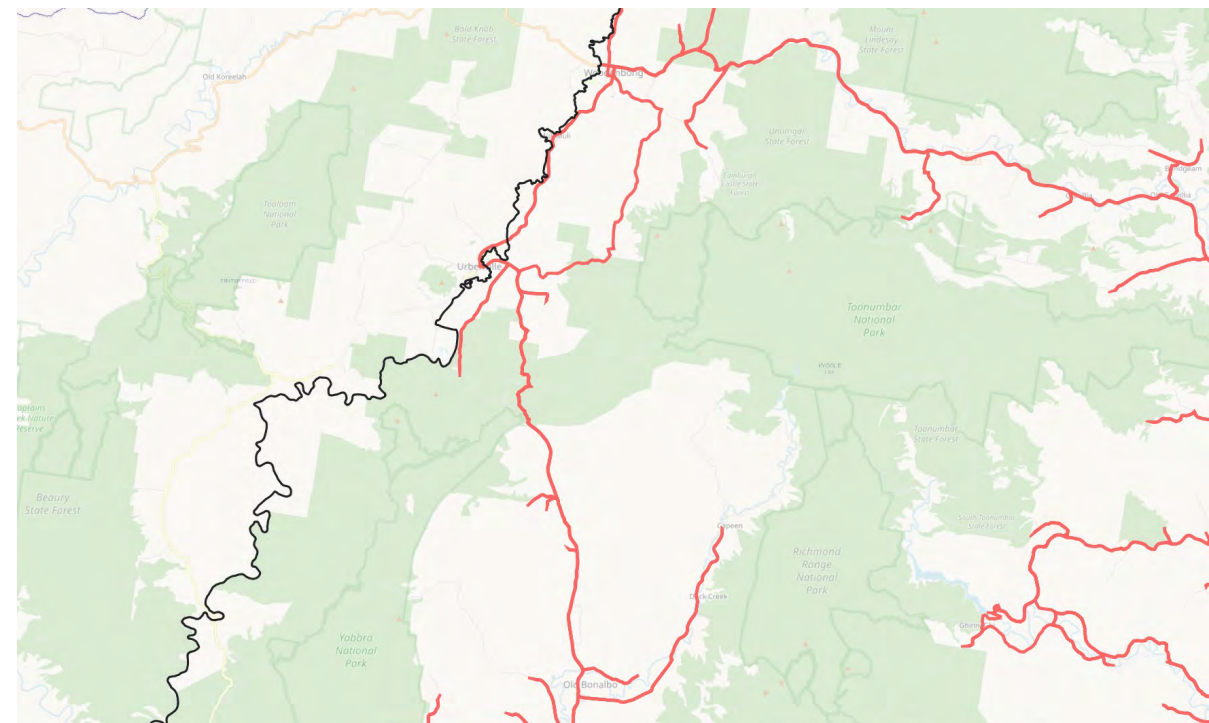
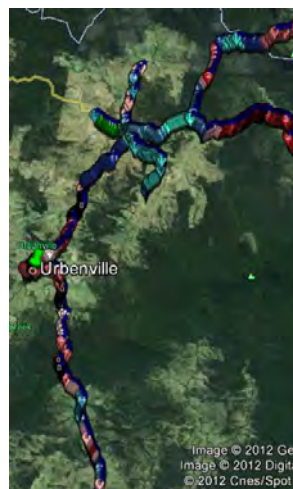
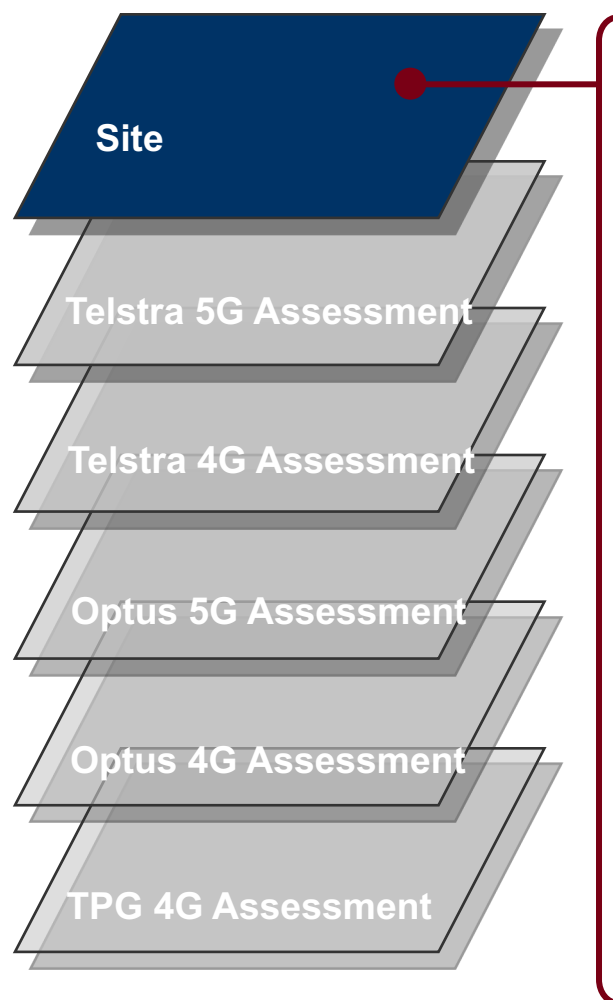
Assessment – Broad 4G blackspot areas

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites required



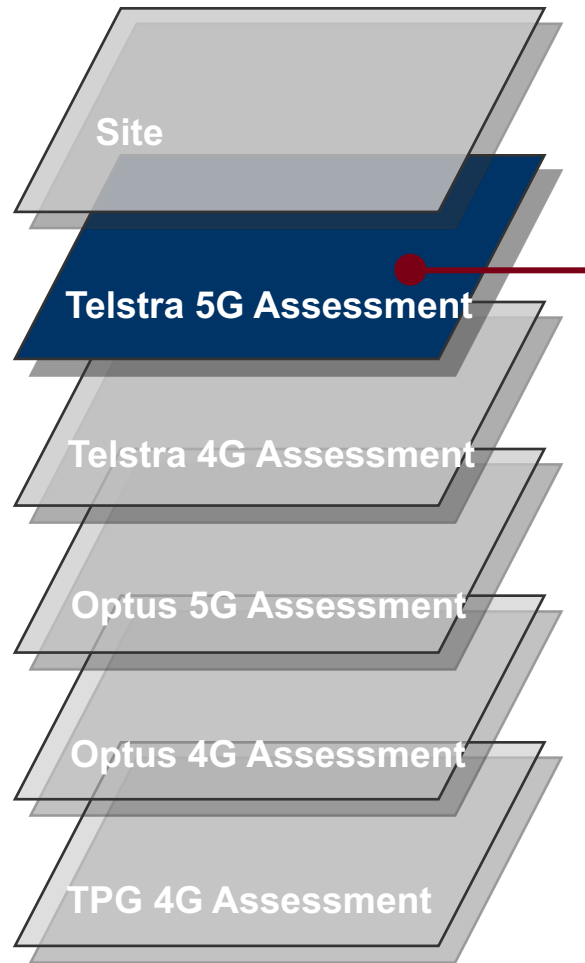
Kyogle Shire Analysis – Comparison with previous assessment

North West Kyogle Shire



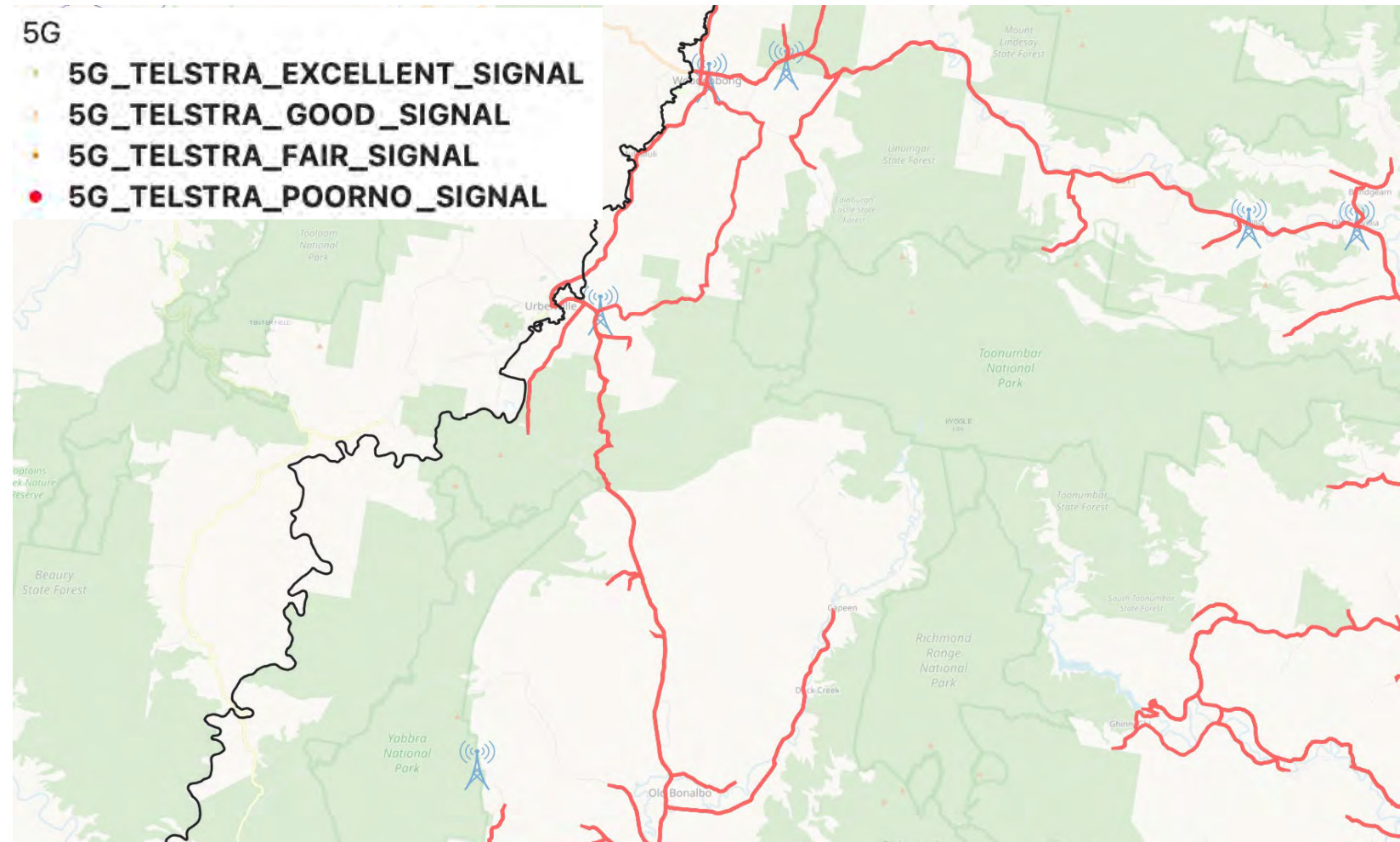
Kyogle Shire Analysis – Comparison with previous assessment

North West Kyogle Shire



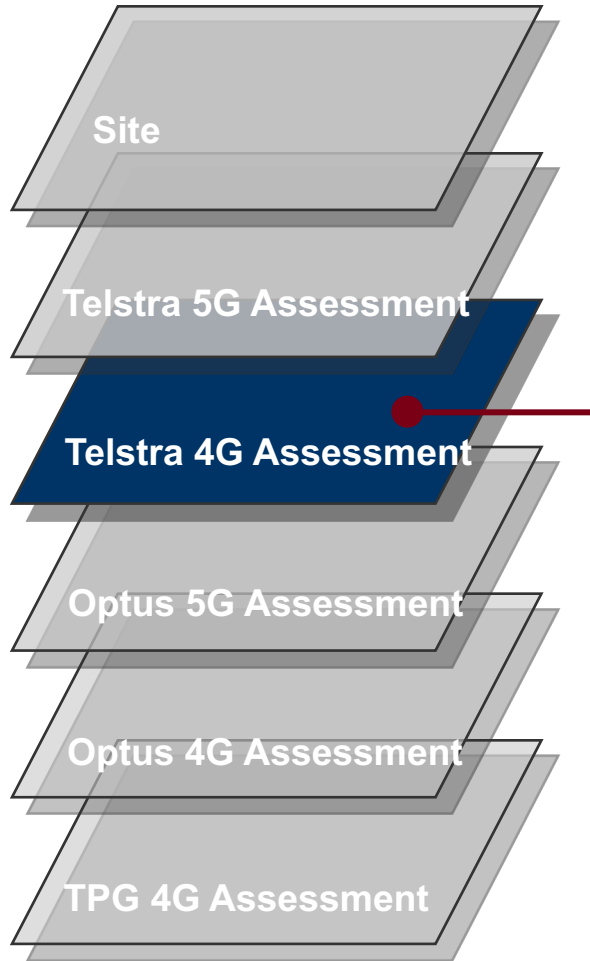
Assessment - No current Telstra 5G coverage

Action – Telstra - Upgrade 6 x Sites to 3.6Ghz 5G & Telstra / Fed Govt – up to 6 new 5G Tower sites required



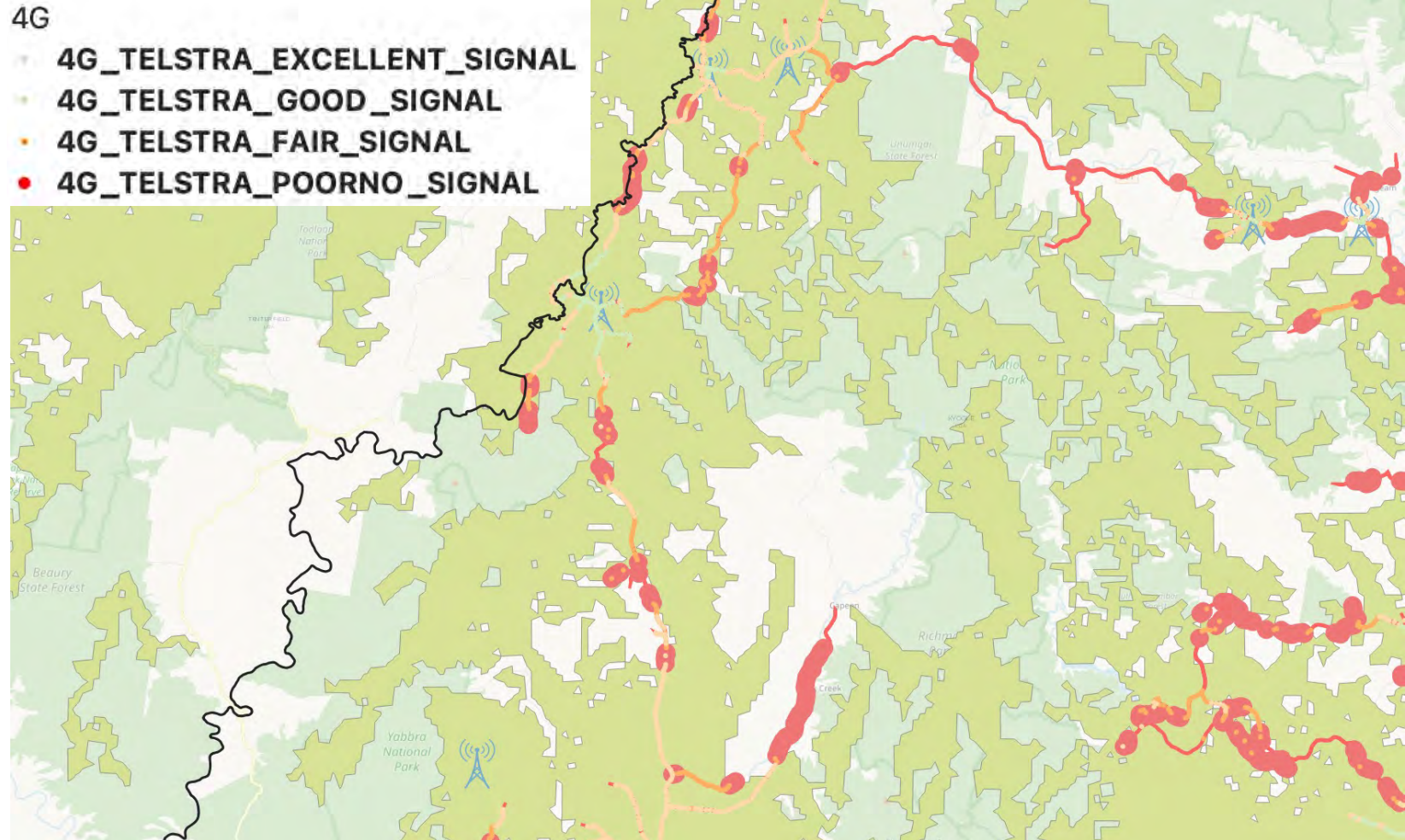
Kyogle Shire Analysis – Comparison with previous assessment

North West Kyogle Shire



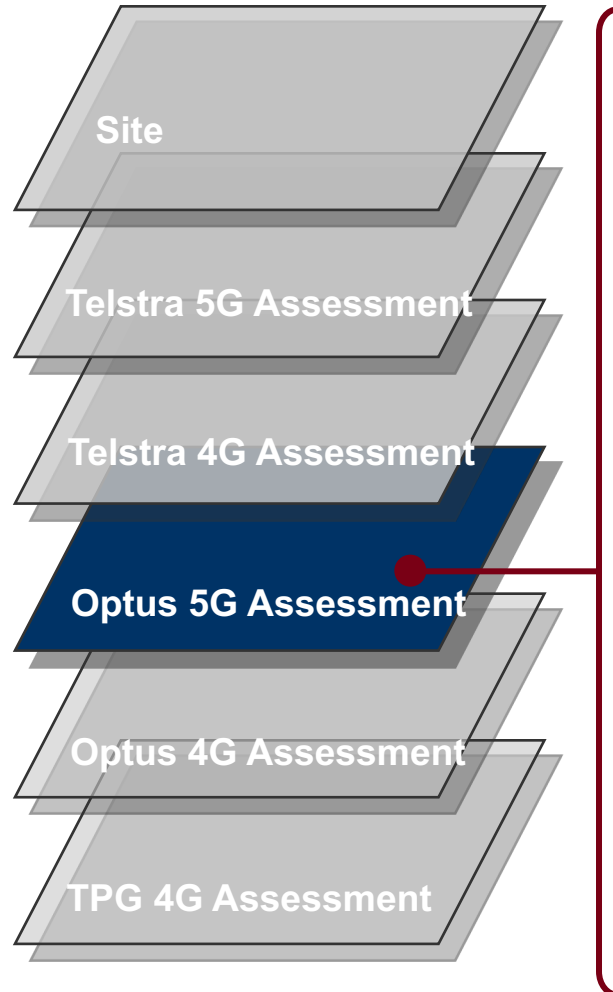
Assessment - Broad 4G blackspots located between Woodenbong and Bonalbo

Action - Telstra / Fed Govt (MBSP) – up to 4 new 4G Tower sites required



Kyogle Shire Analysis – Comparison with previous assessment

North West Kyogle Shire

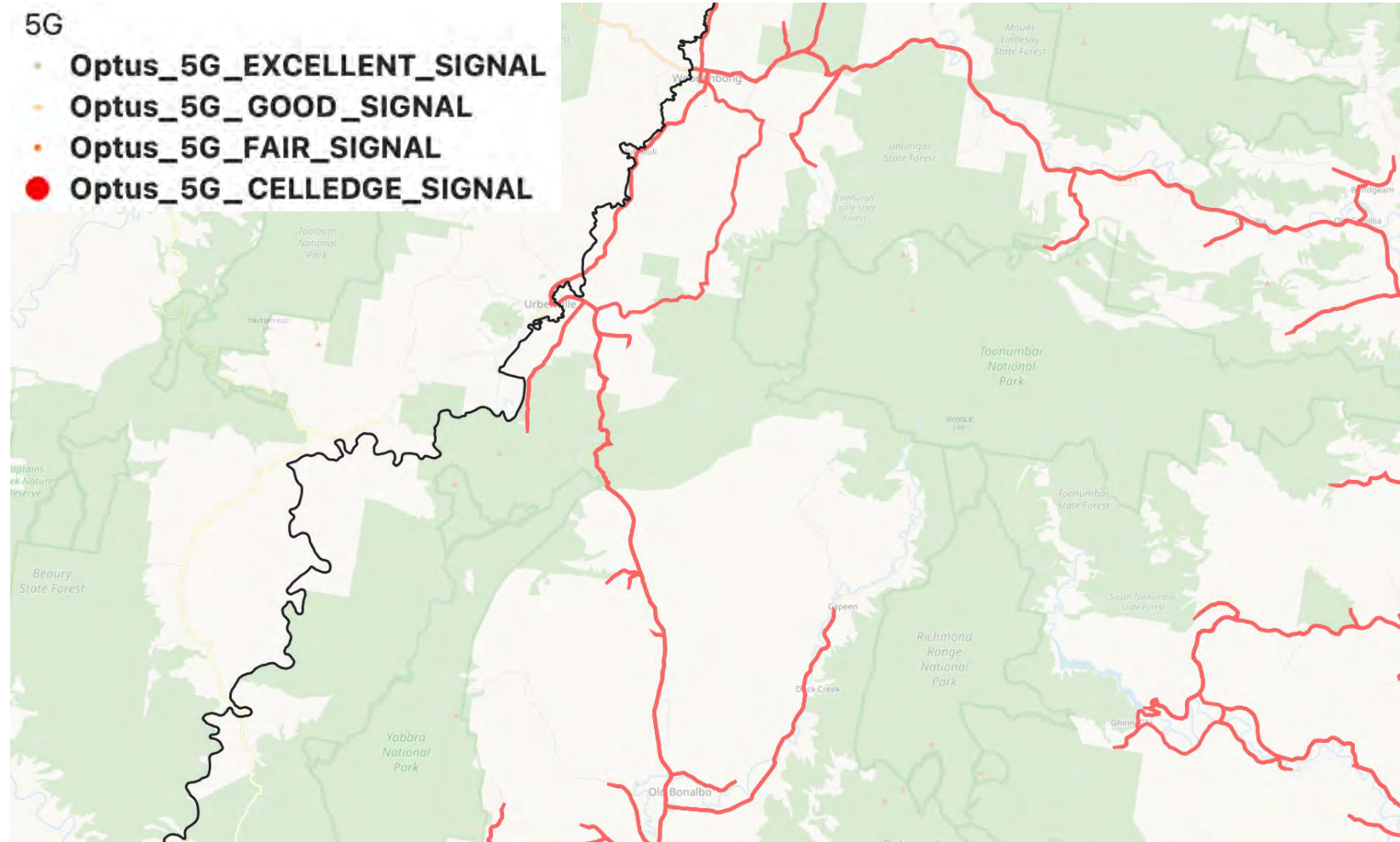


Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt (MBSP) – 6 new 5G Tower sites required

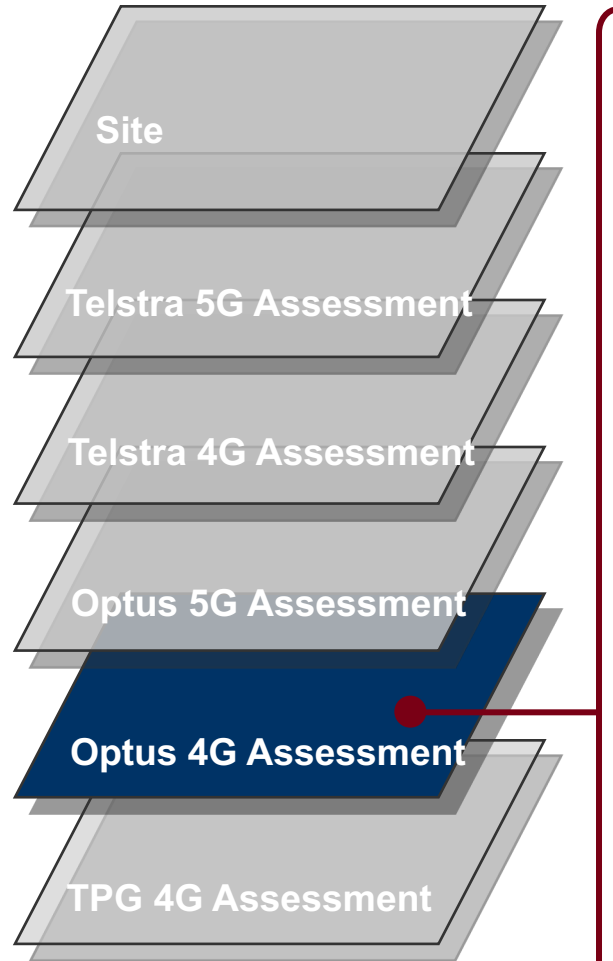
5G

- **Optus_5G_EXCELLENT_SIGNAL**
- **Optus_5G_GOOD_SIGNAL**
- **Optus_5G_FAIR_SIGNAL**
- **Optus_5G_CELLEDEGE_SIGNAL**



Kyogle Shire Analysis – Comparison with previous assessment

North West Kyogle Shire



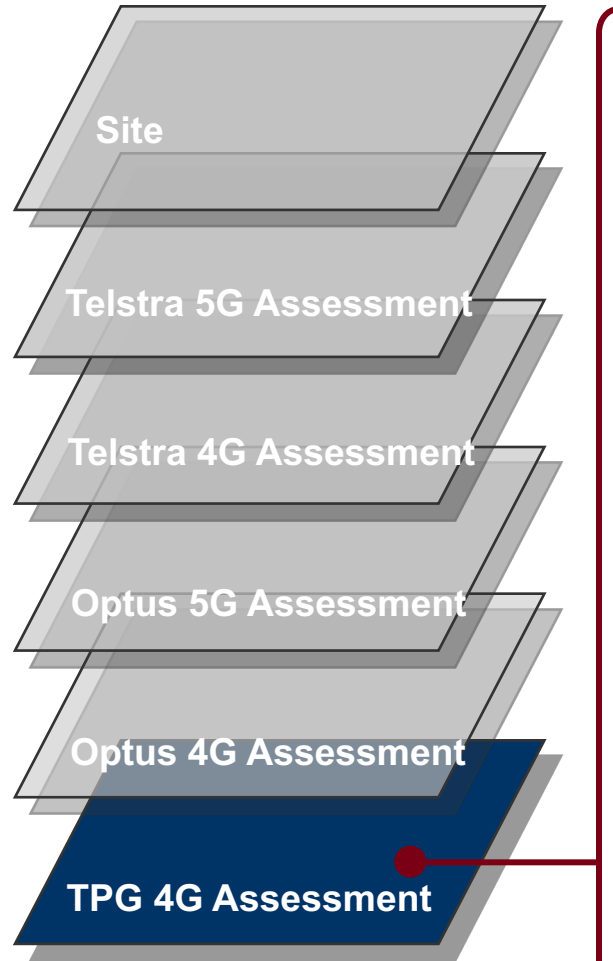
Assessment - No current Optus 4G coverage

Action –Optus / Fed Govt (MBSP) – 6 new 4G Tower sites required



Kyogle Shire Analysis – Comparison with previous assessment

North West Kyogle Shire



Assessment - No current TPG 4G coverage

Action –TPG / Fed Govt (MBSP) – 6 new 4G Tower sites required

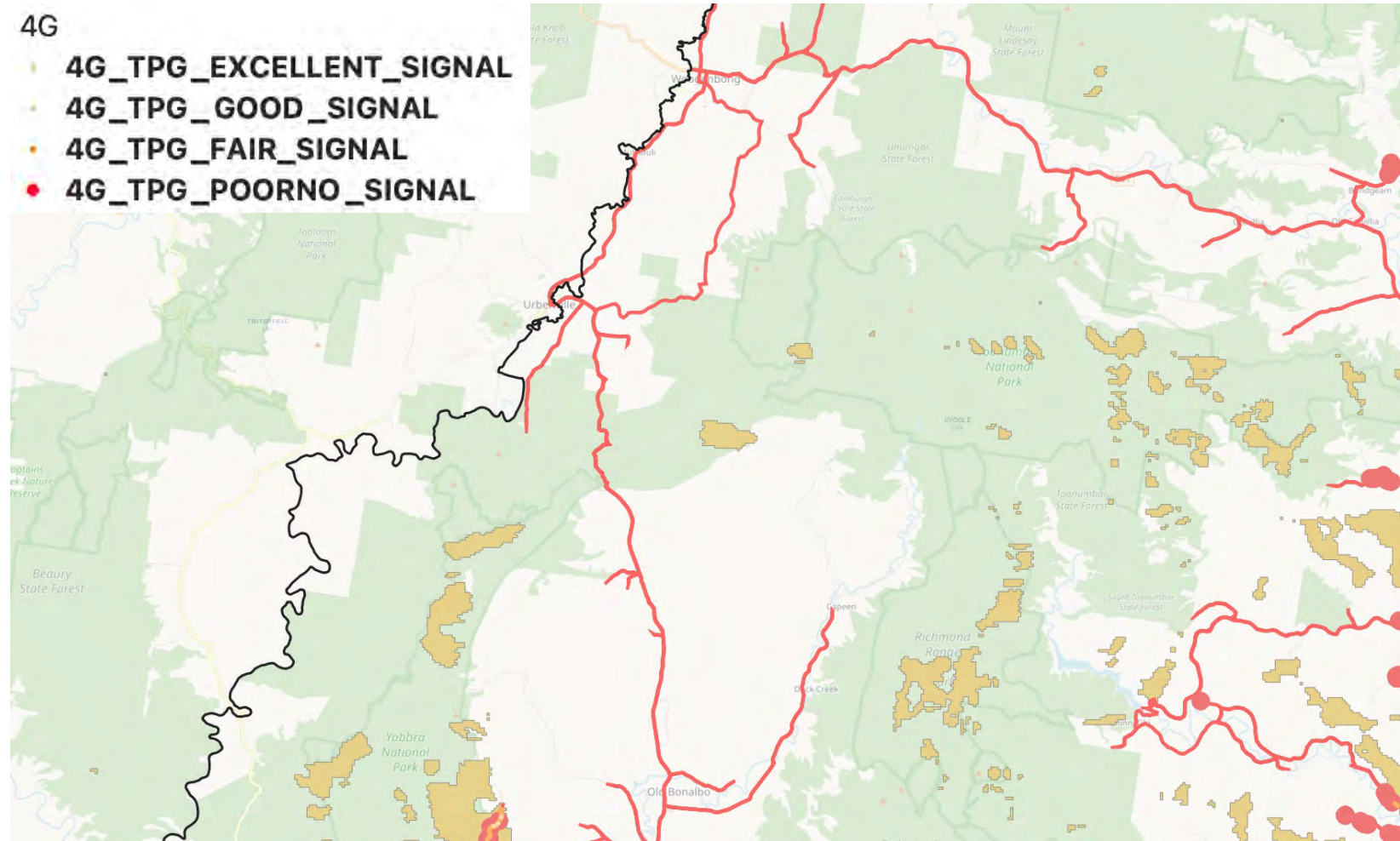
4G

4G_TPG_EXCELLENT_SIGNAL

4G_TPG_GOOD_SIGNAL

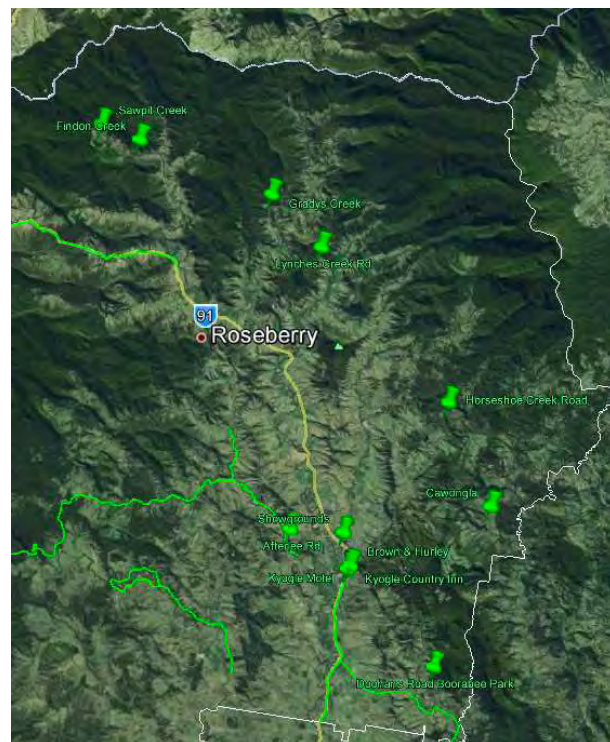
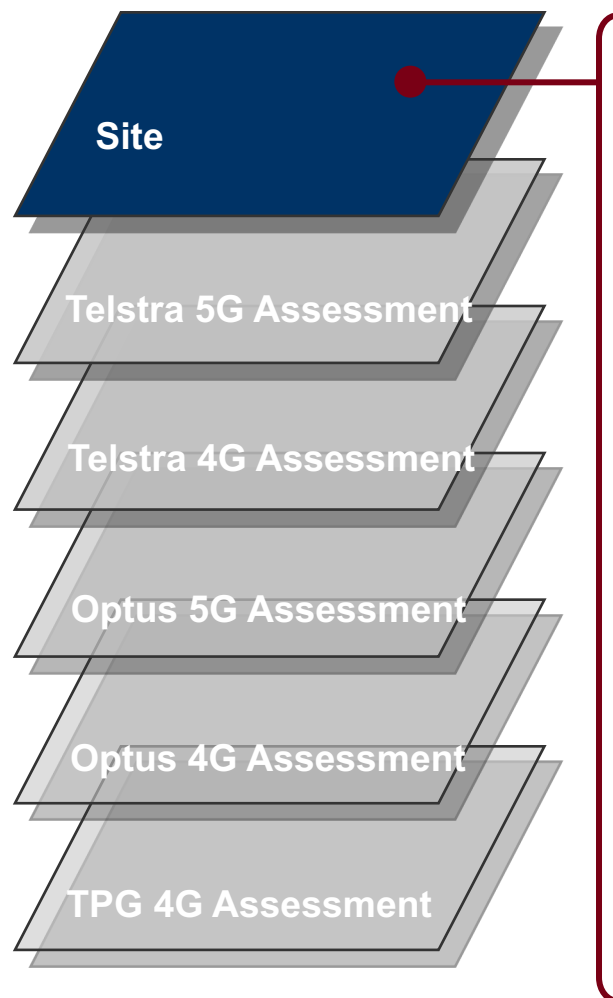
4G_TPG_FAIR_SIGNAL

4G_TPG_POORNO_SIGNAL



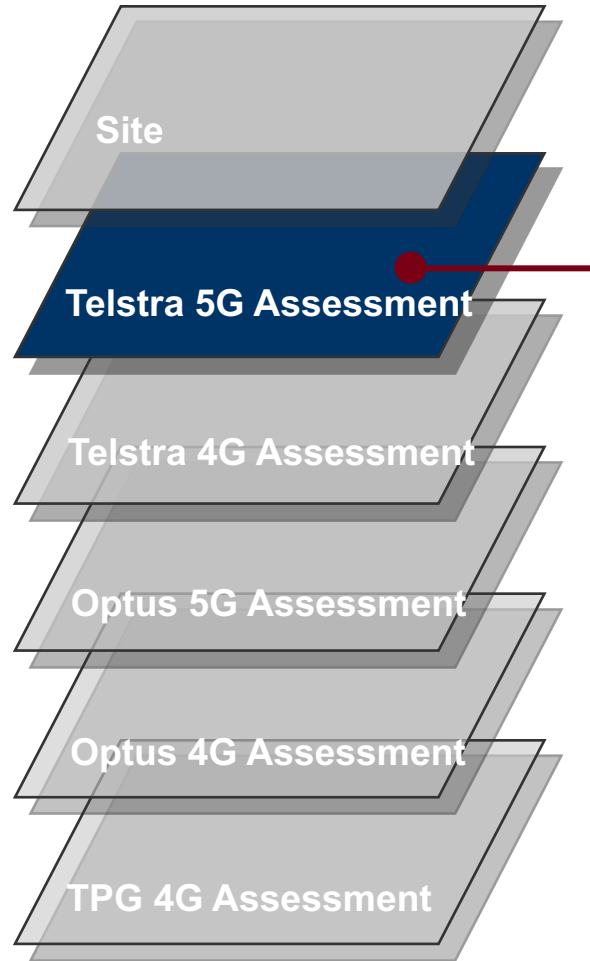
Kyogle Shire Analysis – Comparison with previous assessment

North East Kyogle Shire



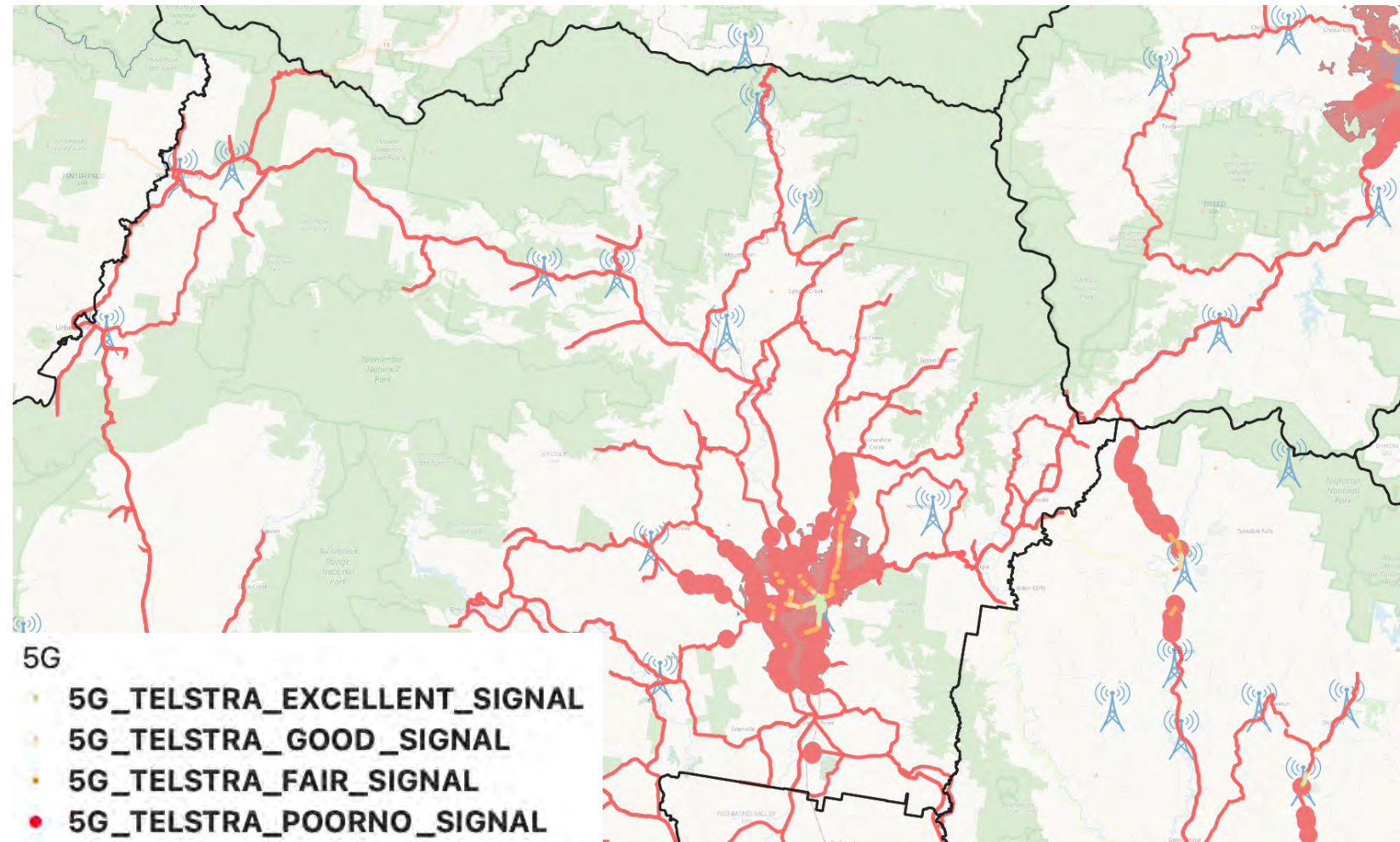
Kyogle Shire Analysis – Comparison with previous assessment

North East Kyogle Shire



Assessment - No current Telstra 5G coverage

Action – Telstra - Upgrade 7 x Sites to 3.6Ghz 5G & Telstra / Fed Govt – up to 5 new 5G Tower sites required

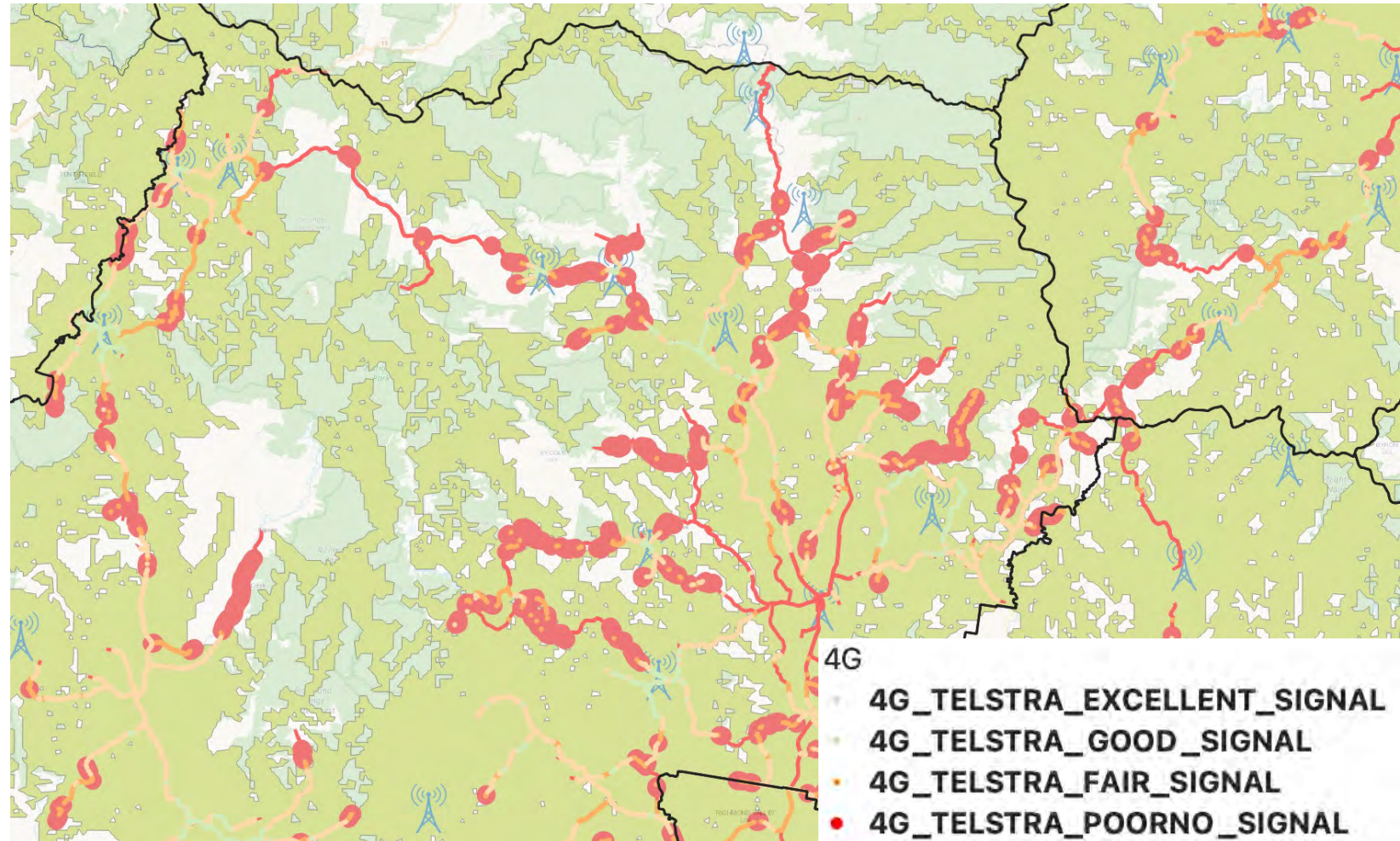
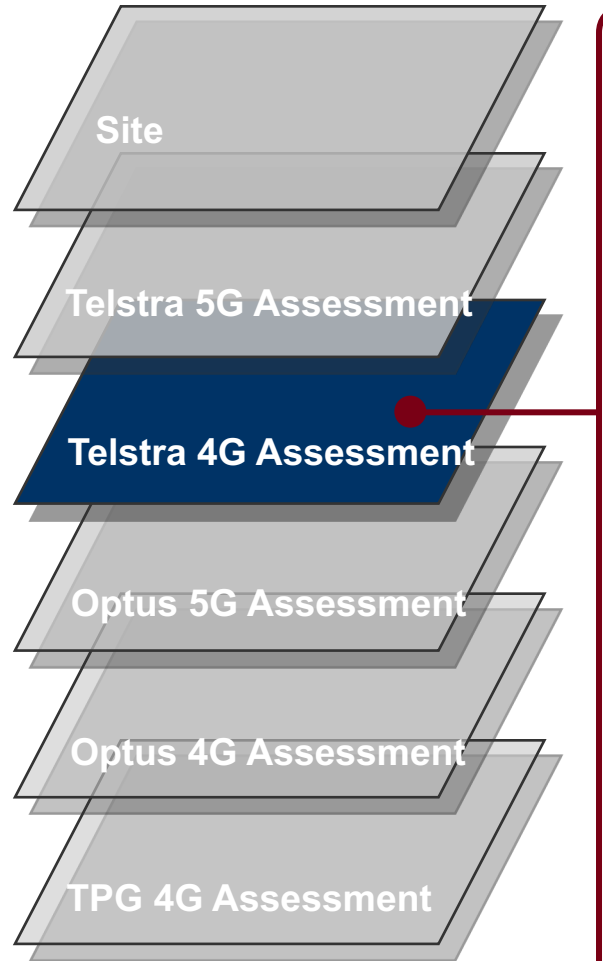


Kyogle Shire Analysis – Comparison with previous assessment

North East Kyogle Shire

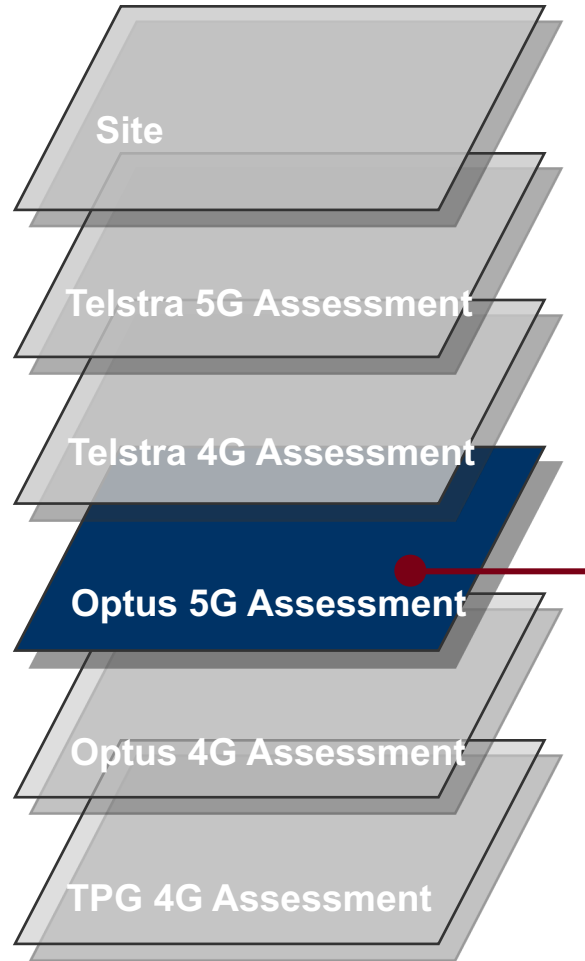
Assessment - Broad 4G blackspots north east of Summerland Way

Action - Telstra / Fed Govt (MBSP) – up to 4 new 4G Tower sites required



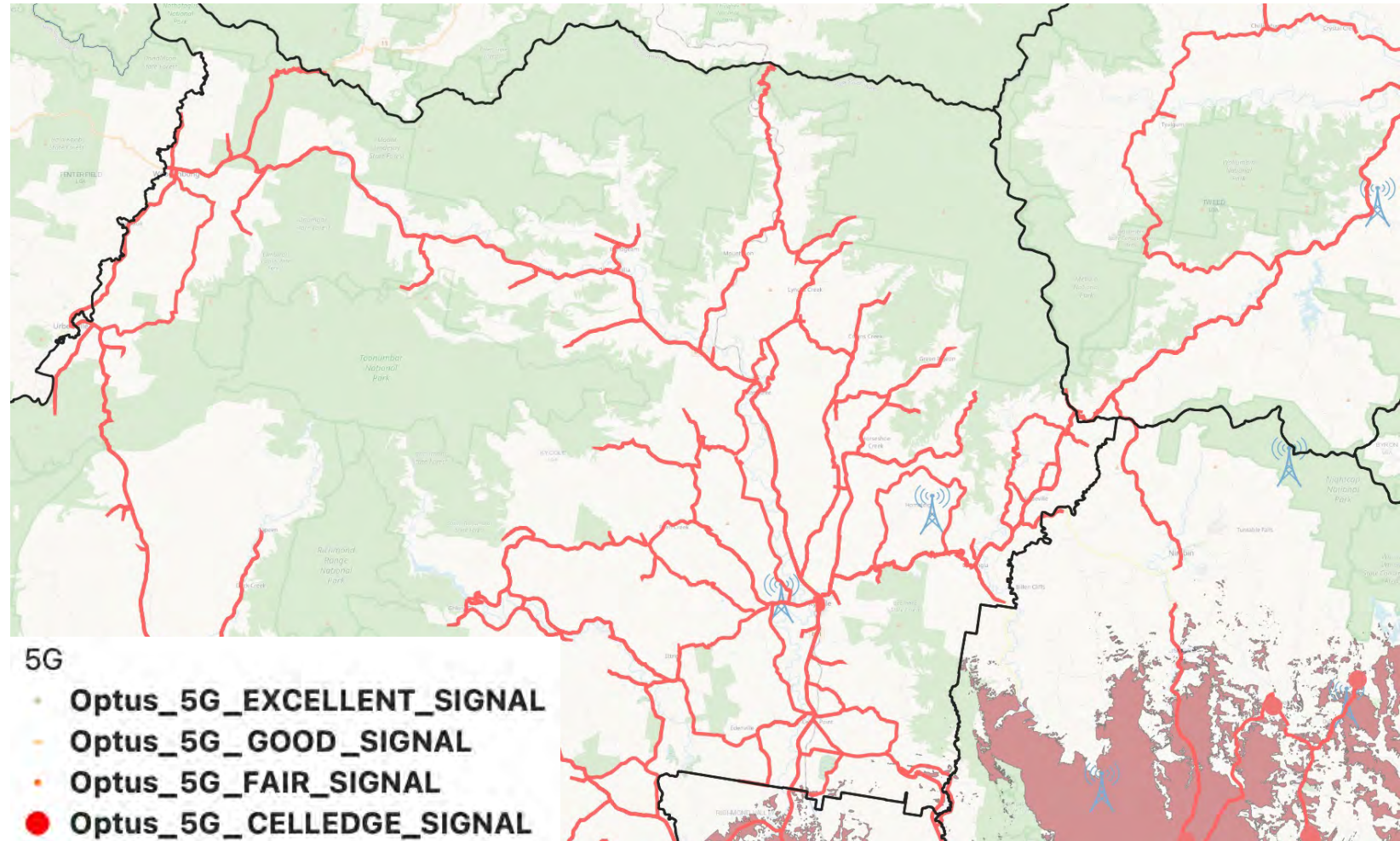
Kyogle Shire Analysis – Comparison with previous assessment

North East Kyogle Shire



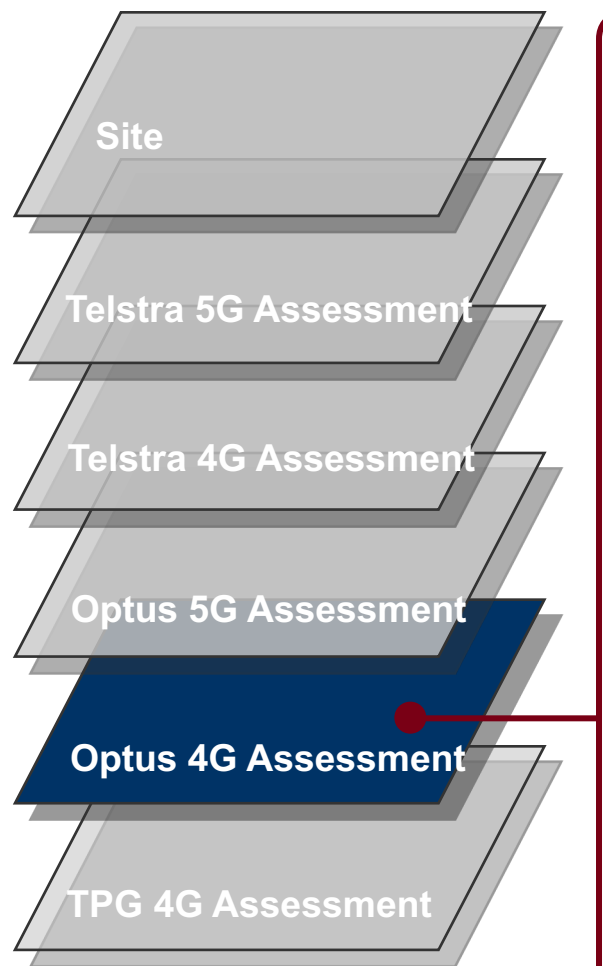
Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt (MBSP) – 6 new 5G Tower sites required



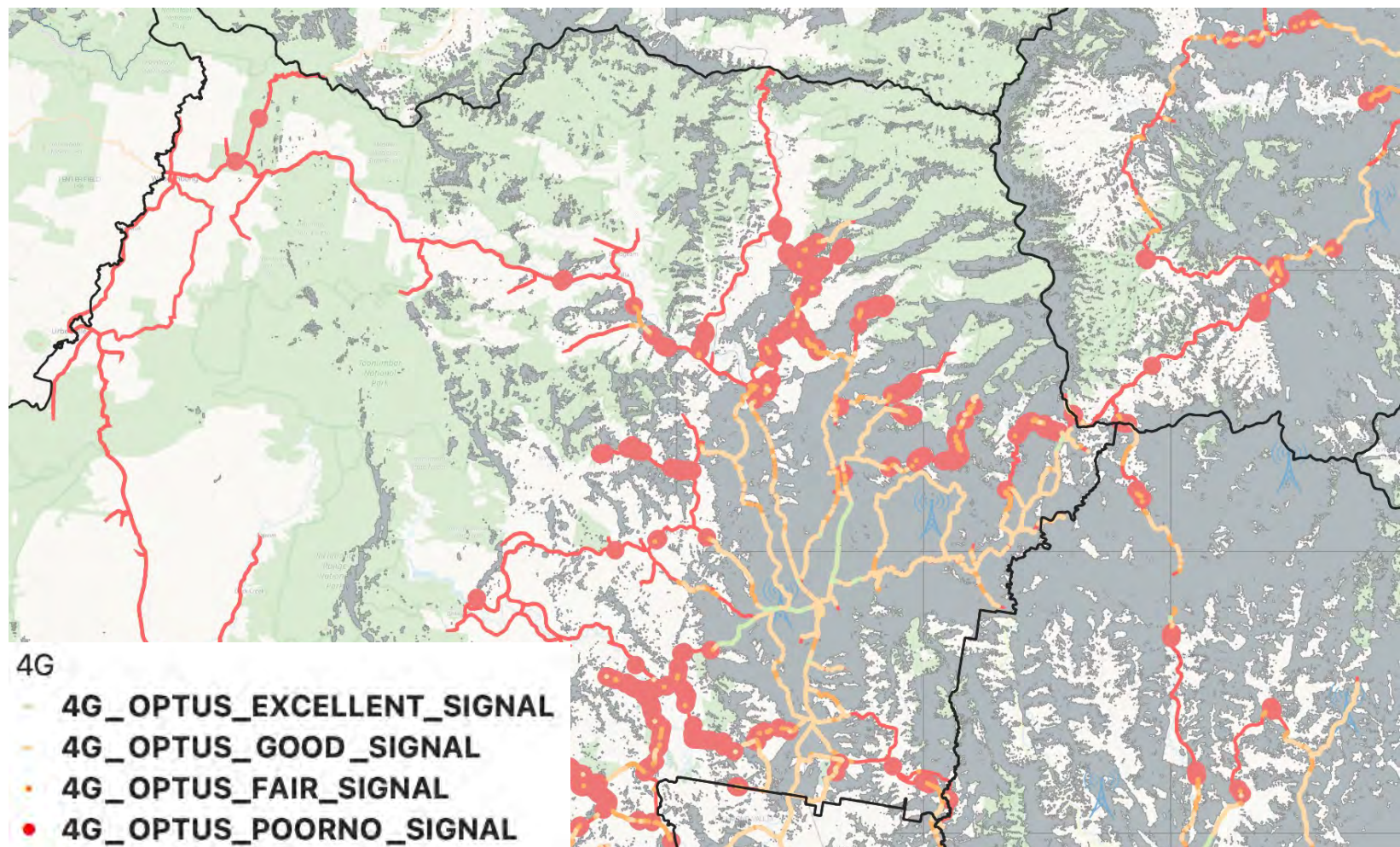
Kyogle Shire Analysis – Comparison with previous assessment

North East Kyogle Shire



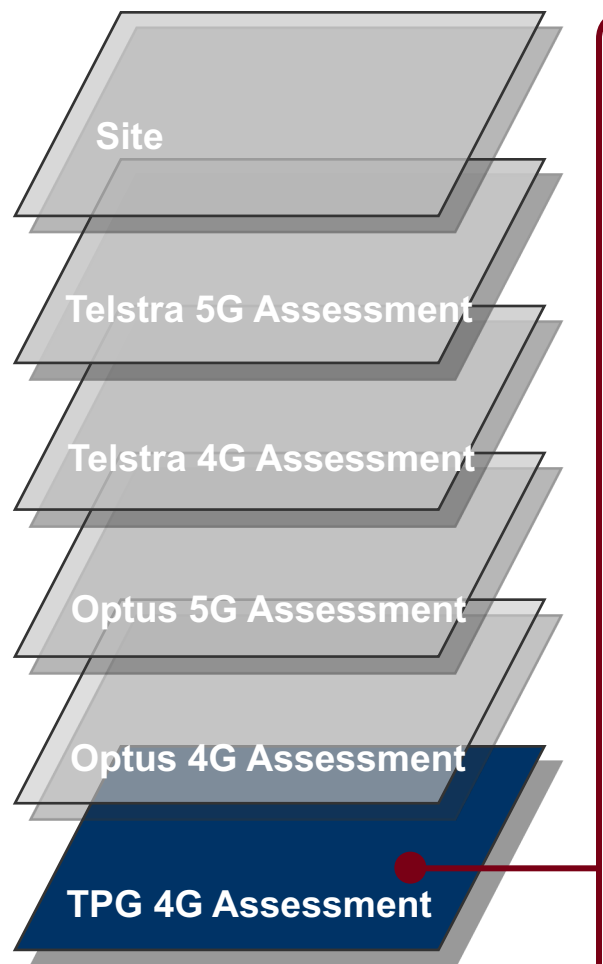
Assessment – Limited Optus 4G coverage

Action – Optus / Fed Govt (MBSP) – up to 8 new 4G Tower sites required



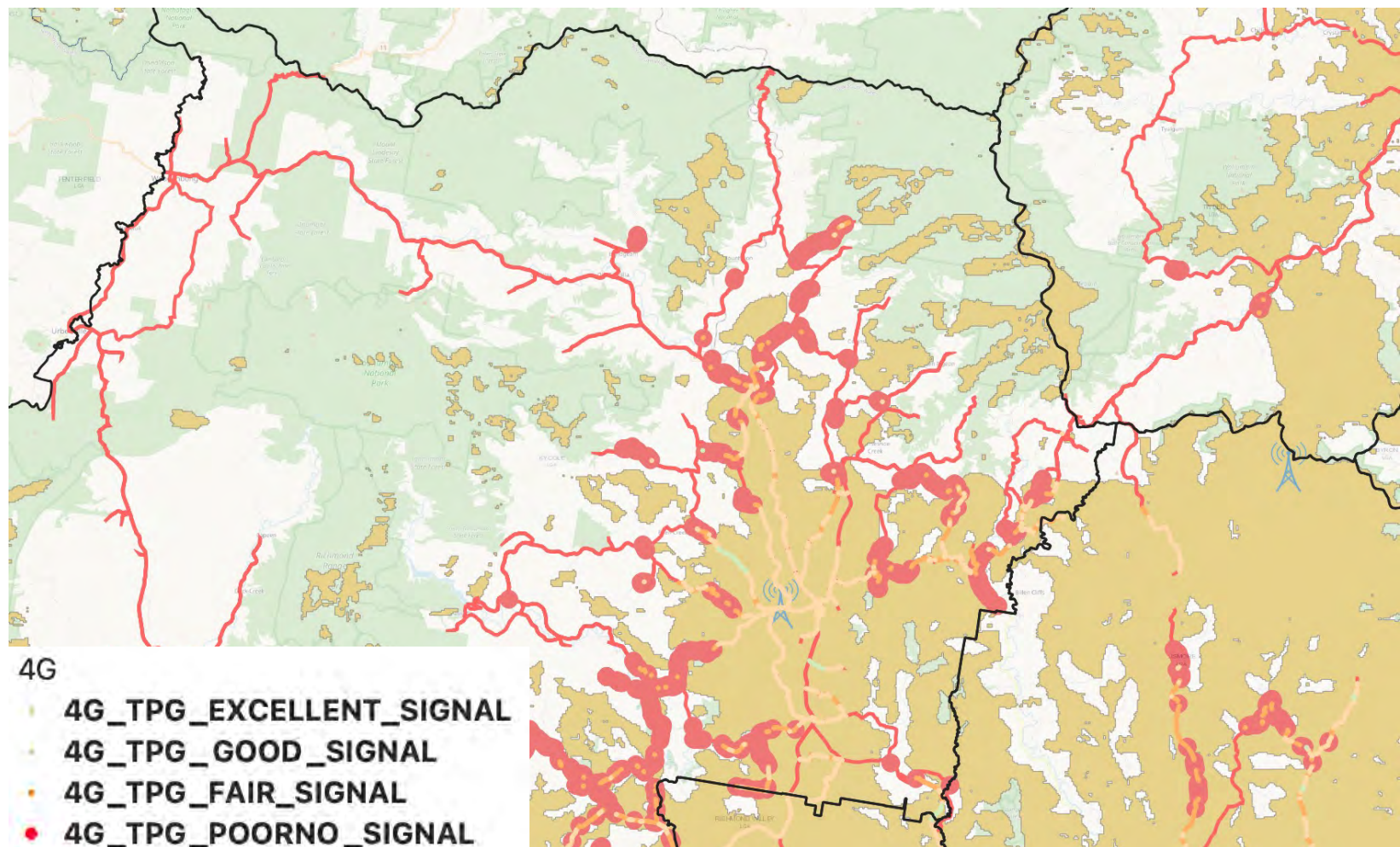
Kyogle Shire Analysis – Comparison with previous assessment

North East Kyogle Shire



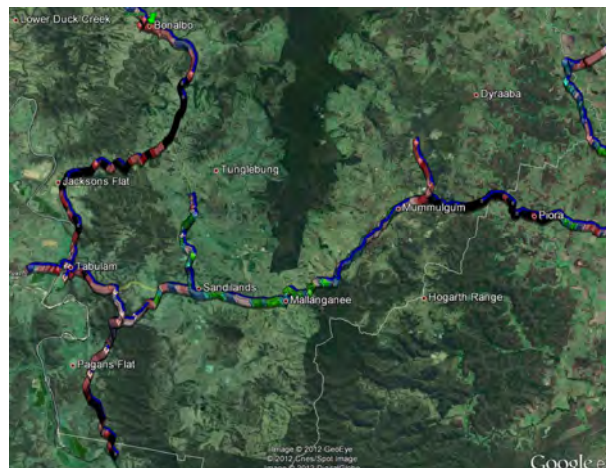
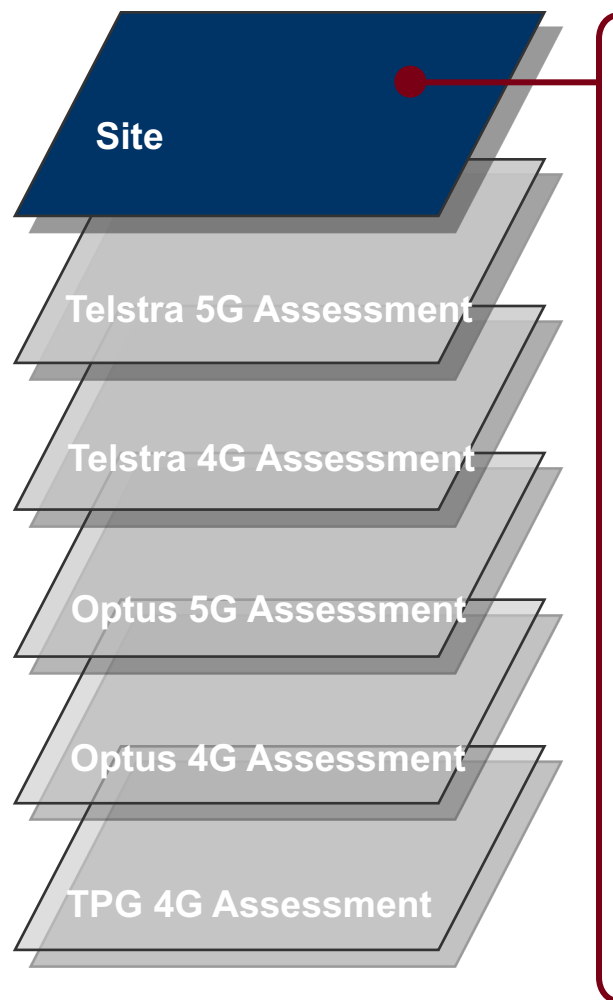
Assessment – Limited TPG 4G coverage

Action –TPG / Fed Govt (MBSP) – up to 8 new 4G Tower sites required



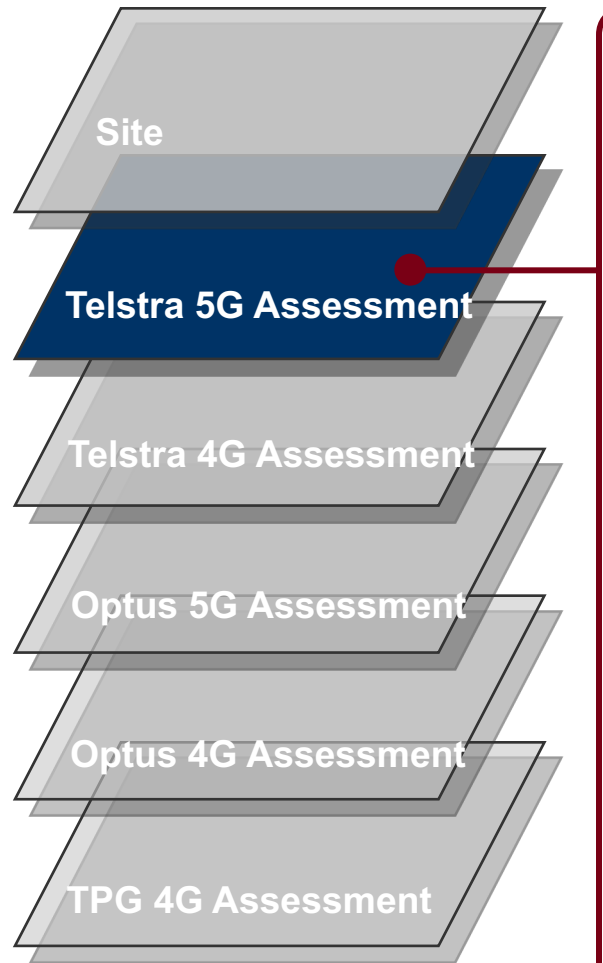
Kyogle Shire Analysis – Comparison with previous assessment

South Kyogle Shire



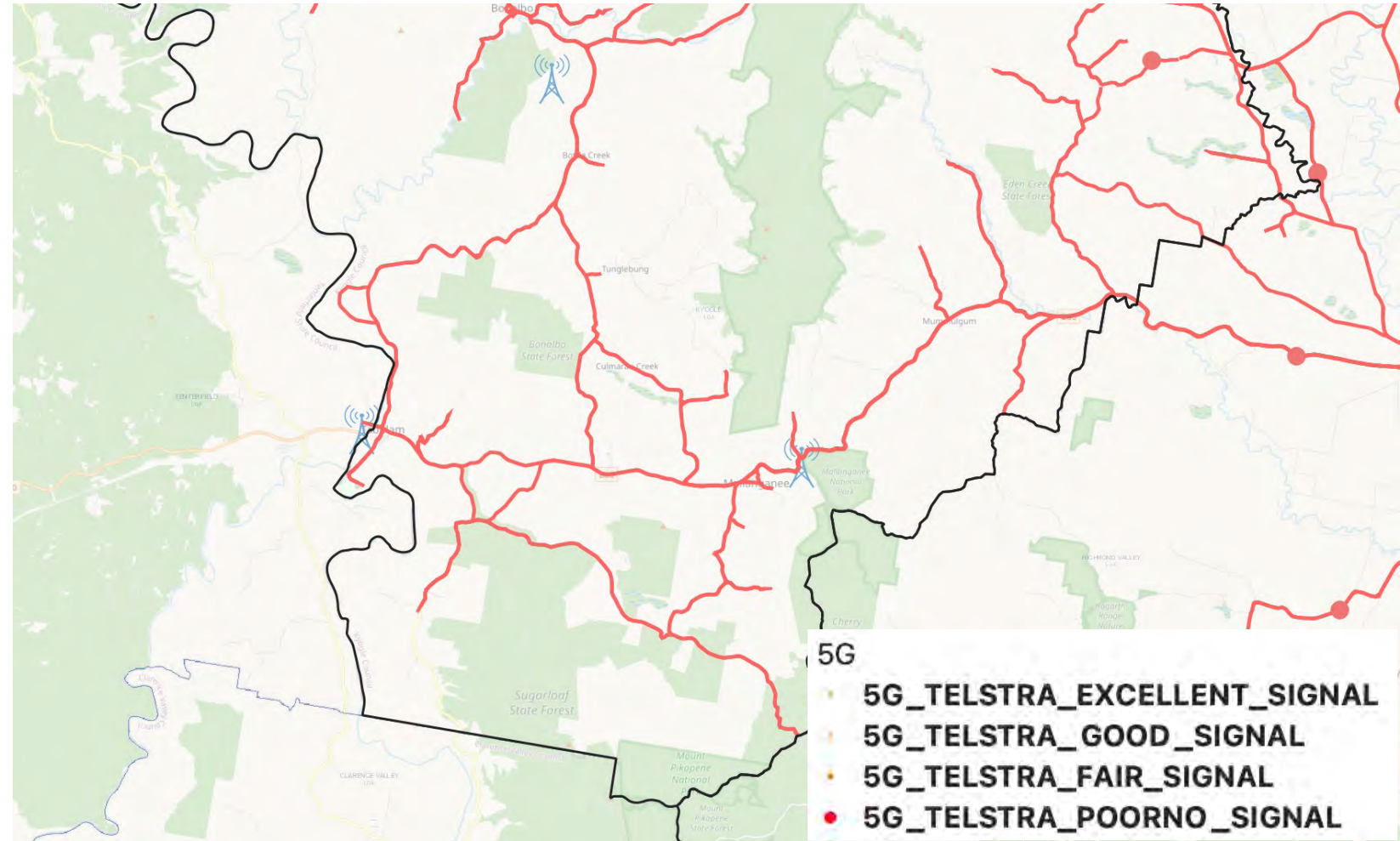
Kyogle Shire Analysis – Comparison with previous assessment

South Kyogle Shire



Assessment - No current Telstra 5G coverage

Action – Telstra - Upgrade 3 x Sites to 3.6Ghz 5G & Telstra / Fed Govt – up to 4 new 5G Tower sites required

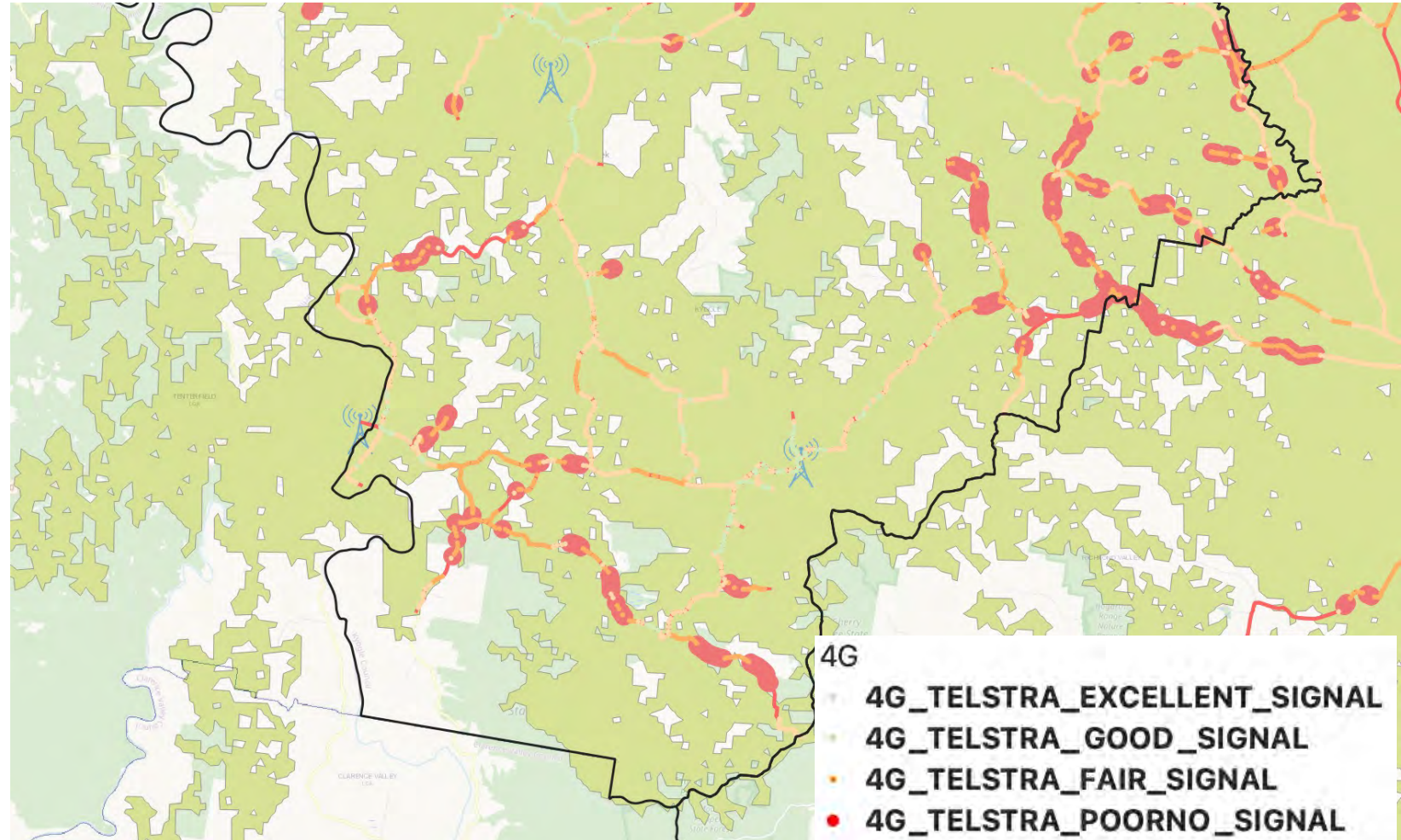
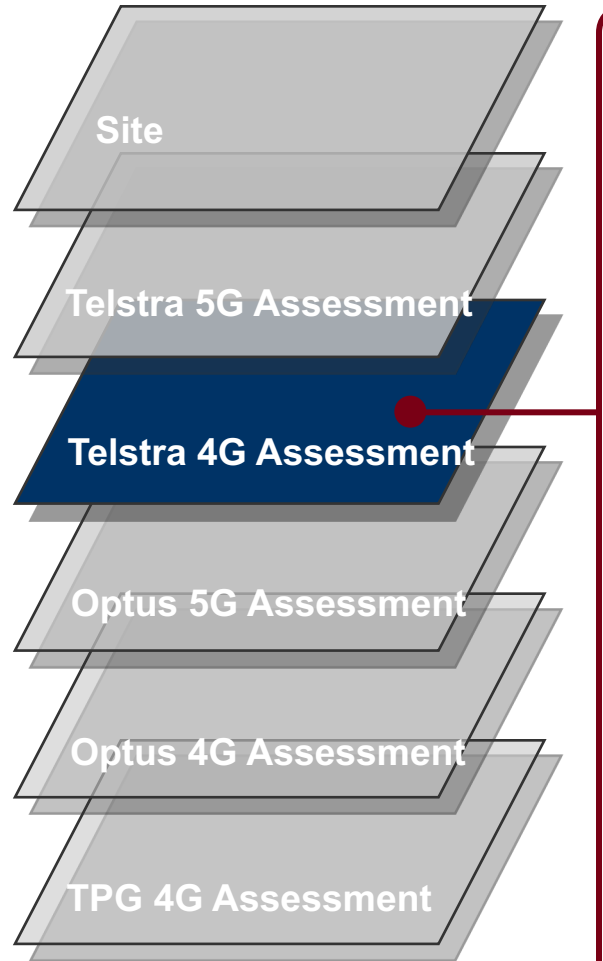


Kyogle Shire Analysis – Comparison with previous assessment

South Kyogle Shire

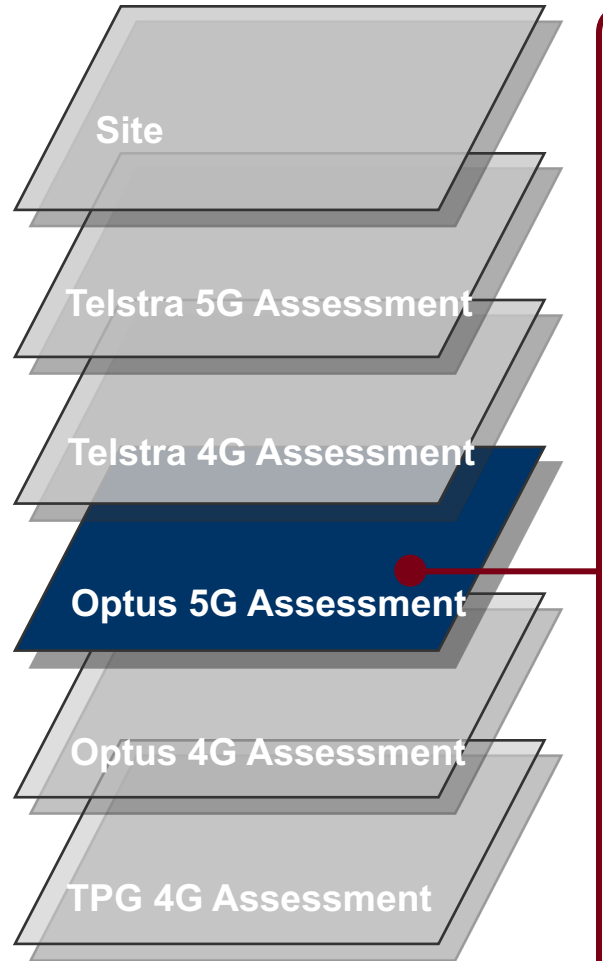
Assessment - Broad 4G blackspots north and south of Bruxner Highway

Action – Telstra / Fed Govt (MBSP) – up to 4 new 4G Tower sites required



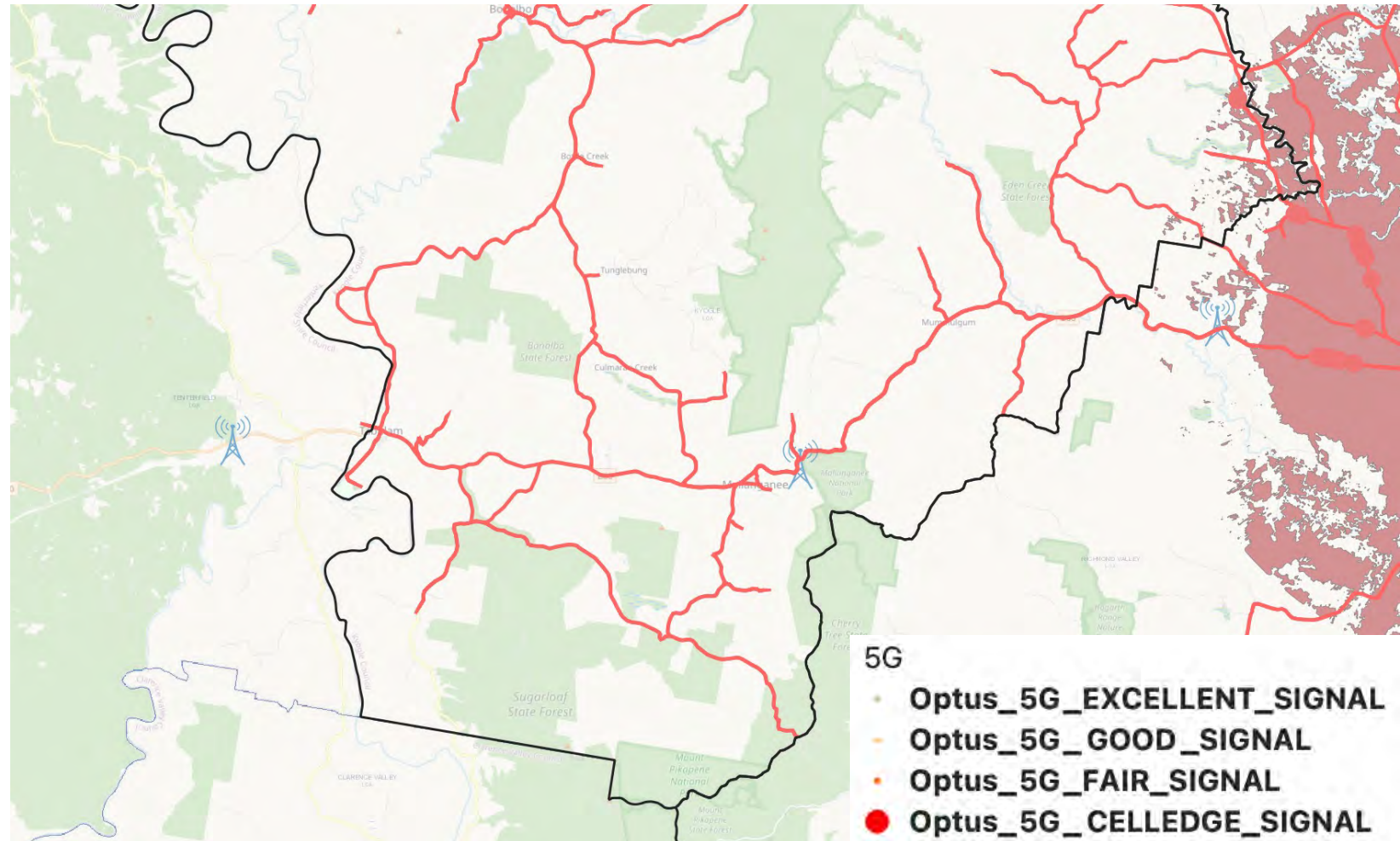
Kyogle Shire Analysis – Comparison with previous assessment

South Kyogle Shire



Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt (MBSP) – 5 new 5G Tower sites required

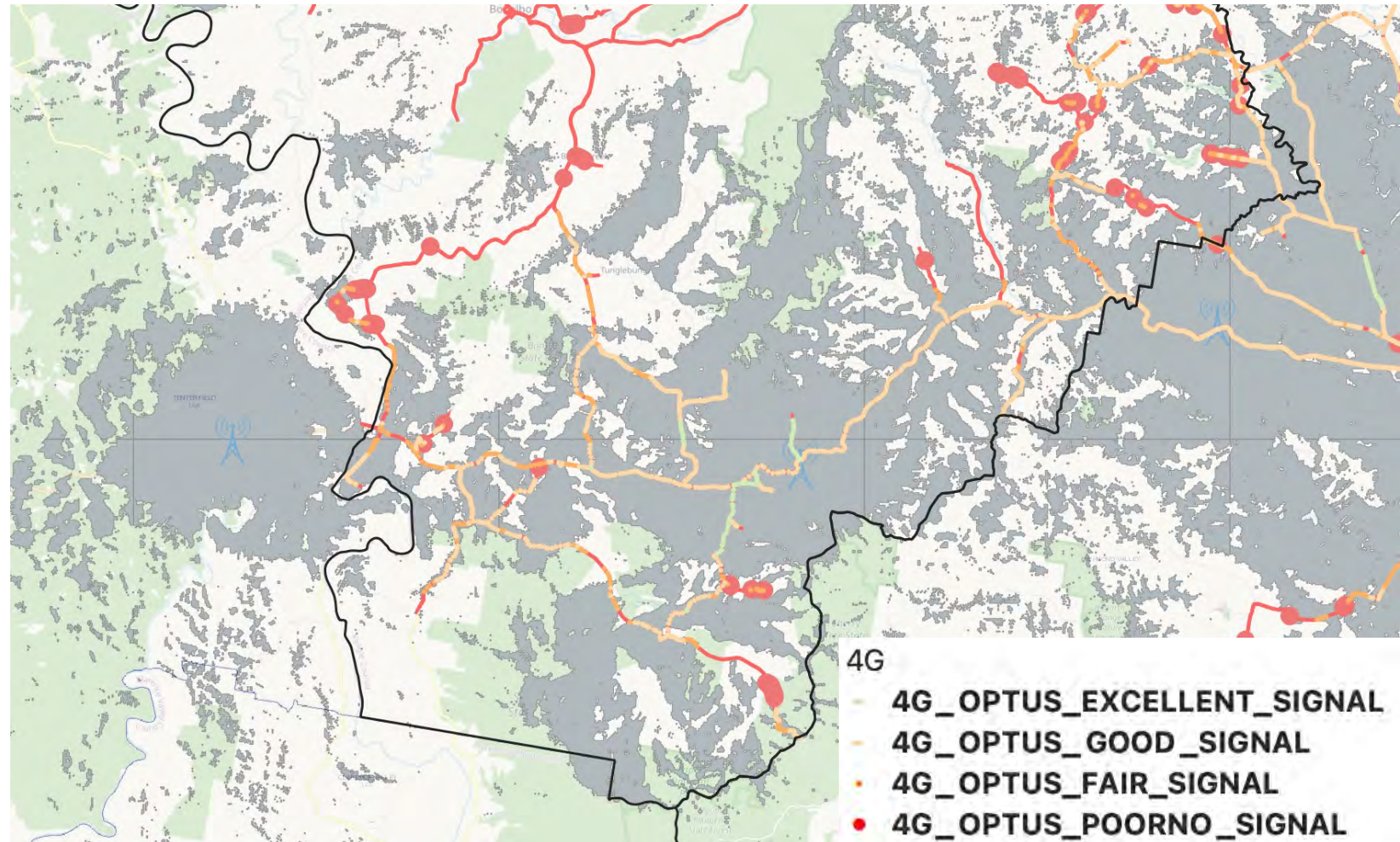
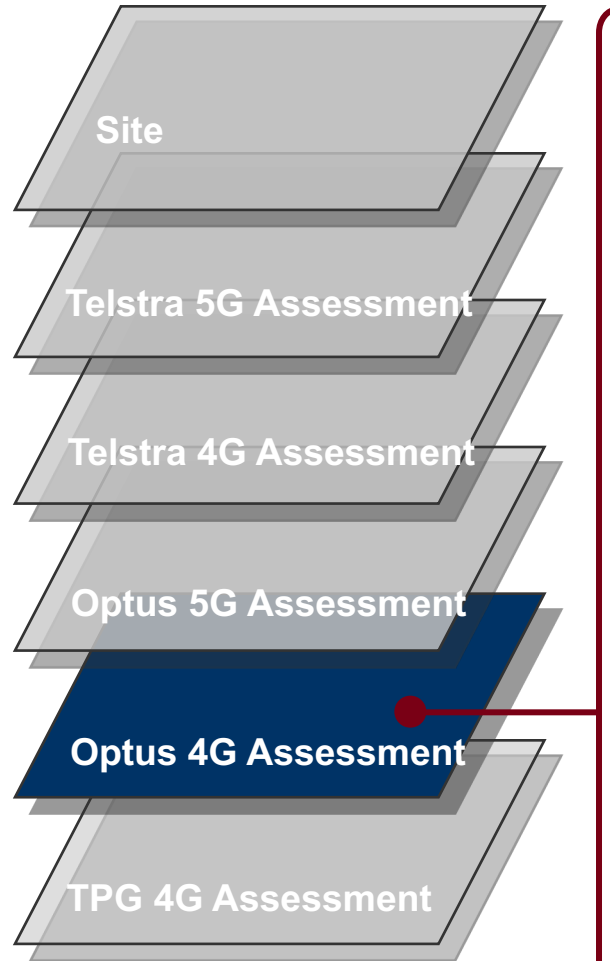


Kyogle Shire Analysis – Comparison with previous assessment

South Kyogle Shire

Assessment – Limited Optus 4G coverage

Action – Optus / Fed Govt (MBSP) – up to 6 new 4G Tower sites required

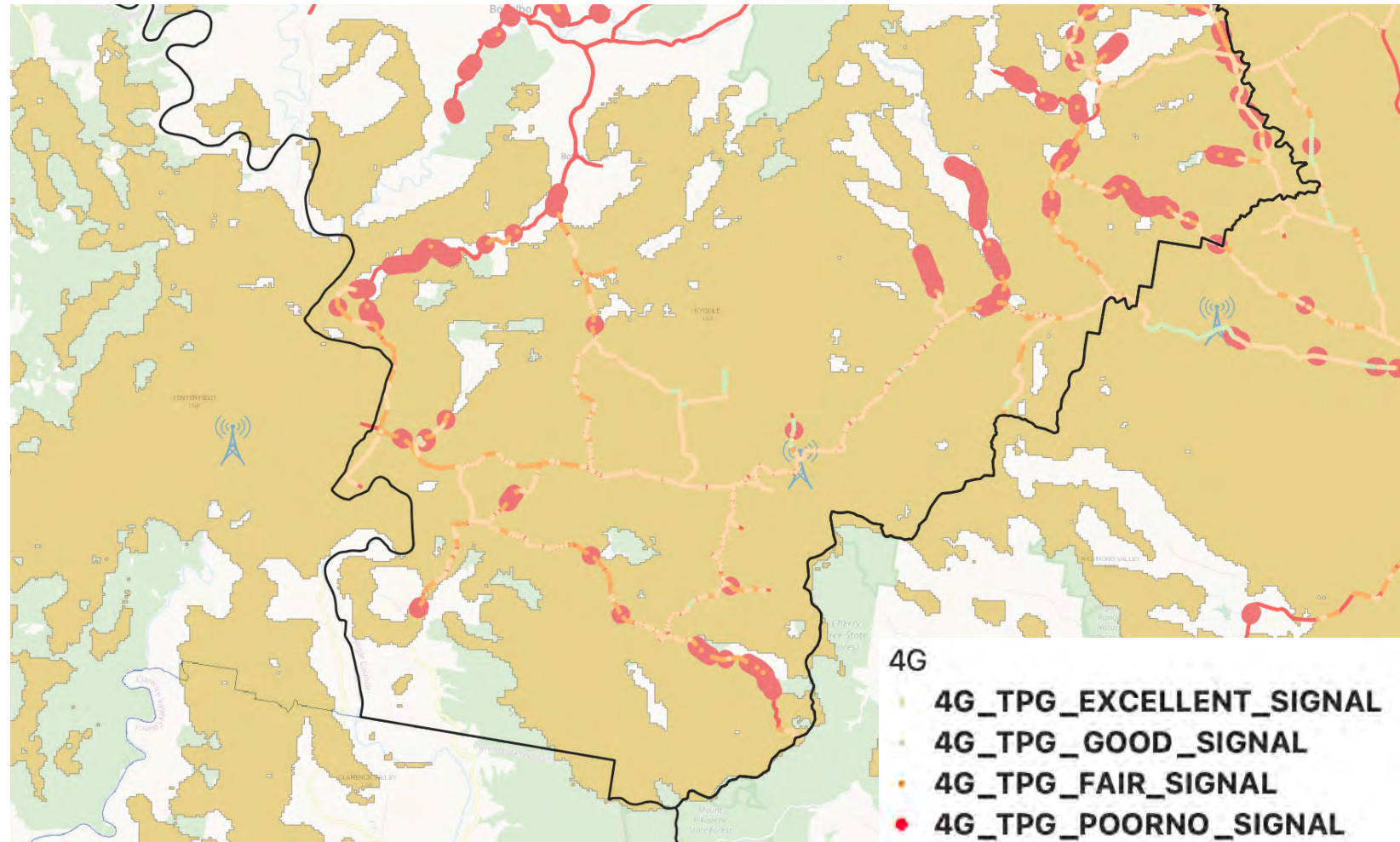
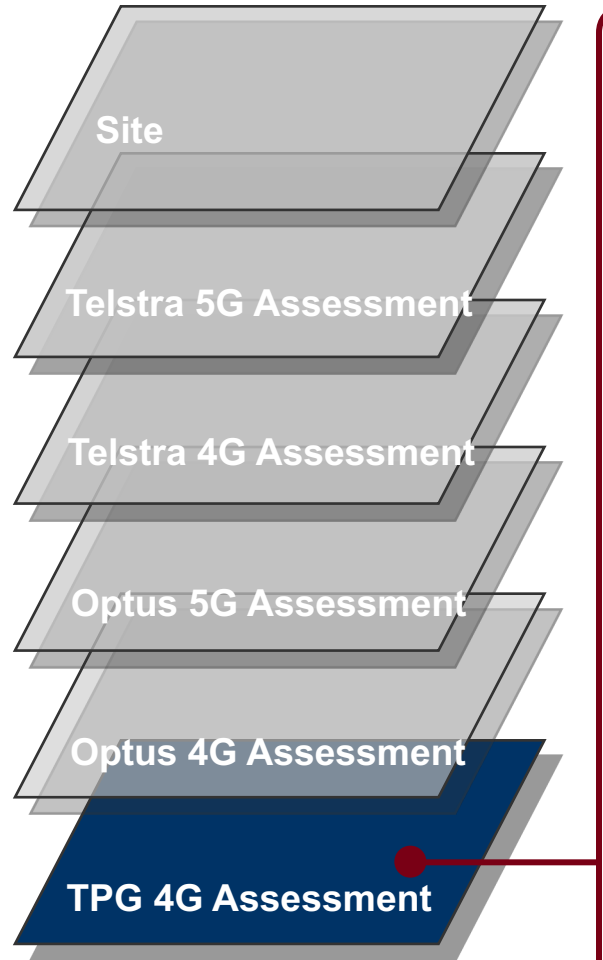


Kyogle Shire Analysis – Comparison with previous assessment

South Kyogle Shire

Assessment – Limited TPG 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 6 new 4G Tower sites required



1. Byron Shire Analysis

Byron Shire Analysis

Signal Testing:

Road name	From	To	Approx Distance
Pacific Highway	Northern Shire boundary Crabbes Creek	Southern Shire boundary Newrybar	45km
The Pocket Road / Main Arm Road	Billinudgel	Mullumbimby	20km
Coolamon Scenic Road	Mullumbimby	Pacific Highway	20km
Myocum Road	Coolamon Scenic Drive	Pacific Highway	15km
Ewingdale Road	Pacific Highway	Byron Bay	5km
Broken Head Road	Byron Bay	Southern shire boundary	15km
Lismore Road	Bangalow	Western Shire boundary	20km
Eureka Road	Bangalow Road	Eureka	5km
Federal Drive	Eureka	Coolamon Scenic Rd	20km
Binna Burra Road	Binna Burra	Federal	15km

Friday Hut Road	Coolamon Scenic Rd	Shire Boundary	35km
Bangalow Road	Bangalow	Broken Head Rd	8km

Network Bandwidth Point Tests:

- Brunswick Heads
- Ocean Shores
- Billinudgel
- Mullumbimby
- Byron Bay
- Bangalow
- Broken Head

This section provides an analysis of the change in Mobile Network Operator sites in the Byron Shire from 2018 to 2022.

Total Number of Sites by MNO

Byron Shire	2018	2022
Optus	11	14
Telstra	12	13
TPG	10	10

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Byron Shire	2018	2022
Optus		
900 MHz	9	14
2100 MHz	9	11
Telstra		
850 MHz	11	11
2100 MHz	3	-
TPG		
900 MHz	10	10
2100 MHz	10	4

Note – A single site may host multiple spectrum bands.

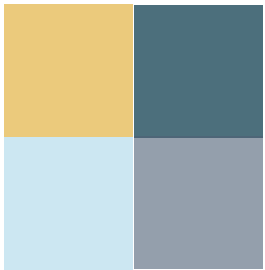
Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

Byron Shire	2018	2022
Optus		
700 MHz	8	11
900 MHz		5
1800 MHz	7	11
2100 MHz	2	11
2300 MHz		
2600 MHz	8	9
3500 MHz		
Telstra		

Byron Shire	2018	2022
700 MHz	10	11
900 MHz		
1800 MHz	10	11
2100 MHz	1	5
2600 MHz	3	2
TPG		
700 MHz		
850 MHz	10	10
1800 MHz	3	3
2100 MHz	7	8
2600 MHz		

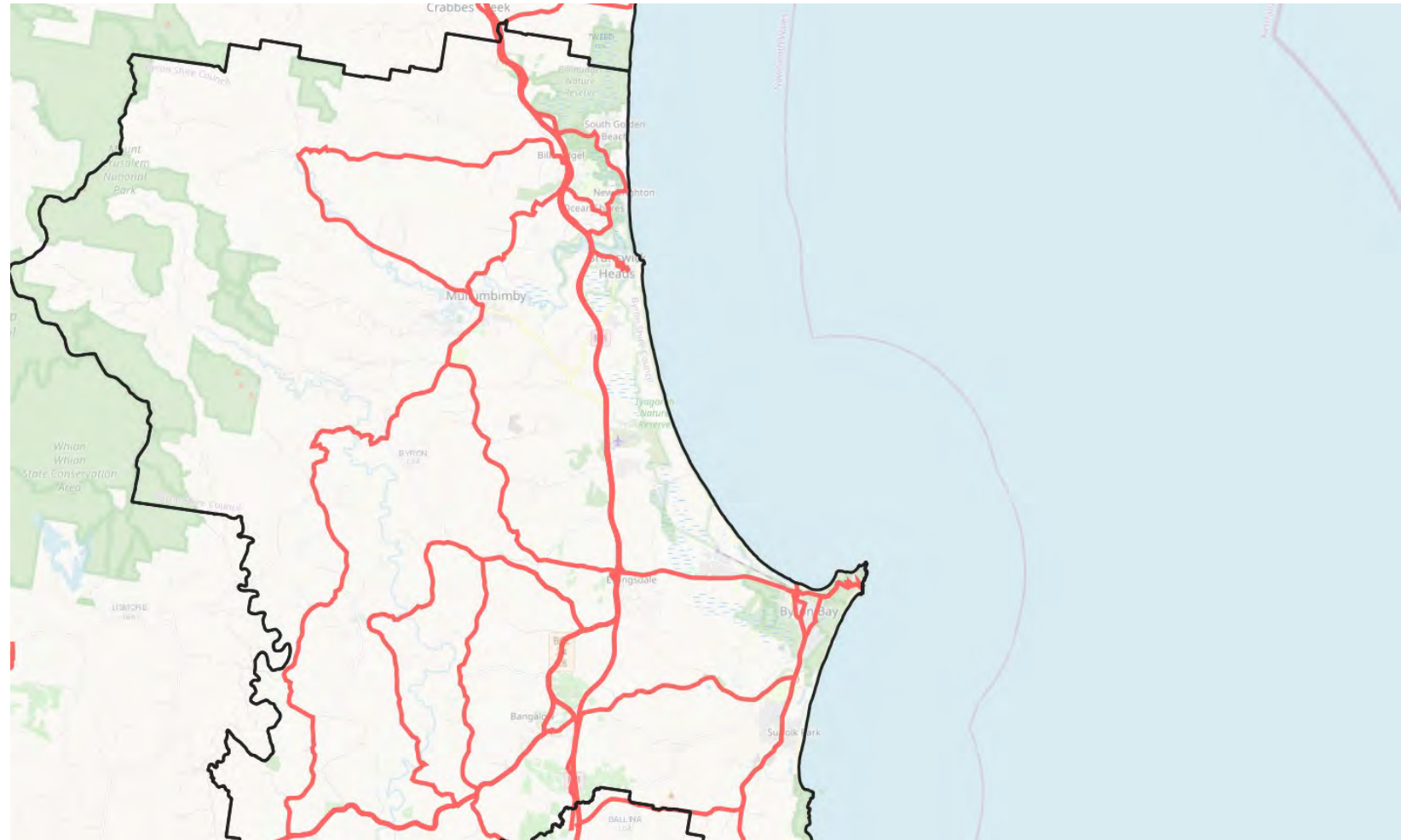
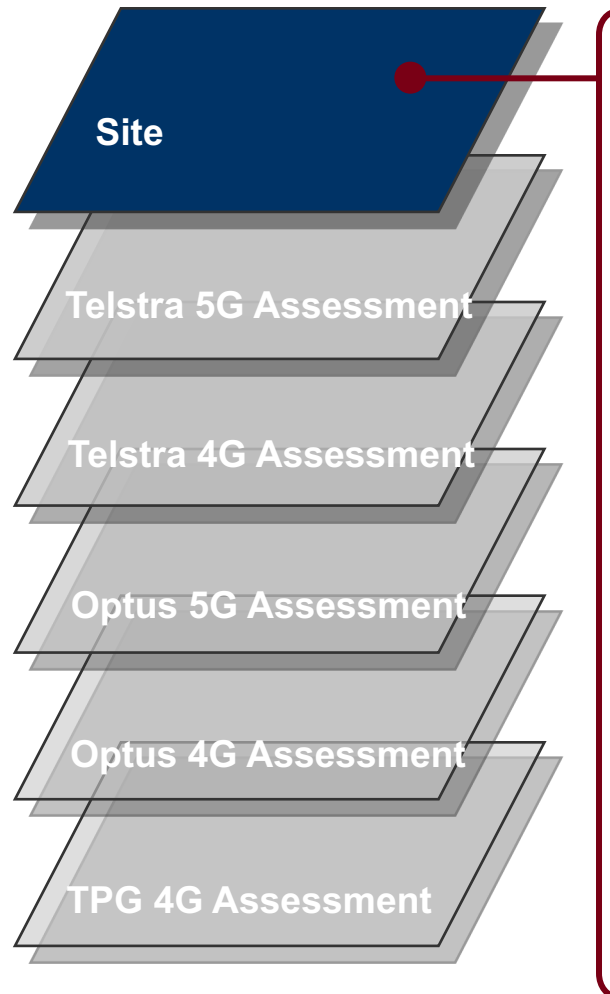
Total Number of 5G Sites by MNO

Byron Shire	2018	2022
Optus		
2100 MHz		1
2300 MHz		
3500 MHz		
26000 MHz		
Telstra		
850 MHz	-	5
2600 MHz	-	-
3600 MHz	-	5
TPG		
700 MHz	-	-
3600 MHz	-	-



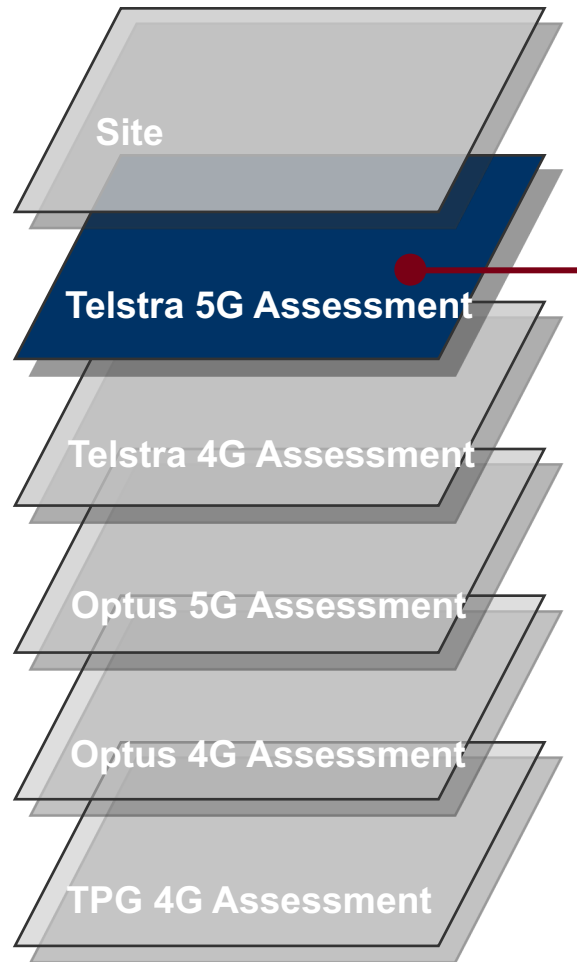
Byron Shire Analysis

Pacific Highway



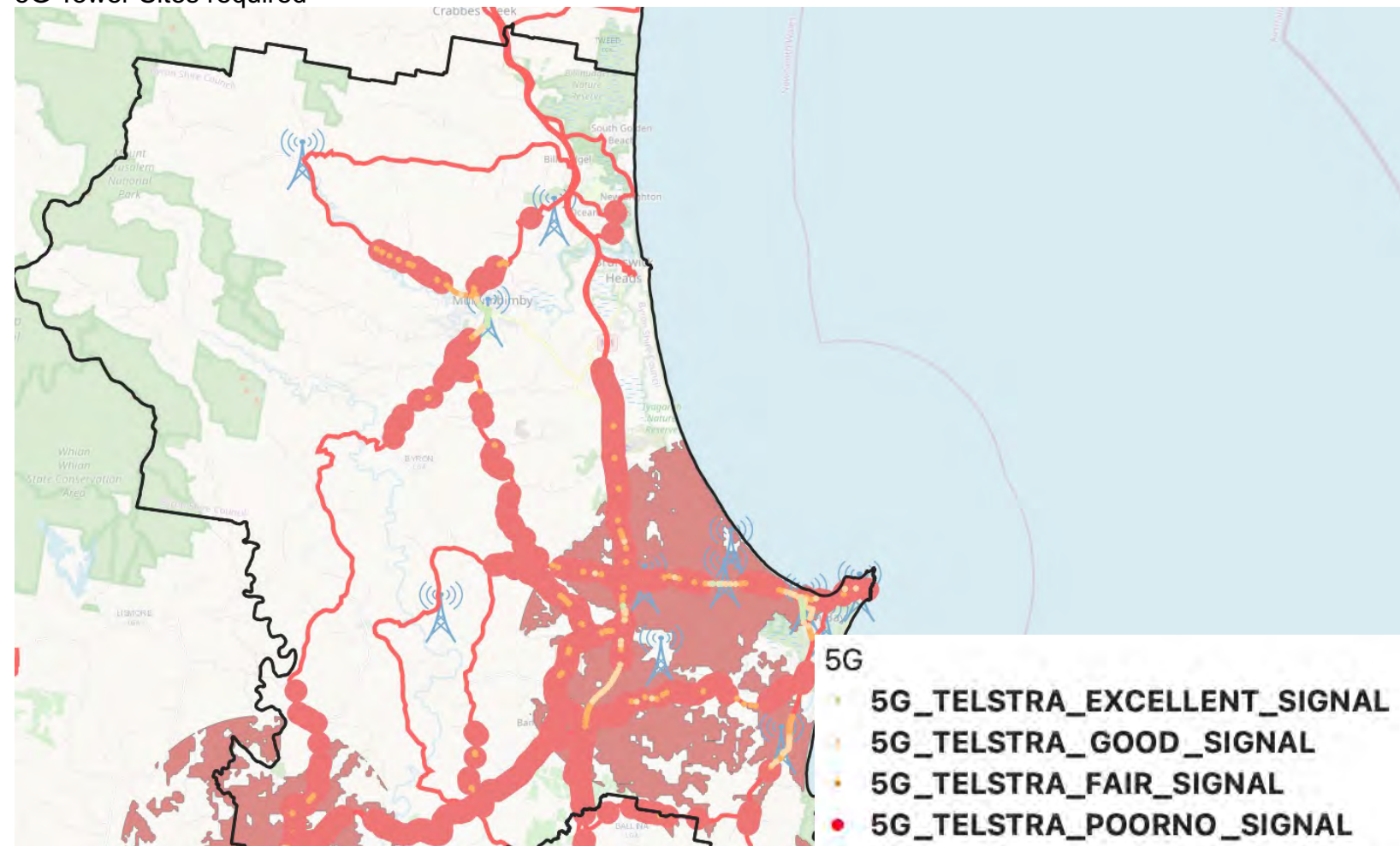
Byron Shire Analysis

Pacific Highway



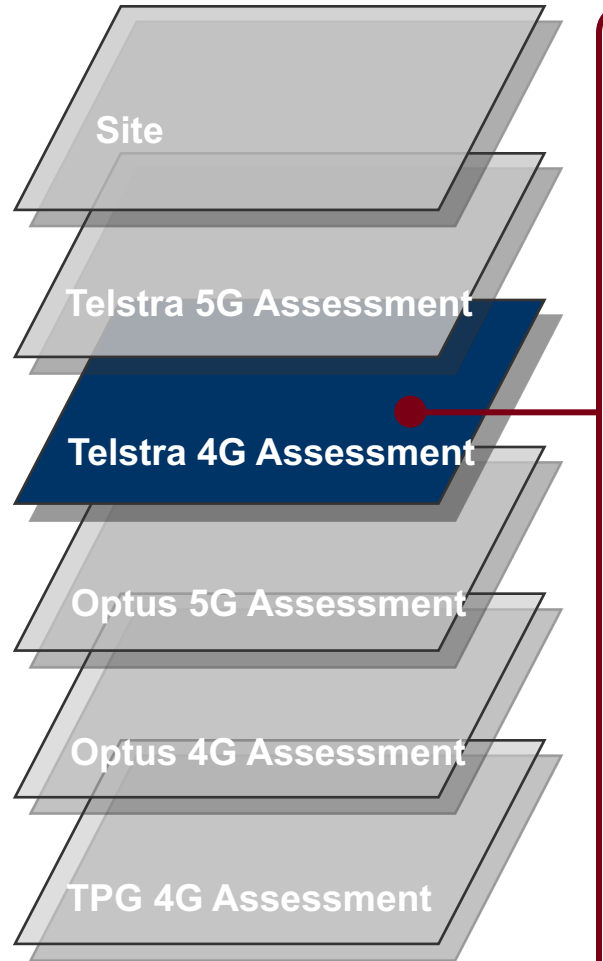
Assessment – Good 5G coverage near Byron Bay. Large areas with no current 5G coverage

Action – Telstra - Upgrade 2 x Telstra Tower Sites with 3.6Ghz 5G & Telstra / Fed Govt (MBSP) – up to 3 new 5G Tower Sites required



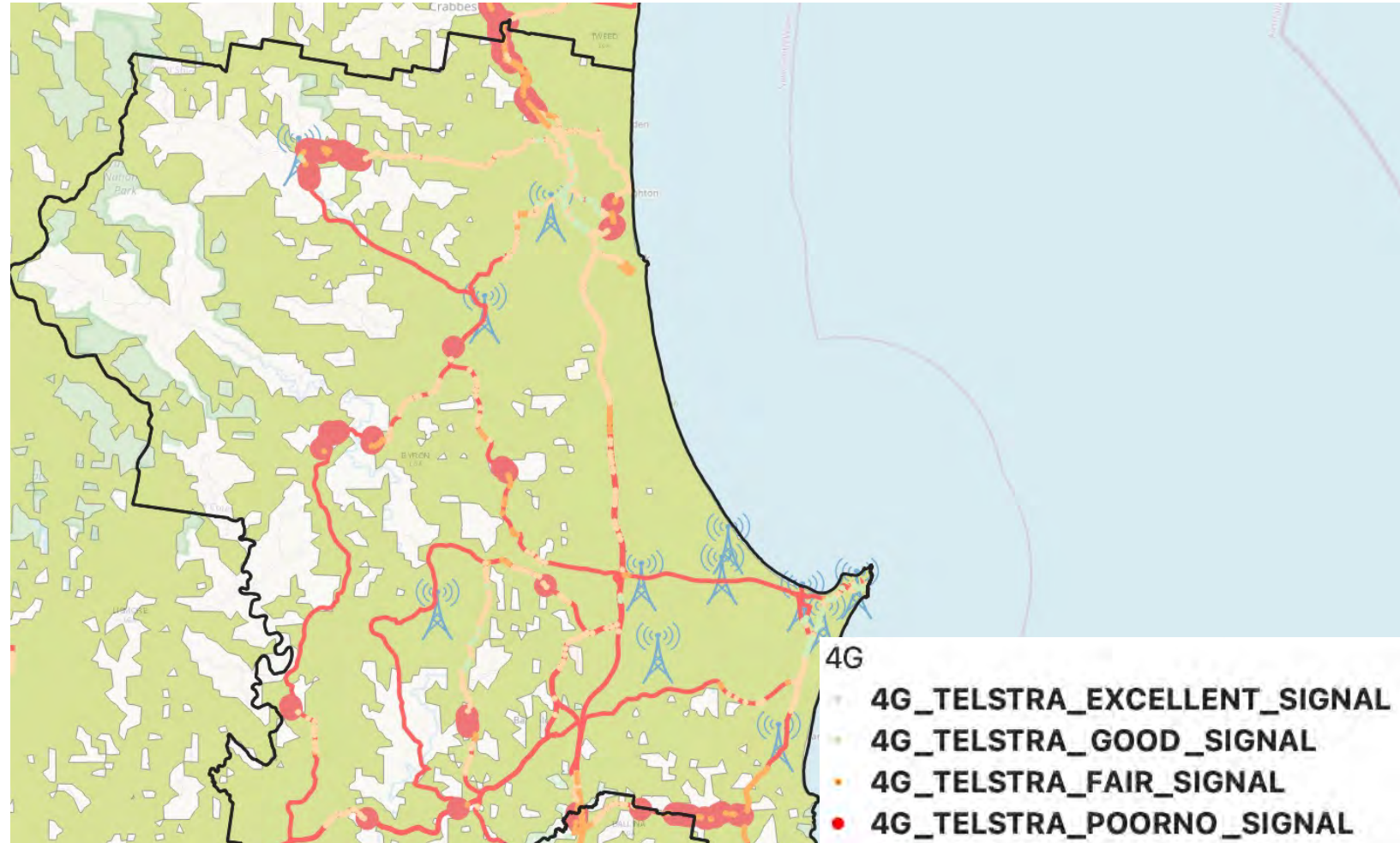
Byron Shire Analysis

Pacific Highway



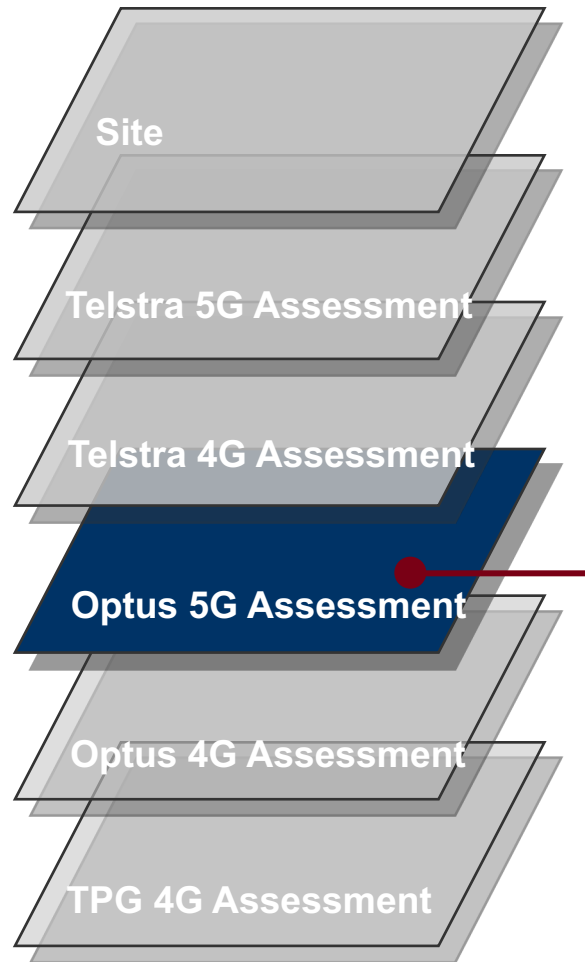
Assessment - Good 4G coverage with 4G Blackspot areas near Northern Shire Boundary

Action – Telstra / Fed Govt (MBSP) – 1 new 4G Tower sites



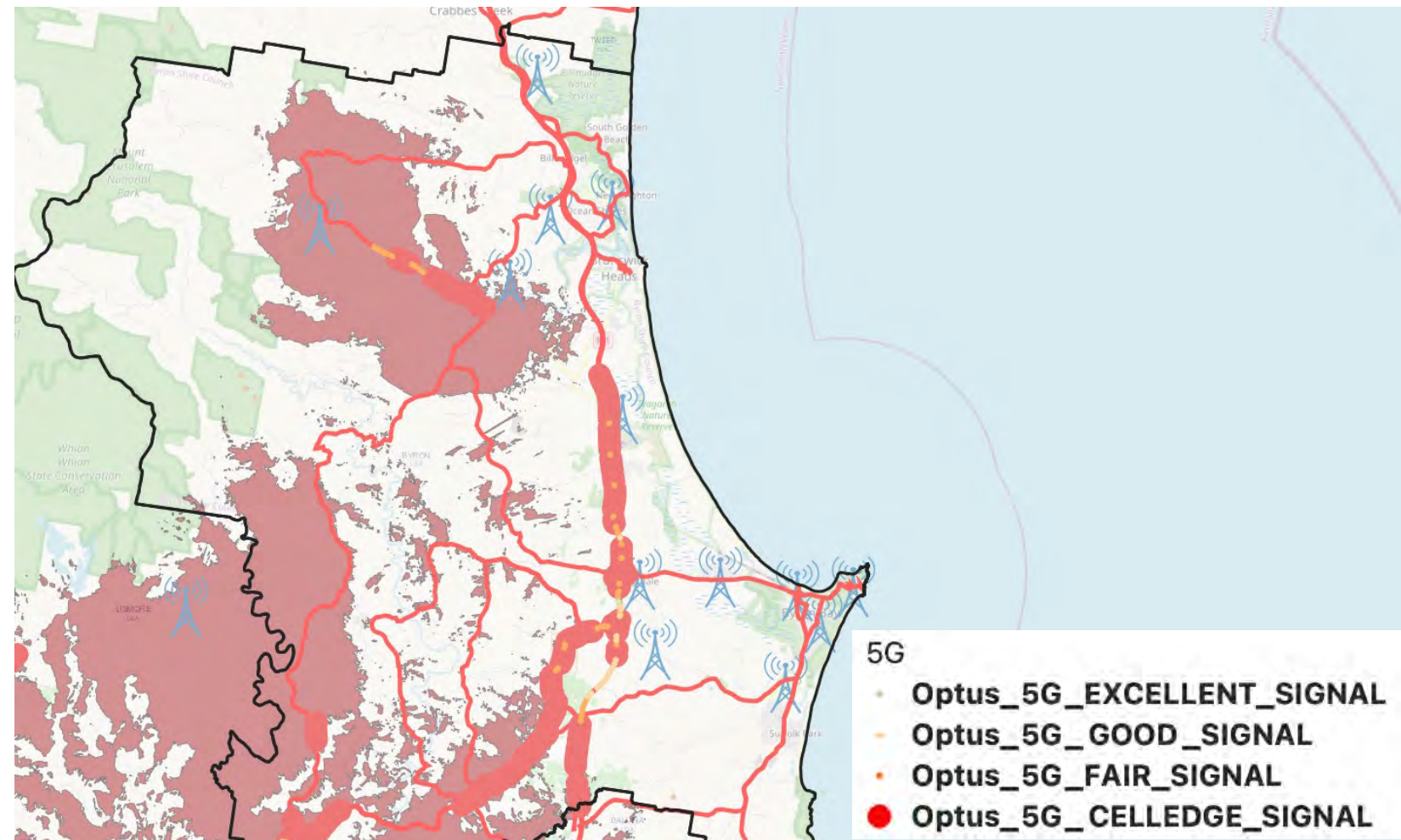
Byron Shire Analysis

Pacific Highway



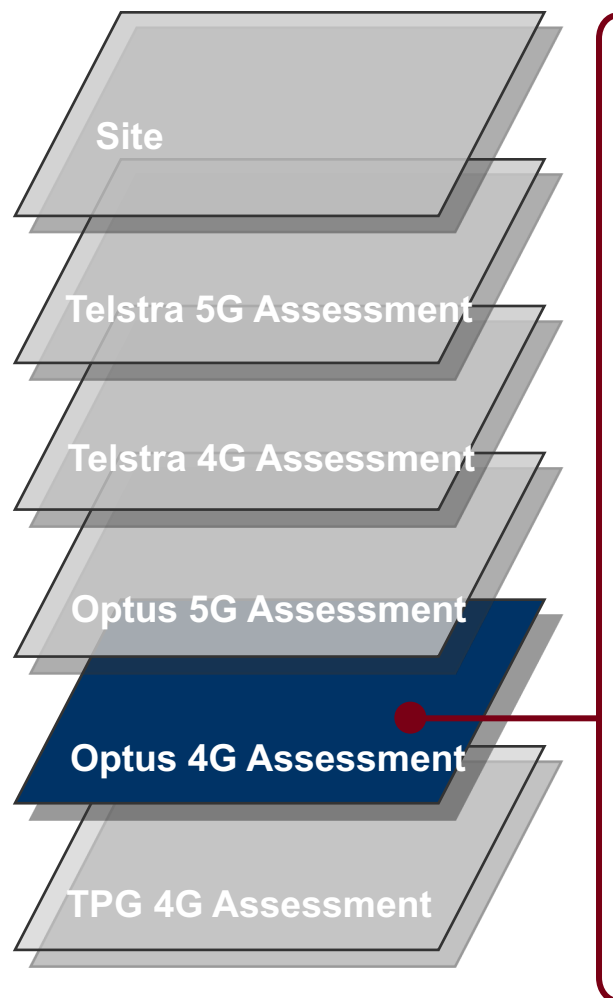
Assessment – Initial Optus 5G coverage areas near Bangalow. Broad 5G blackspot areas.

Action – Optus - Upgrade 6 x Optus Site to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites



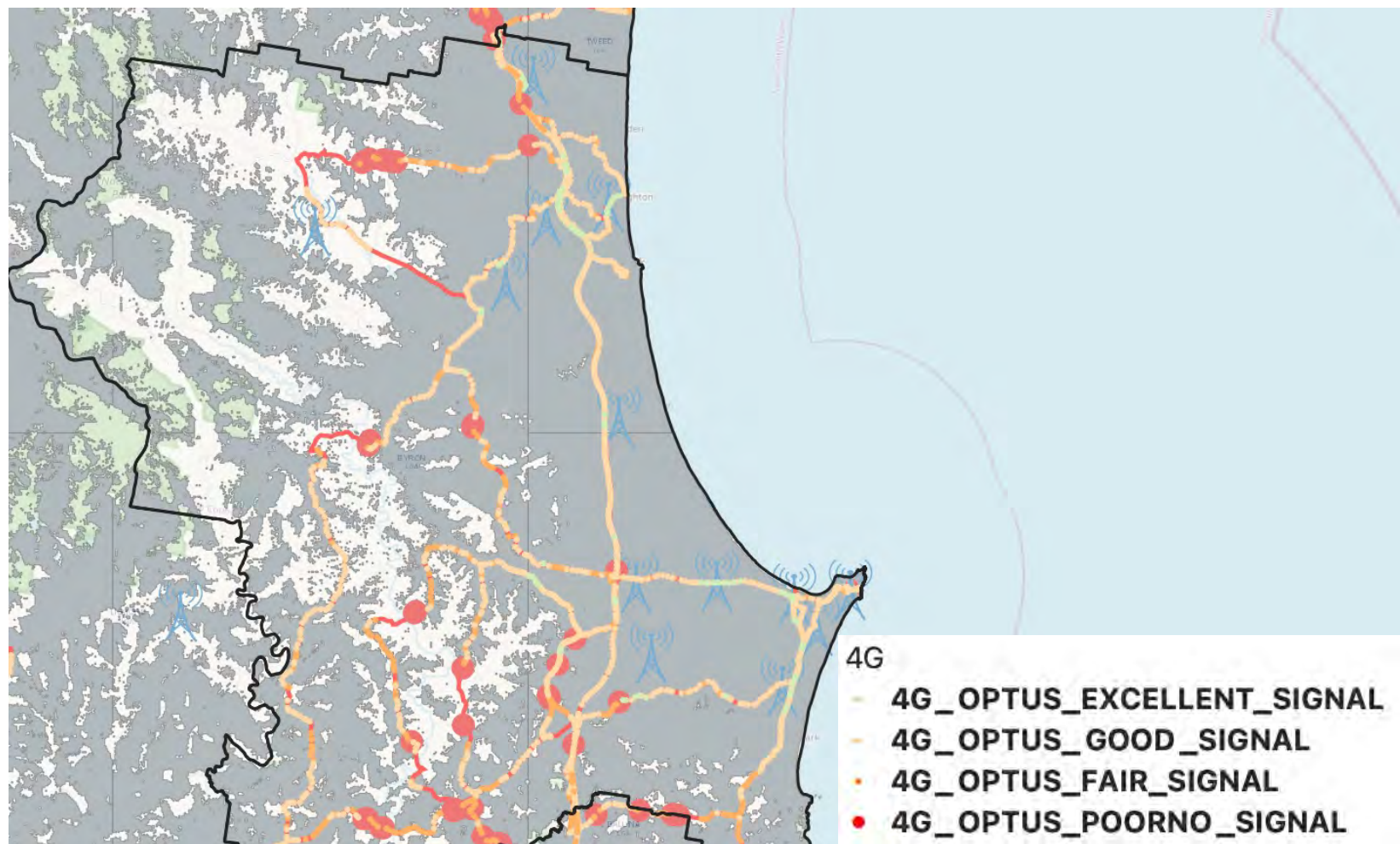
Byron Shire Analysis

Pacific Highway



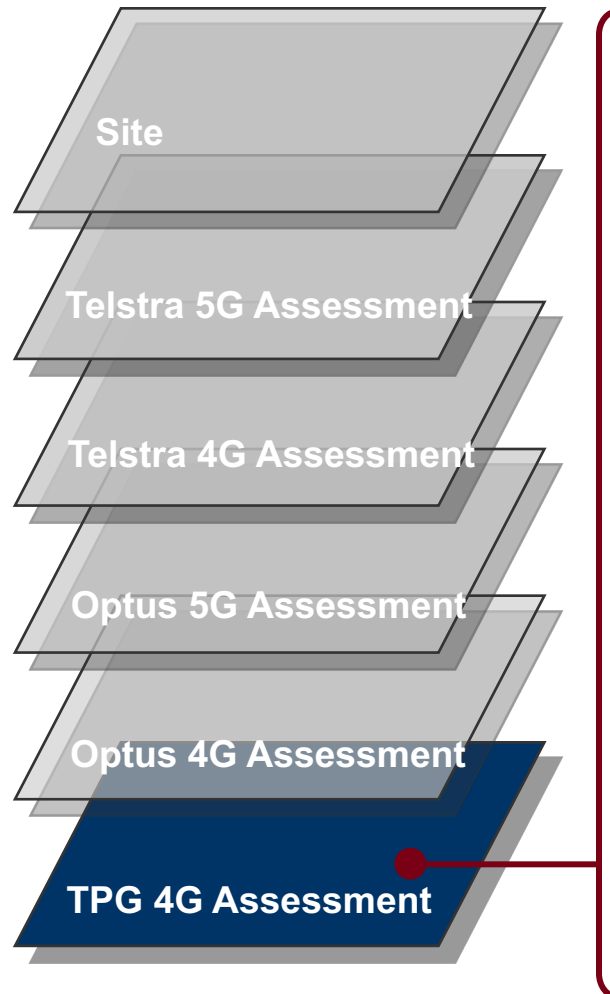
Assessment – Good 4G coverage. 4G blackspots near northern shire boundary

Action – Optus – 1 x 4G mid band upgrades required



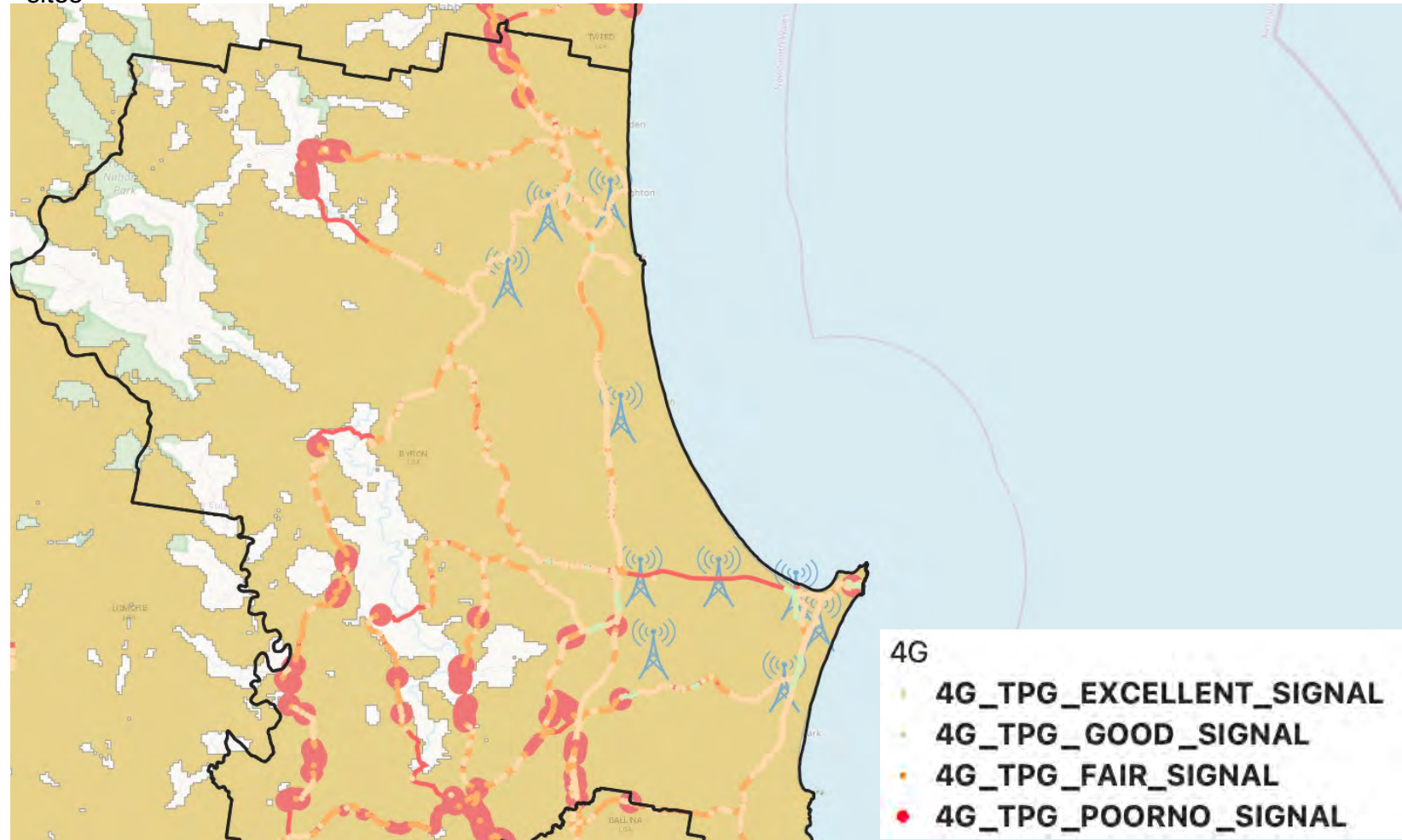
Byron Shire Analysis

Pacific Highway



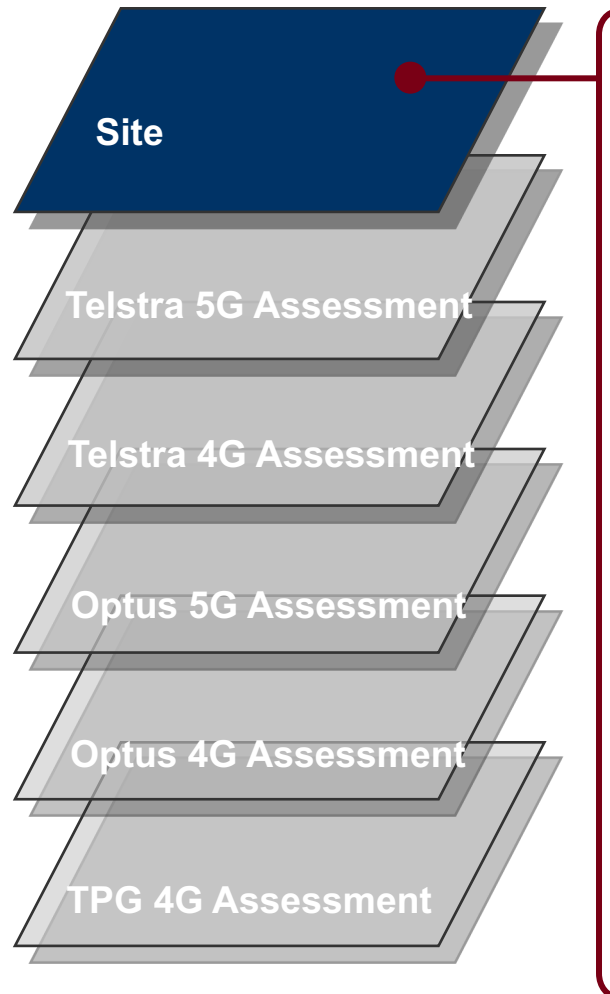
Assessment - 4G blackspots more frequent at northern and southern shire boundary

Action – TPG – Upgrade 2 existing sites with 4G mid band & TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites



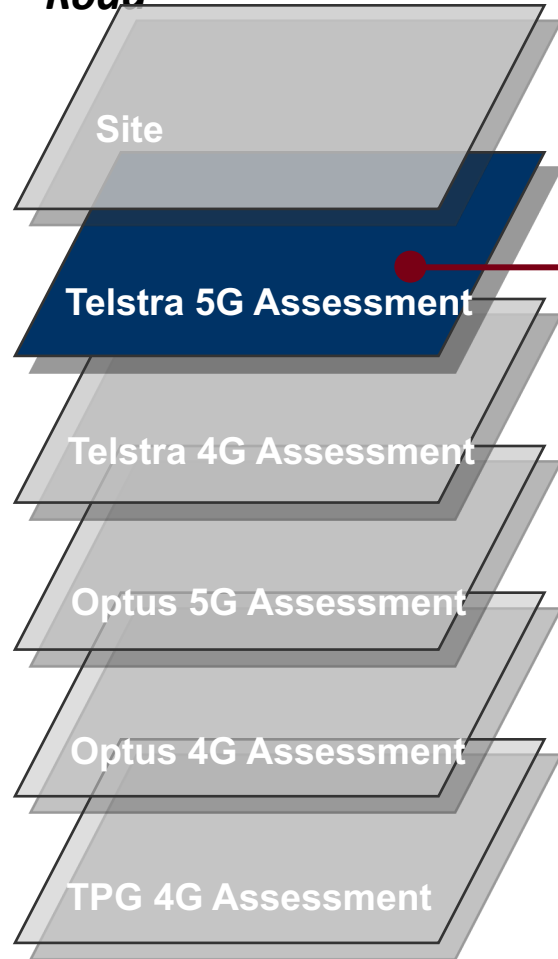
Byron Shire Analysis

The Pocket Road / Main Arm Road



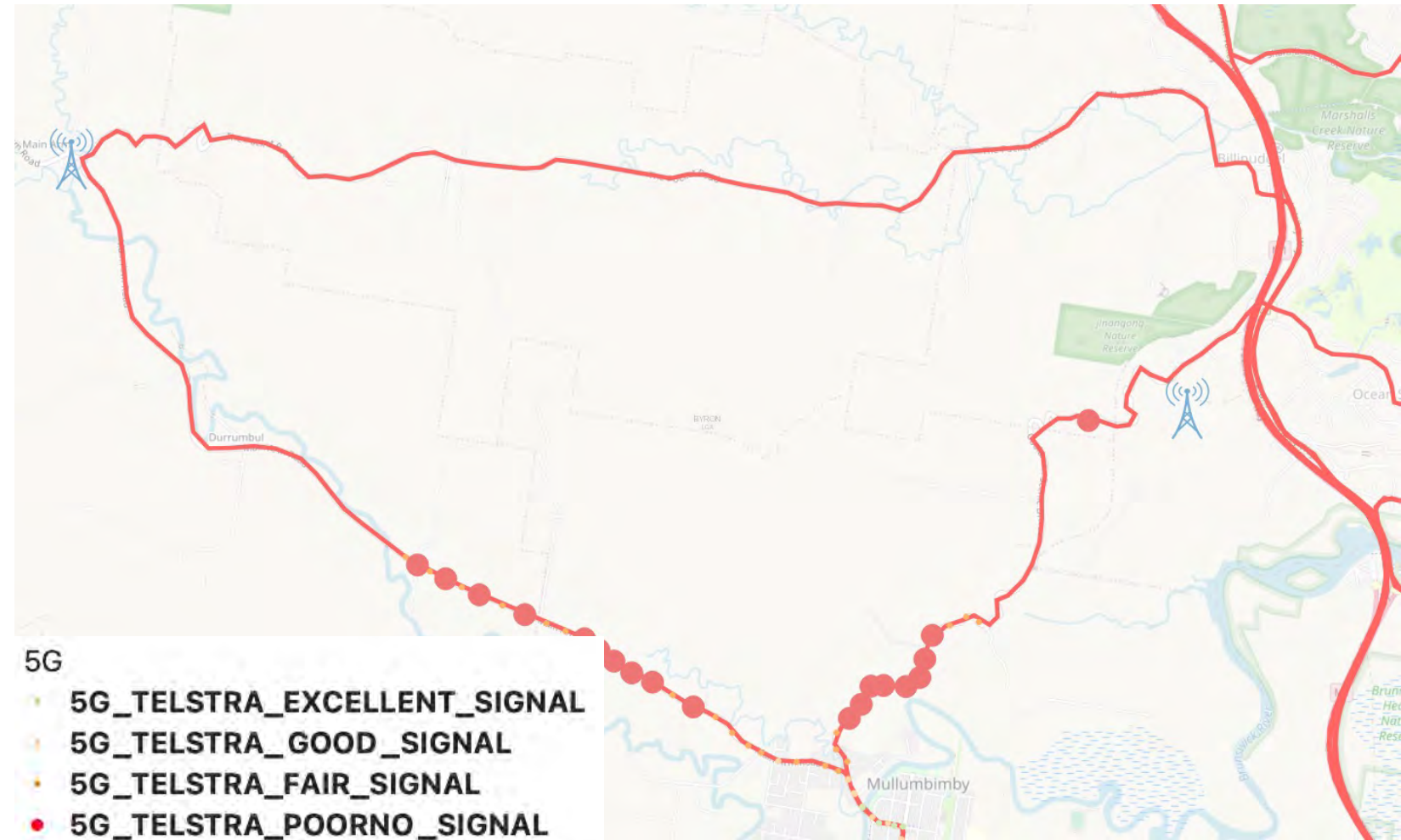
Byron Shire Analysis

The Pocket Road / Main Arm Road



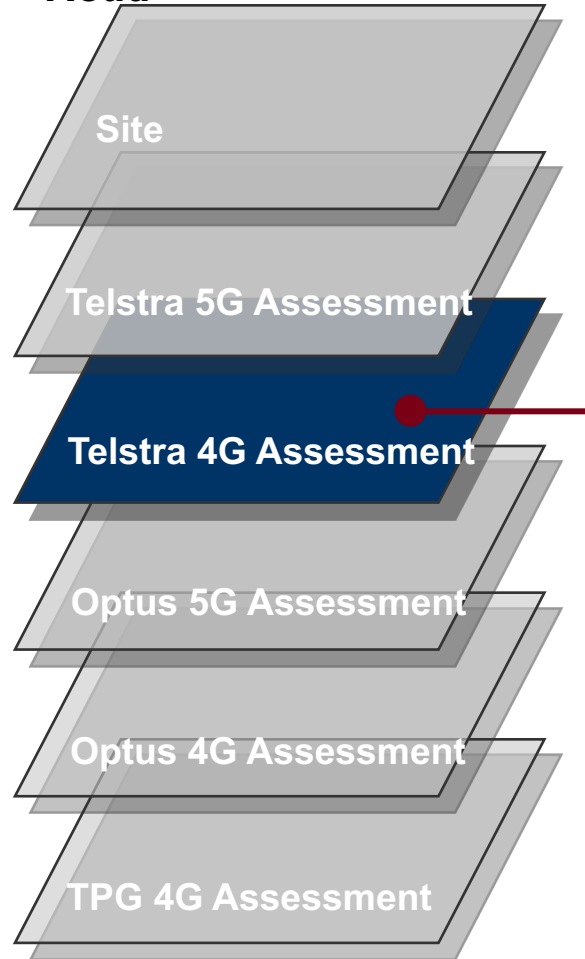
Assessment – No current 5G coverage.

Action – Telstra - Upgrade 2 x Tower Sites to 5G & Telstra / Fed Govt (MBSP) - up to 2 new 5G Tower sites



Byron Shire Analysis

The Pocket Road / Main Arm Road



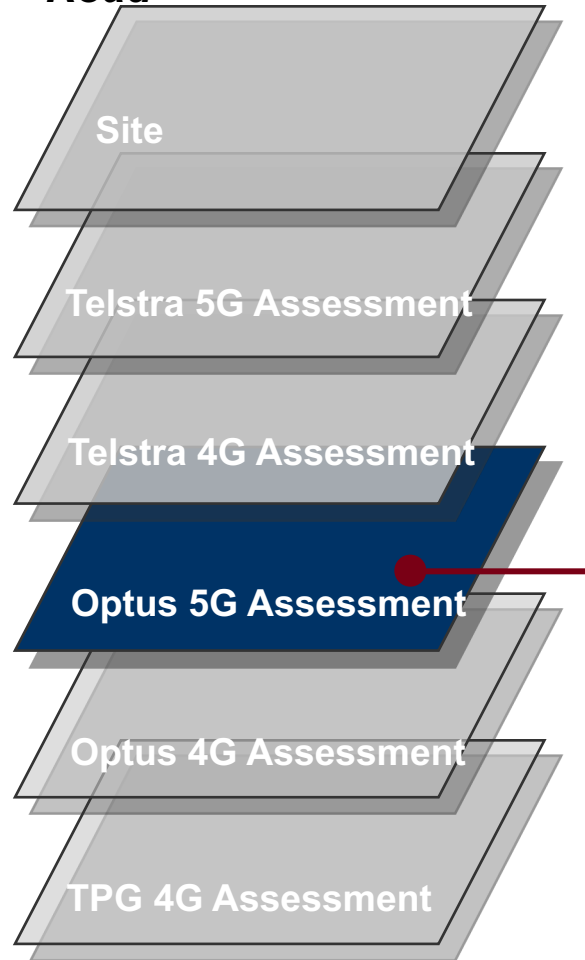
Assessment – Areas of good 4G coverage with broad 4G Blackspots at Main Arm

Action - Telstra – upgrade 1 site to 4G midband



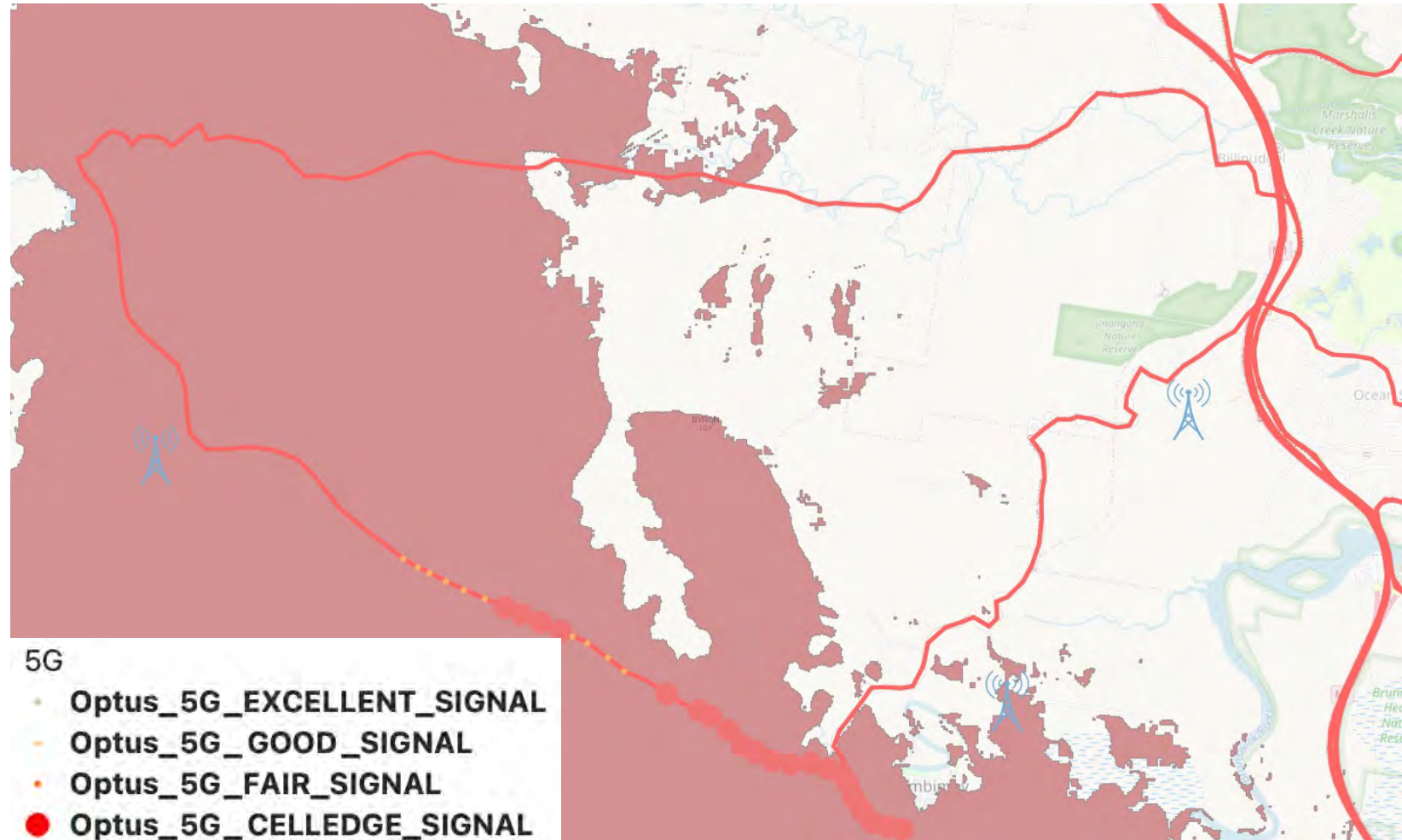
Byron Shire Analysis

The Pocket Road / Main Arm Road



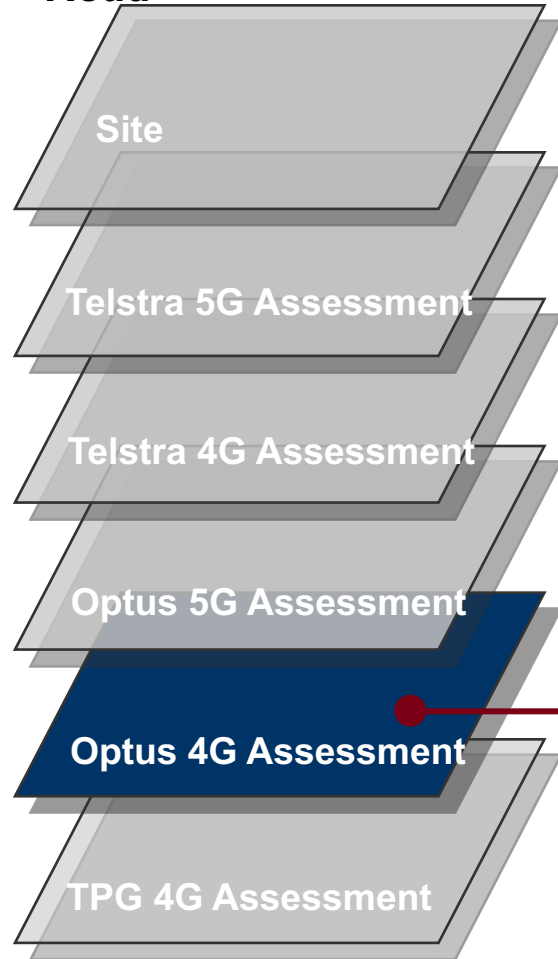
Assessment – Broad areas of 5G blackspots vs coverage mapping

Action – Optus - Upgrade 2 x Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



Byron Shire Analysis

The Pocket Road / Main Arm Road



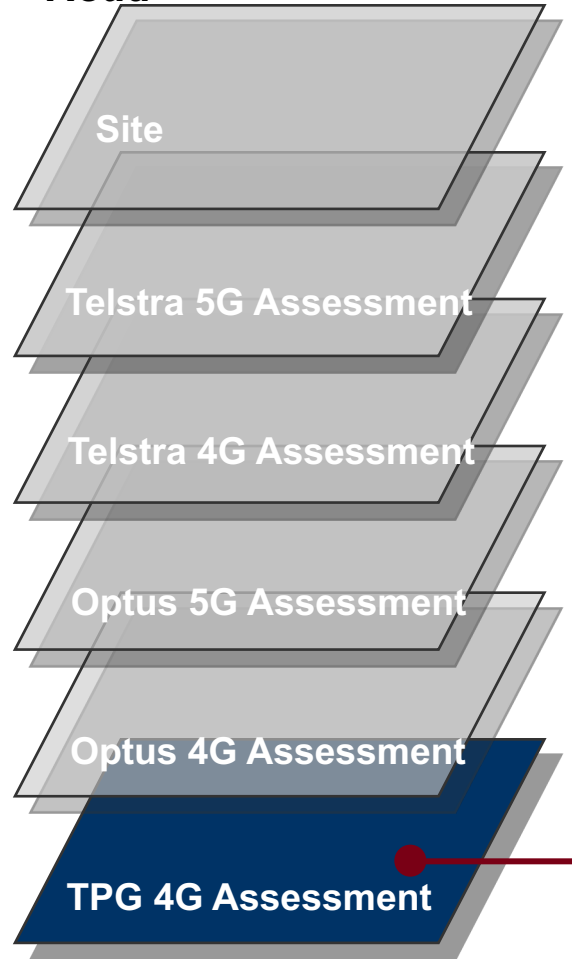
Assessment – Good 4G coverage with broad 4G blackspots located near Main Arm

Action – Optus / Fed Govt – 1 new 4G Tower sites



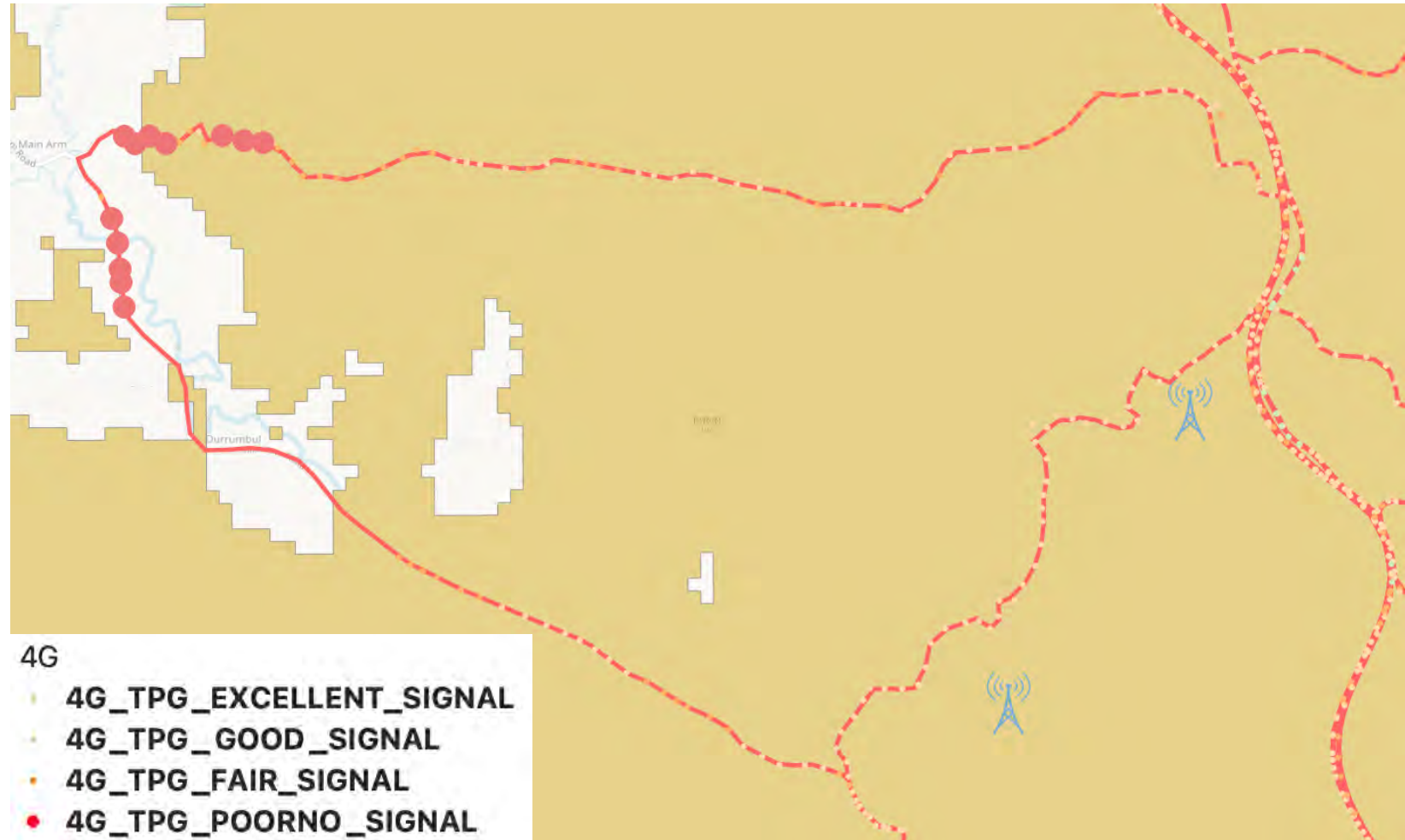
Byron Shire Analysis

The Pocket Road / Main Arm Road



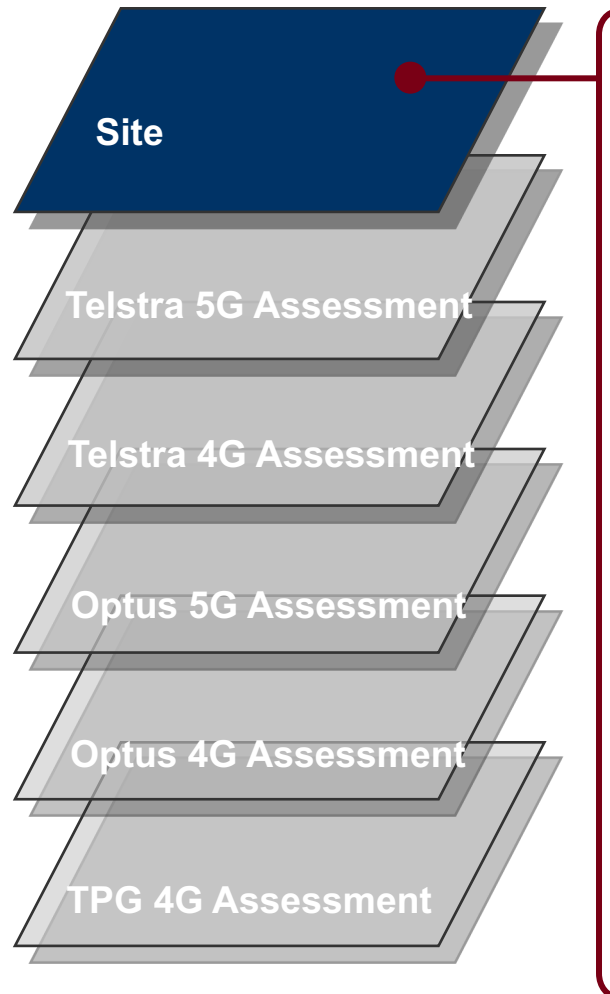
Assessment – Good 4G coverage with broad 4G blackspots located near Main Arm

Action – TPG / Fed Govt – 1 new 4G Tower sites



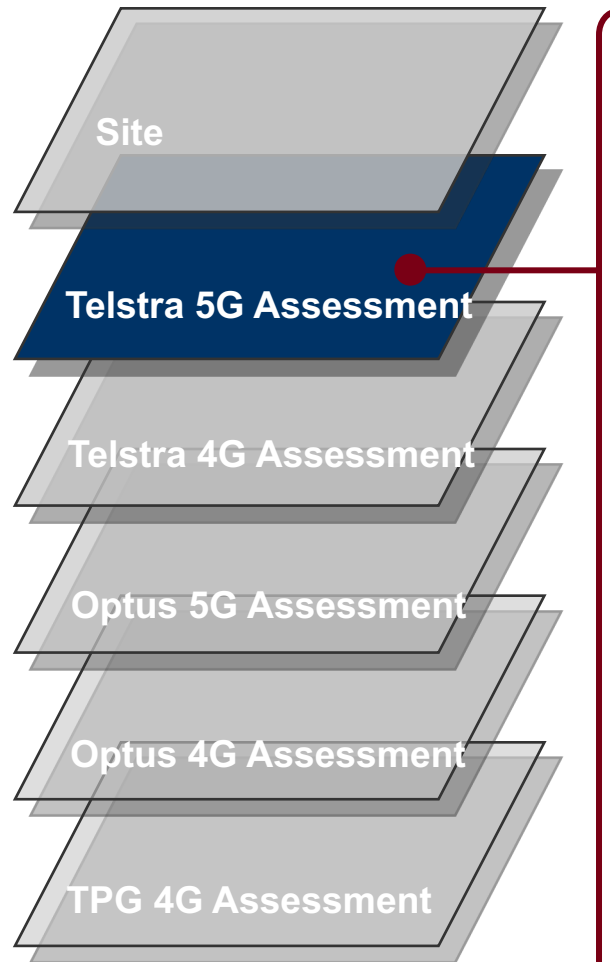
Byron Shire Analysis

Coolamon Scenic Drive



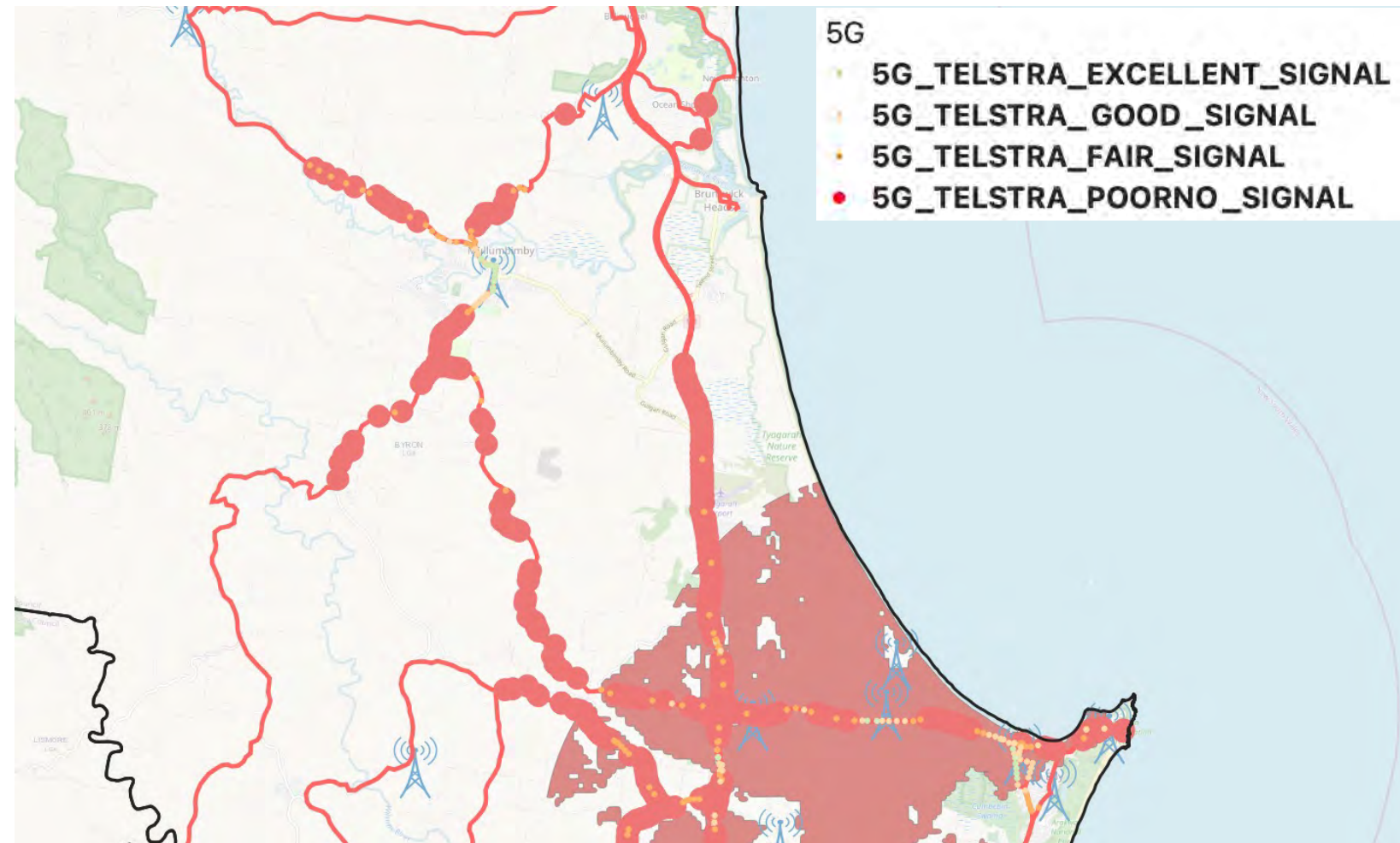
Byron Shire Analysis

Coolamon Scenic Drive



Assessment – Initial 5G coverage areas near Bangalow. Broad 5G blackspot areas.

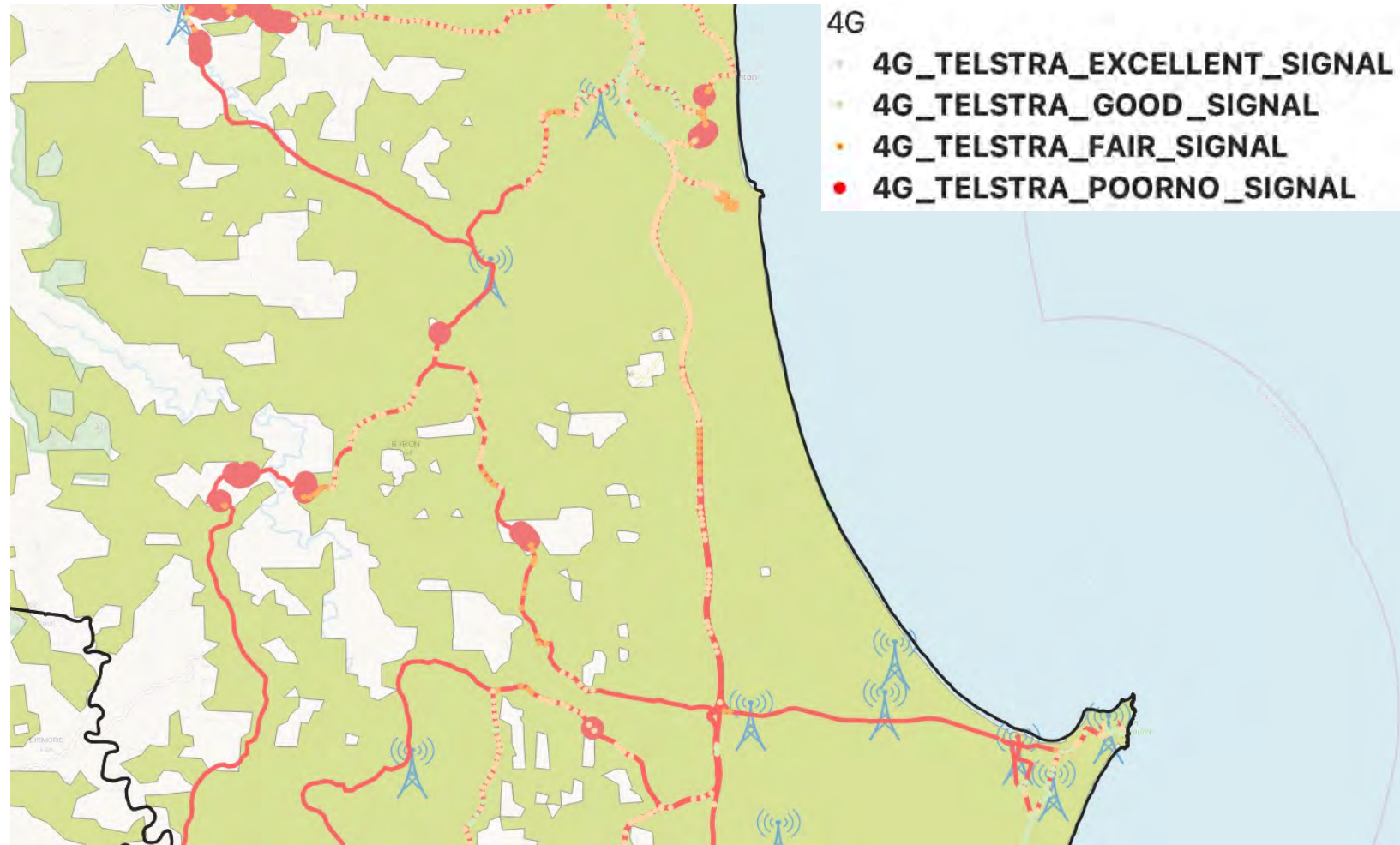
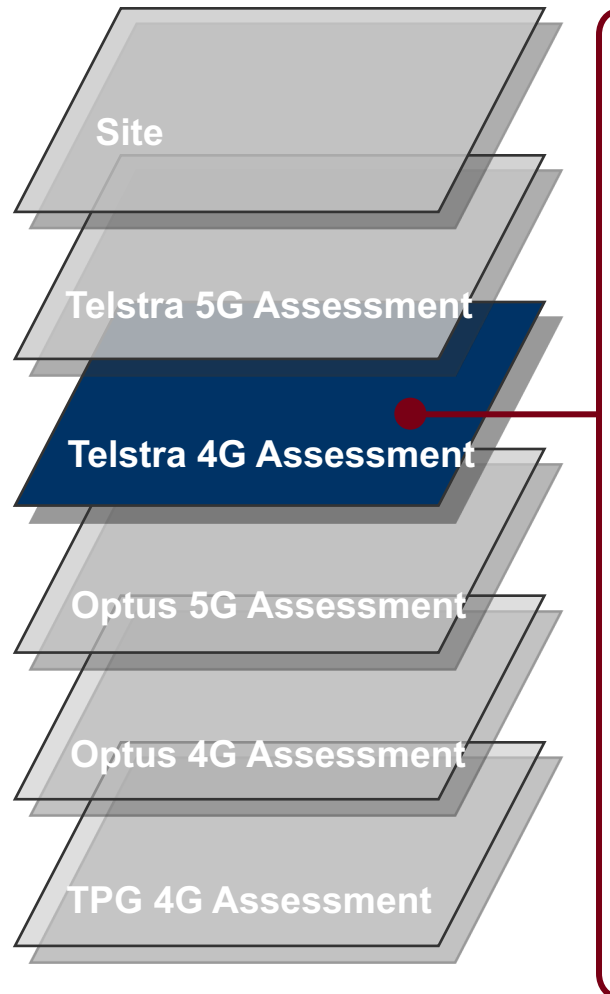
Action – Telstra - Upgrade 3 x Site to 5G & Telstra / Fed Govt – up to 2 new 5G Tower sites



Byron Shire Analysis

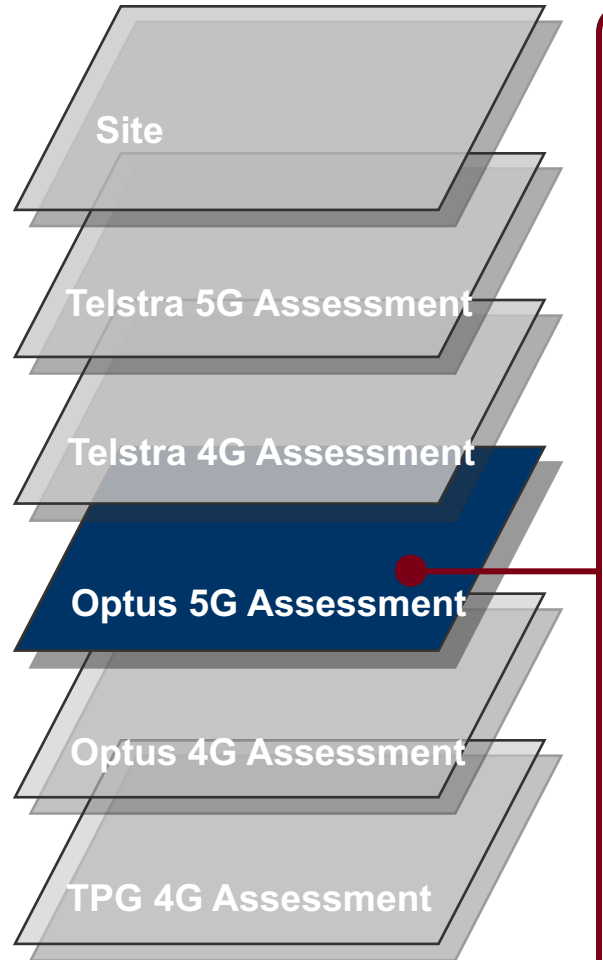
Coolamon Scenic Drive

Assessment – Good 4G coverage with a few minor blackspot areas



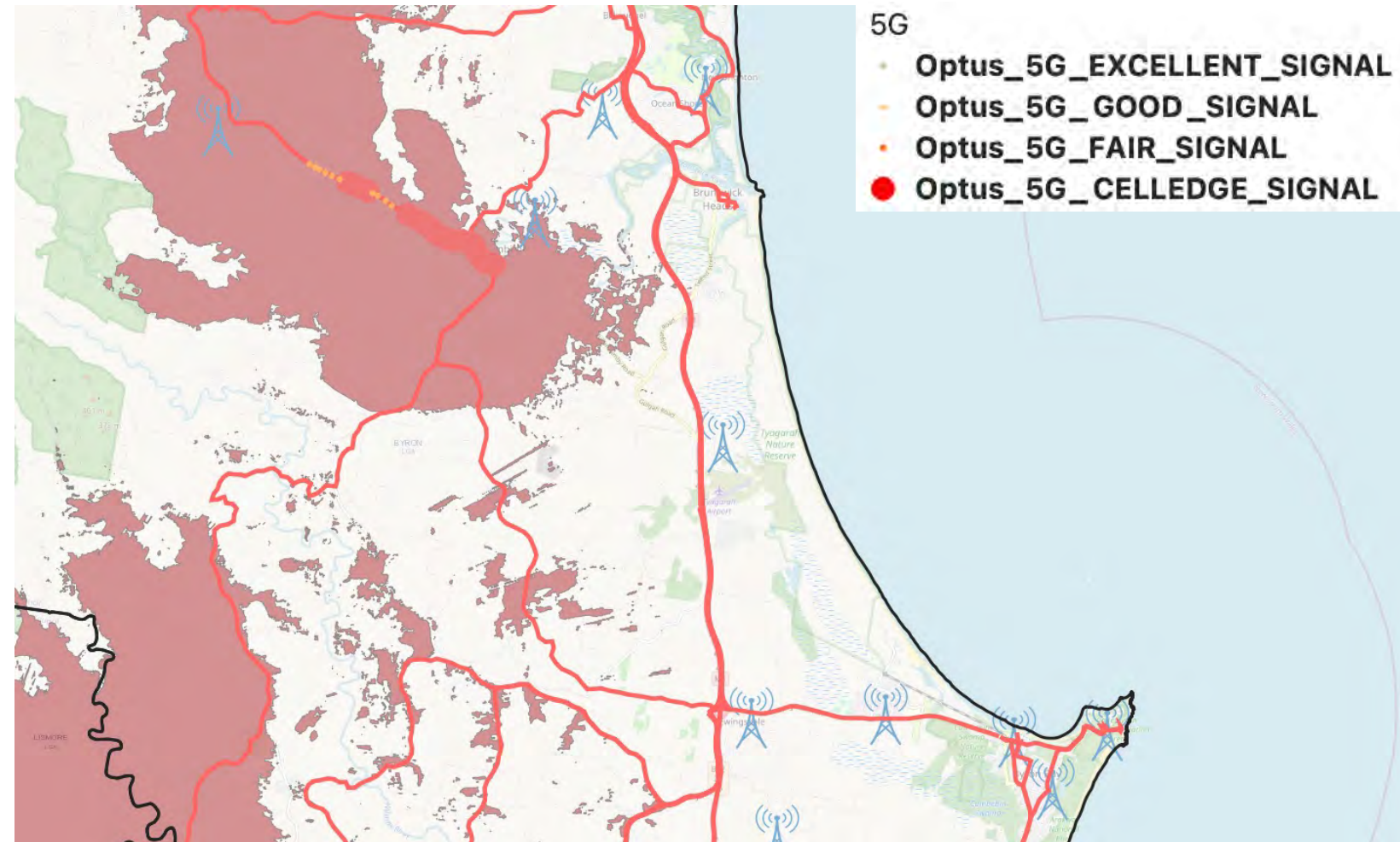
Byron Shire Analysis

Coolamon Scenic Drive



Assessment – Broad areas of 5G blackspots outside and within coverage mapping areas

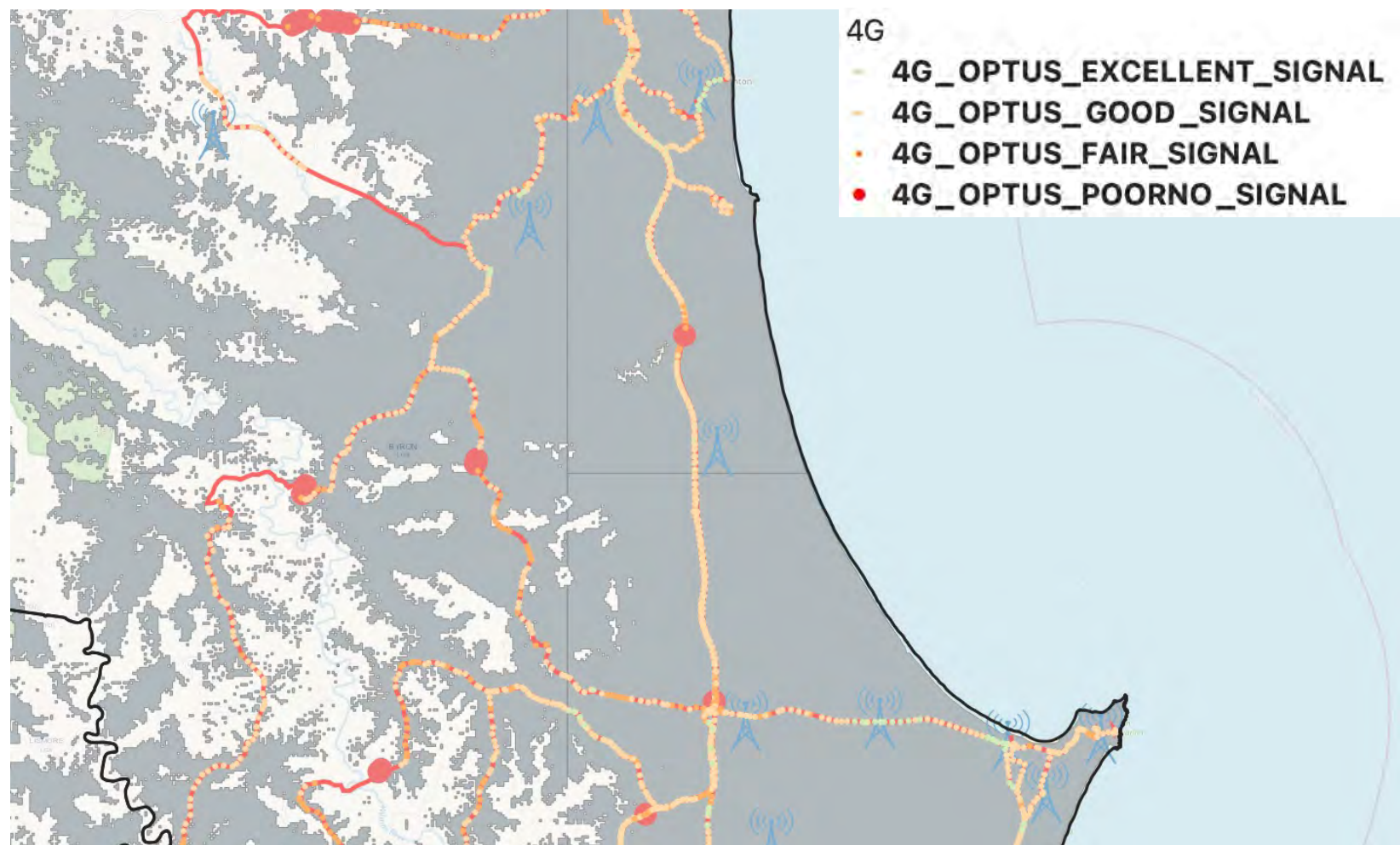
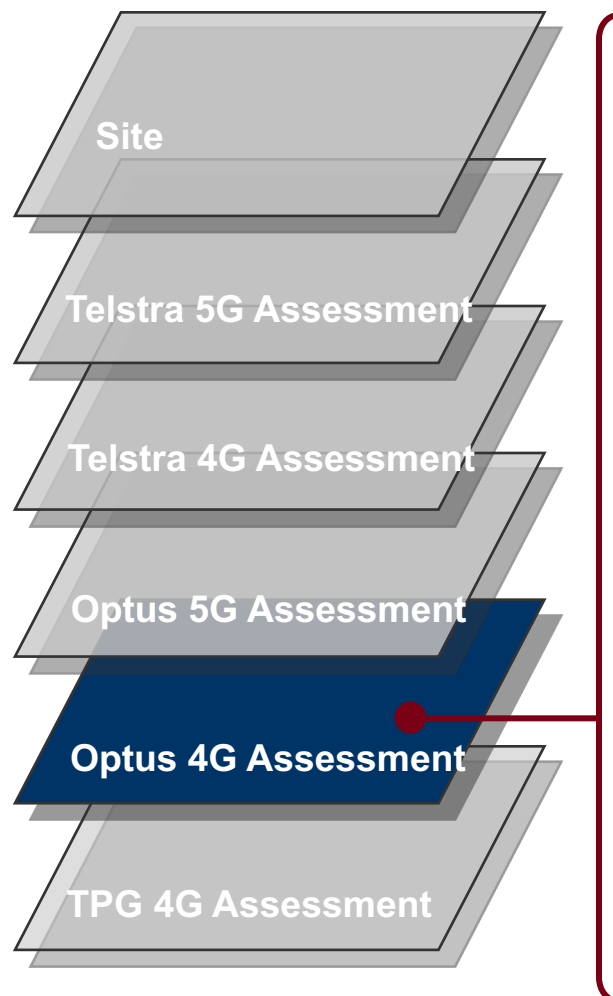
Action – Optus - Upgrade 2 x Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



Byron Shire Analysis

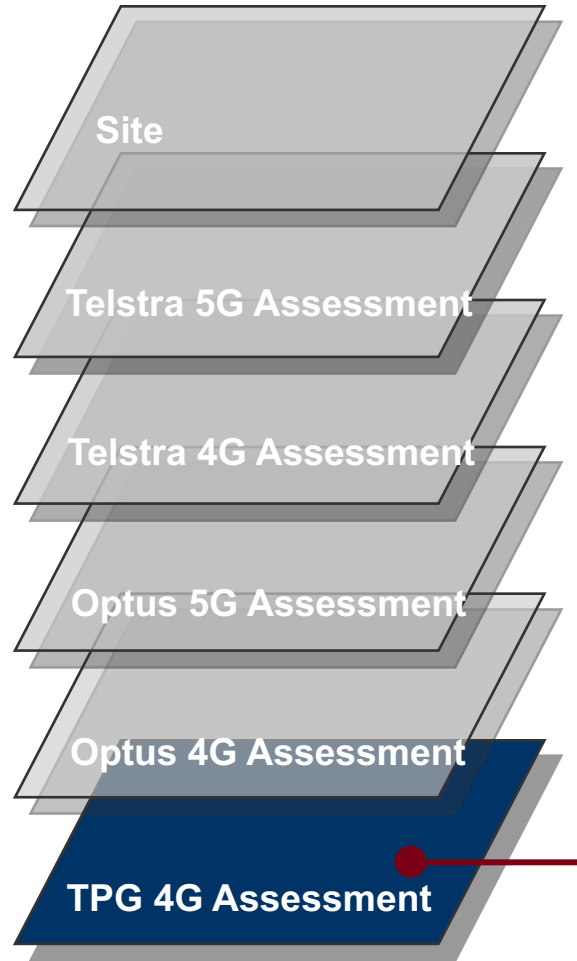
Coolamon Scenic Drive

Assessment – Good 4G coverage



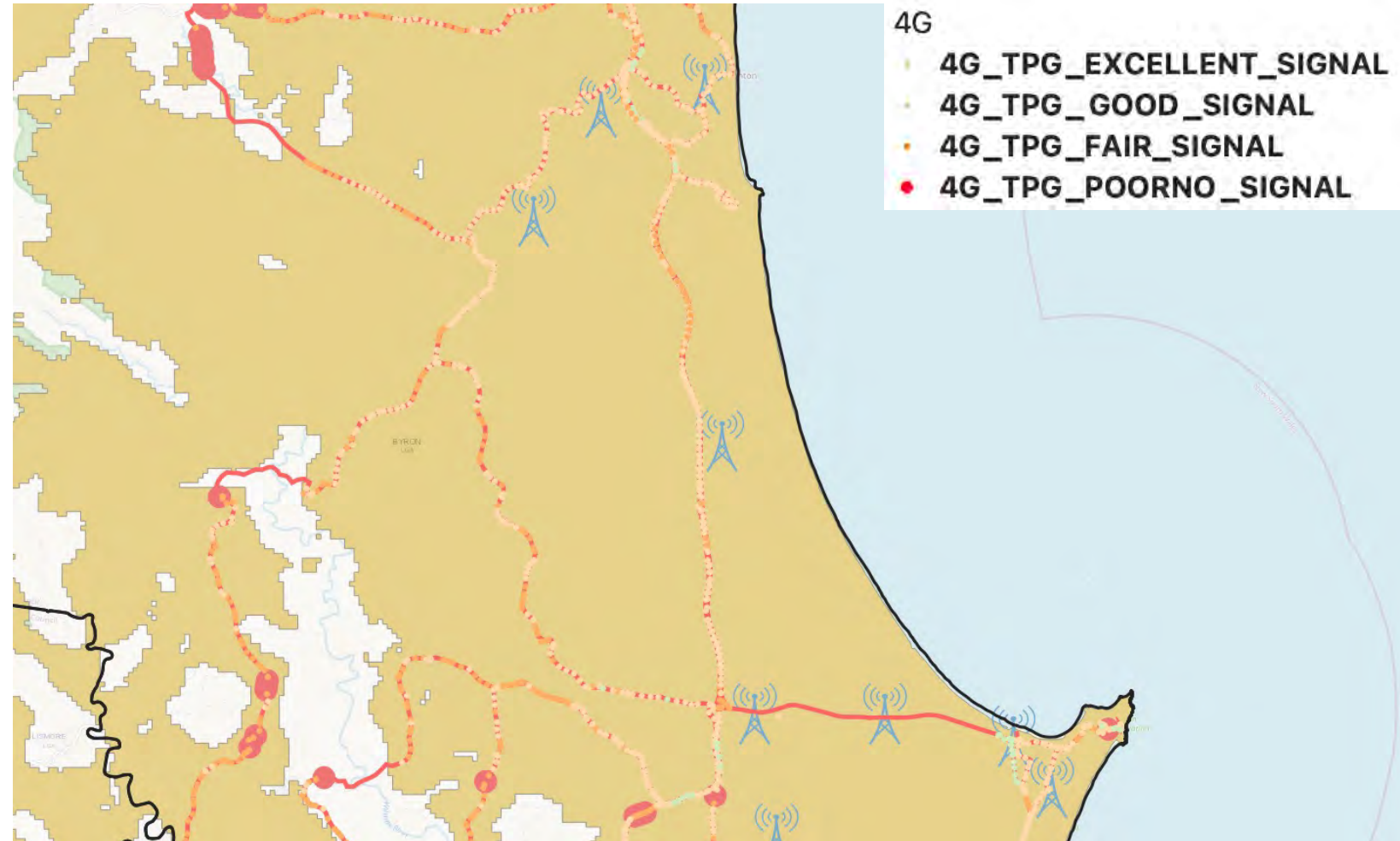
Byron Shire Analysis

Coolamon Scenic Drive



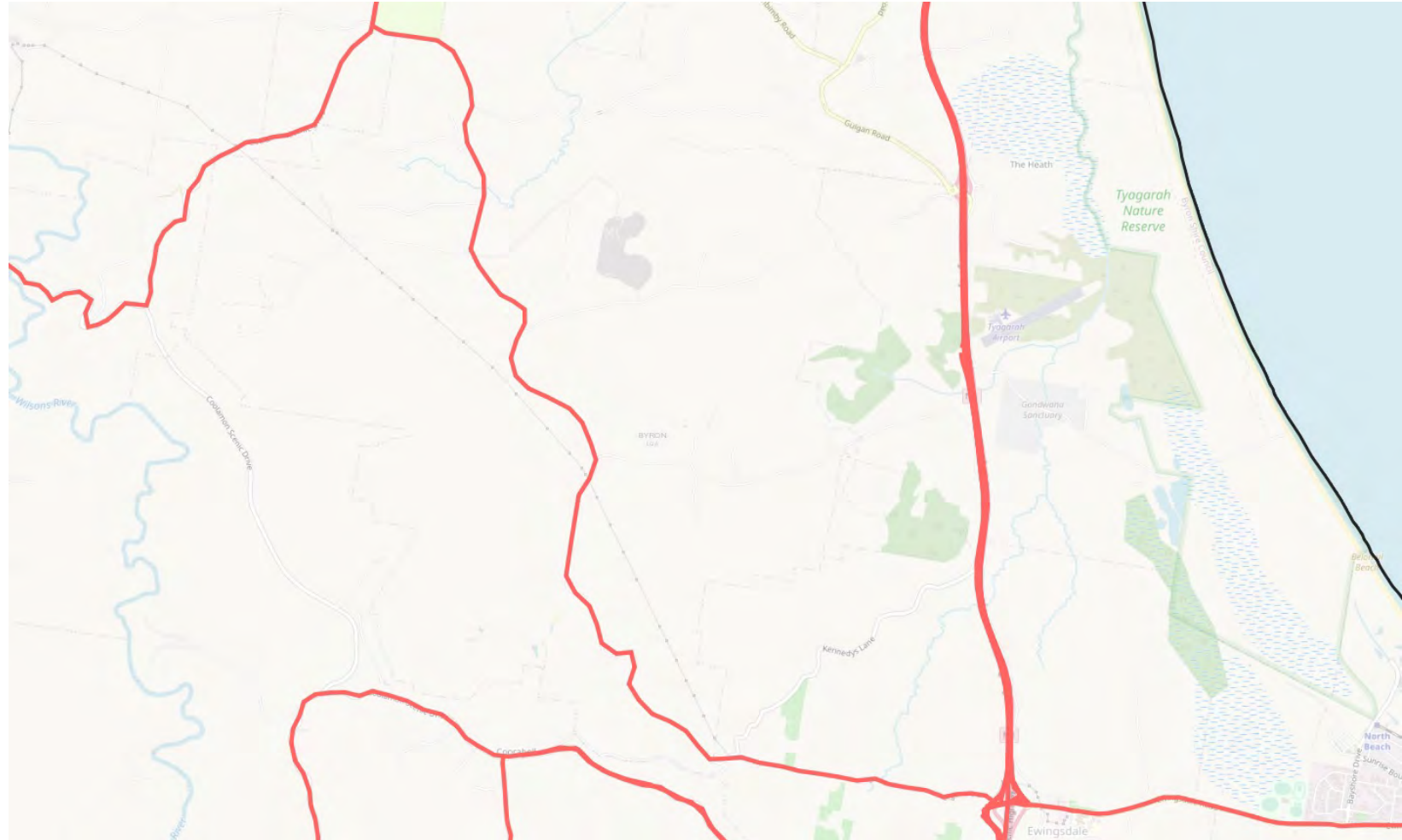
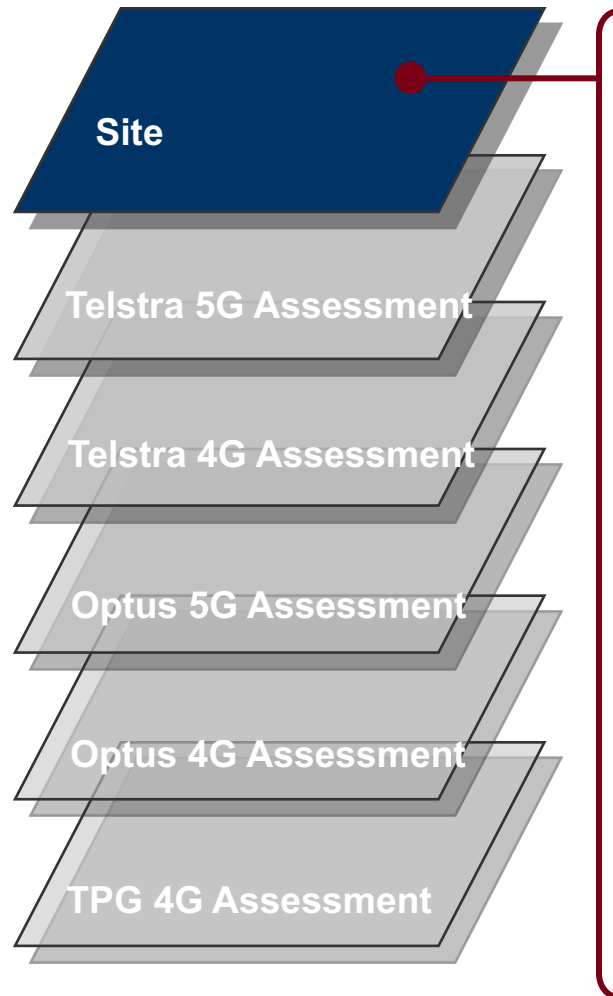
Assessment – Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites



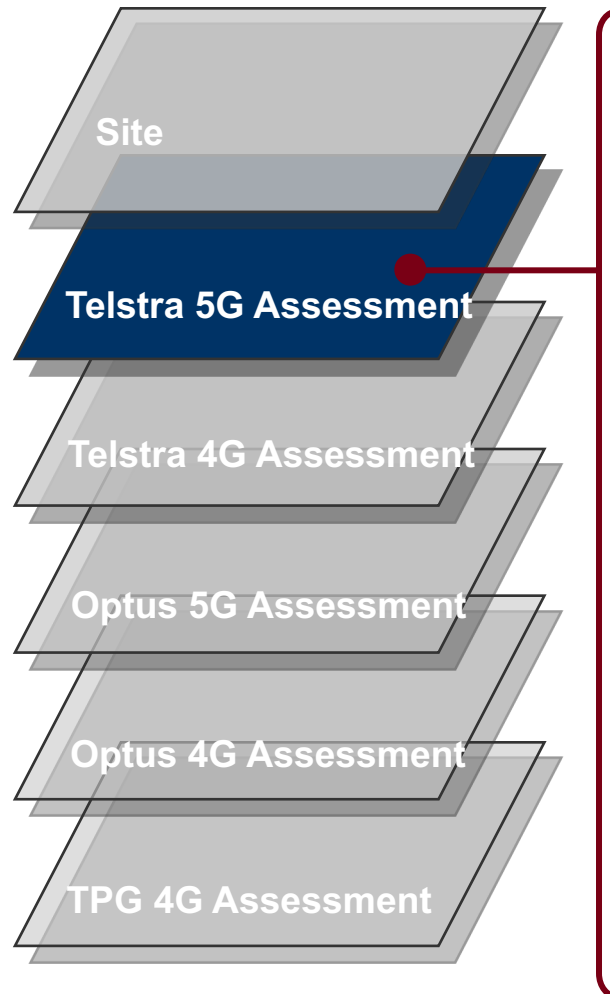
Byron Shire Analysis

Myocum Road



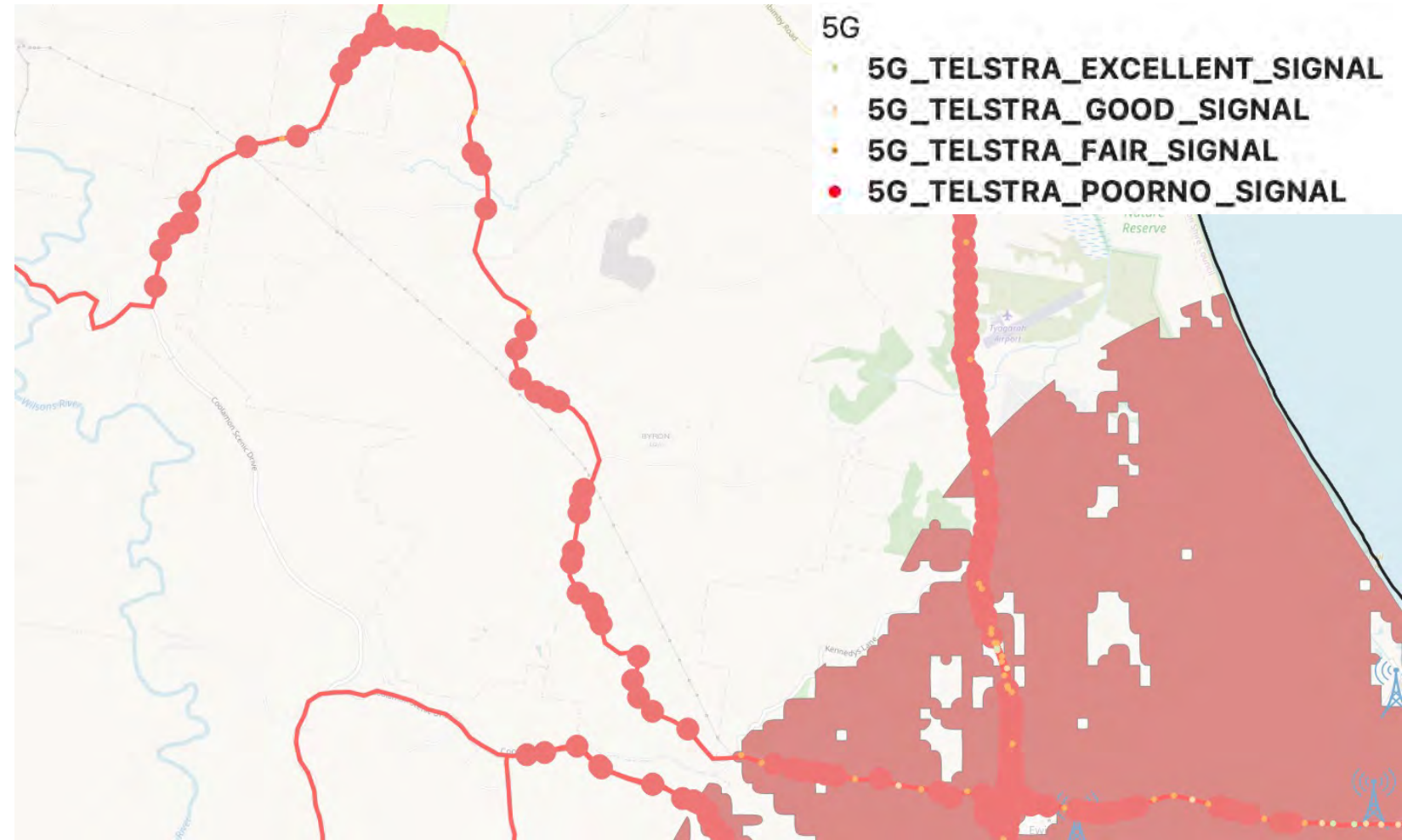
Byron Shire Analysis

Myocum Road



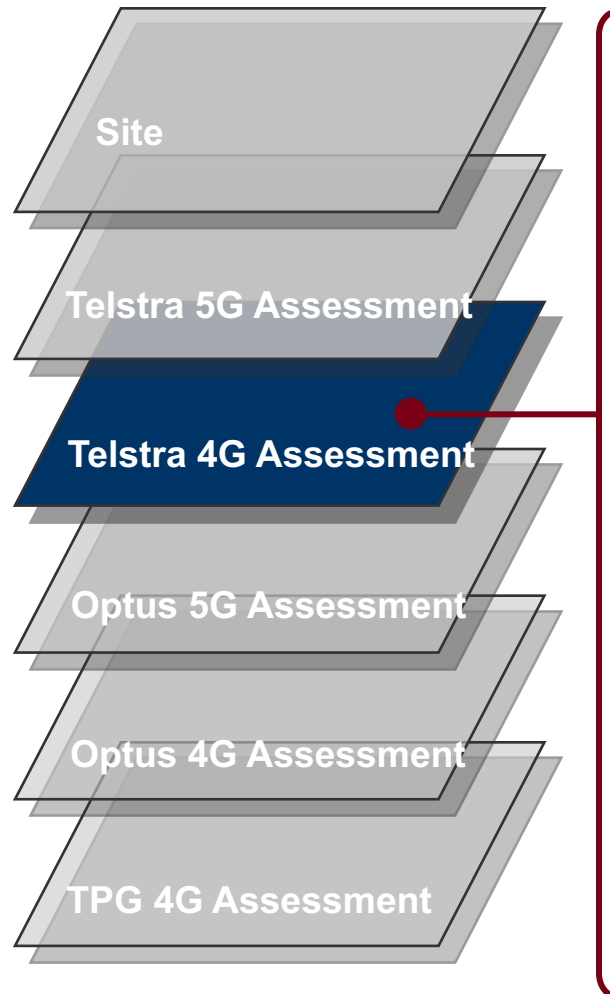
Assessment – Good 5G coverage near Byron Bay. Large areas with no current 5G coverage

Action – Telstra / Fed Govt (MBSP) – 1 new 5G Tower Sites required



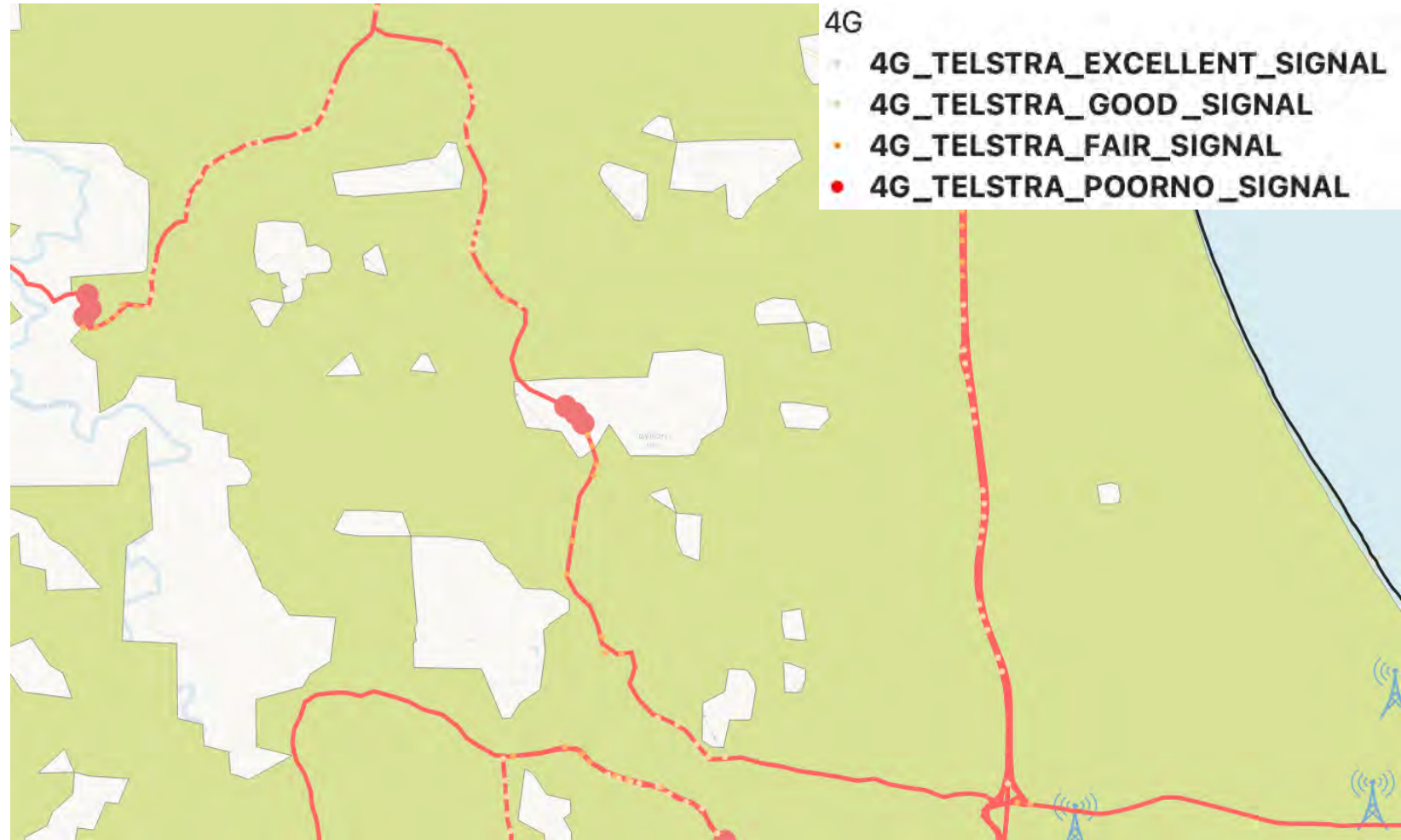
Byron Shire Analysis

Myocum Road



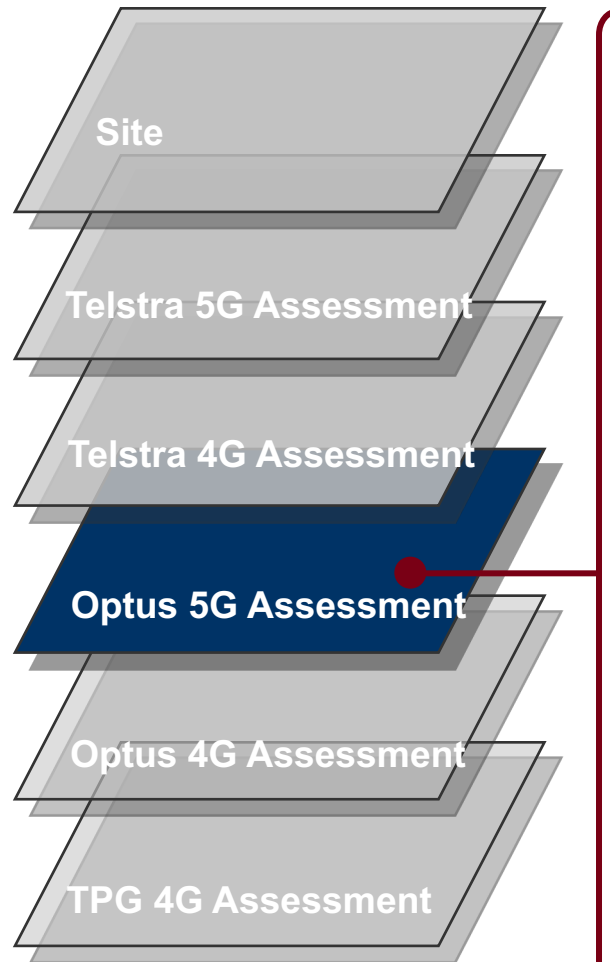
Assessment – Good 4G coverage with a few minor blackspot areas

Action – Telstra / Fed Govt (MBSP) – 1 new 4G Tower Sites required



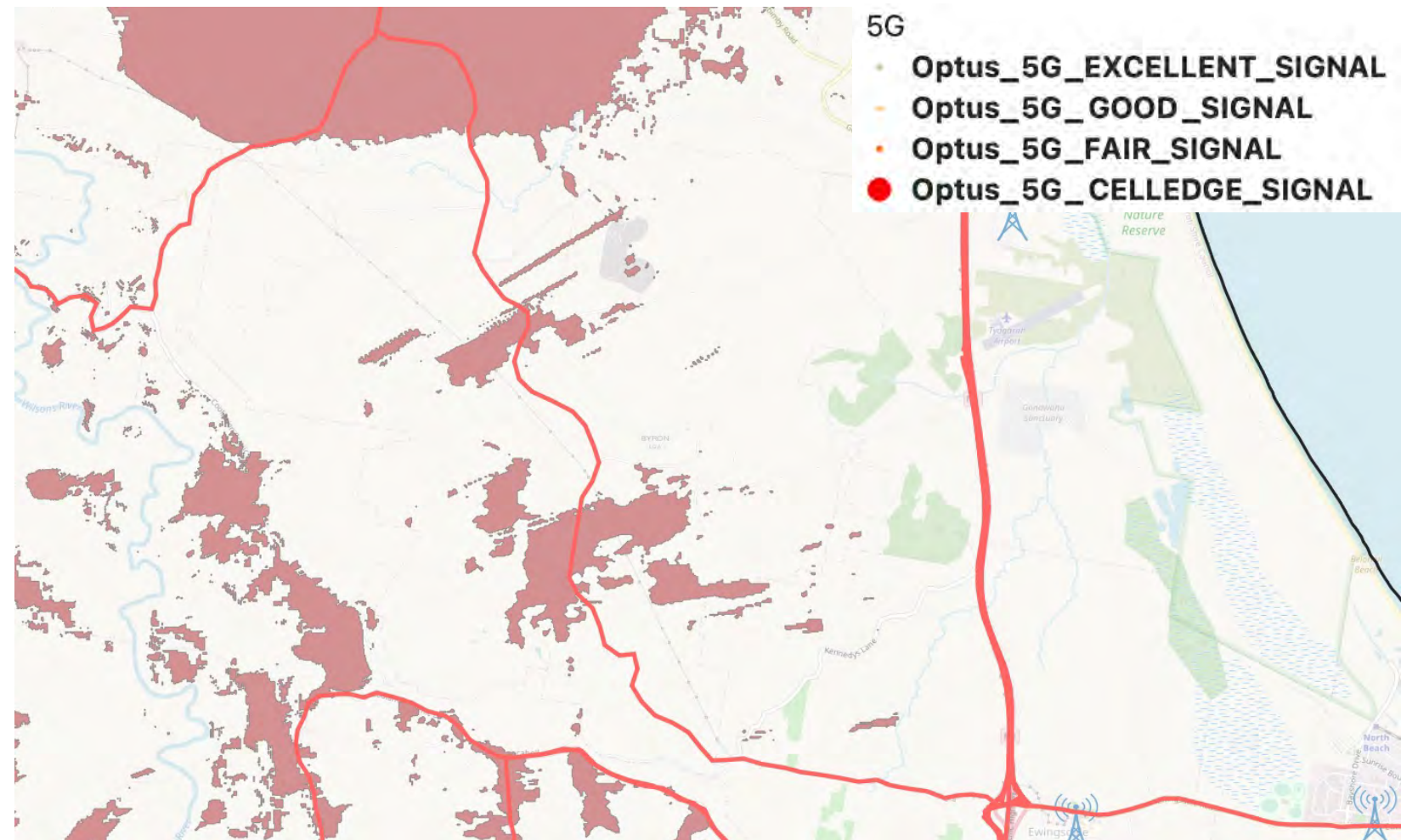
Byron Shire Analysis

Myocum Road



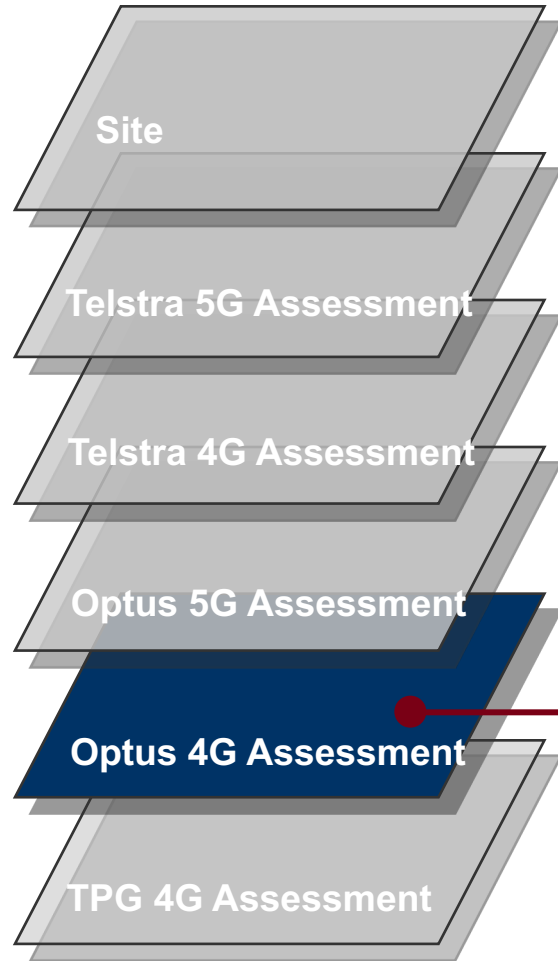
Assessment – Broad areas of 5G blackspots outside and within coverage mapping areas

Action – Optus / Fed Govt – 1 new 5G Tower sites



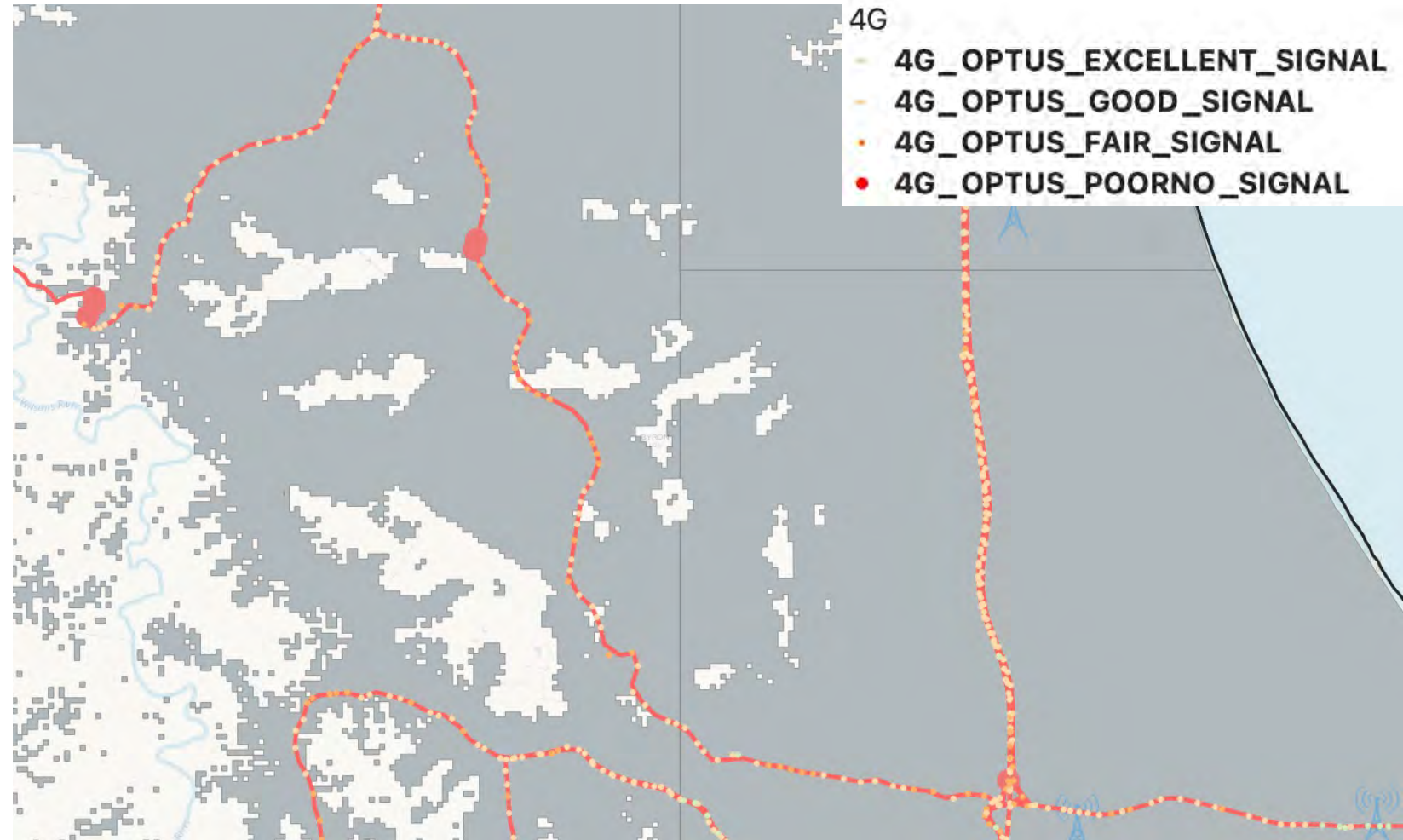
Byron Shire Analysis

Myocum Road



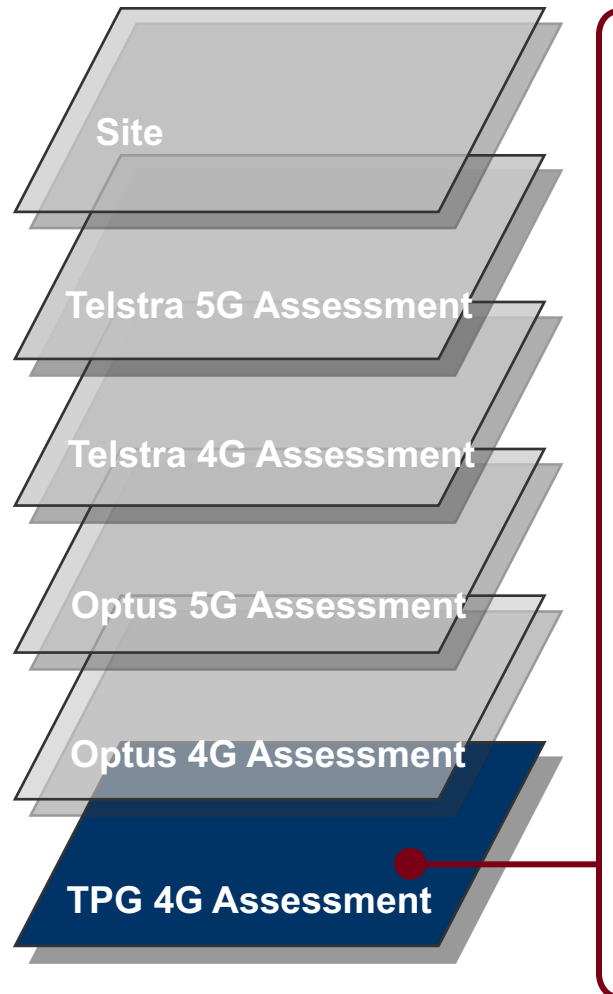
Assessment – Good 4G coverage with a few minor blackspot areas

Action – Optus/ Fed Govt (MBSP) – 1 new 4G Tower Sites required



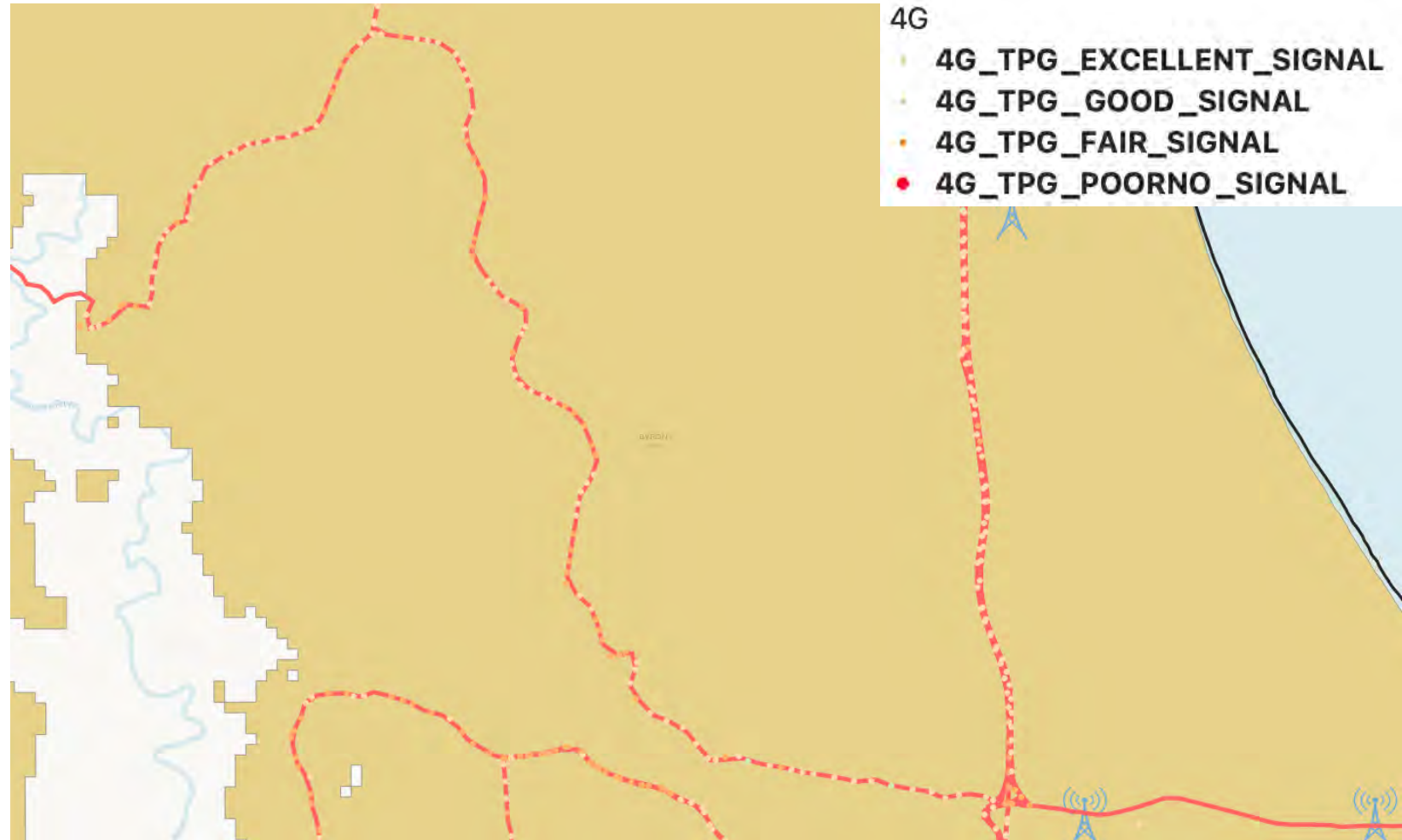
Byron Shire Analysis

Myocum Road



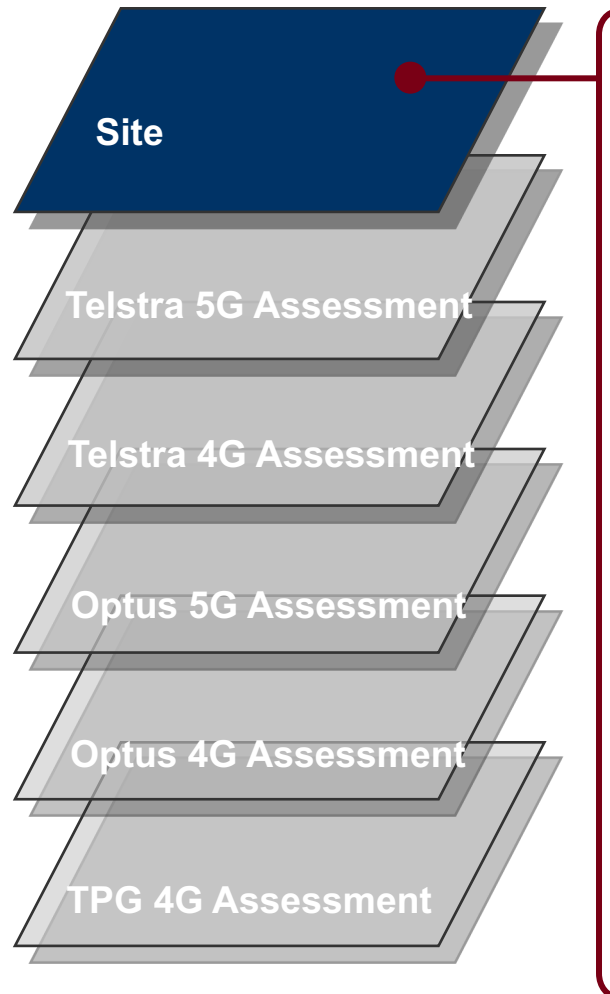
Assessment – Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites



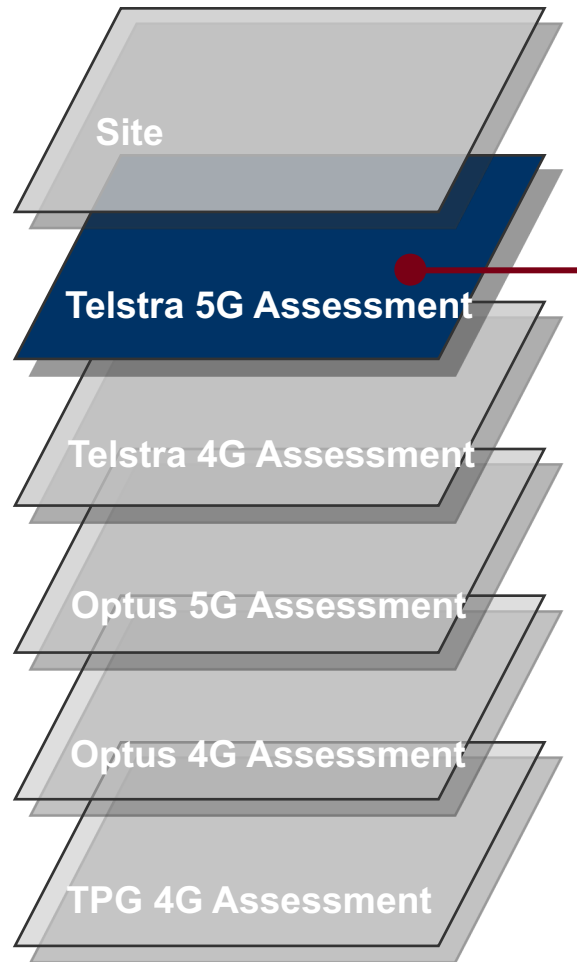
Byron Shire Analysis

Ewingsdale Road



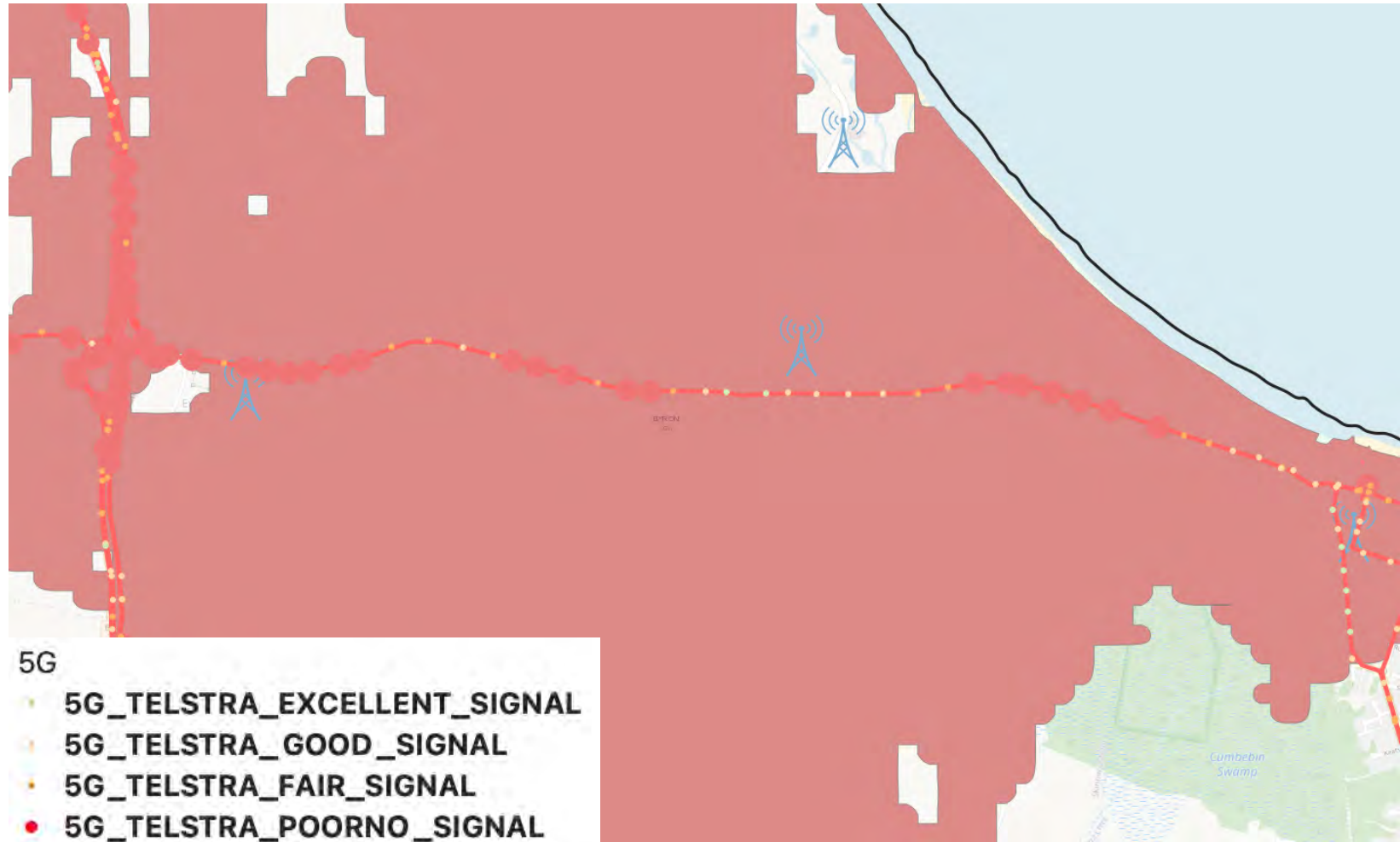
Byron Shire Analysis

Ewingsdale Road



Assessment – Mixed 5G coverage.

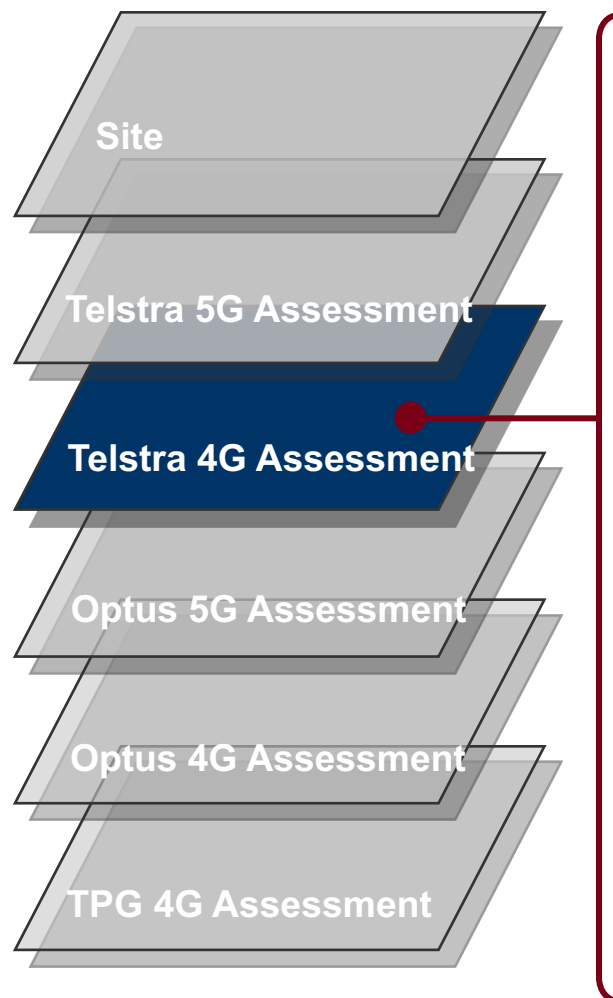
Action – Upgrade 3 x Telstra Tower Sites with 5G low band / mid band



Byron Shire Analysis

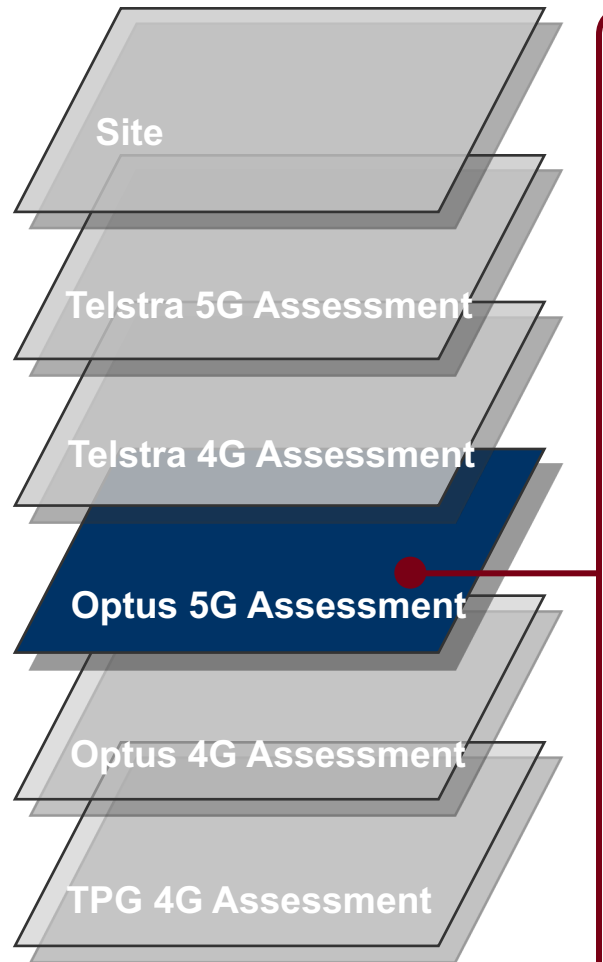
Ewingsdale Road

Assessment - Good 4G coverage



Byron Shire Analysis

Ewingsdale Road



Assessment - No current Optus 5G coverage

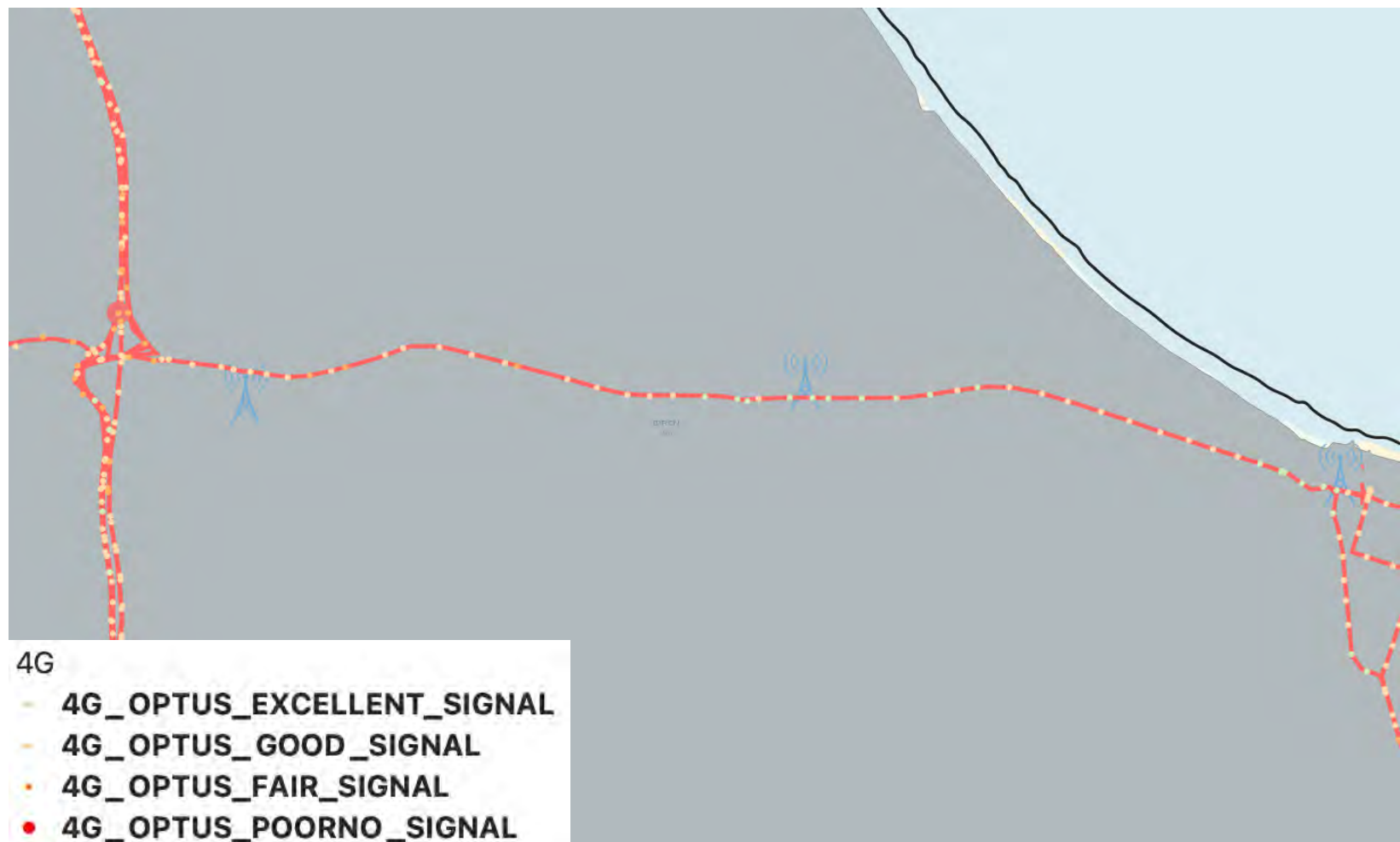
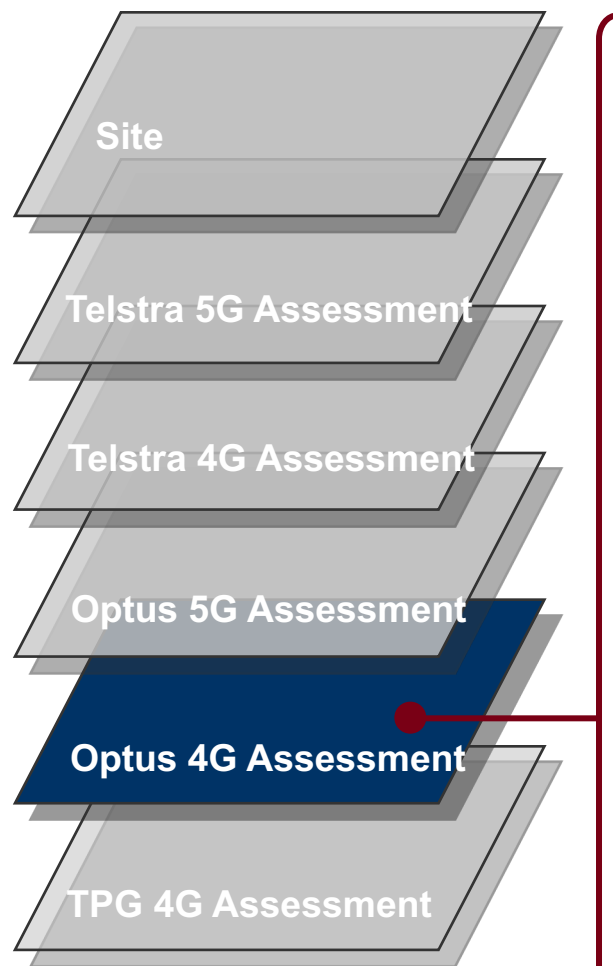
Action – Optus - Upgrade 3 Sites to 5G



Byron Shire Analysis

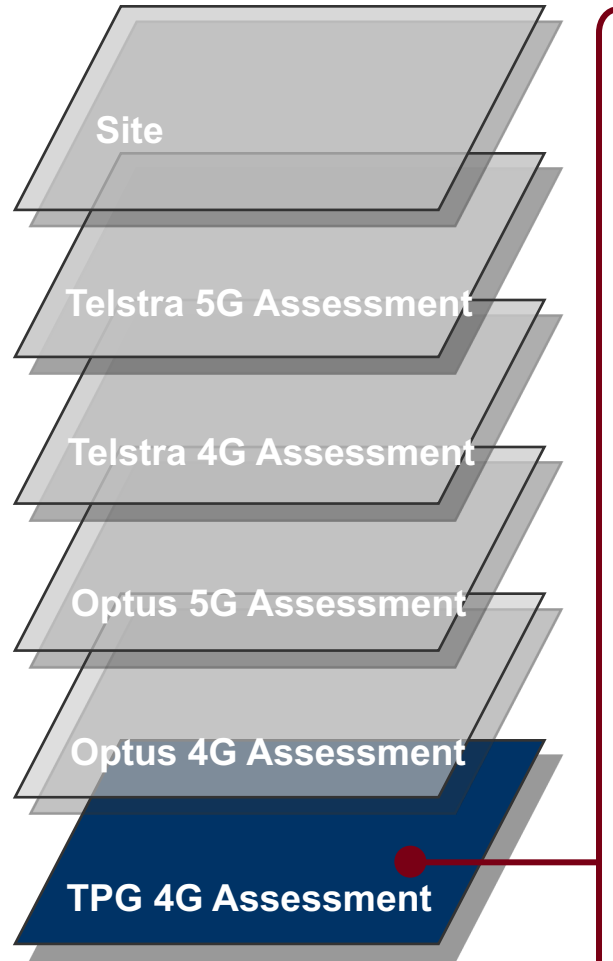
Ewingsdale Road

Assessment – Good 4G coverage



Byron Shire Analysis

Ewingsdale Road



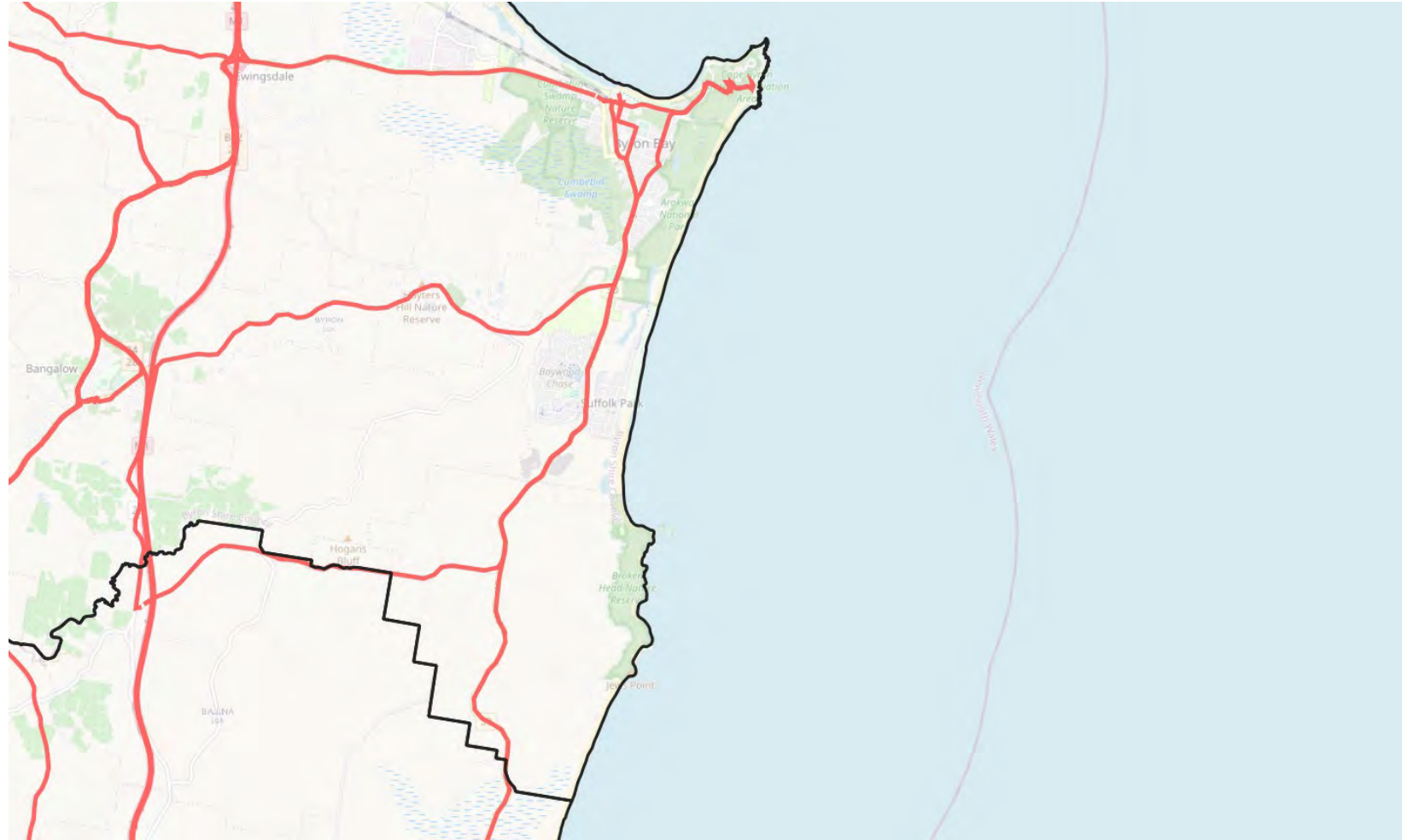
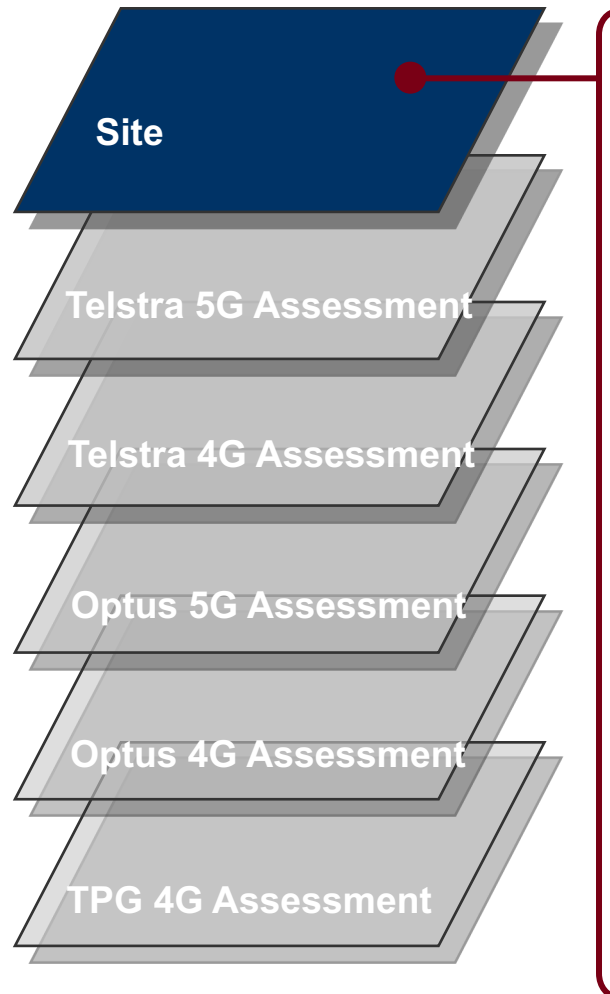
Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – TPG - Upgrade 3 Sites to 4G midband



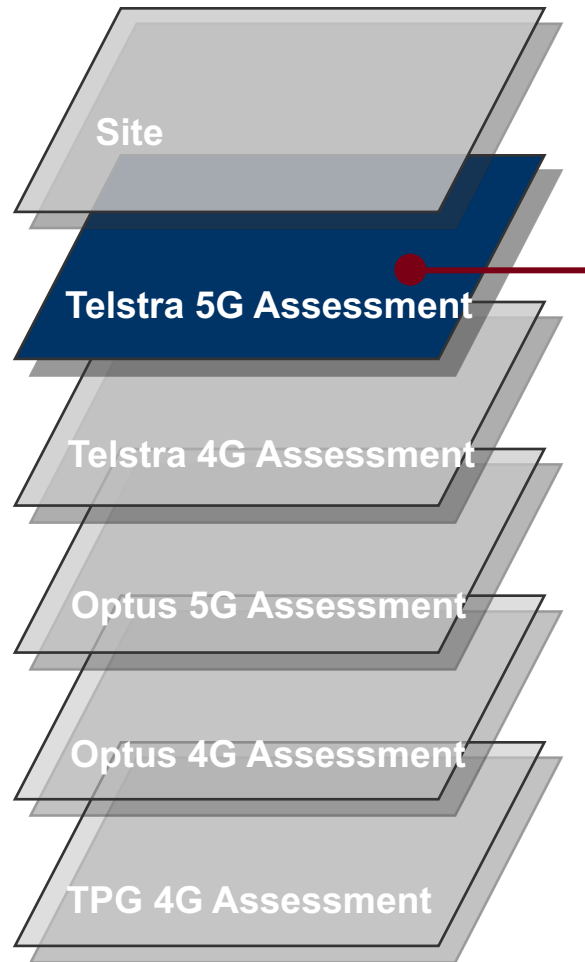
Byron Shire Analysis

Broken Head Road



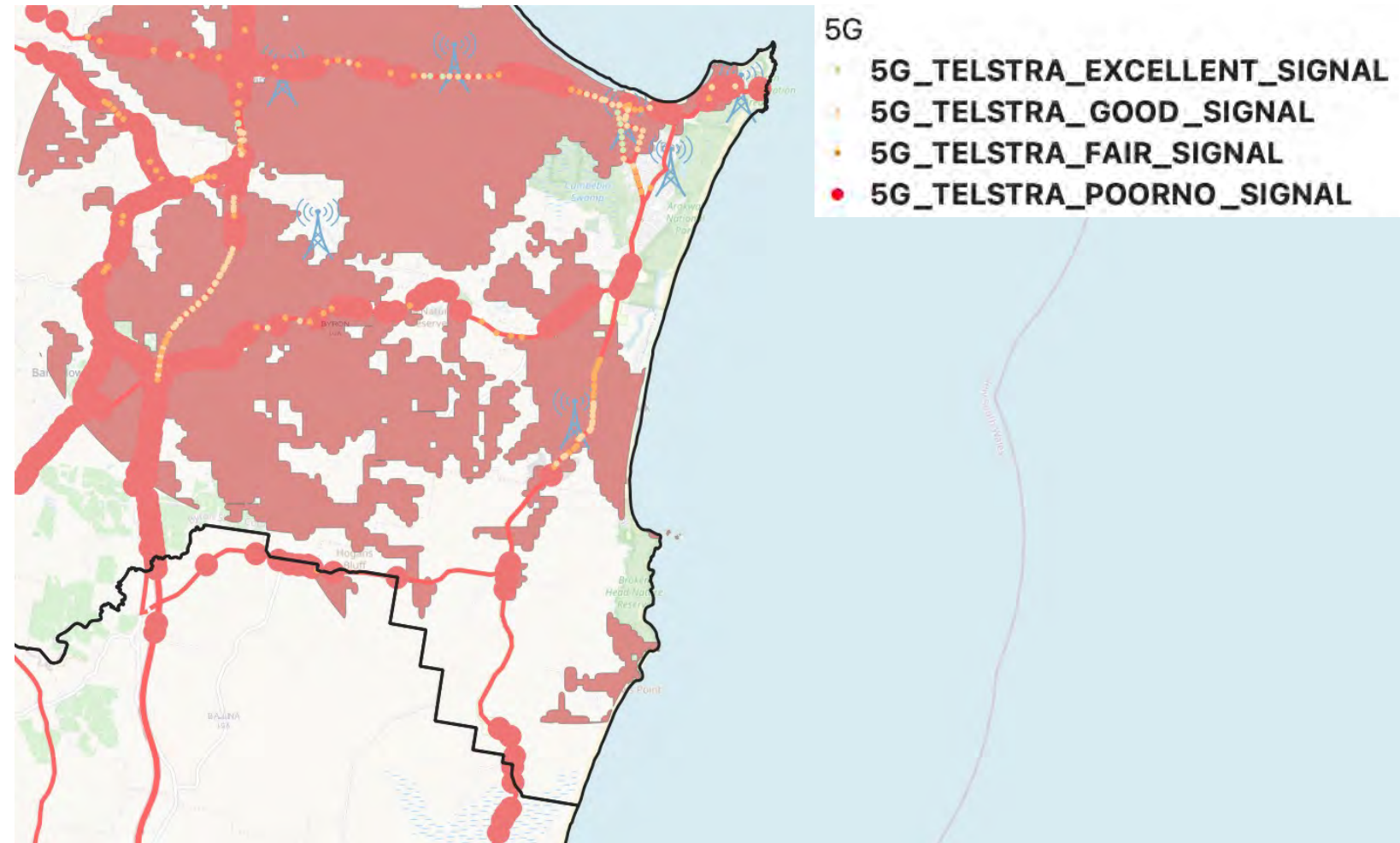
Byron Shire Analysis

Broken Head Road



Assessment – 5G coverage mixed inside and outside of coverage mapping. Broad 5G blackspot areas.

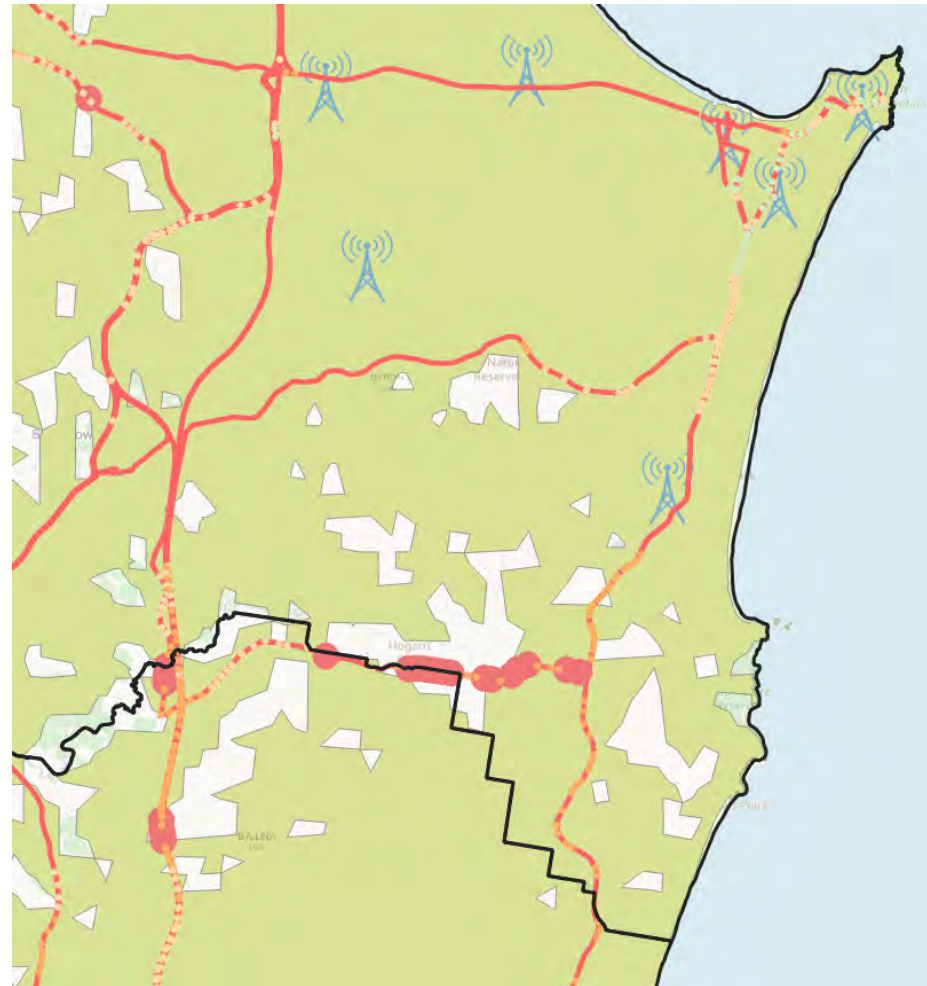
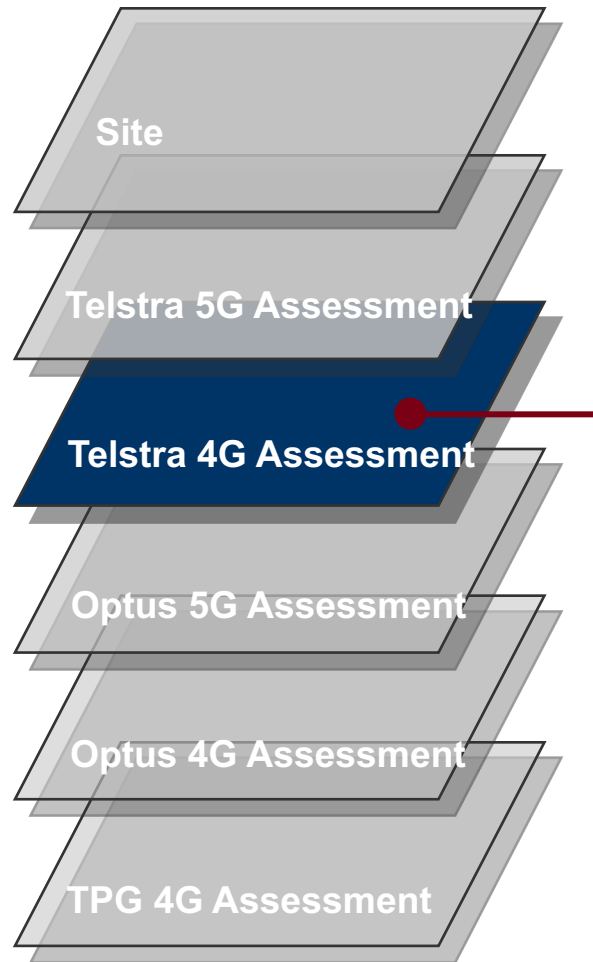
Action – Telstra - Upgrade 2 x Site to 5G & Telstra / Fed Govt – up to 2 new 5G Tower sites



Byron Shire Analysis

Broken Head Road

Assessment – Good 4G coverage

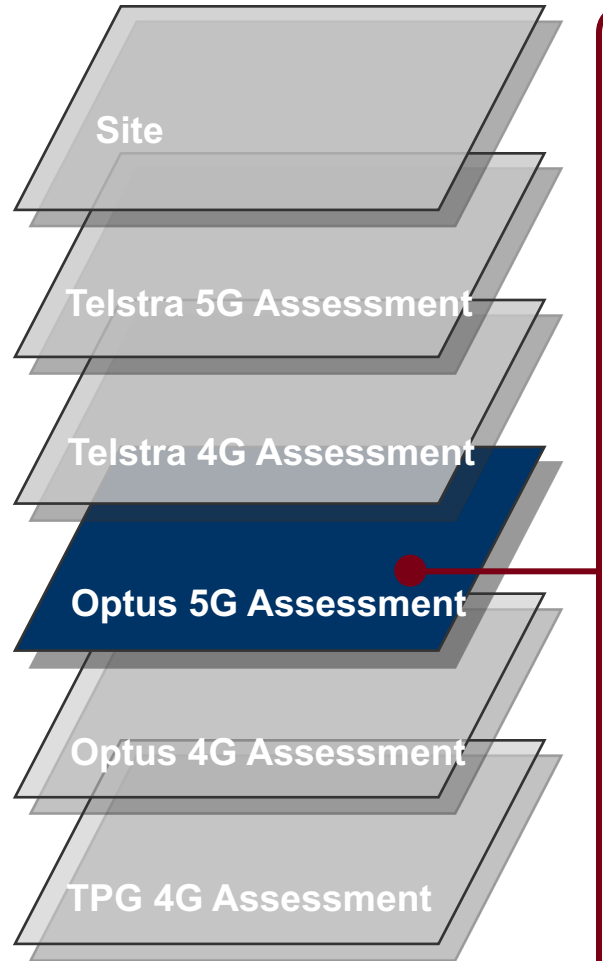


4G

- 4G_TELSTRA_EXCELLENT_SIGNAL
- 4G_TELSTRA_GOOD_SIGNAL
- 4G_TELSTRA_FAIR_SIGNAL
- 4G_TELSTRA_POORNO_SIGNAL

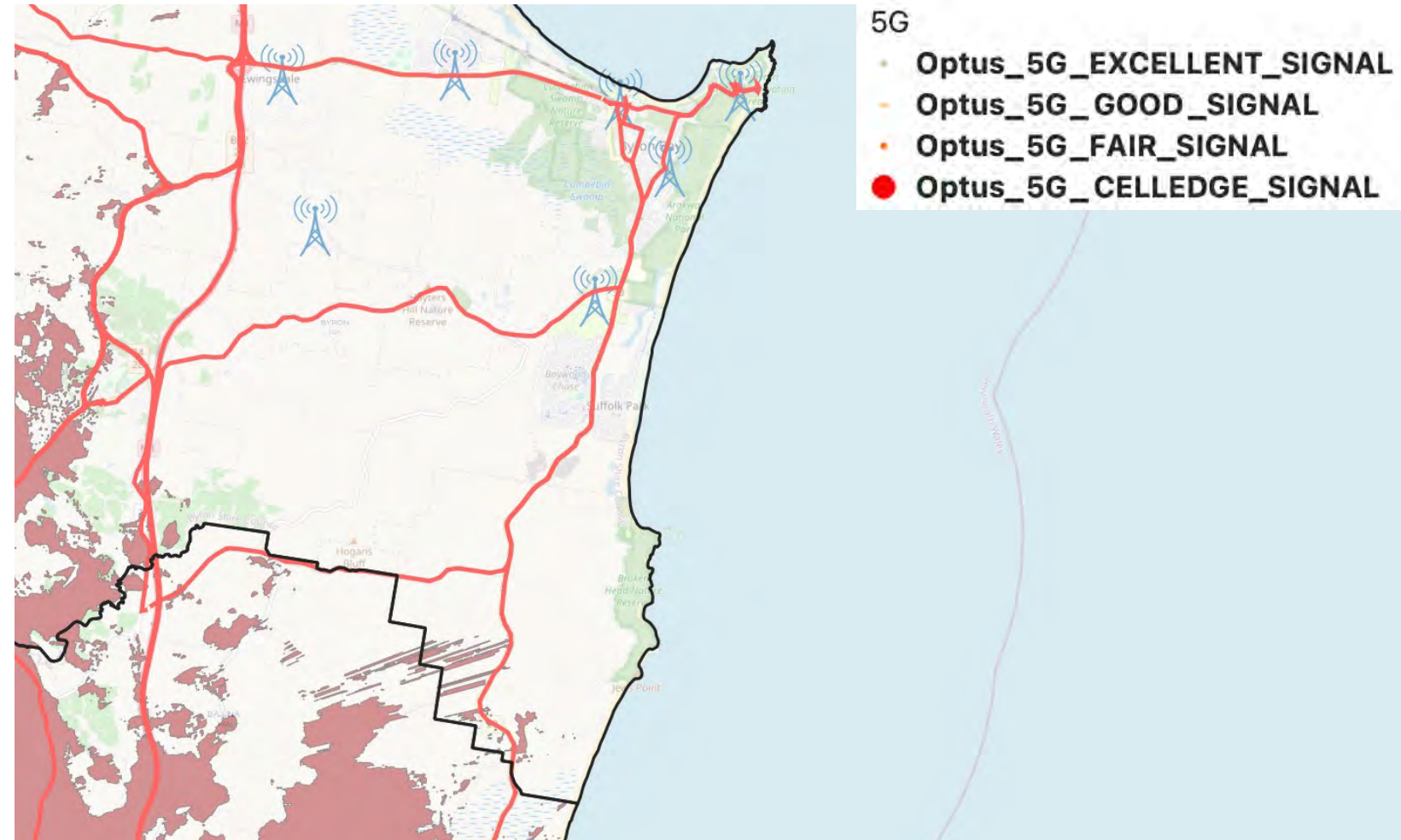
Byron Shire Analysis

Broken Head Road



Assessment - No current Optus 5G coverage

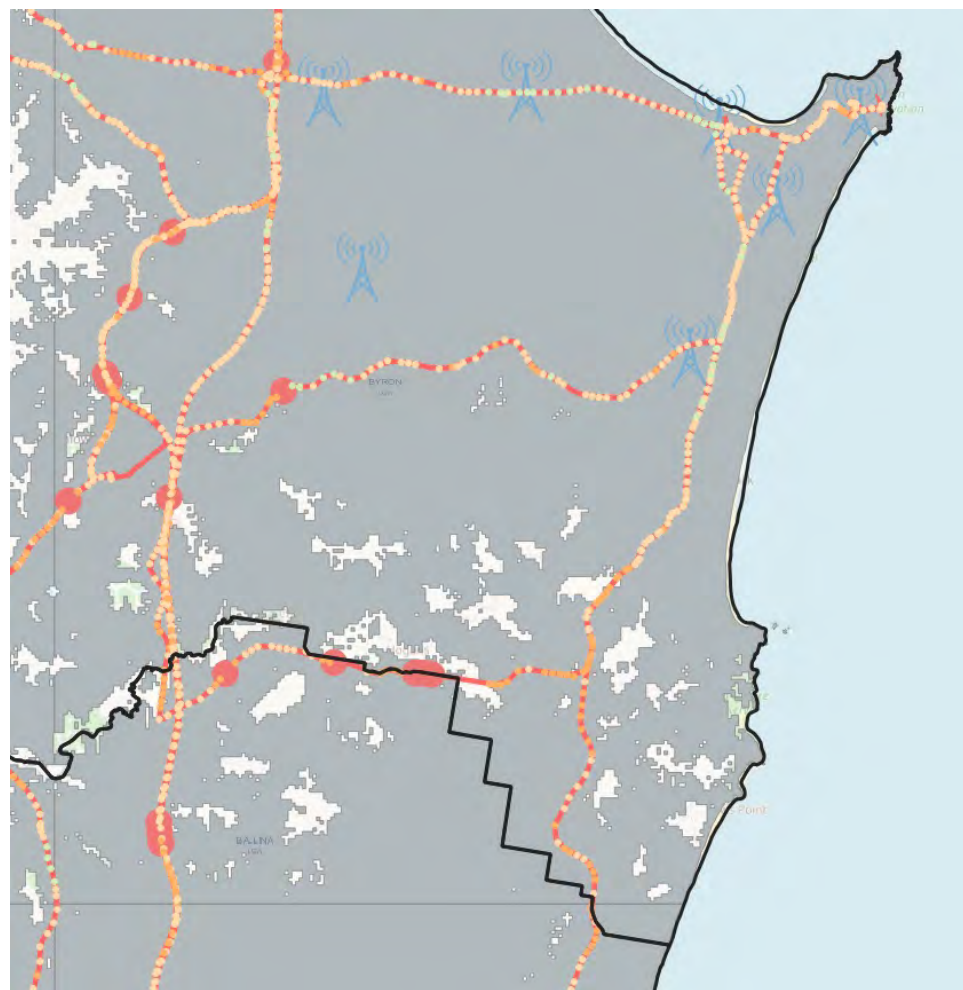
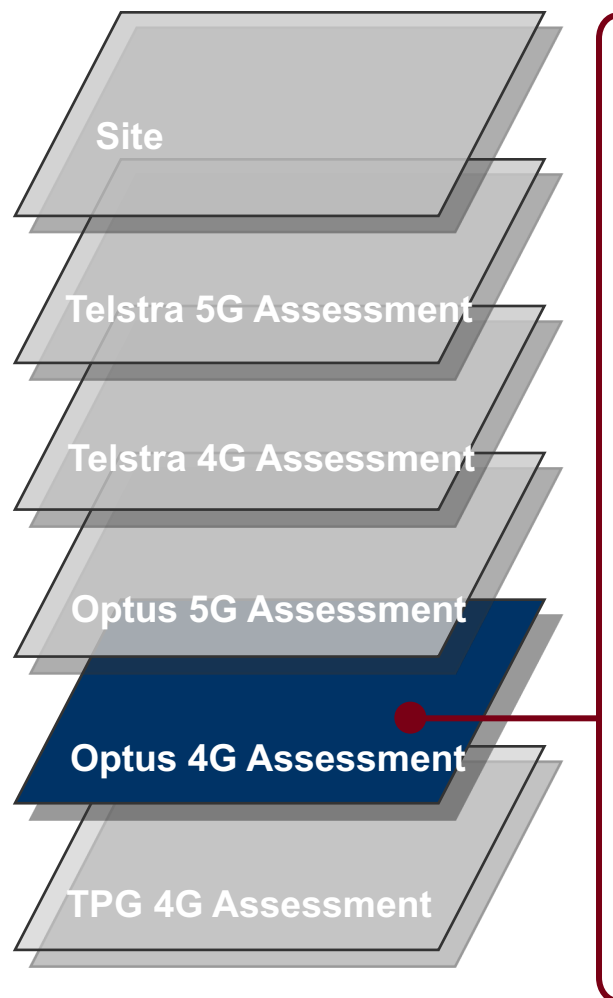
Action – Optus - Upgrade 3 Sites to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites



Byron Shire Analysis

Broken Head Road

Assessment – Good 4G coverage

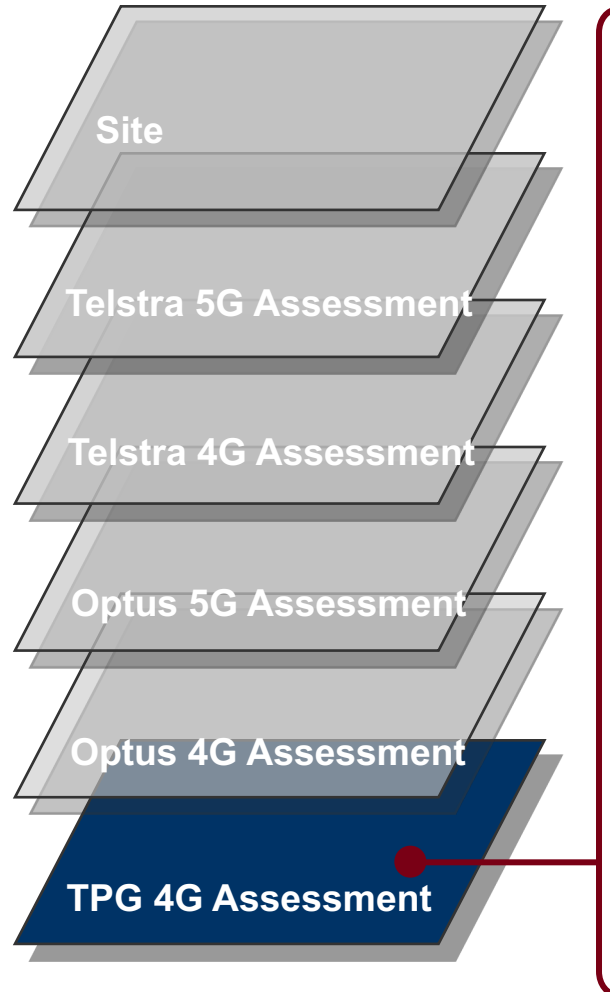


4G

- 4G_OPTUS_EXCELLENT_SIGNAL
- 4G_OPTUS_GOOD_SIGNAL
- 4G_OPTUS_FAIR_SIGNAL
- 4G_OPTUS_POORNO_SIGNAL

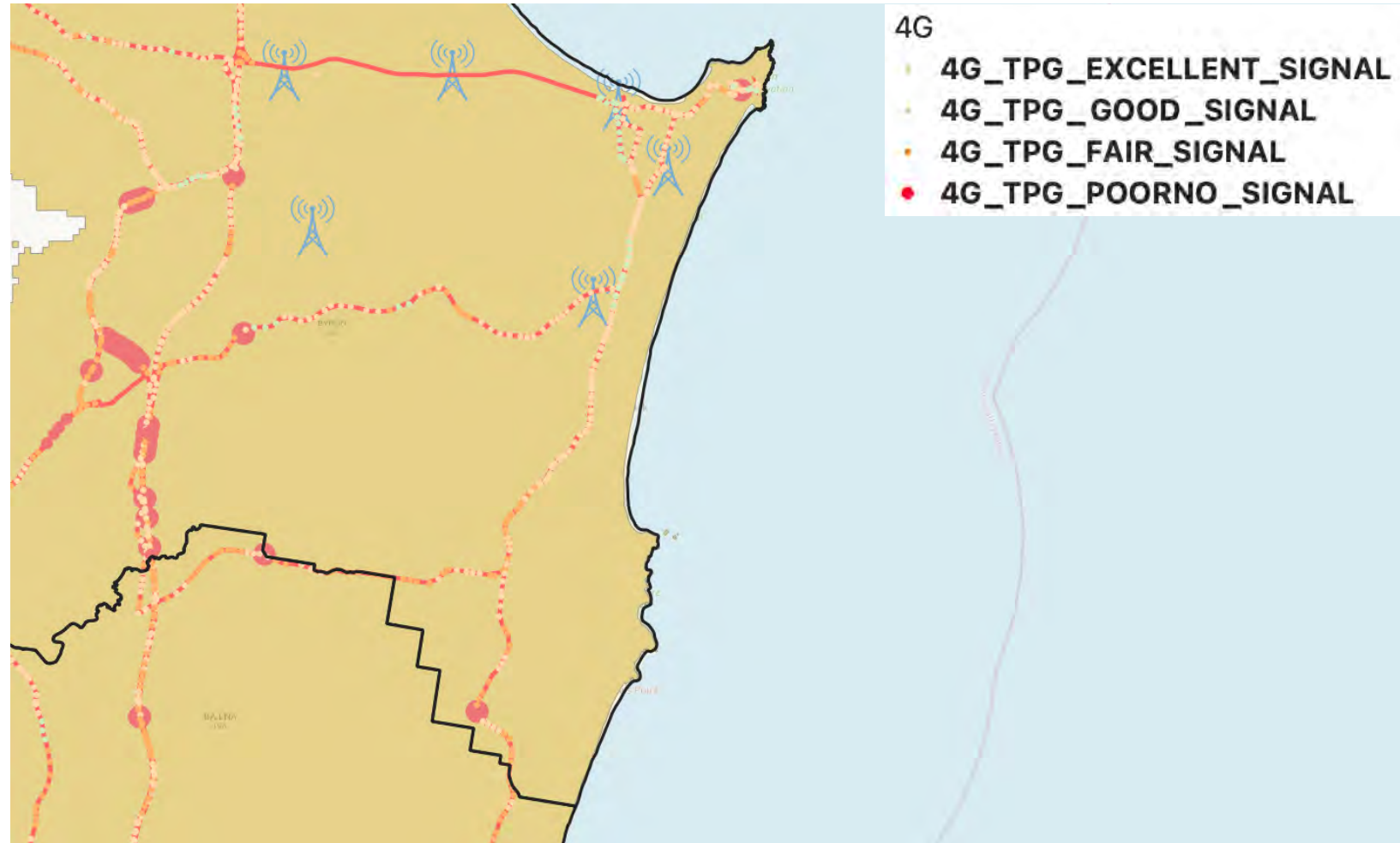
Byron Shire Analysis

Broken Head Road



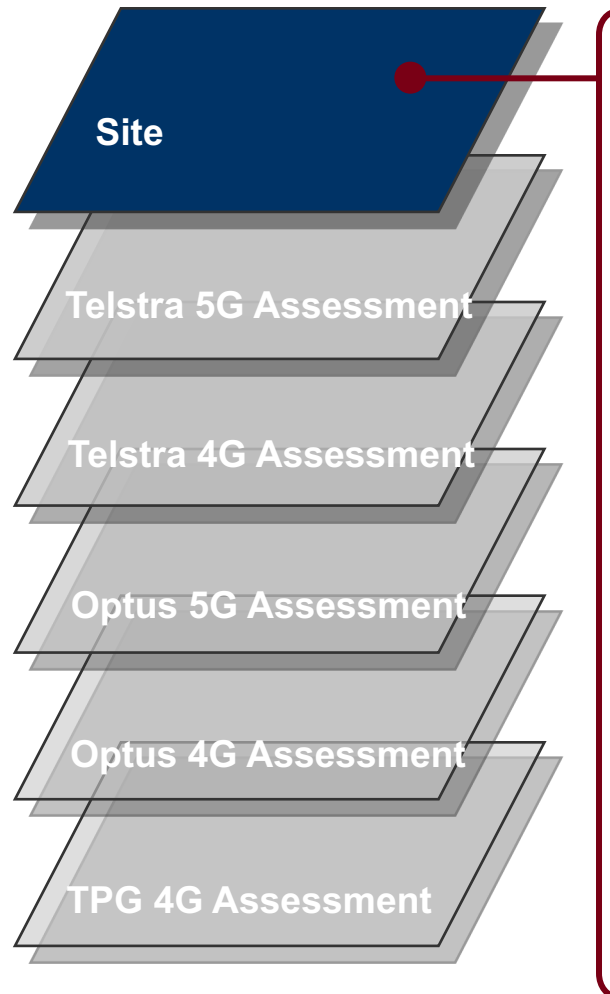
Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – TPG - Upgrade 3 Sites to 4G midband & TPG / Fed Govt (MBSP) – up to 2 new 4G sites



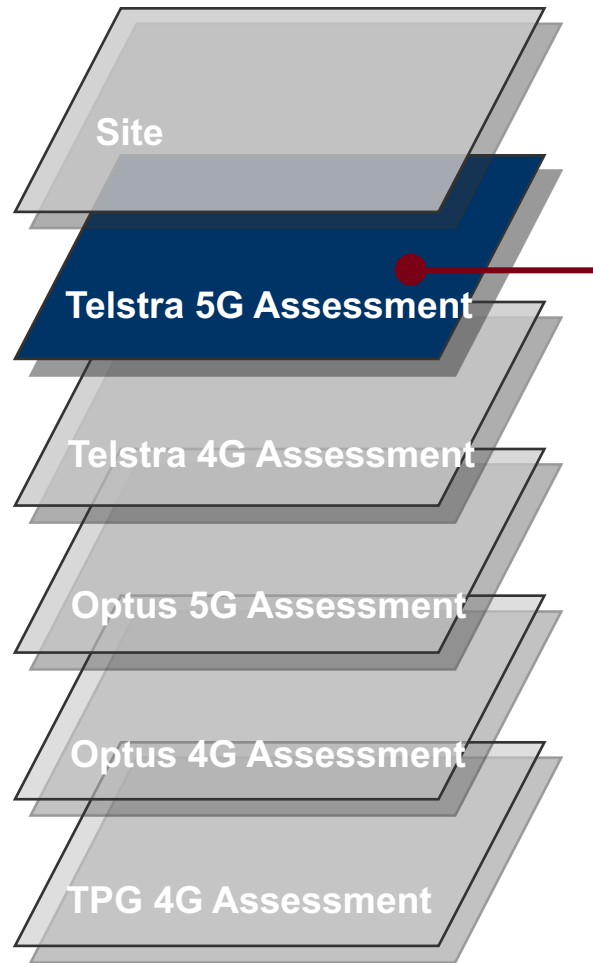
Byron Shire Analysis

Lismore Road



Byron Shire Analysis

Lismore Road



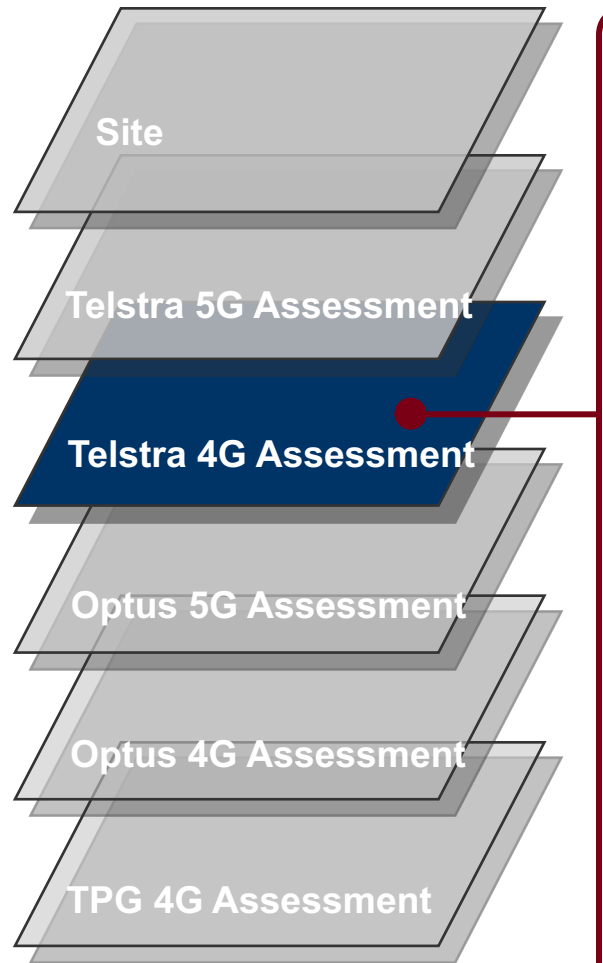
Assessment – 5G coverage mixed inside and outside of coverage mapping. Broad 5G blackspot areas.

Action – Telstra - Upgrade 1 x Site to 5G & Telstra / Fed Govt – 1 new 5G Tower sites



Byron Shire Analysis

Lismore Road



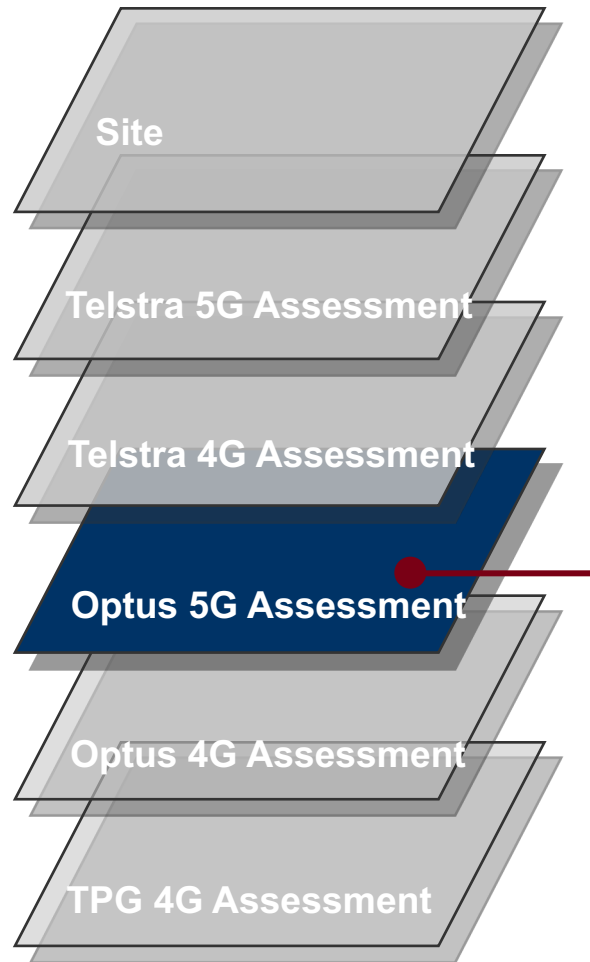
Assessment – 4G blackspots near Binna Burra

Action –Telstra / Fed Govt – 1 new 4G Tower sites



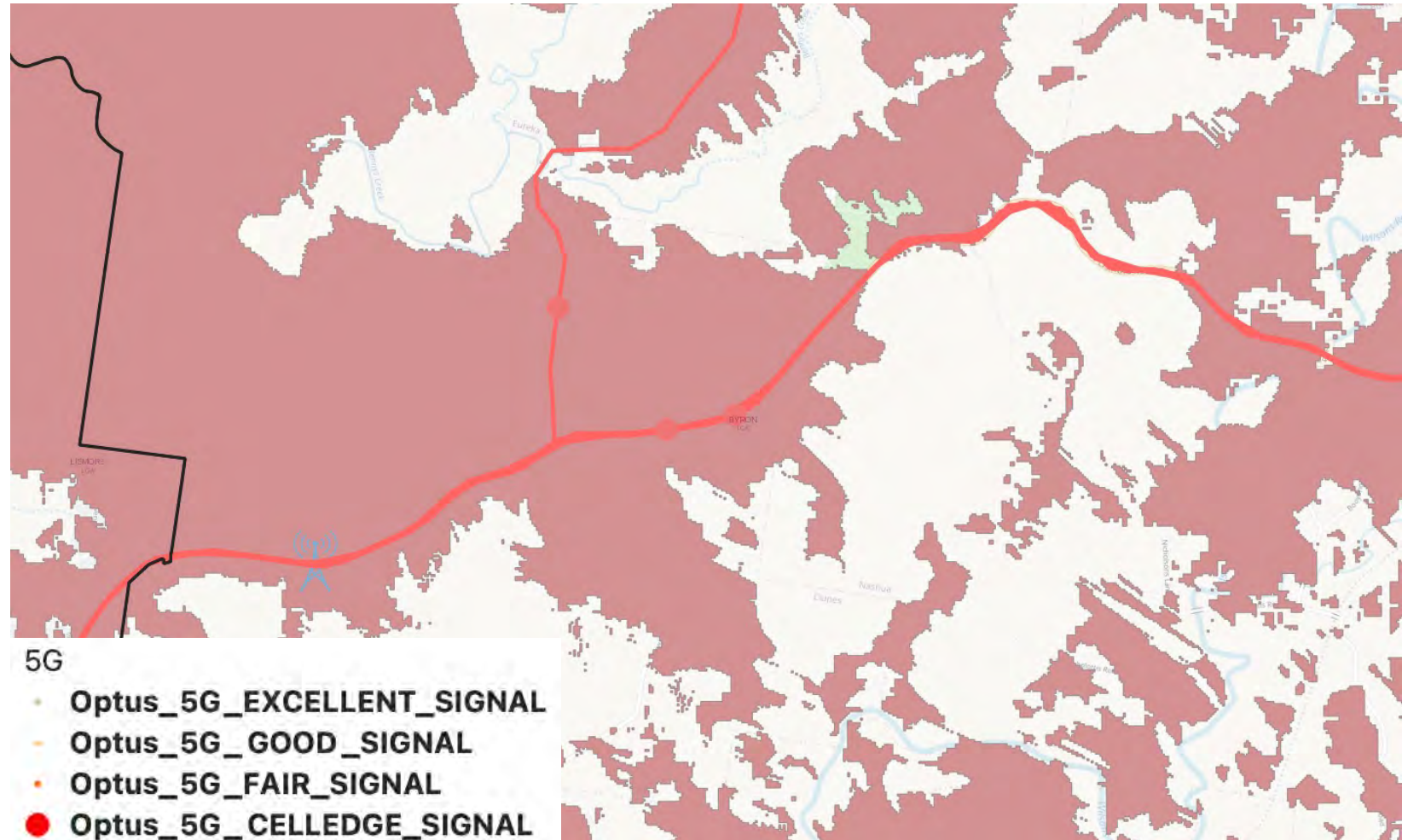
Byron Shire Analysis

Lismore Road



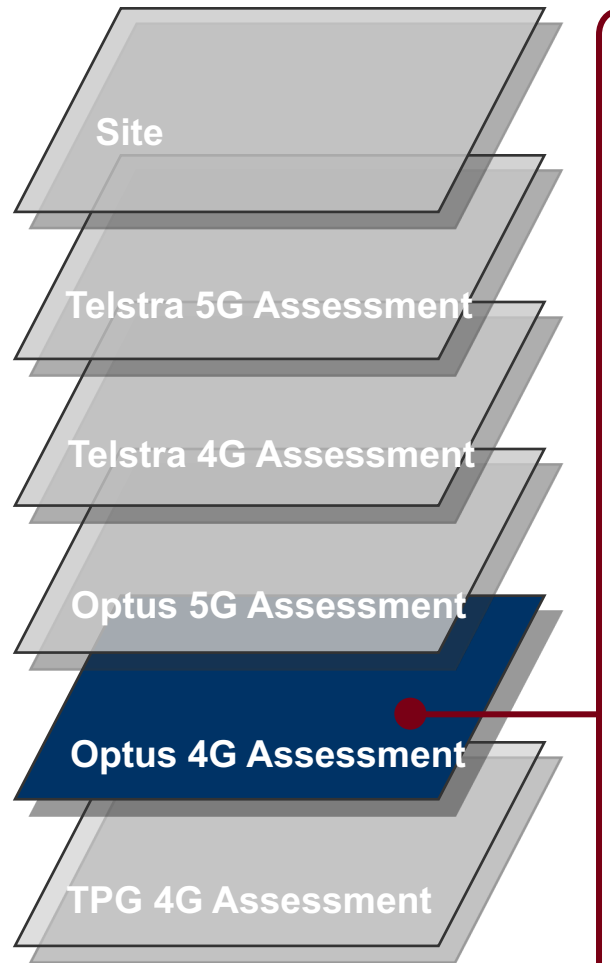
Assessment - No current Optus 5G coverage either inside or outside of coverage mapping

Action – Optus - Upgrade 1x Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



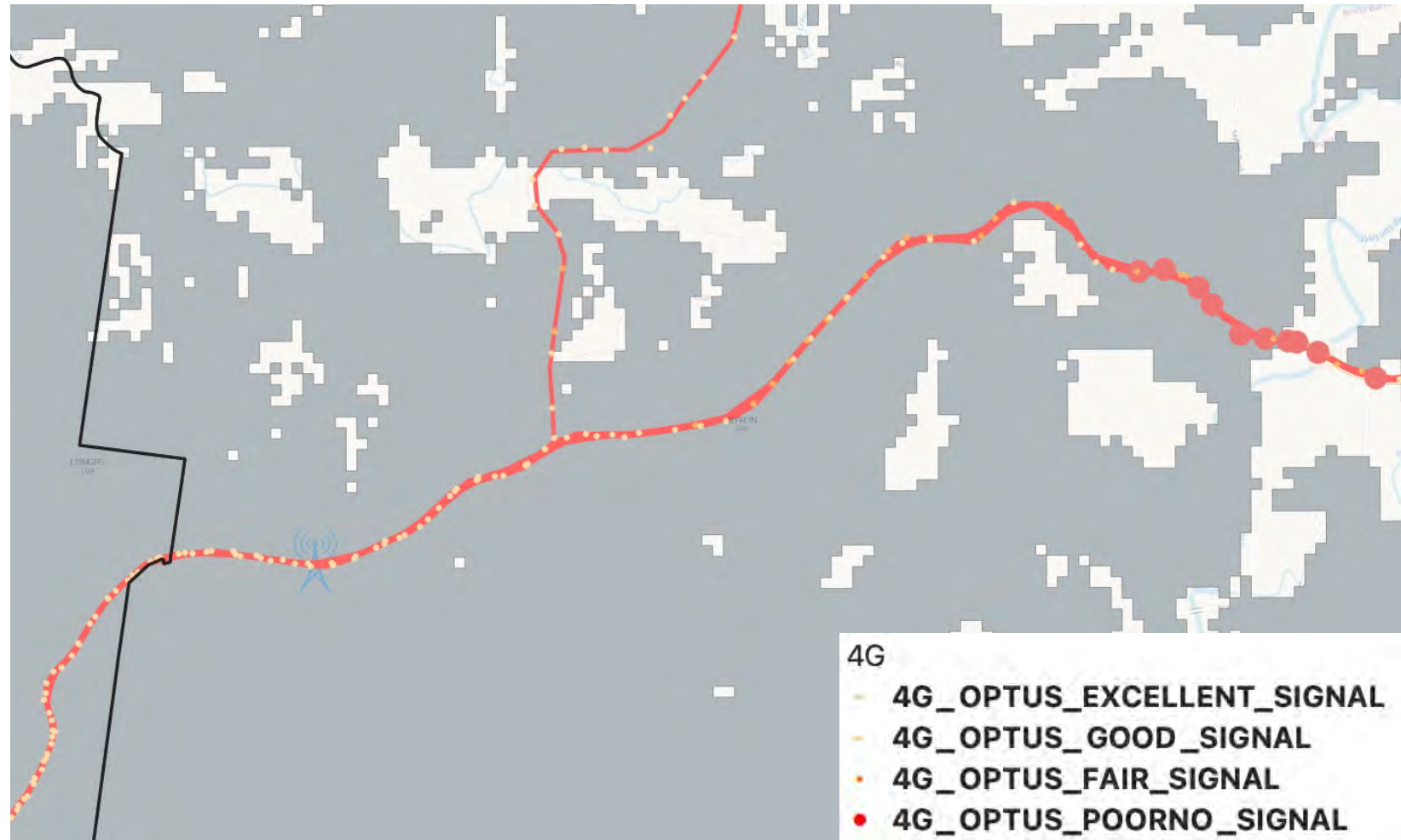
Byron Shire Analysis

Lismore Road



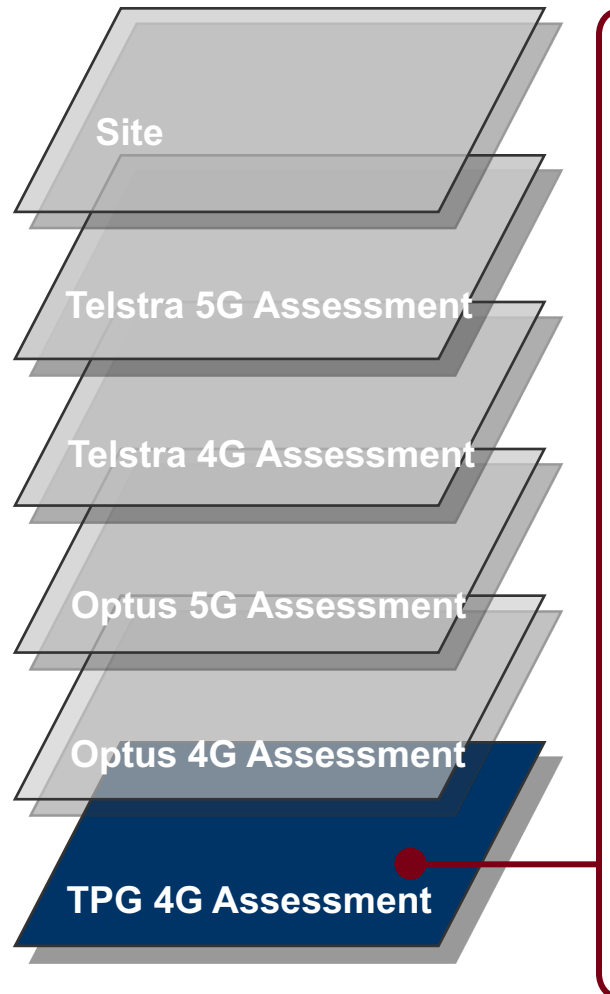
Assessment - 4G blackspots at Binna Burra

Action – Optus / Fed Govt – 1 new 4G Tower sites



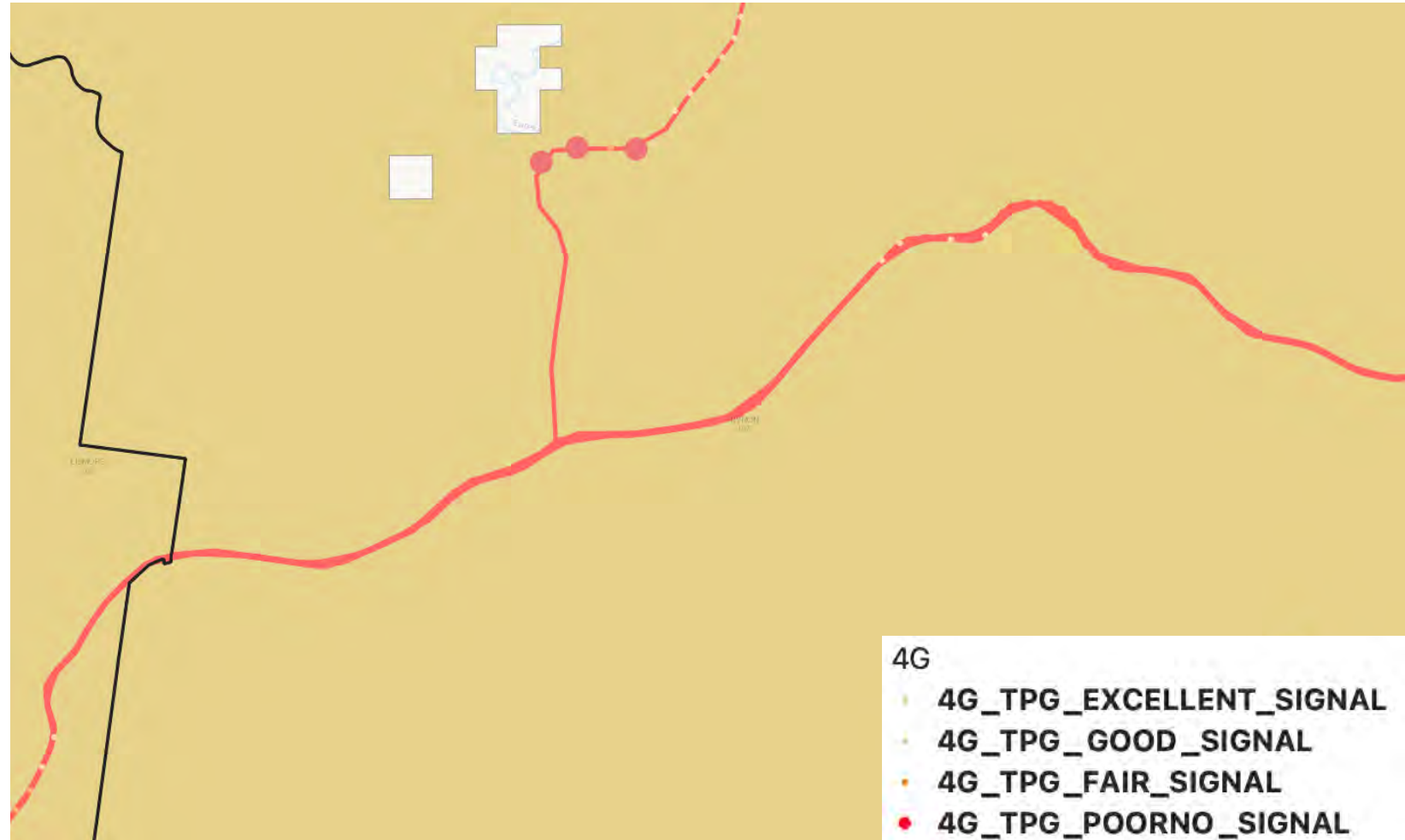
Byron Shire Analysis

Lismore Road



Assessment – Broad 4G blackspots inside coverage mapping

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites

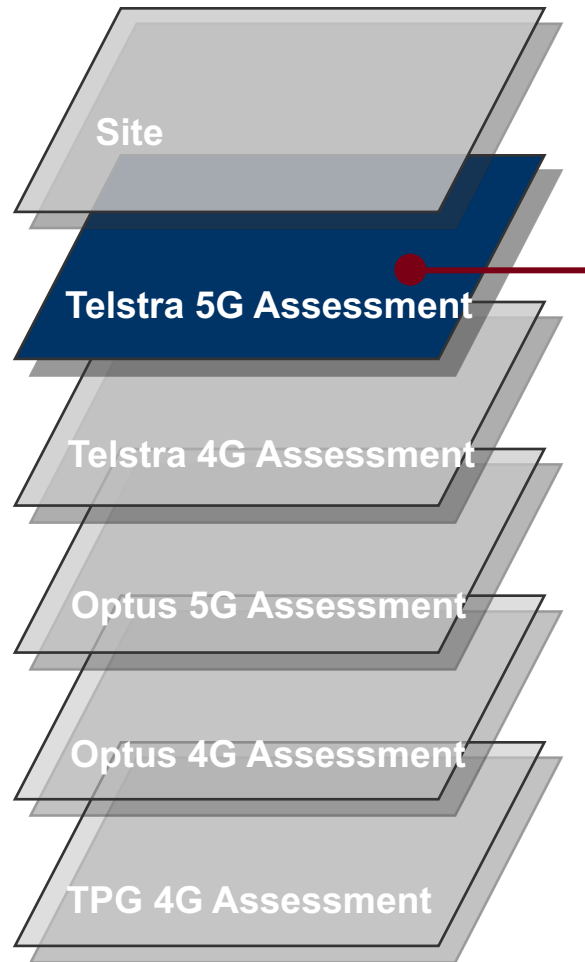


Eureka Road



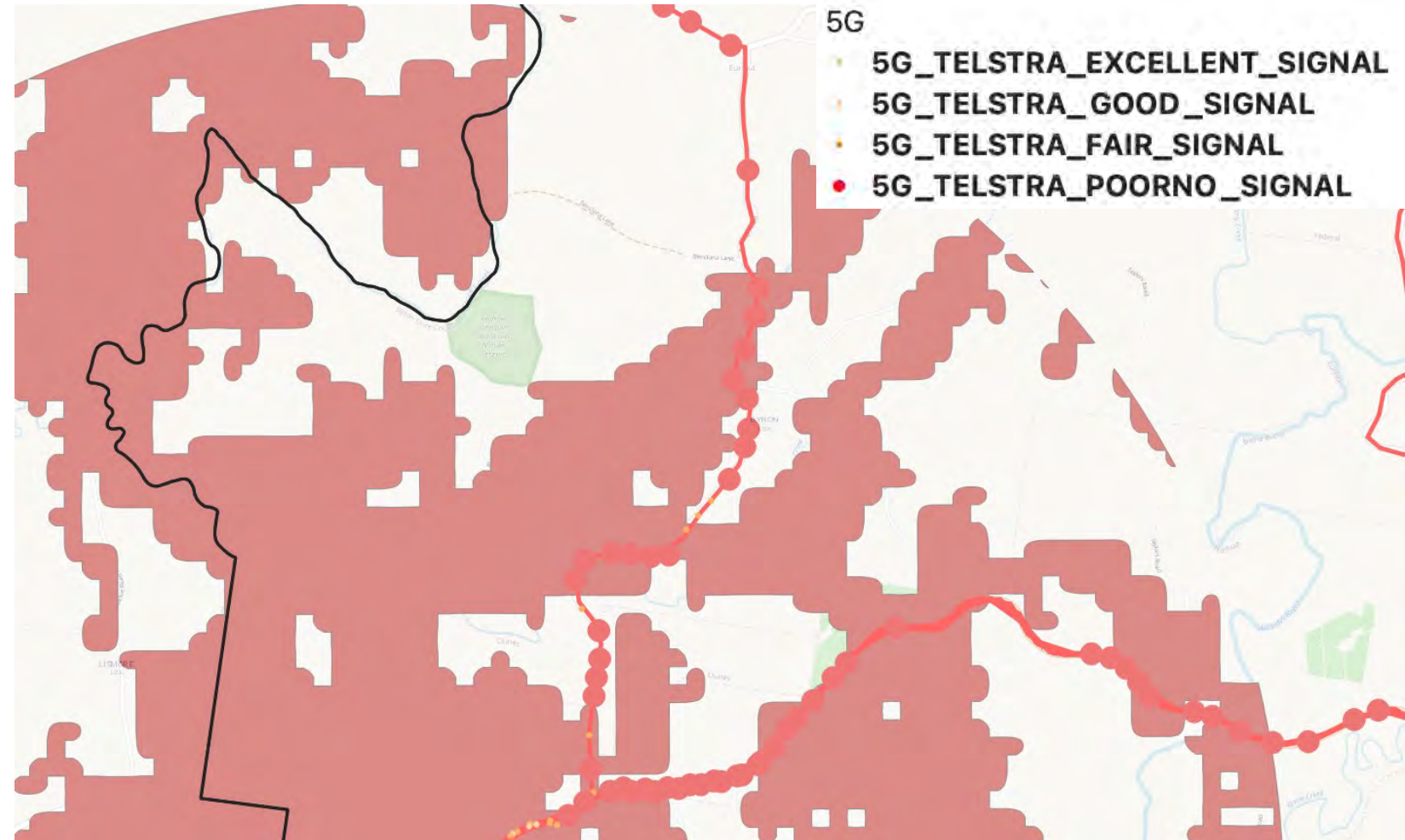
Byron Shire Analysis

Eureka Road



Assessment – 5G coverage mixed inside and outside of coverage mapping. Broad 5G blackspot areas.

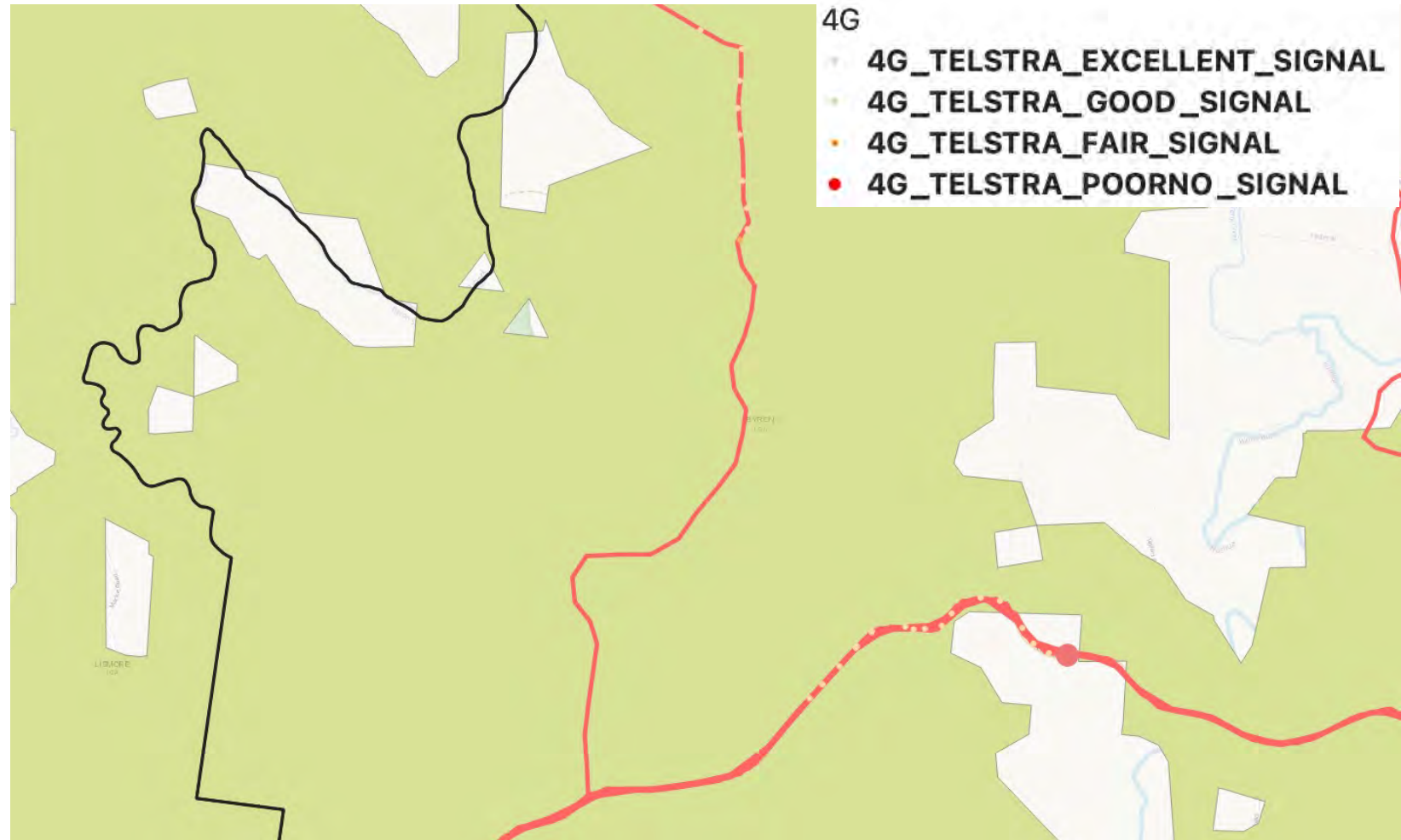
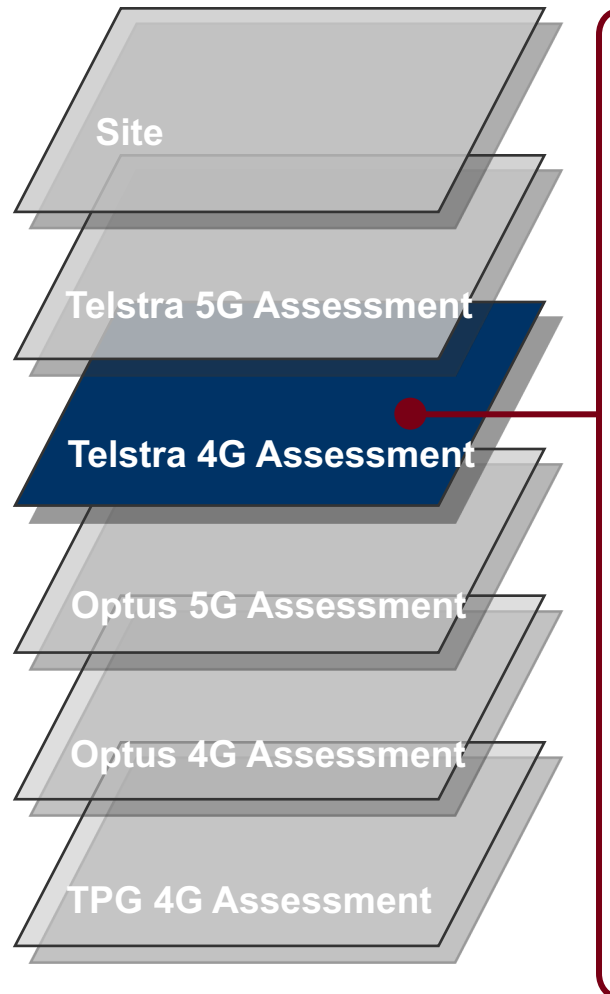
Action – Telstra / Fed Govt – 2 new 5G Tower sites



Byron Shire Analysis

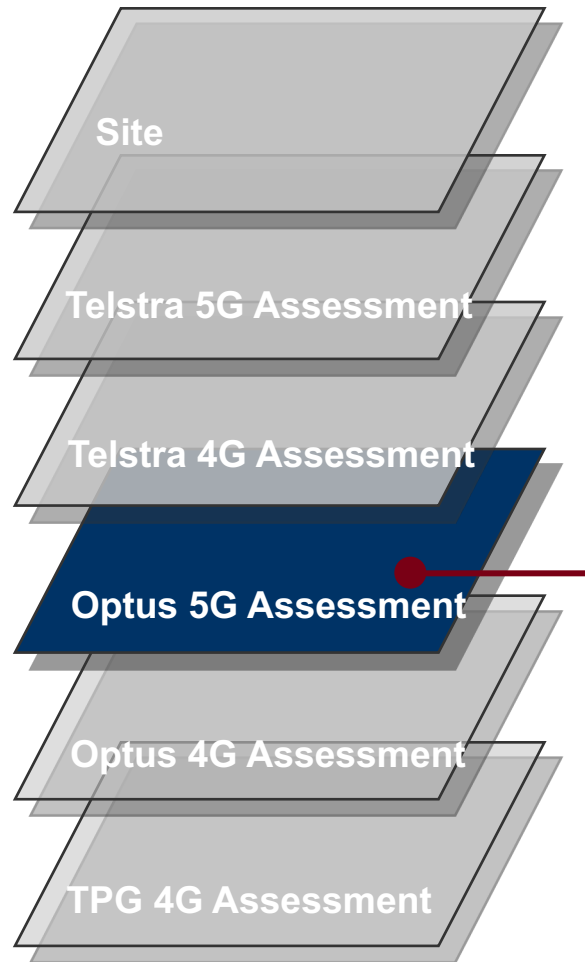
Eureka Road

Assessment – Good 4G coverage



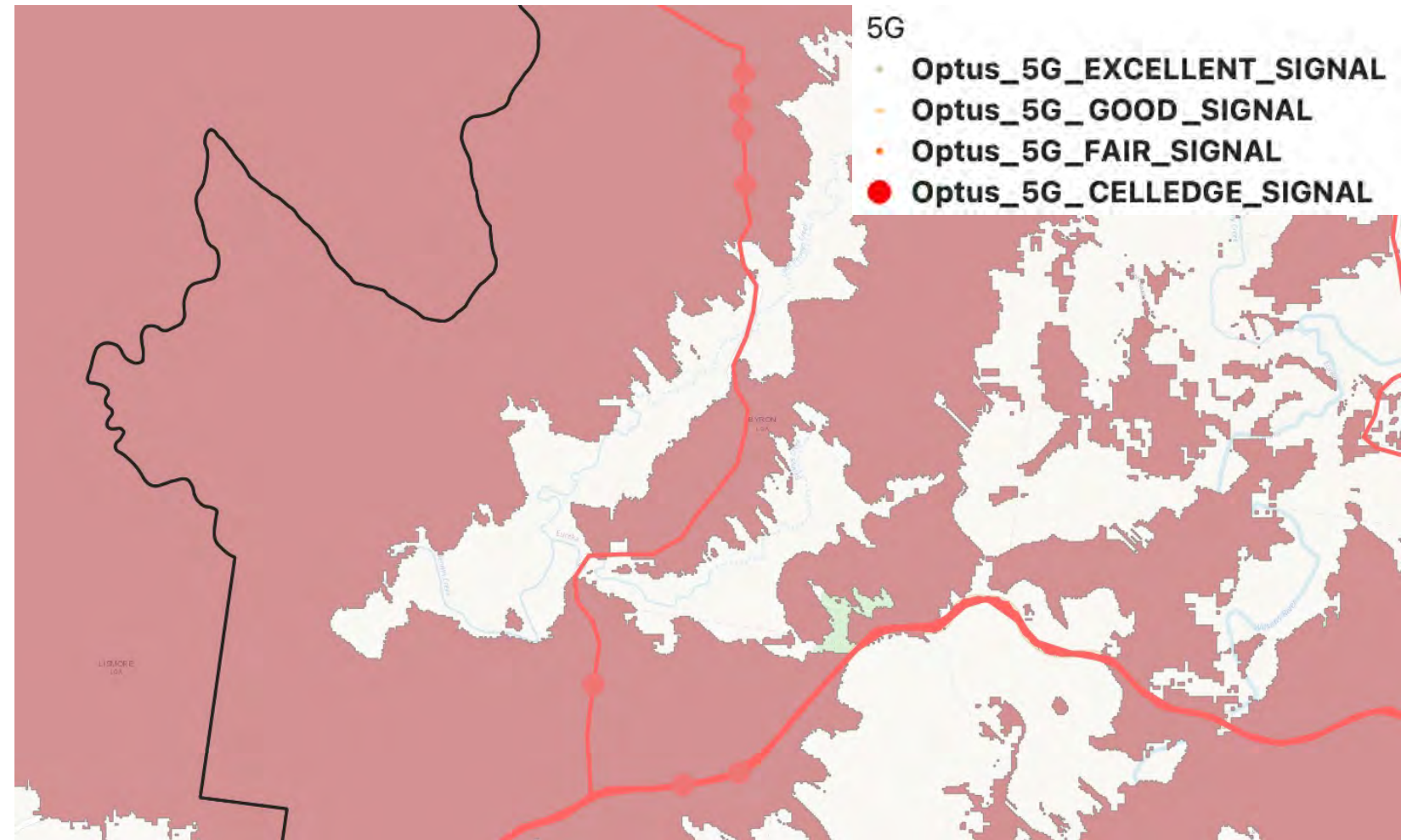
Byron Shire Analysis

Eureka Road



Assessment – 5G coverage mixed inside and outside of coverage mapping. Broad 5G blackspot areas.

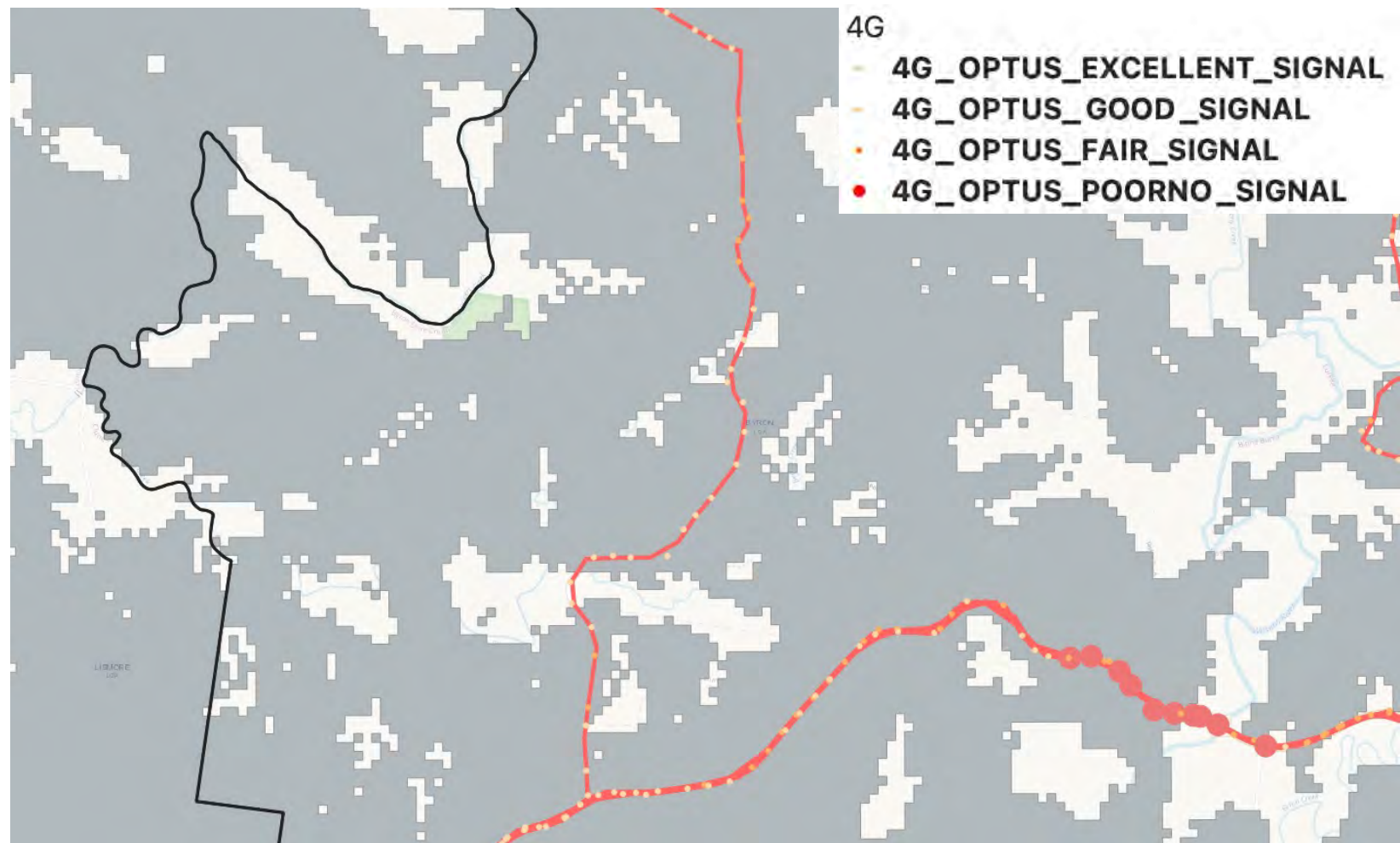
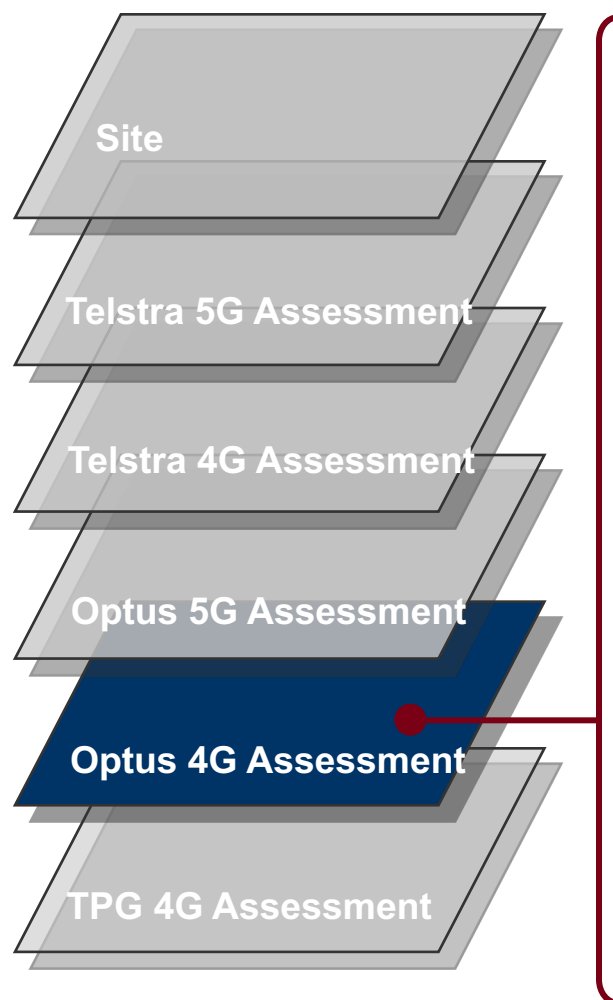
Action –Optus – upgrade 2 sites with 5G lowband / midband & Optus / Fed Govt – 1 new 5G Tower sites



Byron Shire Analysis

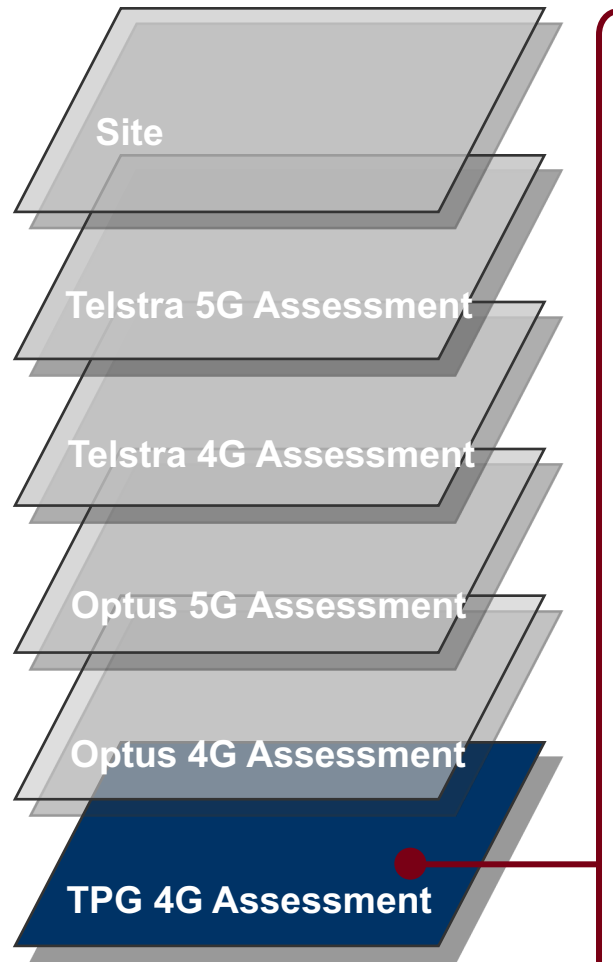
Eureka Road

Assessment – Good 4G coverage



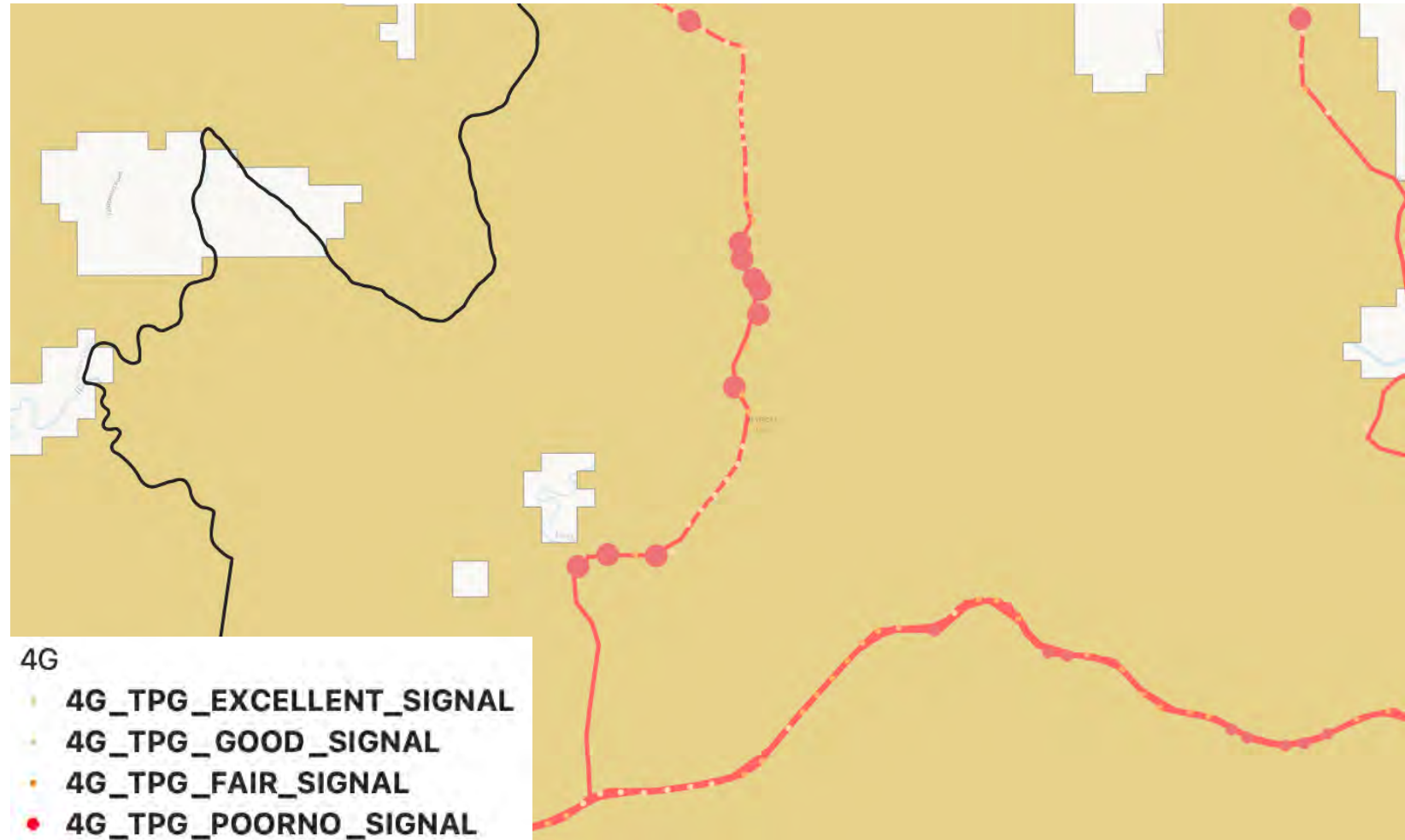
Byron Shire Analysis

Eureka Road



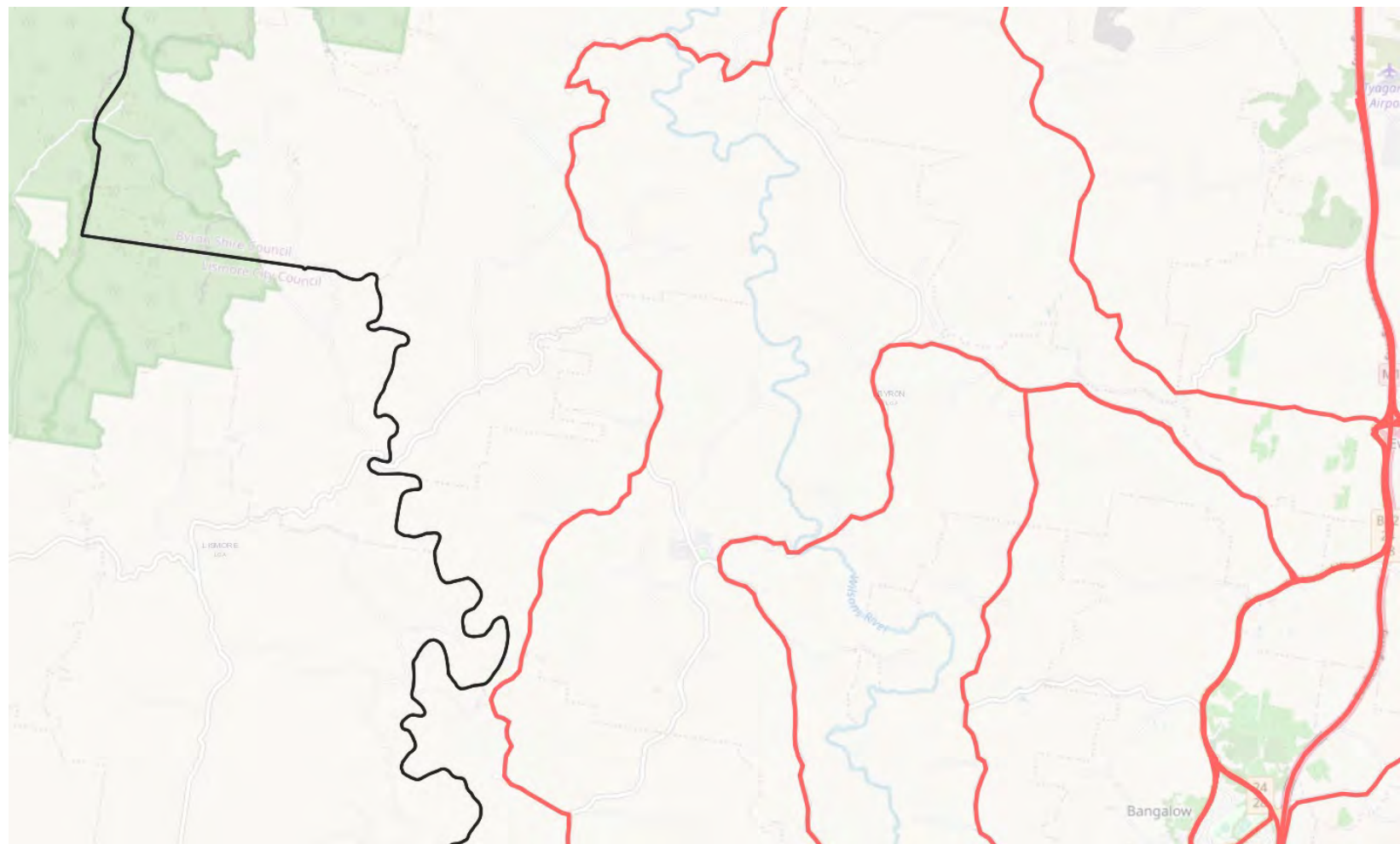
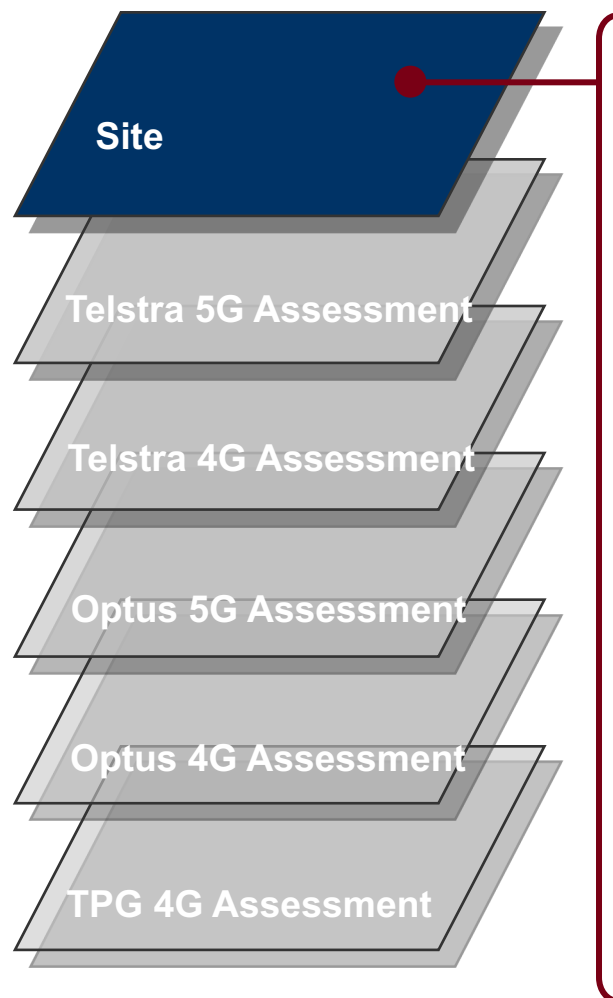
Assessment - 4G blackspots located

Action – TPG – upgrade existing sites with 4G lowband / midband



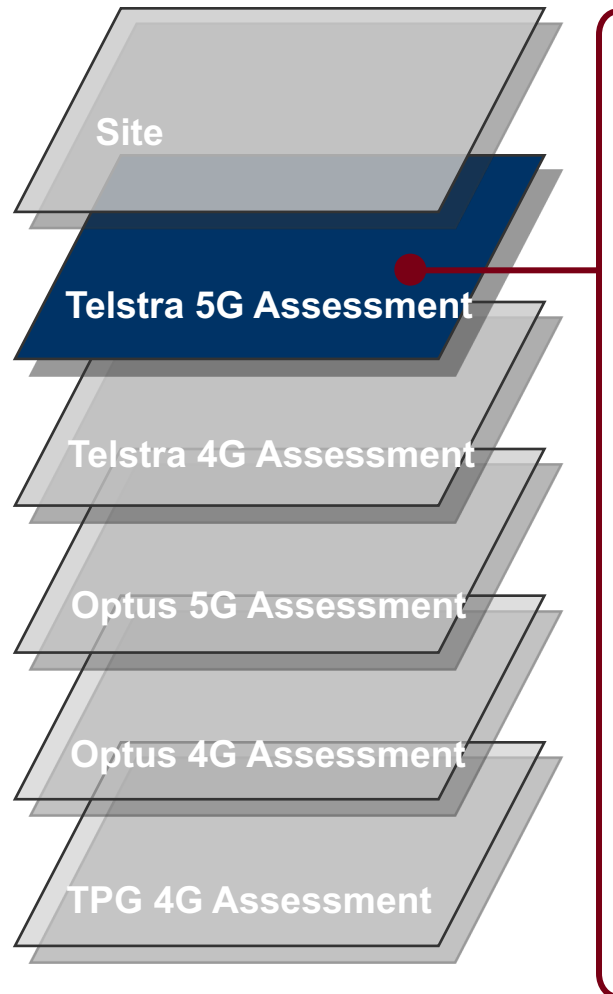
Byron Shire Analysis

Federal Drive



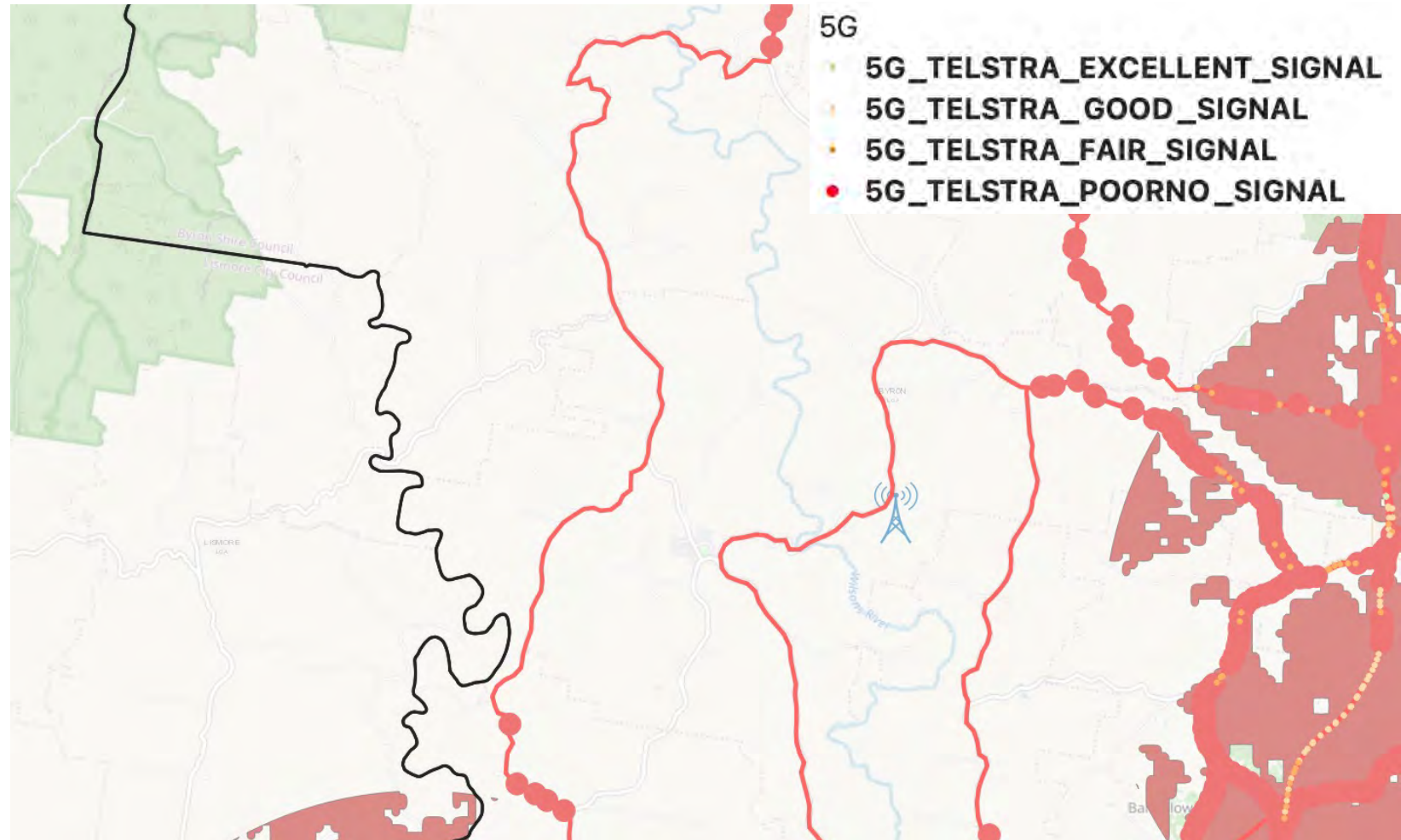
Byron Shire Analysis

Federal Drive



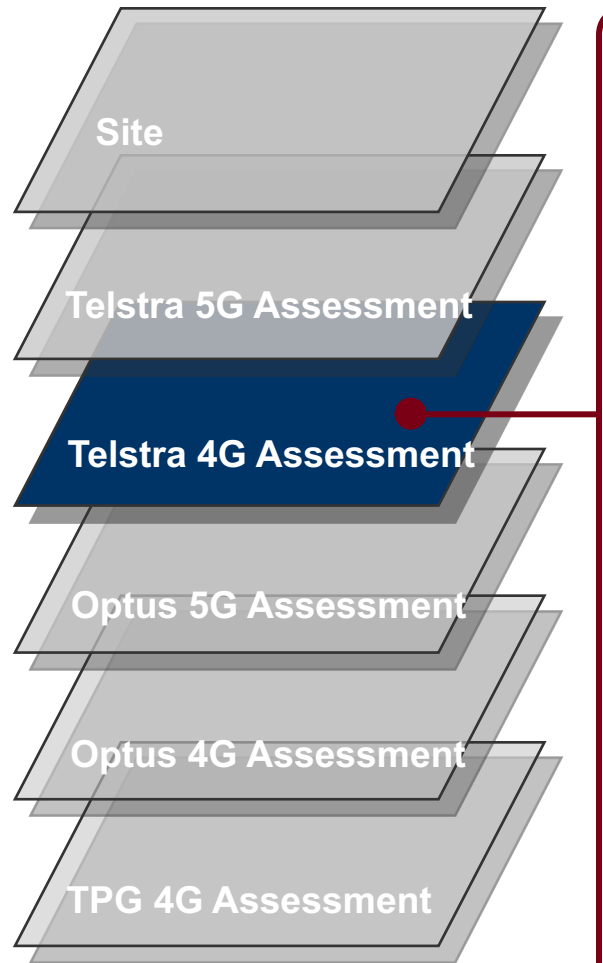
Assessment – No 5G coverage

Action - Telstra / Fed Govt – 2 new 5G Tower sites



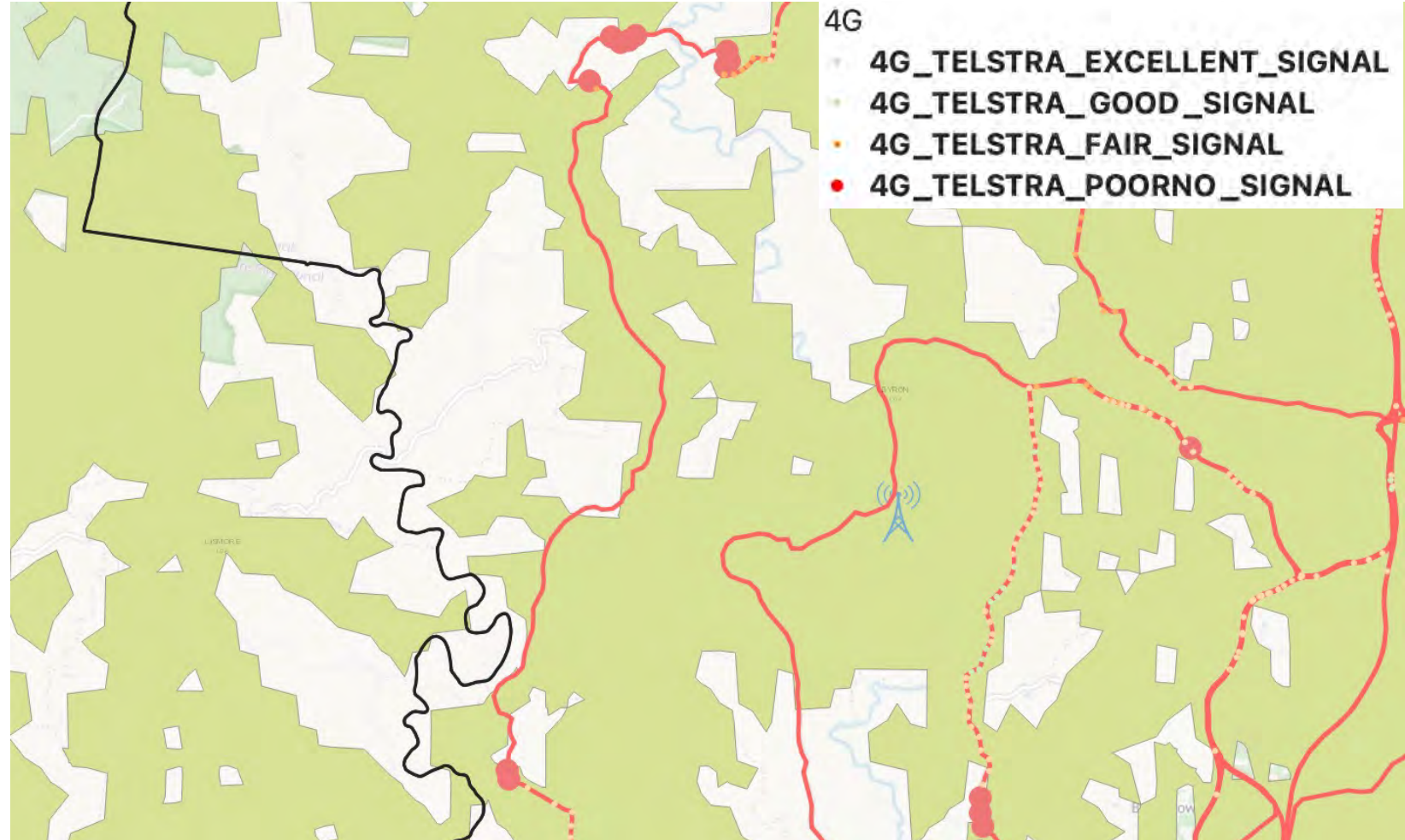
Byron Shire Analysis

Federal Drive



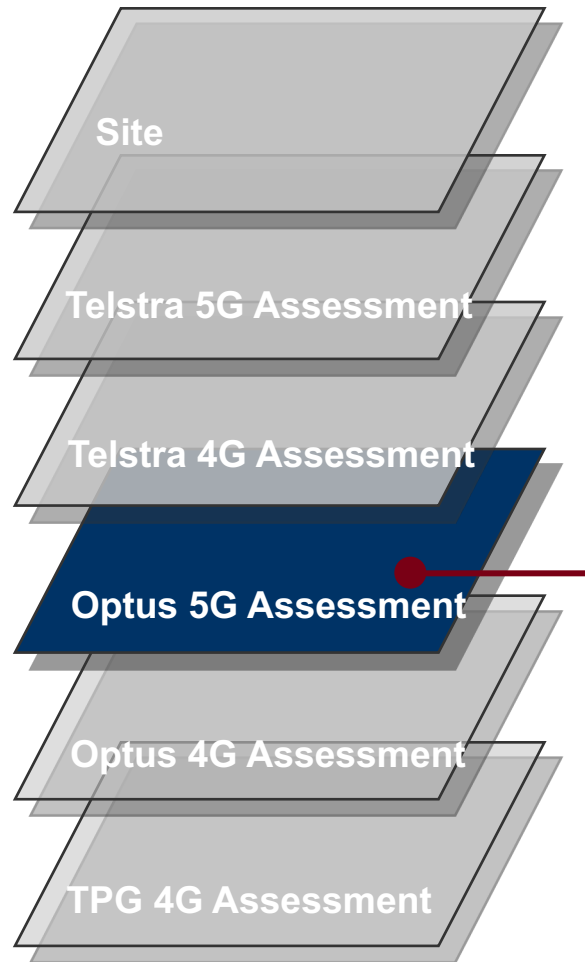
Assessment - 4G blackspots areas located

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



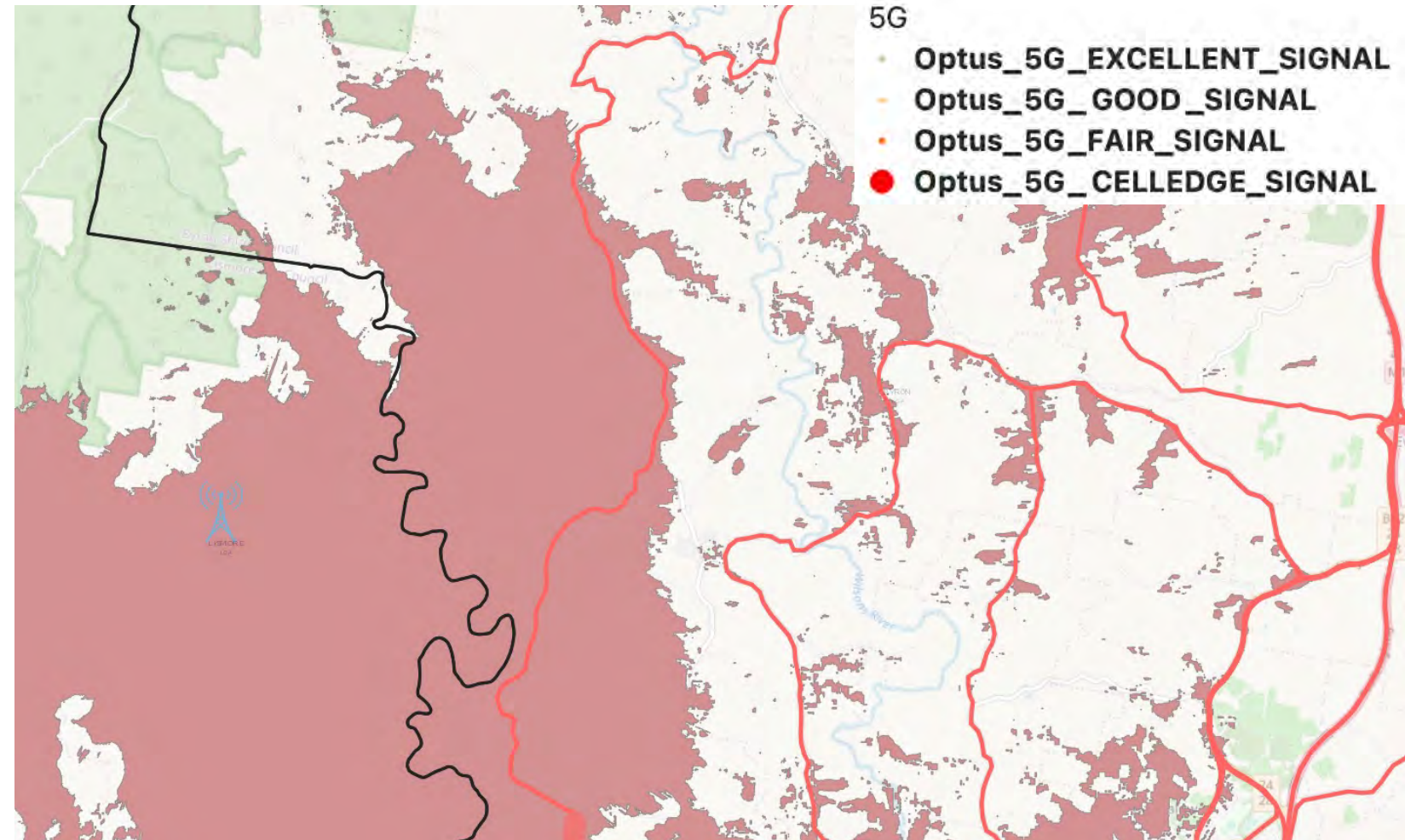
Byron Shire Analysis

Federal Drive



Assessment – No 5G coverage inside and outside of coverage mapping

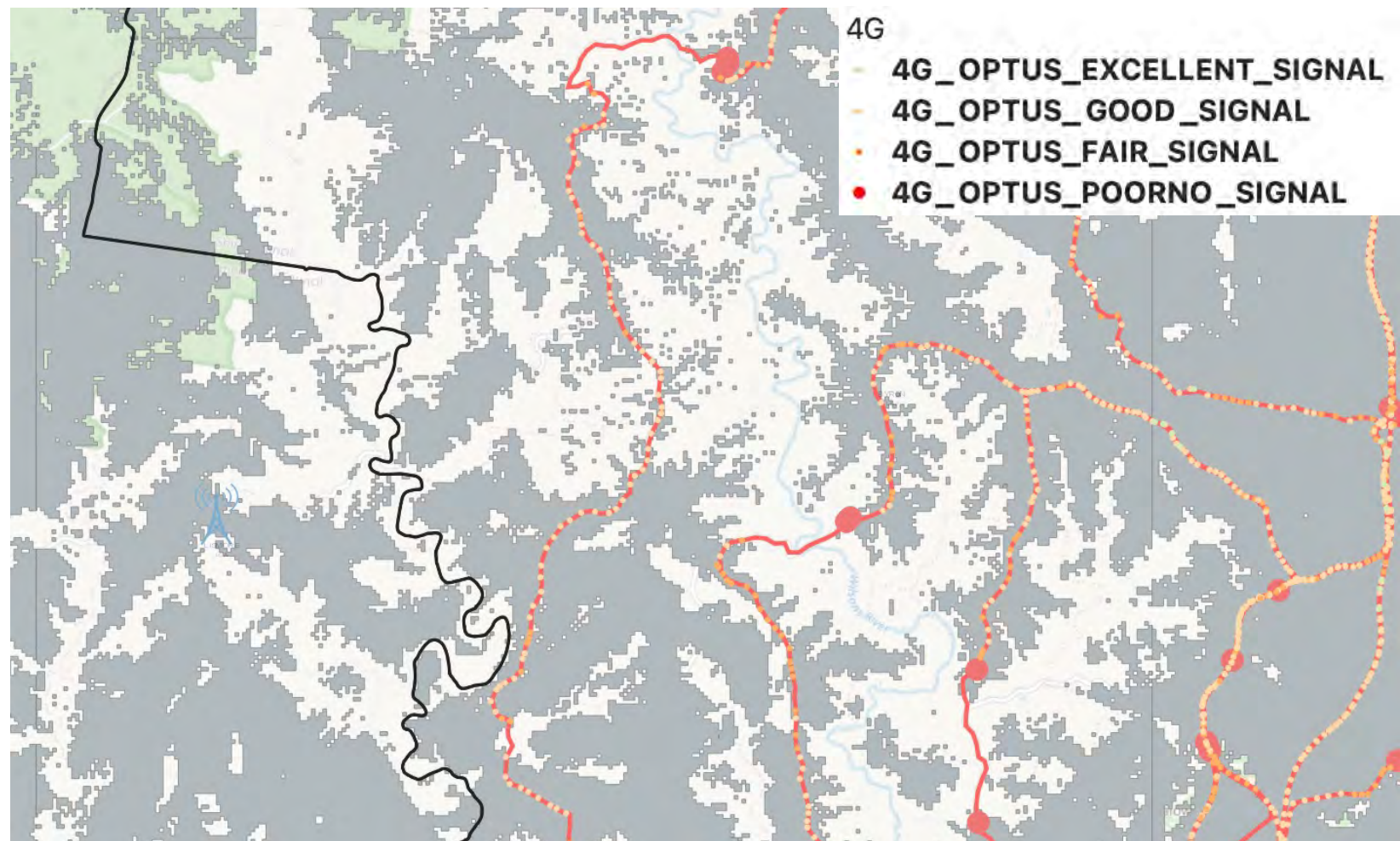
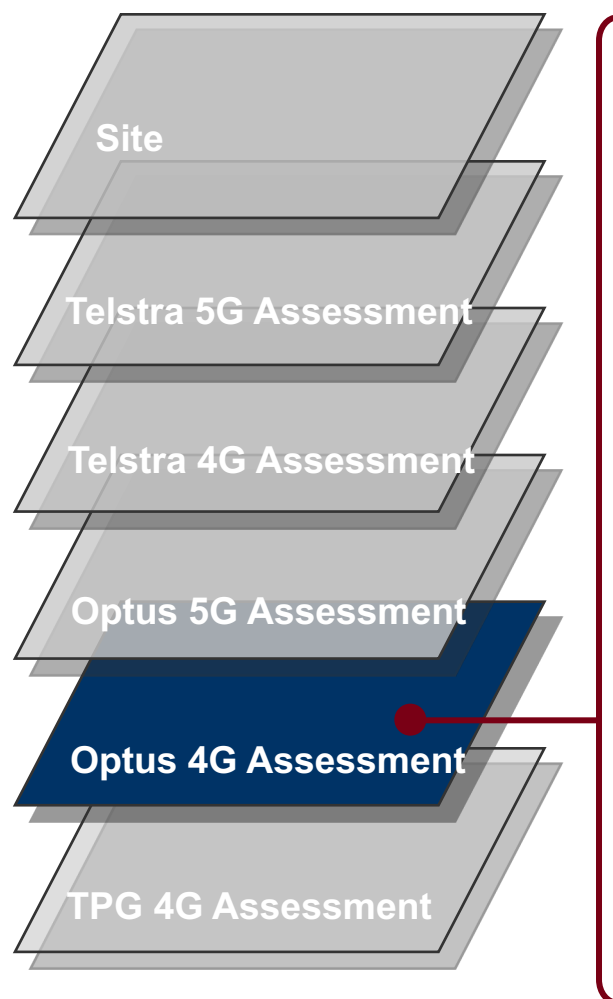
Action –Optus – upgrade 1 sites with 5G lowband / midband & Optus / Fed Govt – 1 new 5G Tower sites



Byron Shire Analysis

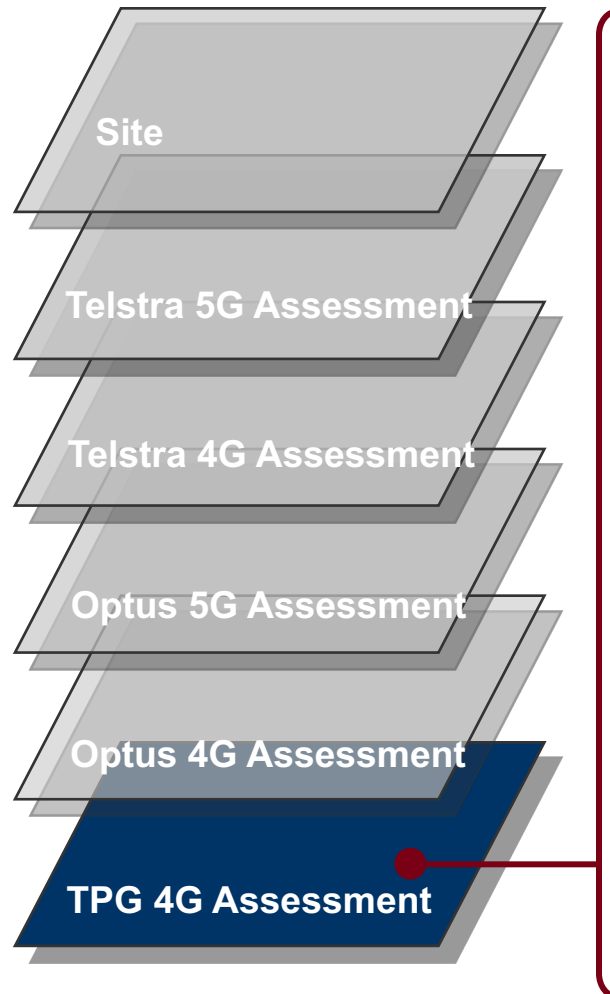
Federal Drive

Assessment – Good 4G coverage



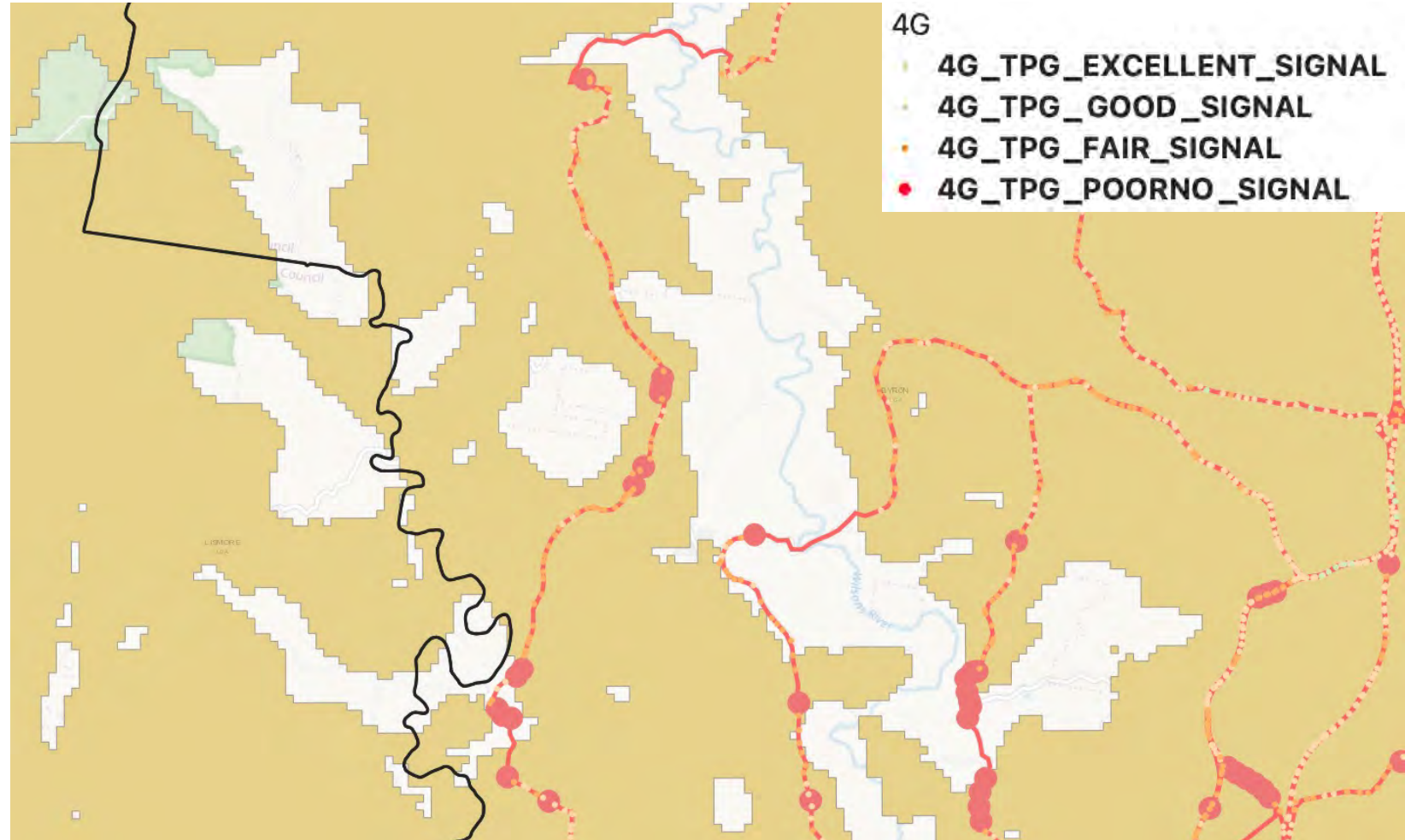
Byron Shire Analysis

Federal Drive



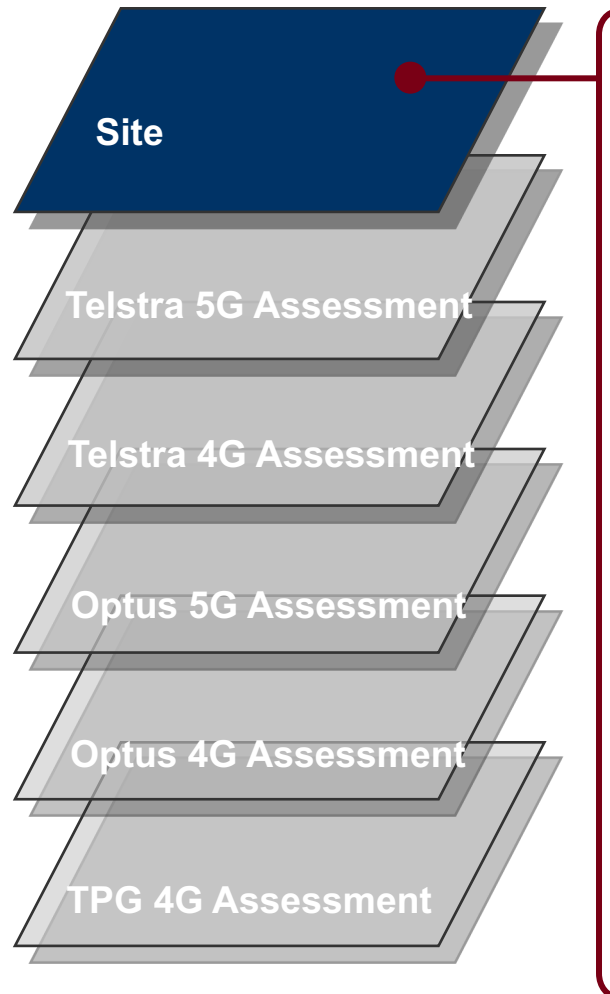
Assessment - Mixture of Good and Poor / Fair 4G coverage with many 4G blackspots

Action – TPG - Upgrade 3 Sites to 4G midband & TPG / Fed Govt (MBSP) – up to 2 new 4G sites



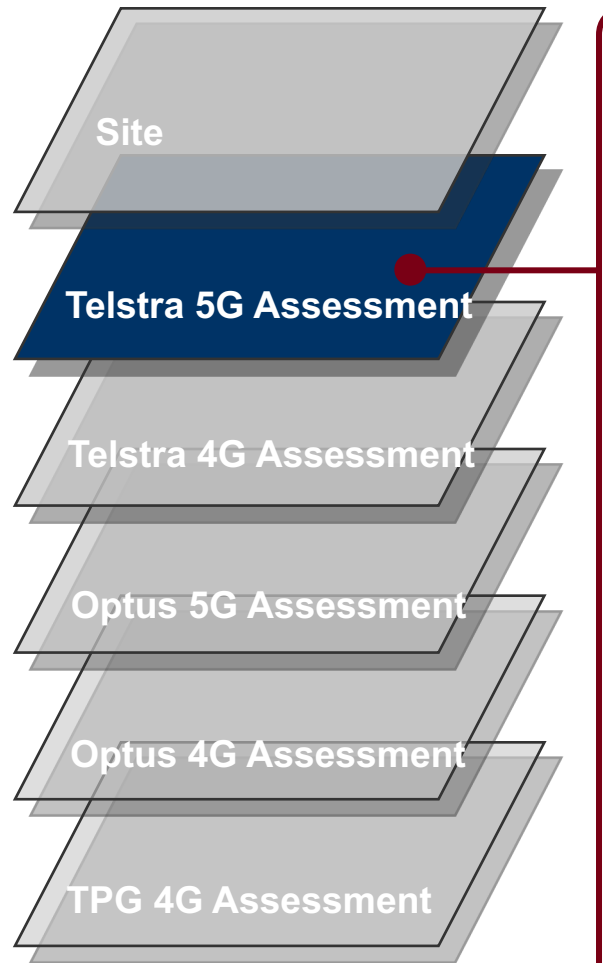
Byron Shire Analysis

Binna Burra Road



Byron Shire Analysis

Binna Burra Road



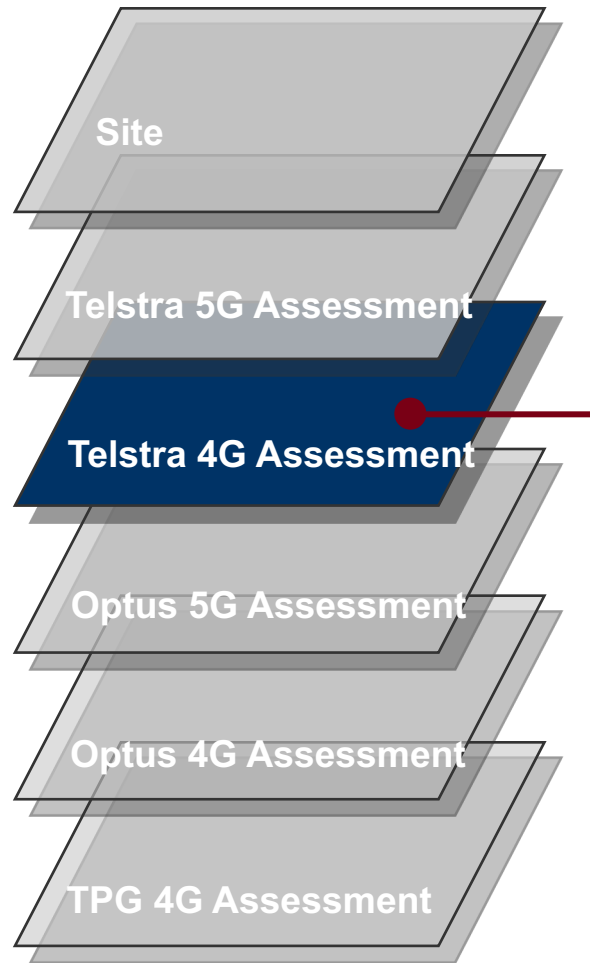
Assessment – No current 5G coverage

Action - Telstra / Fed Govt (MBSP) – 1 new 5G sites



Byron Shire Analysis

Binna Burra Road



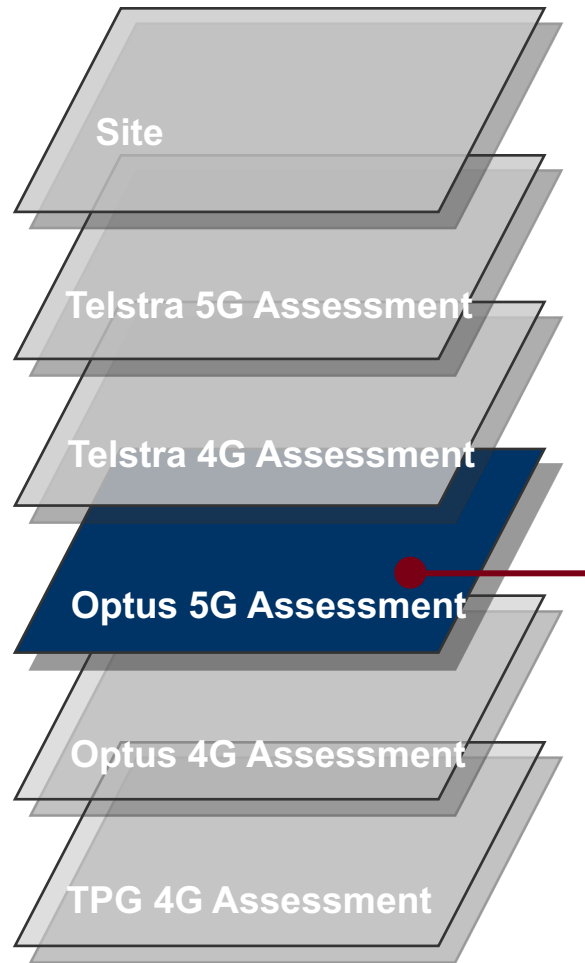
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – Telstra - Upgrade 1 Sites to 4G midband & Telstra / Fed Govt (MBSP) – 1 new 4G sites



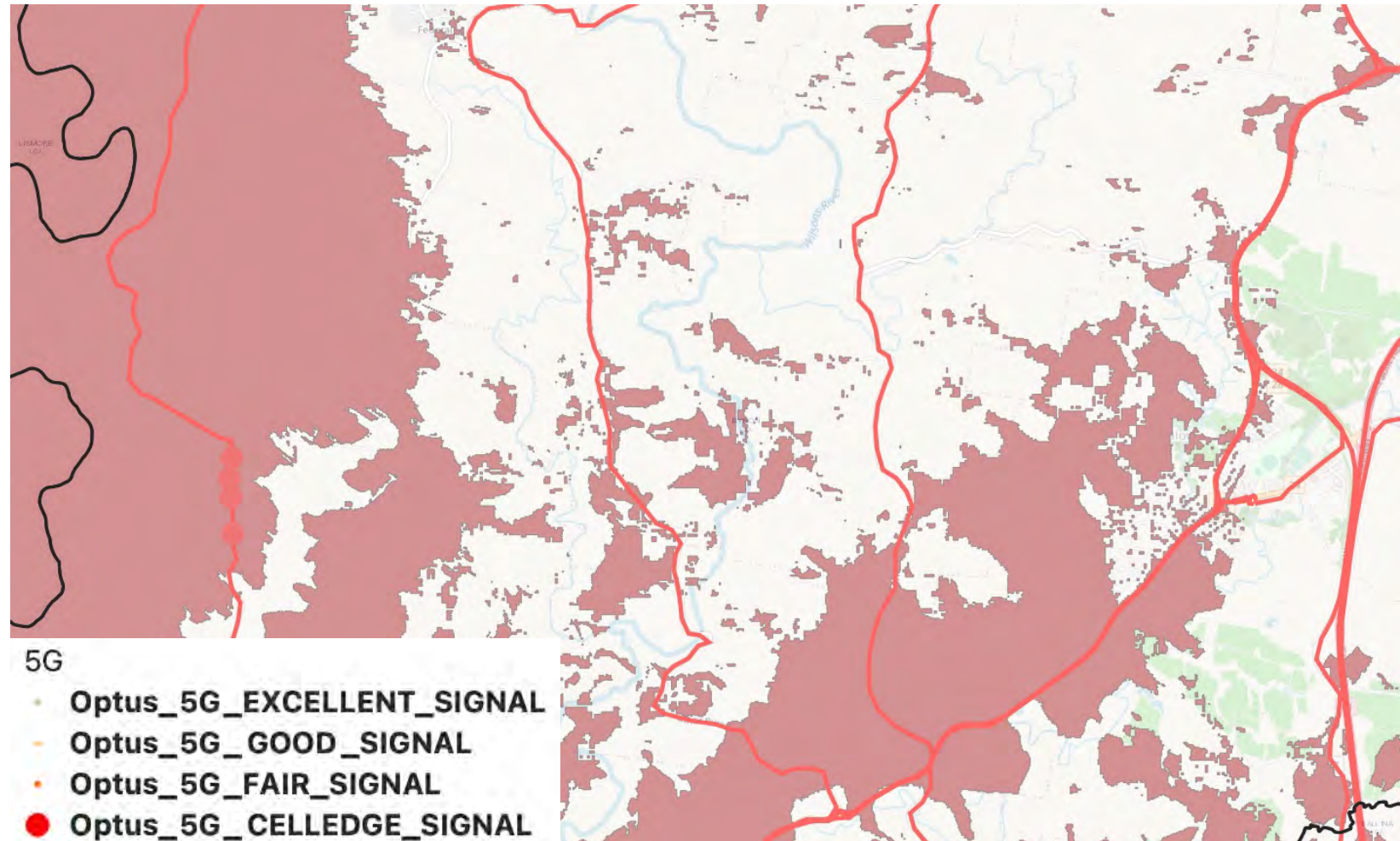
Byron Shire Analysis

Binna Burra Road



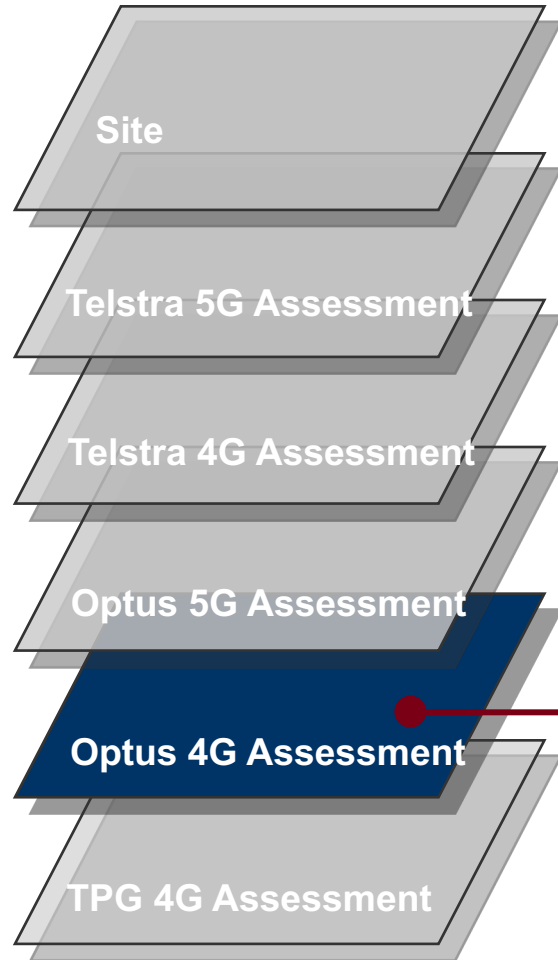
Assessment - No current Optus 5G coverage

Action –Optus / Fed Govt – up to 4 new 5G Tower sites



Byron Shire Analysis

Binna Burra Road



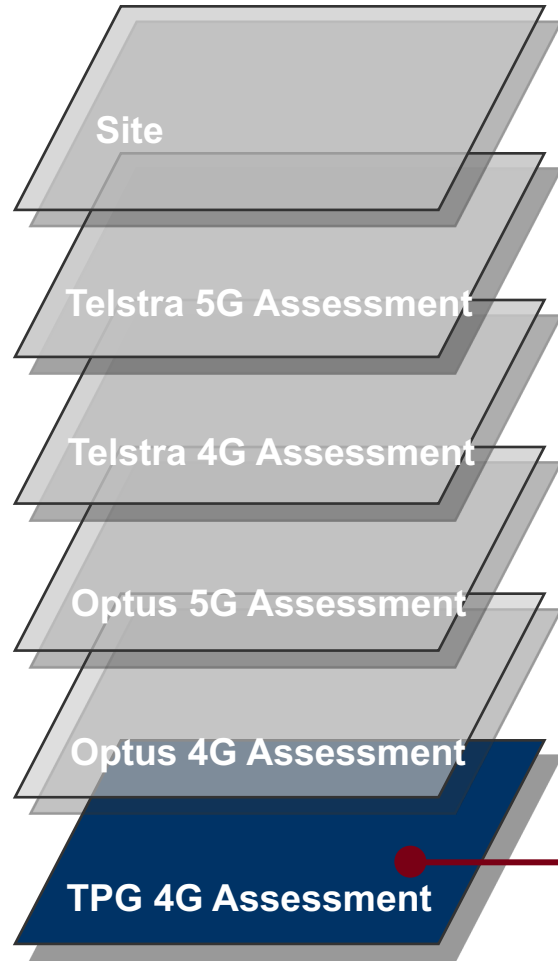
Assessment - Mixture of Good and Poor / Fair 4G coverage with many 4G blackspots

Action – Optus - Upgrade 1 Sites to 4G midband & Optus / Fed Govt (MBSP) – 1 new 4G sites



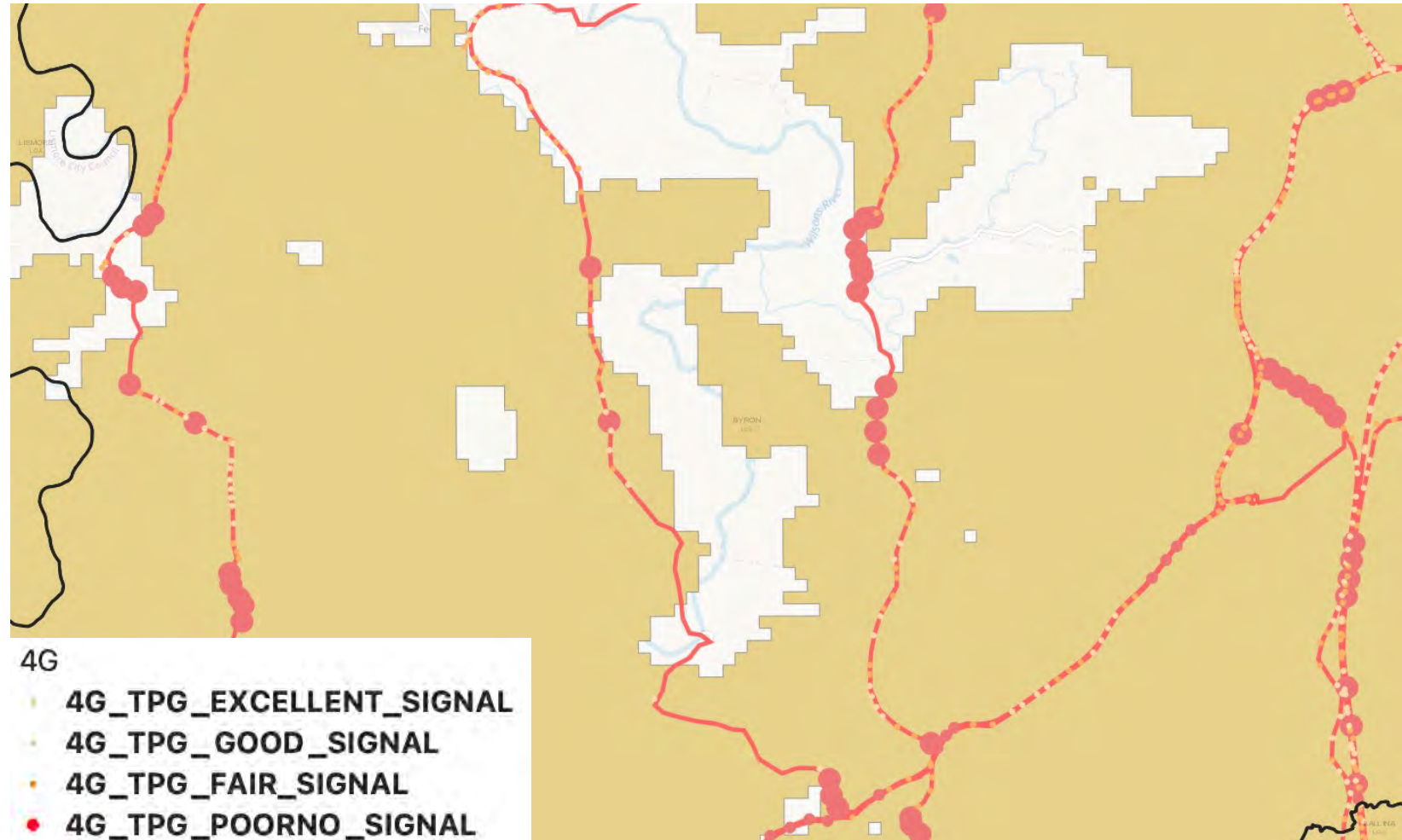
Byron Shire Analysis

Binna Burra Road



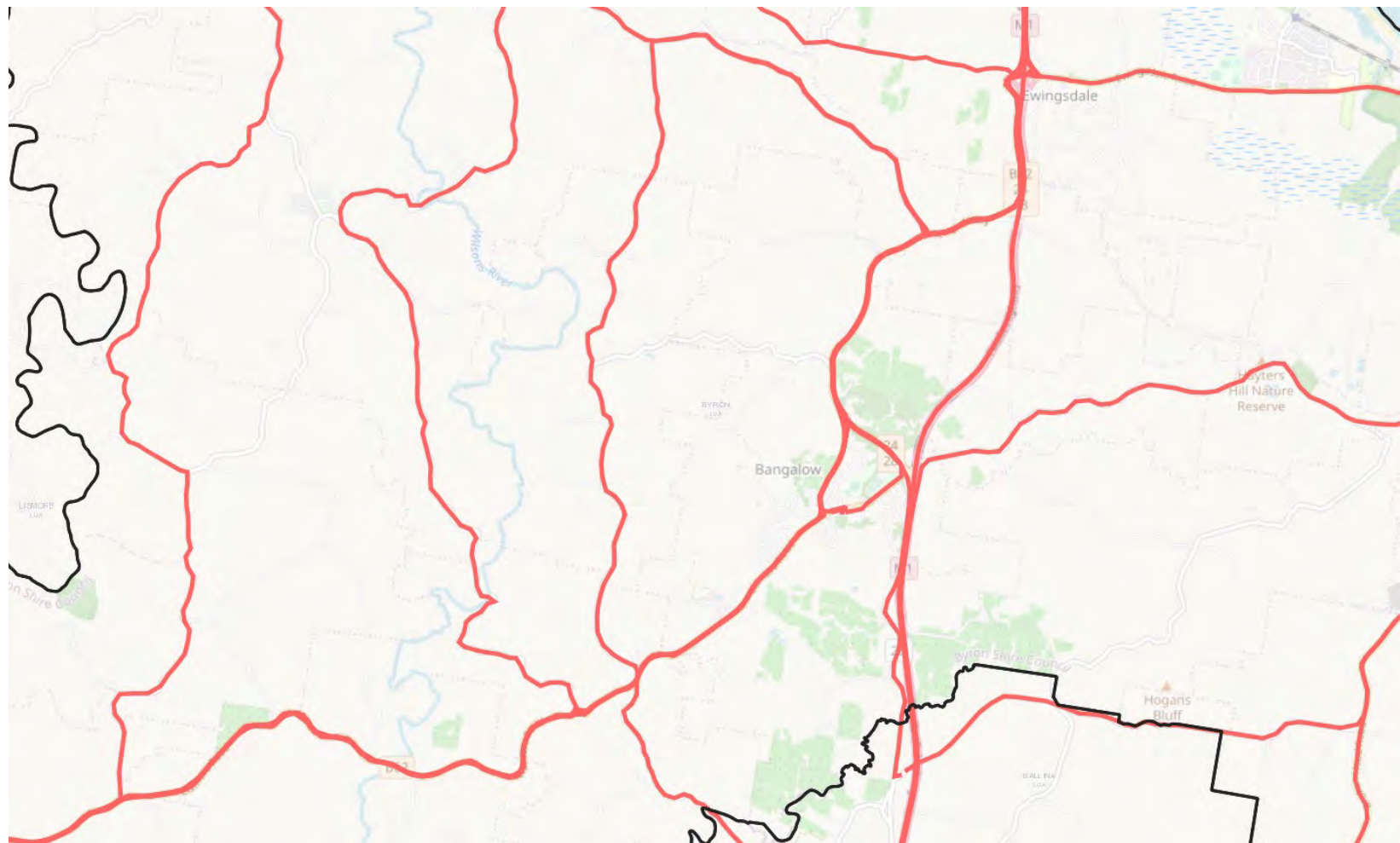
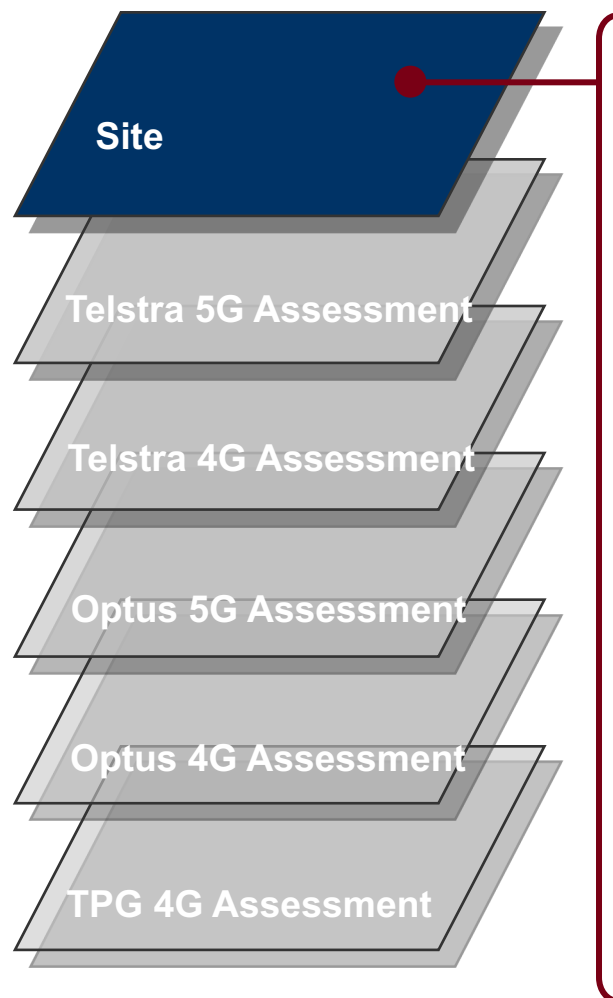
Assessment - Mixture of Good and Poor / Fair 4G coverage with many 4G blackspots

Action – TPG - Upgrade 1 Sites to 4G midband & TPG / Fed Govt (MBSP) – 1 new 4G sites



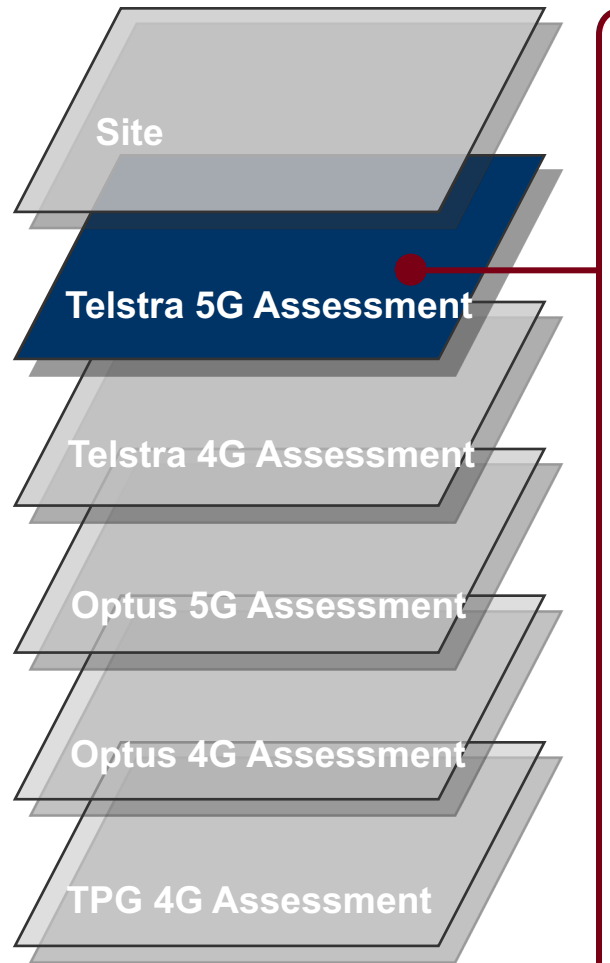
Byron Shire Analysis

Friday Hut Road



Byron Shire Analysis

Friday Hut Road

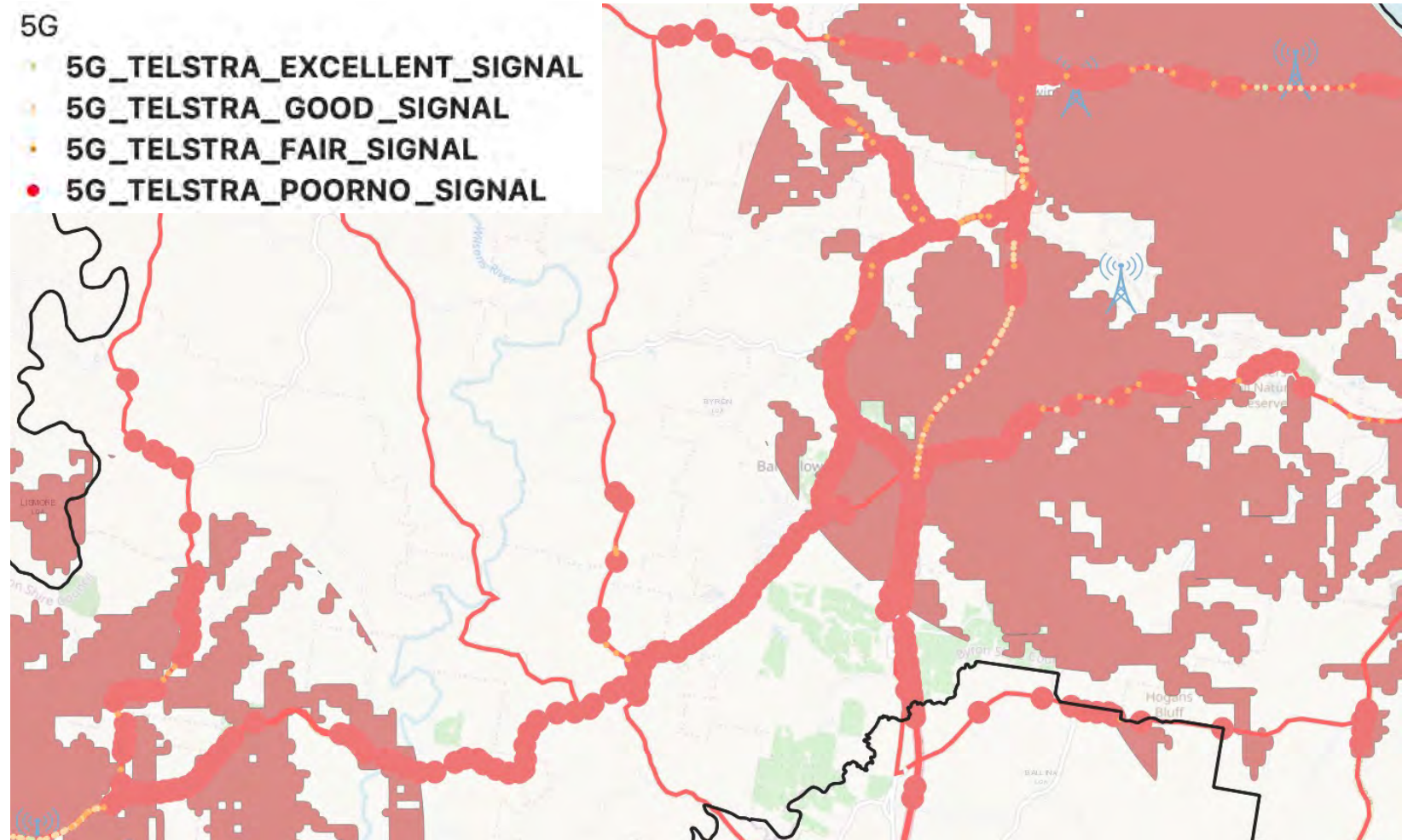


Assessment – No current 5G coverage

Action - Telstra / Fed Govt (MBSP) – up to 3 new 5G sites

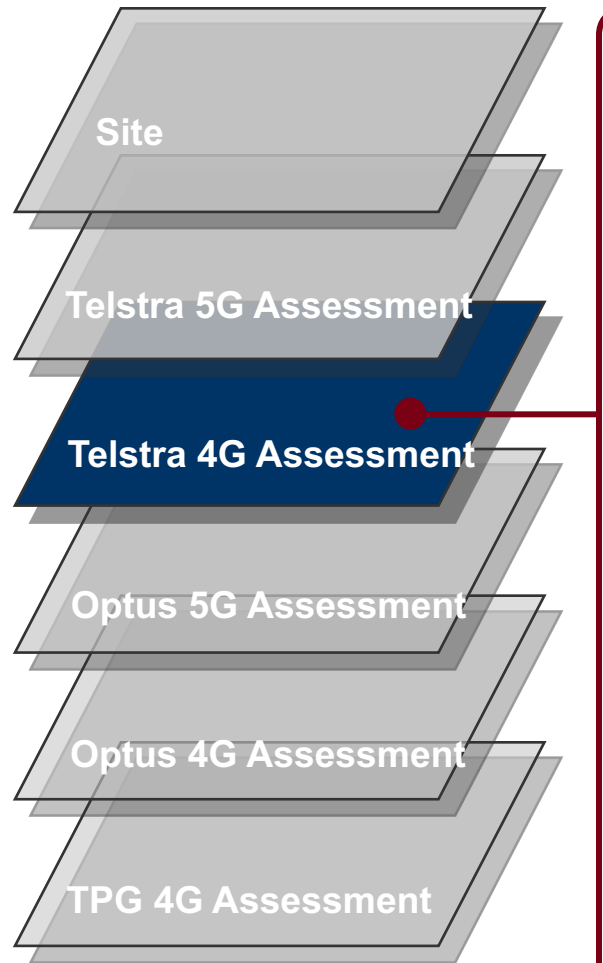
5G

- 5G_TELSTRA_EXCELLENT_SIGNAL
- 5G_TELSTRA_GOOD_SIGNAL
- 5G_TELSTRA_FAIR_SIGNAL
- 5G_TELSTRA_POORNO_SIGNAL



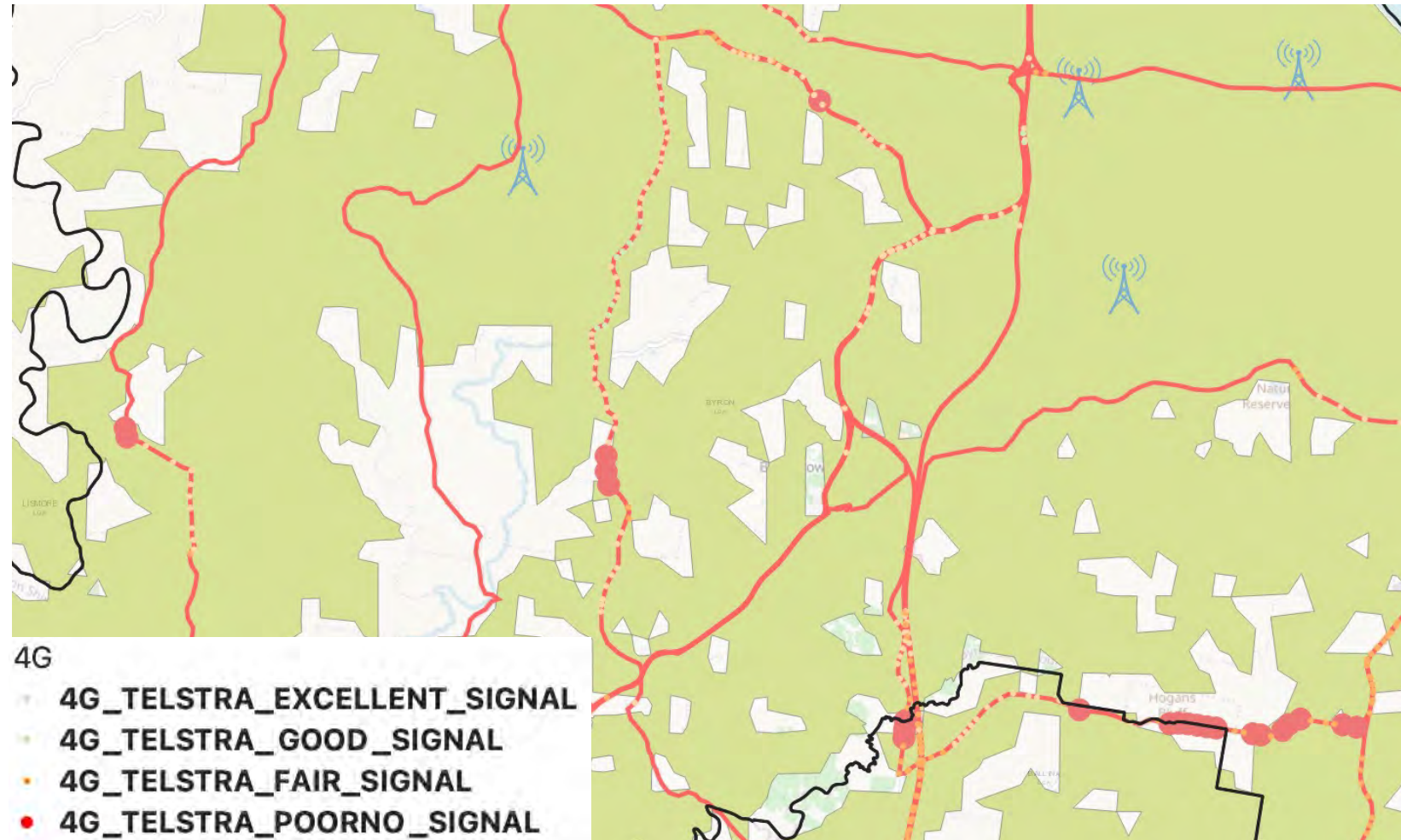
Byron Shire Analysis

Friday Hut Road



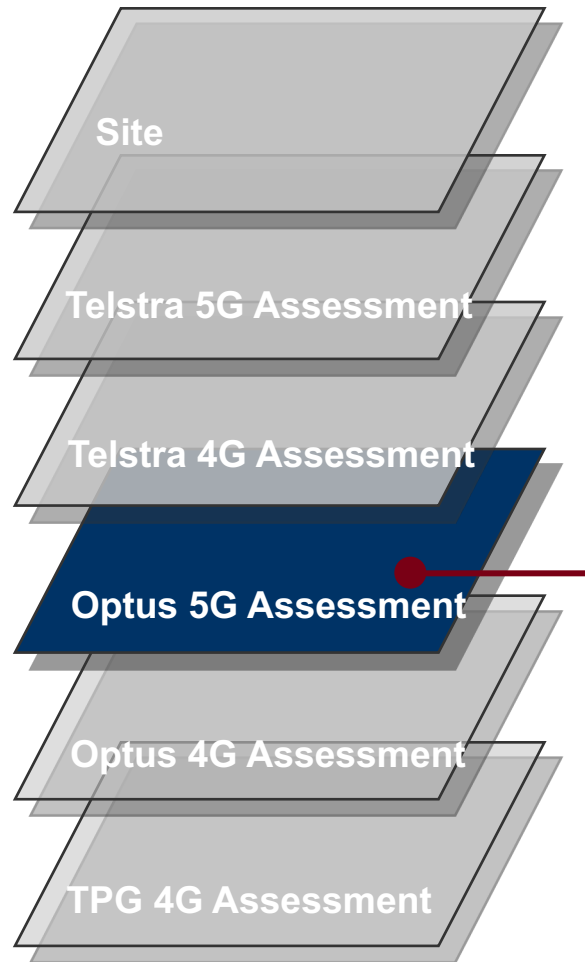
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – Telstra - Upgrade 2 Sites to 4G midband & Telstra / Fed Govt (MBSP) – 1 new 4G sites



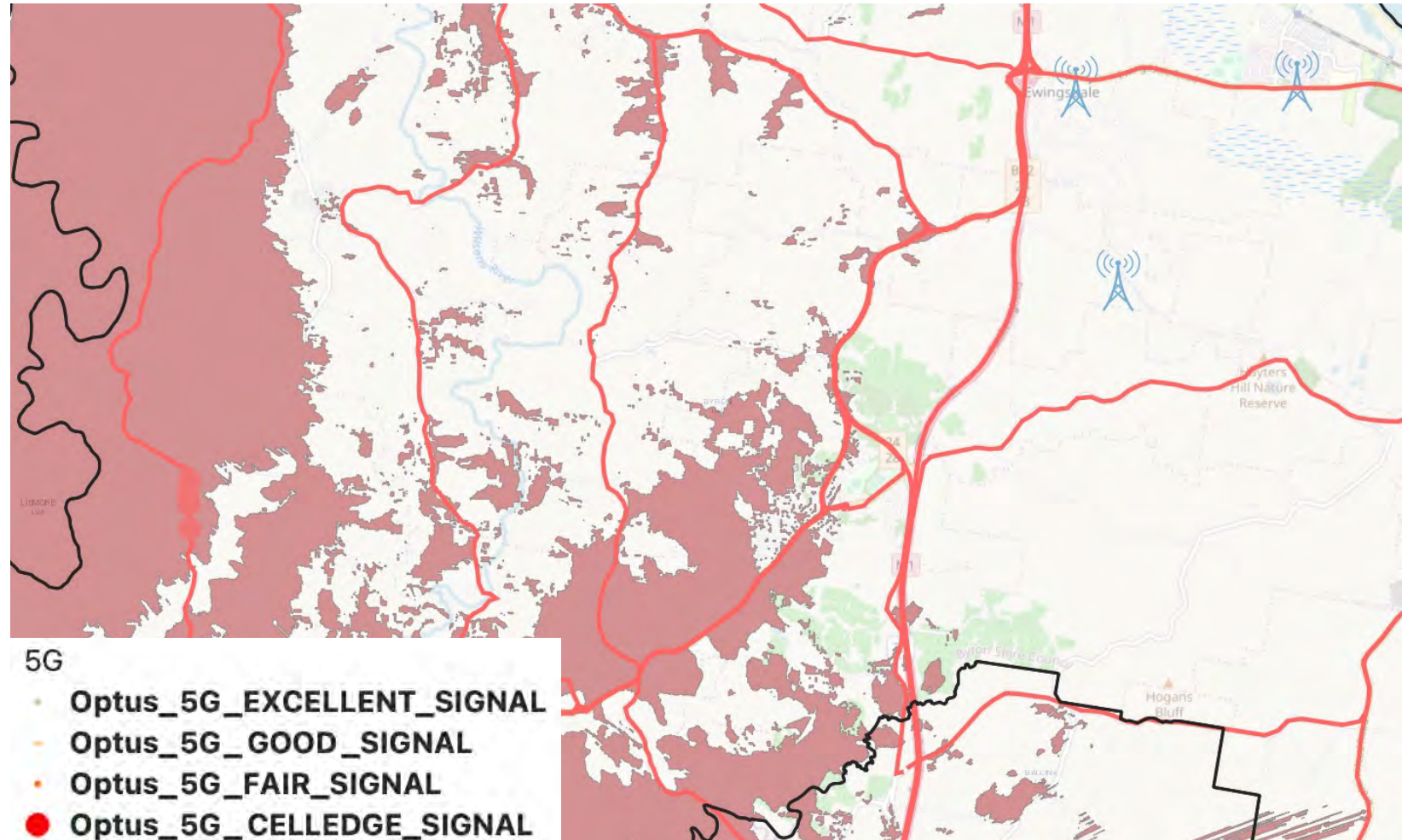
Byron Shire Analysis

Friday Hut Road



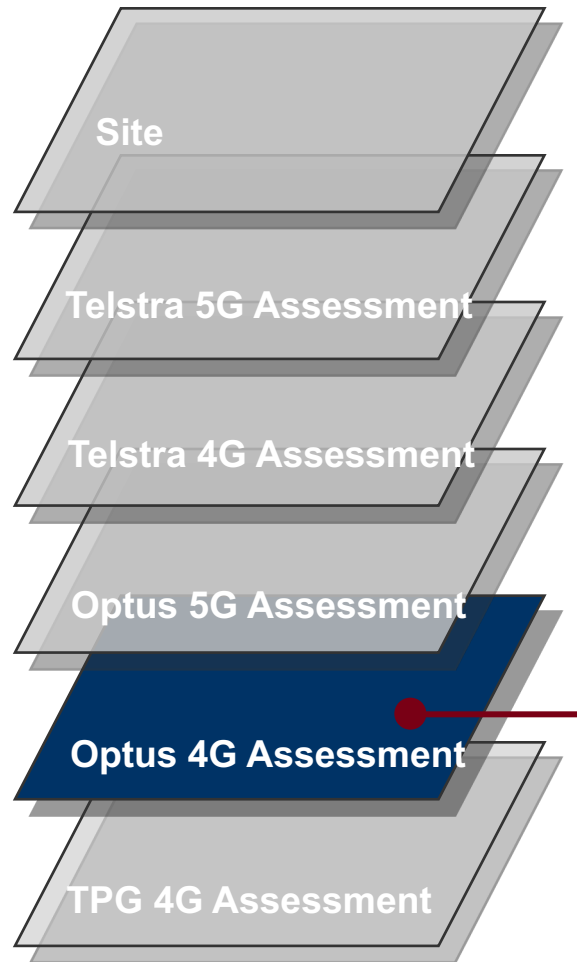
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 2 x Sites to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites



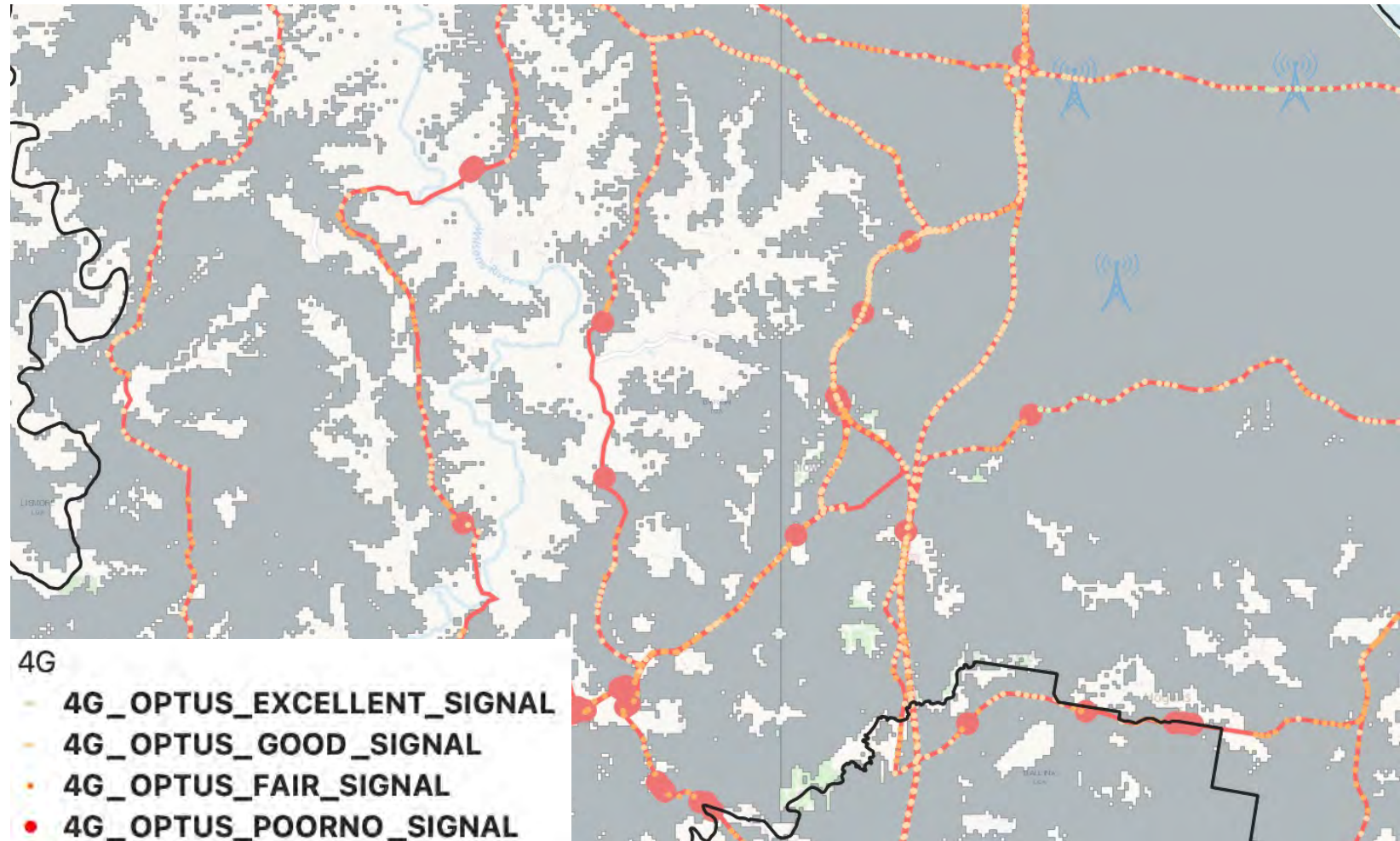
Byron Shire Analysis

Friday Hut Road



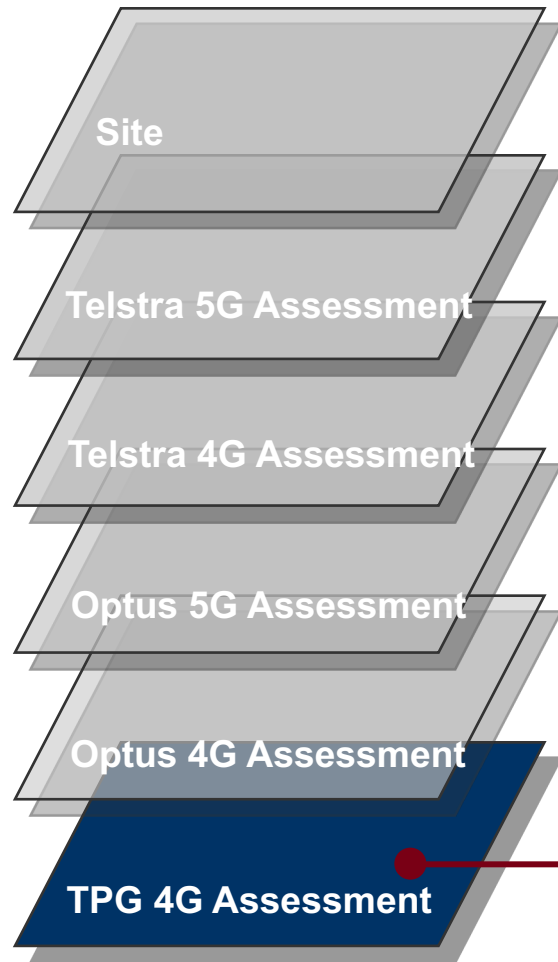
Assessment - Mixture of Good and Poor / Fair 4G coverage with many 4G blackspots

Action – Optus - Upgrade 2 Sites to 4G midband & Optus / Fed Govt (MBSP) – 2 new 4G sites



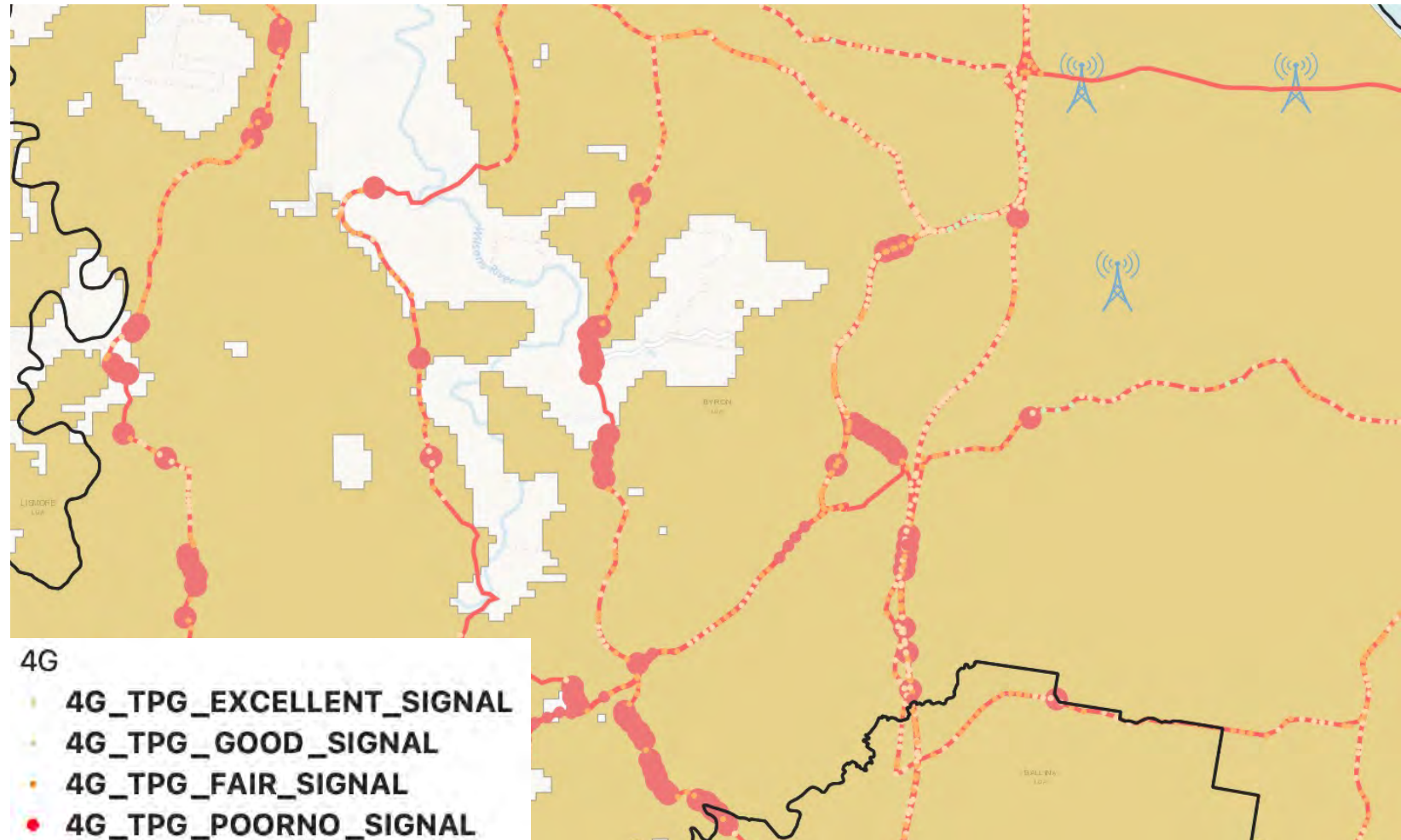
Byron Shire Analysis

Friday Hut Road



Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – TPG - Upgrade 2 Sites to 4G midband & TPG / Fed Govt (MBSP) – 2 new 4G sites

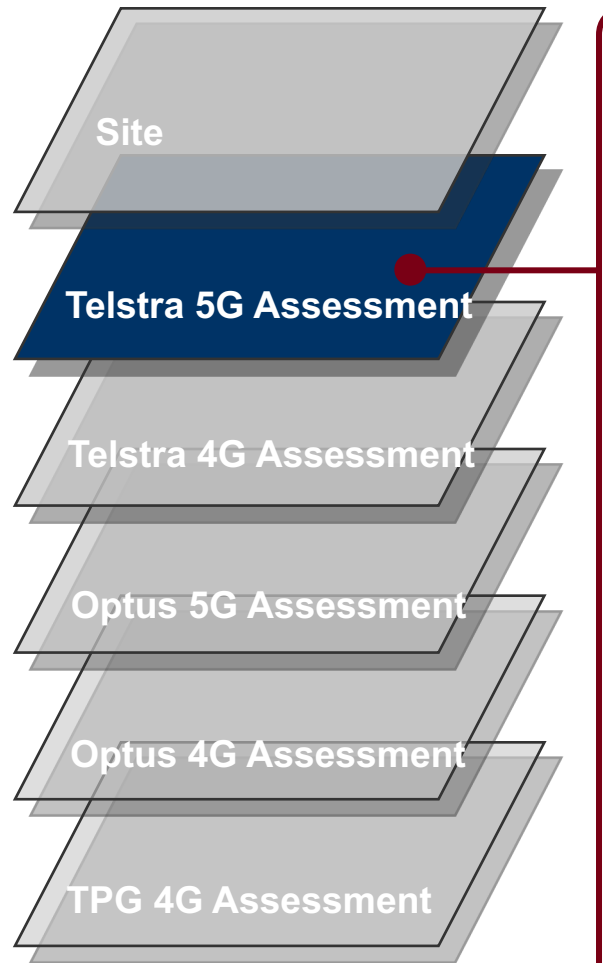


Bangalow Road



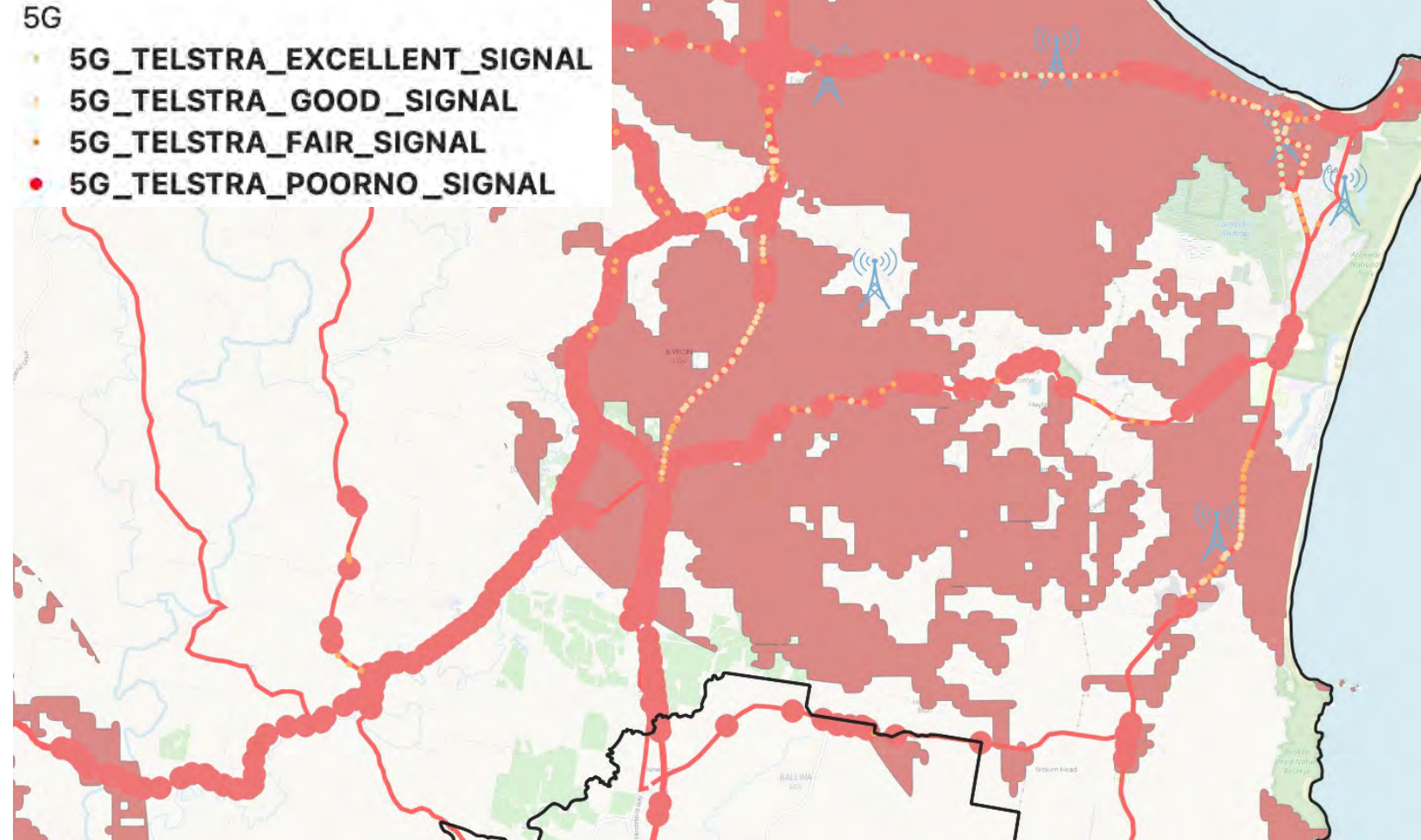
Byron Shire Analysis

Bangalow Road



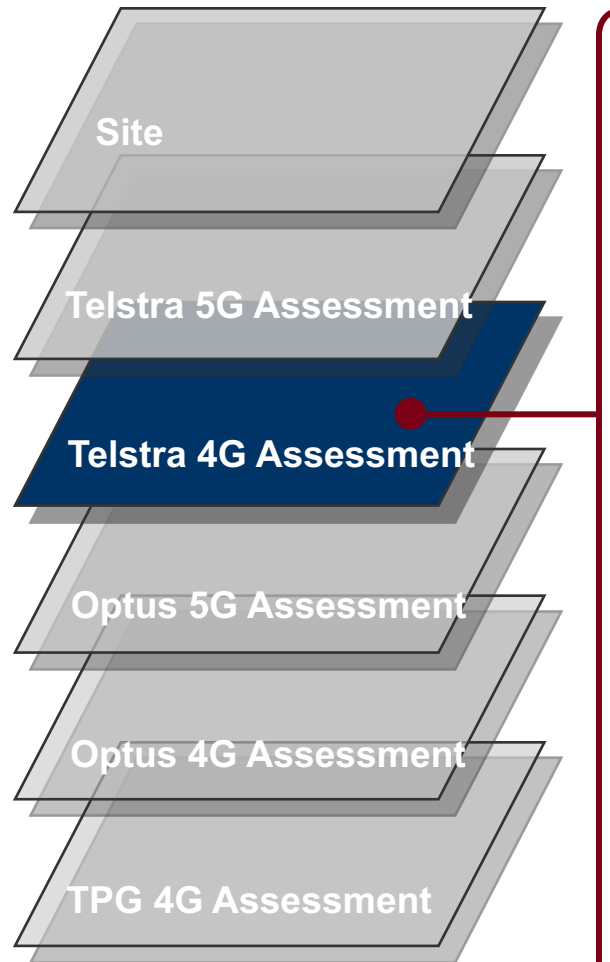
Assessment – 5G coverage mixed inside and outside of coverage mapping. Broad 5G blackspot areas.

Action – Telstra / Fed Govt – up to 3 new 5G Tower sites



Byron Shire Analysis

Bangalow Road



Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – Telstra - Upgrade 1 Sites to 4G midband & Telstra / Fed Govt (MBSP) – up to 2 new 4G sites

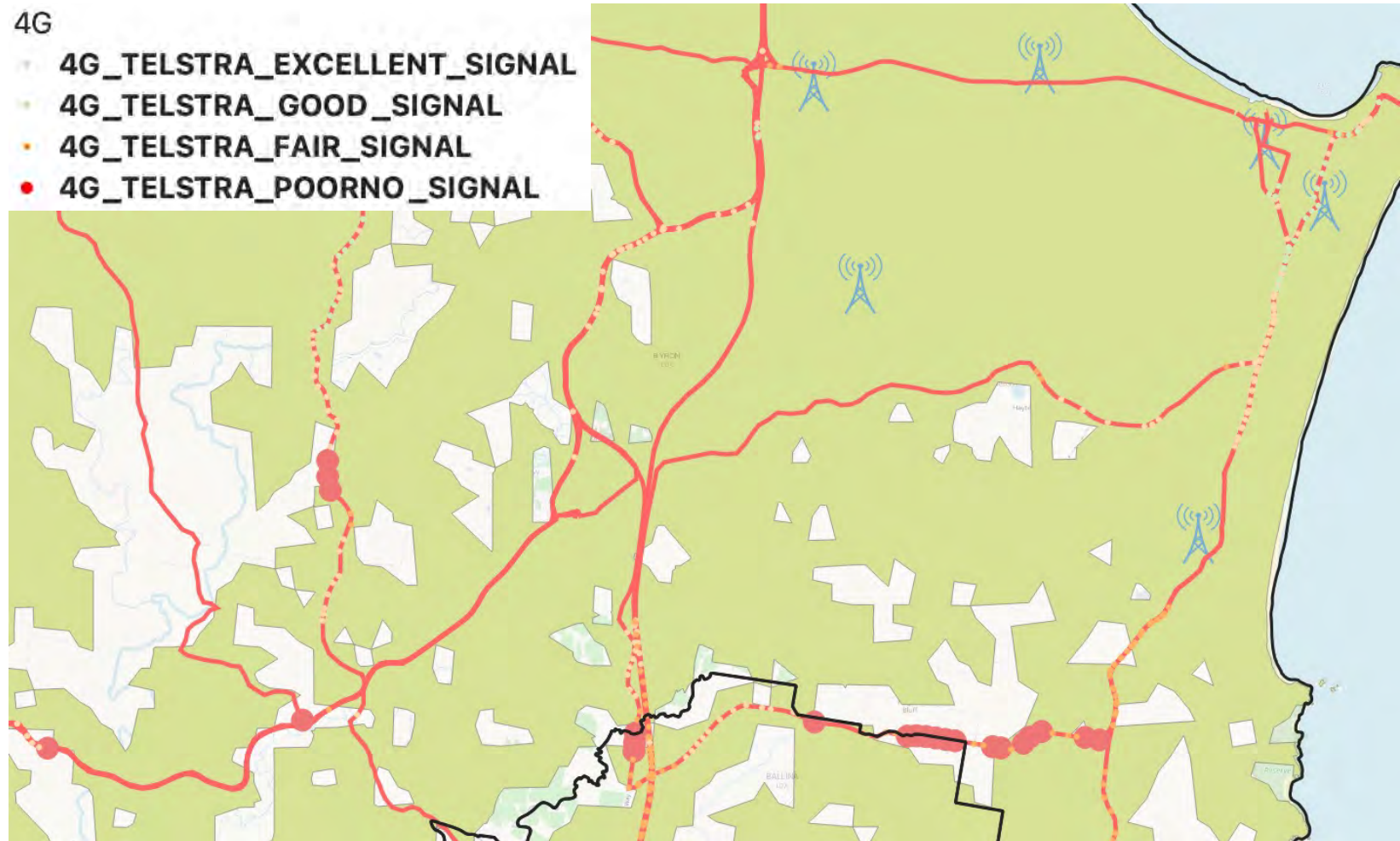
4G

4G_TELSTRA_EXCELLENT_SIGNAL

4G_TELSTRA_GOOD_SIGNAL

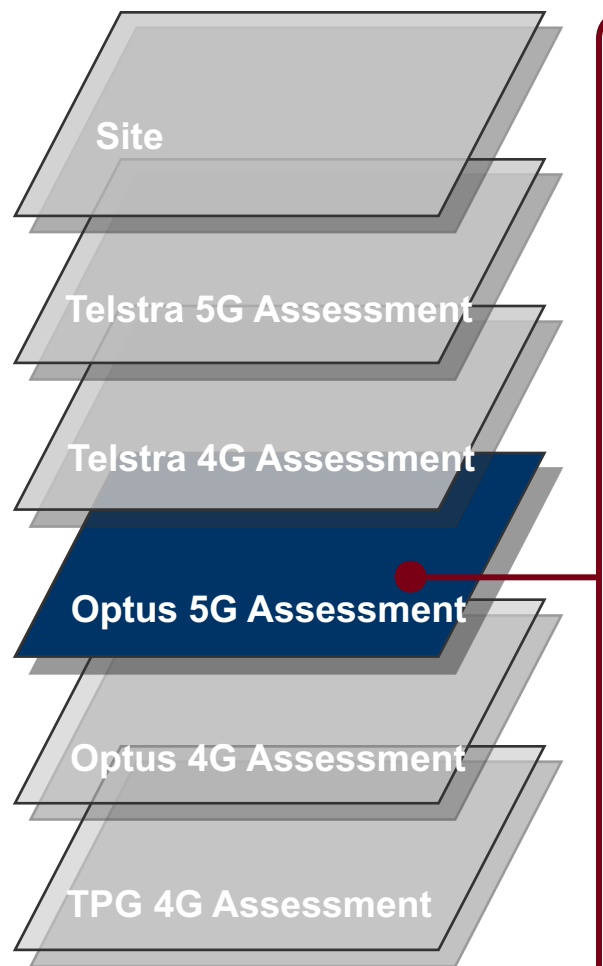
4G_TELSTRA_FAIR_SIGNAL

4G_TELSTRA_POORNO_SIGNAL



Byron Shire Analysis

Bangalow Road

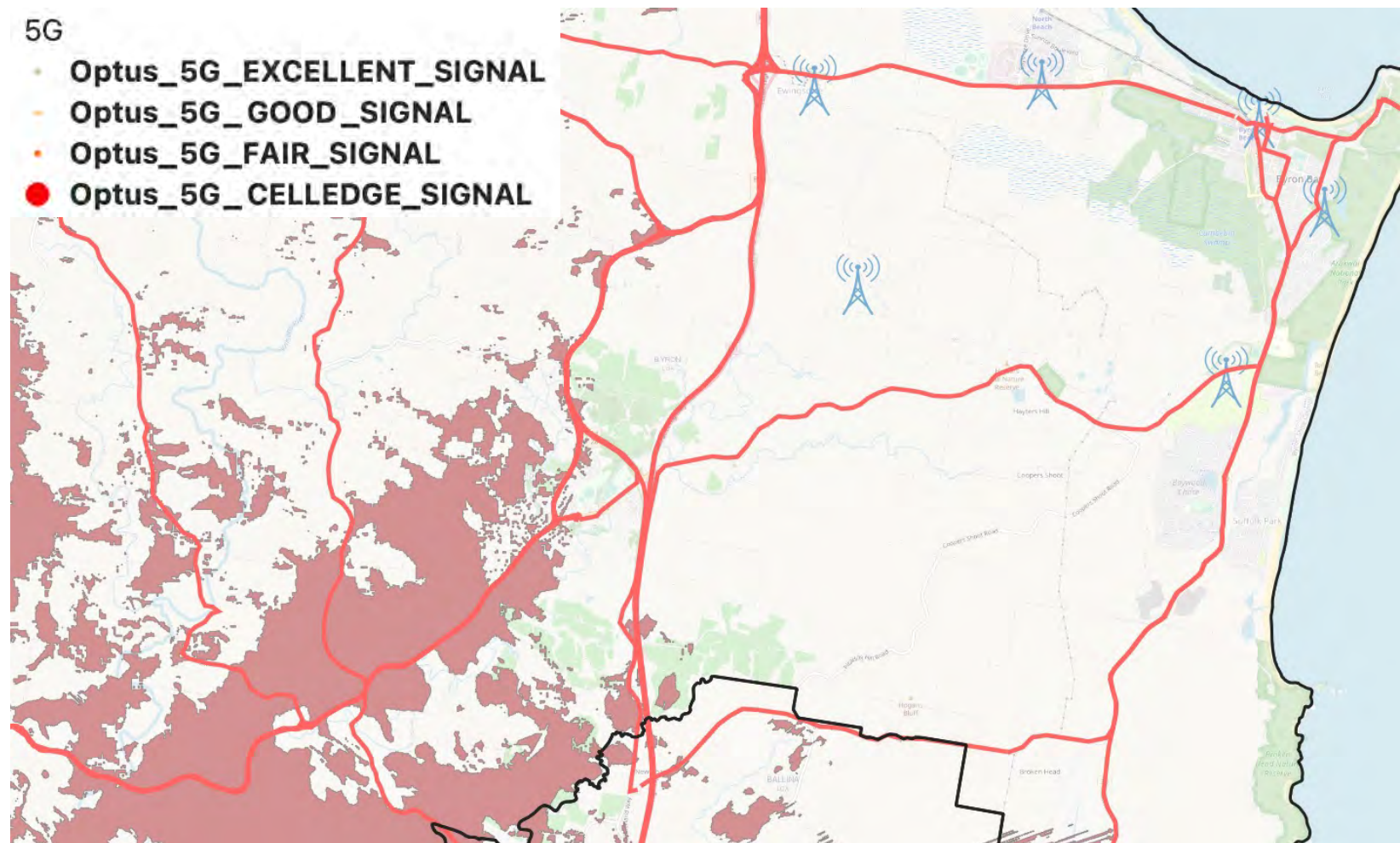


Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 4 x Sites to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites

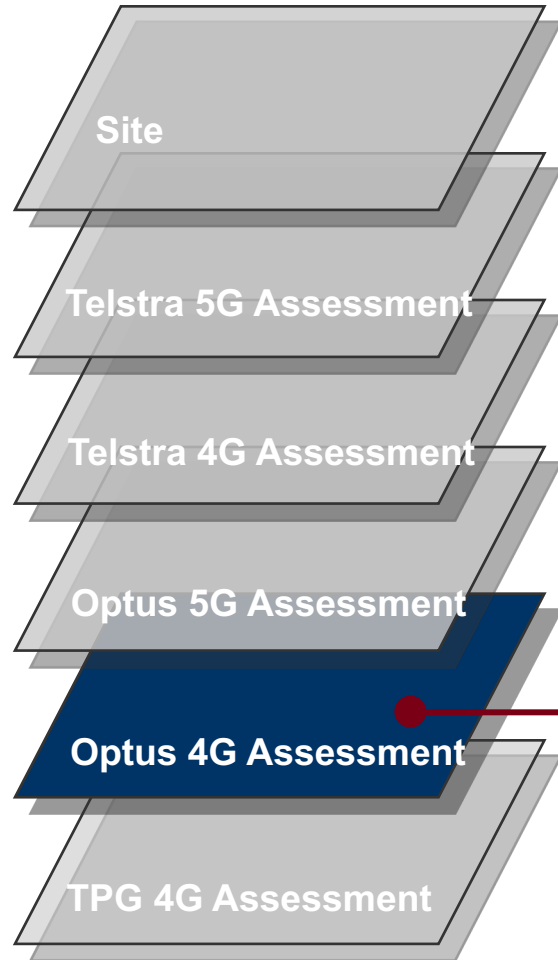
5G

- Optus_5G_EXCELLENT_SIGNAL
- Optus_5G_GOOD_SIGNAL
- Optus_5G_FAIR_SIGNAL
- Optus_5G_CELLEDGE_SIGNAL



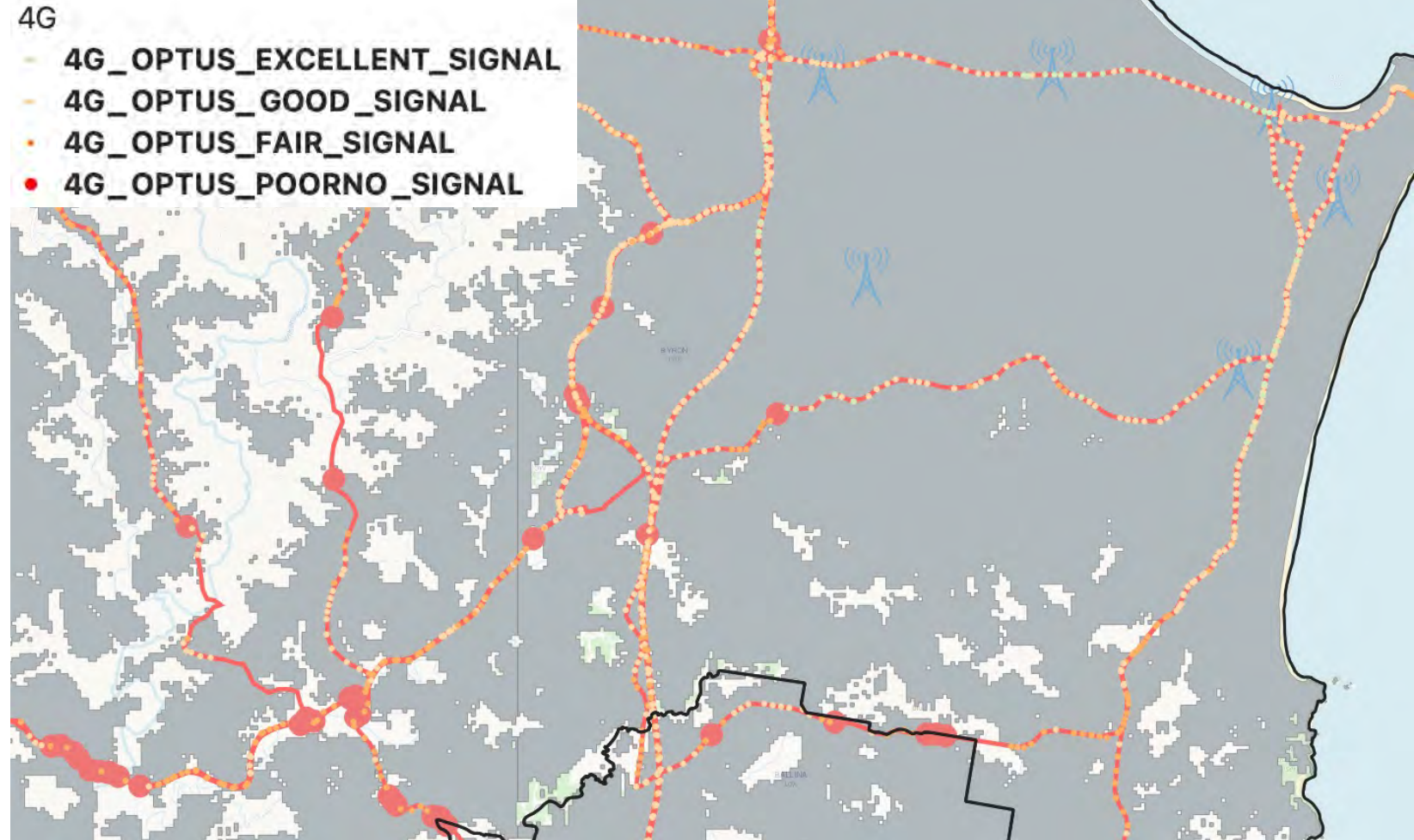
Byron Shire Analysis

Bangalow Road



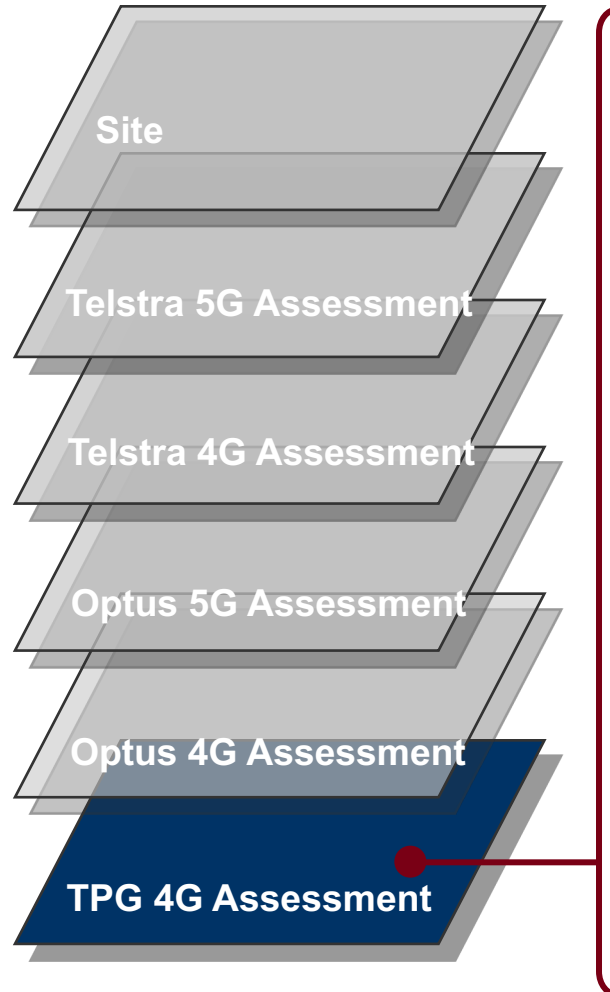
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action –Optus / Fed Govt (MBSP) – Up to 3 new 4G sites



Byron Shire Analysis

Bangalow Road

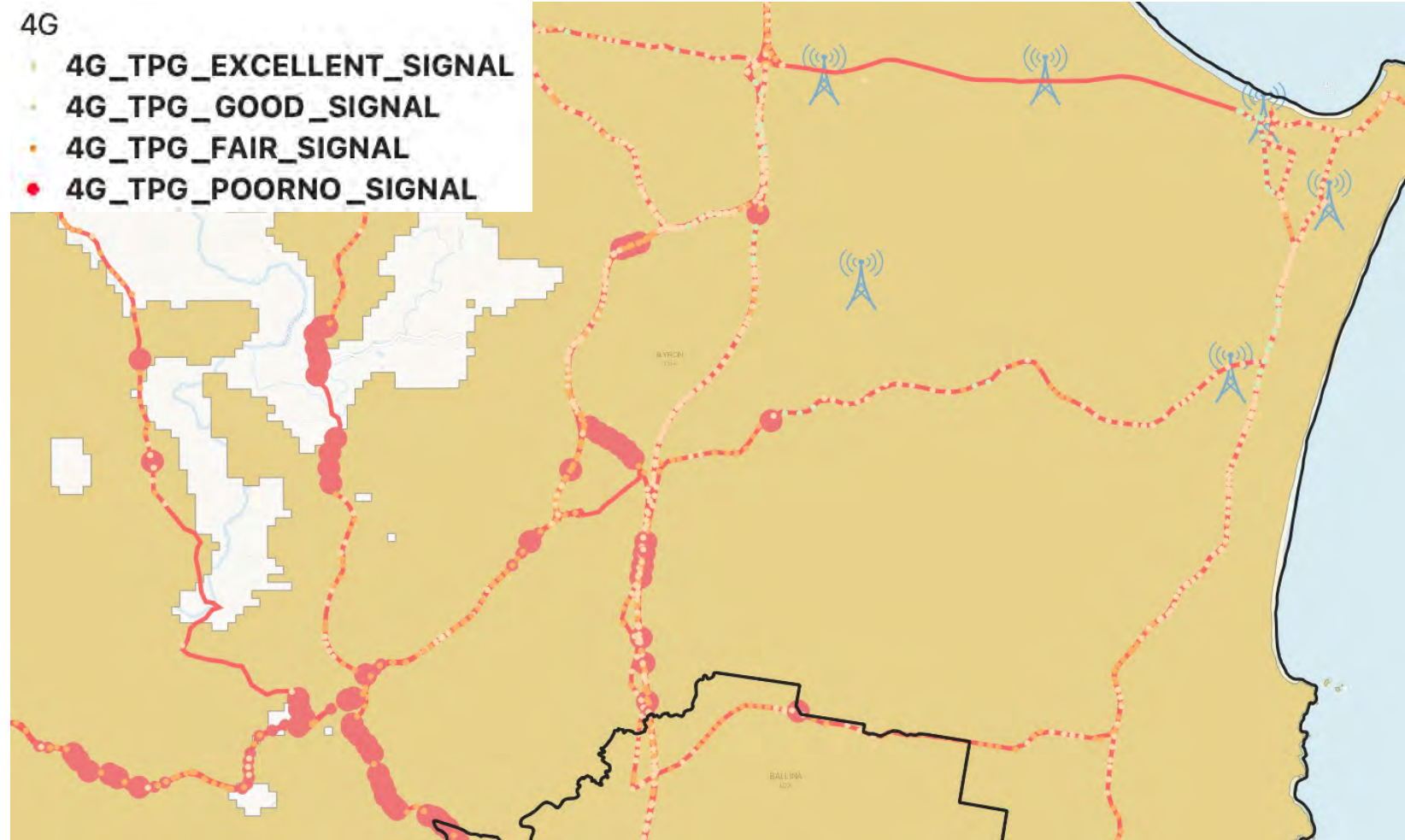


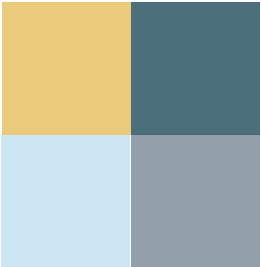
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action –TPG / Fed Govt (MBSP) – Up to 3 new 4G sites

4G

- 4G_TPG_EXCELLENT_SIGNAL
- 4G_TPG_GOOD_SIGNAL
- 4G_TPG_FAIR_SIGNAL
- 4G_TPG_POORNO_SIGNAL





1. Lismore City Analysis

Lismore City Analysis

Signal Testing:

Road name	From	To	Approx Distance
Bruxner Highway	Western shire boundary	Eastern shire boundary	38km
Bangalow Road	Clunes	Lismore	19km
Kyogle Road	Lismore	Western shire boundary	15km
Nimbin Road / Blue Knob Road	Blue Knob	Lismore	37km
Wyrallah Road	Lismore	Woodburn	35km
Dunoon Road	Lismore	Shire boundary	
The Channon Road	Dunoon Rd	The Channon	5km
Turntable Creek Road	The Channon	Nimbin	18km
Rous Rd / Dalwood Rd / Wardell Rd	Goonellabah	Wardell	27km

Network Bandwidth Point Tests:

- Lismore
- Nimbin
- Goonellabah
- Clunes

This section provides an analysis of the change in Mobile Network Operator sites in the Lismore City from 2018 to 2022.

Total Number of Sites by MNO

Lismore City	2018	2022
Optus	10	14
Telstra	14	17
TPG	5	8

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Lismore City	2018	2022
Optus 900 MHz 2100 MHz	10 9	14 9
Telstra 850 MHz 2100 MHz	12 1	14 -
TPG 900 MHz 2100 MHz	5 5	8 1

Note – A single site may host multiple spectrum bands.

Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

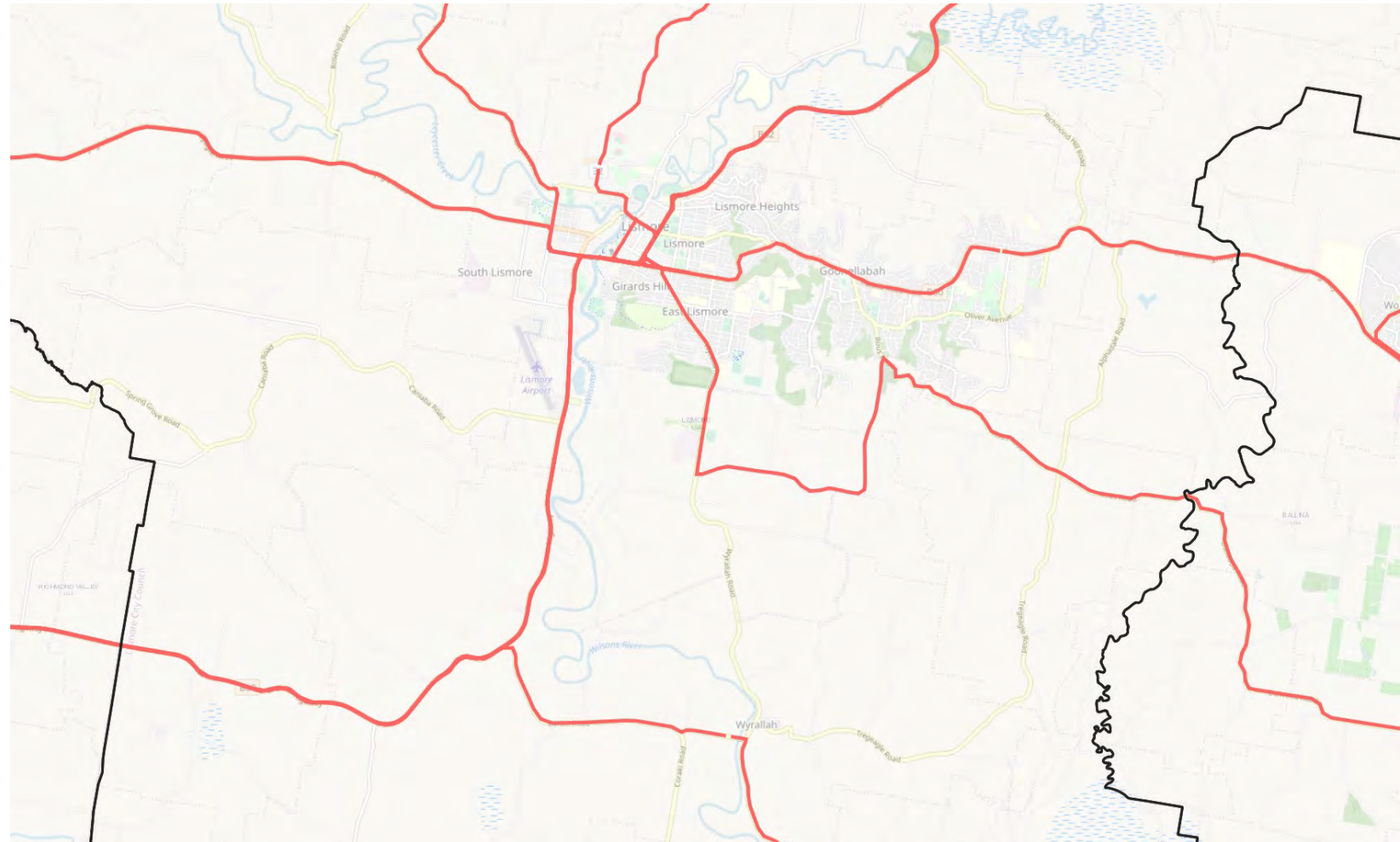
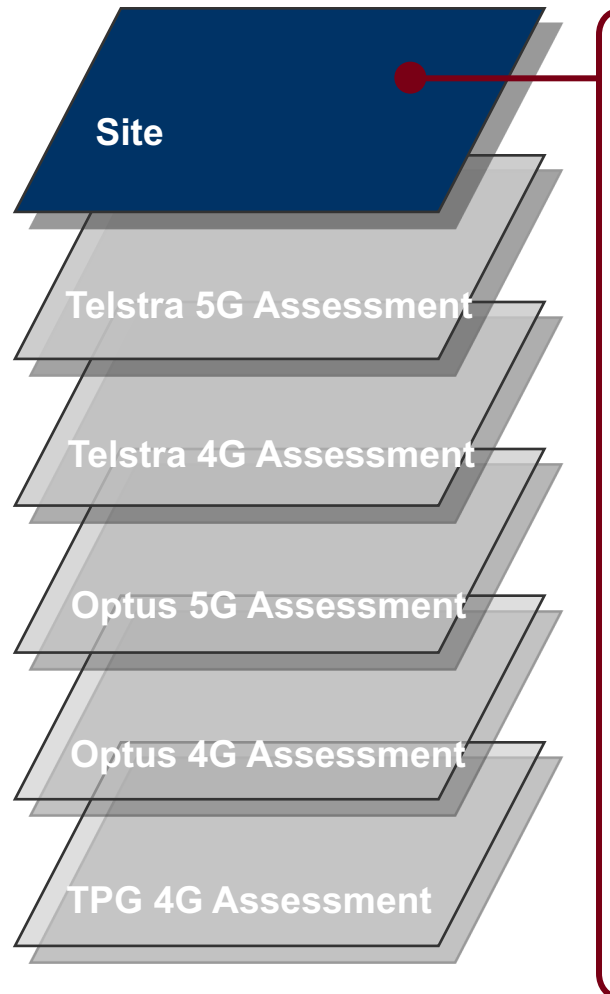
Lismore City	2018	2022
Optus		
700 MHz	8	13
900 MHz		6
1800 MHz	3	9
2100 MHz	2	9
2300 MHz		
2600 MHz	7	9
3500 MHz		
Telstra		
700 MHz	11	15
900 MHz		
1800 MHz	7	8
2100 MHz		5
2600 MHz	1	4
TPG		
700 MHz		
850 MHz	5	8
1800 MHz		1
2100 MHz	5	7
2600 MHz		

Total Number of 5G Sites by MNO

Lismore City	2018	2022
Optus		
2100 MHz	-	3
2300 MHz	-	-
3500 MHz	-	-
26000 MHz	-	-
Telstra		
850 MHz	-	1
2600 MHz	-	
3600 MHz	-	4
TPG		
700 MHz	-	-
3600 MHz	-	-

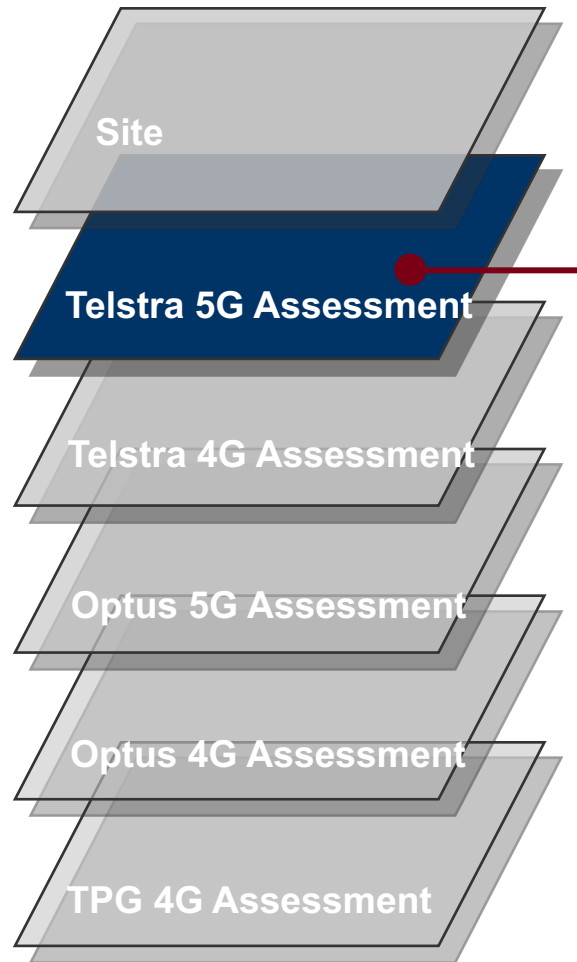
Lismore City Analysis

Bruxner Highway



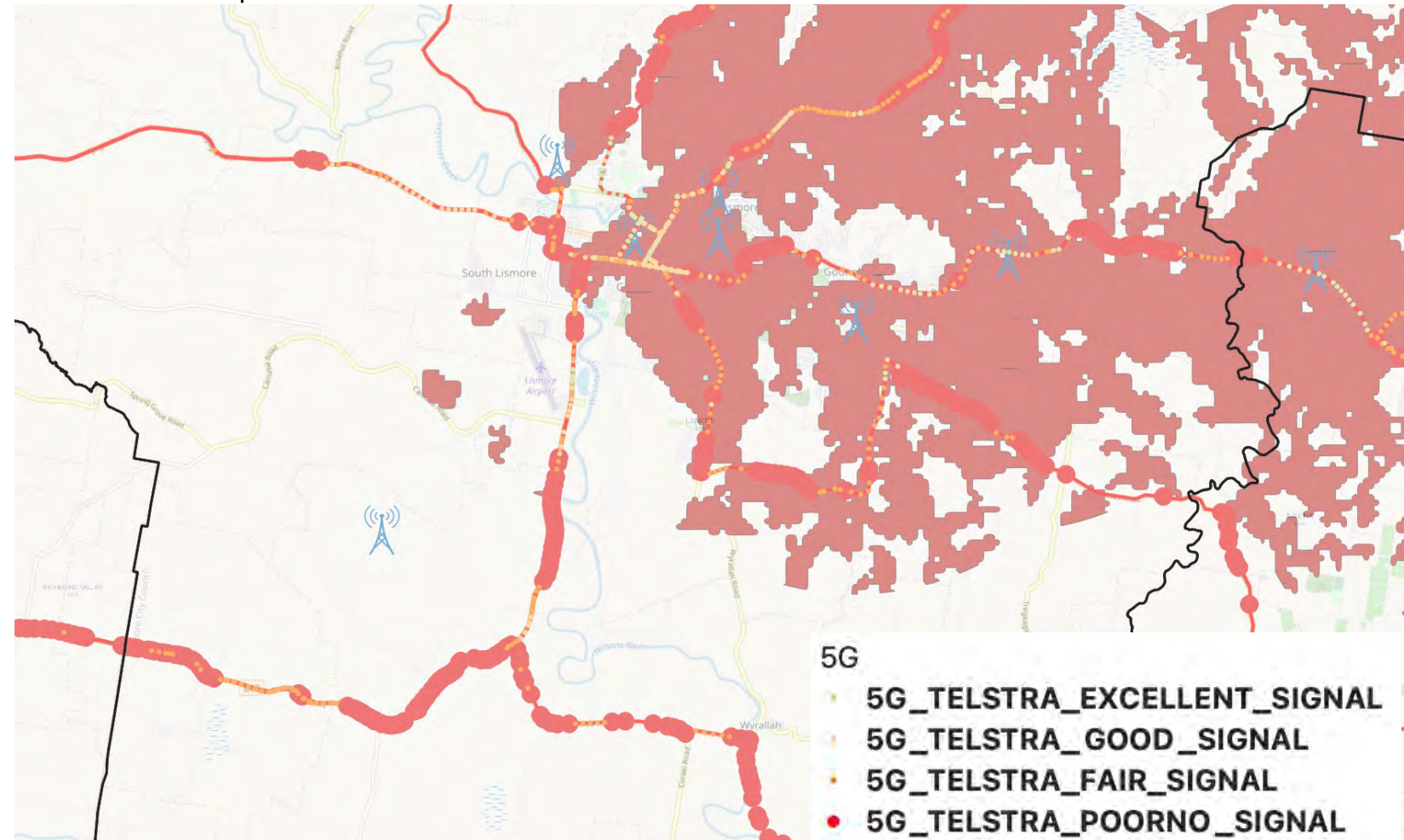
Lismore City Analysis

Bruxner Highway



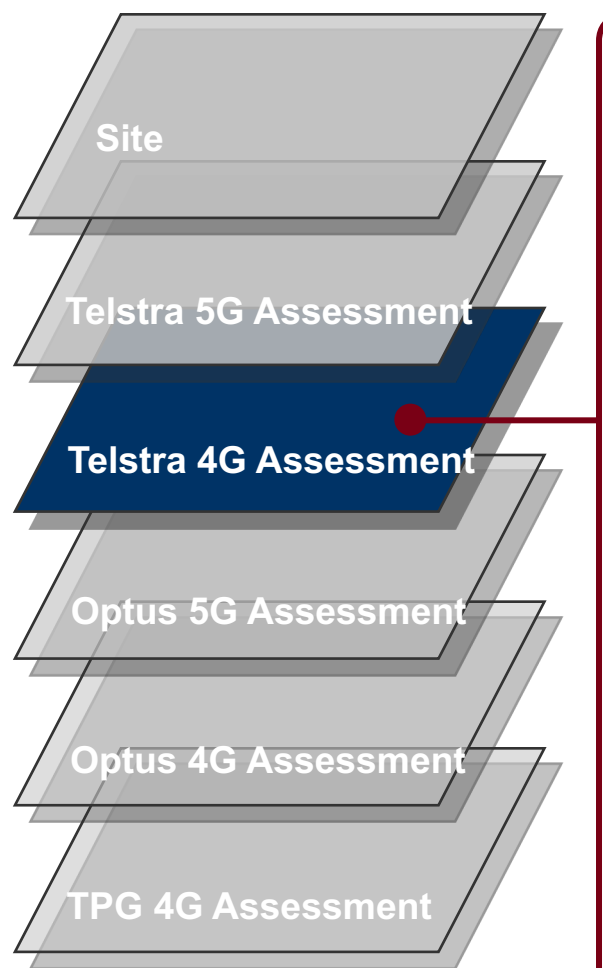
Assessment – Good 5G coverage in and east of Lismore. Large areas with no current 5G coverage

Action – Telstra - Upgrade 1 x Telstra Tower Sites with 3.6Ghz 5G & Telstra / Fed Govt (MBSP) – up to 2 new 5G Tower Sites required



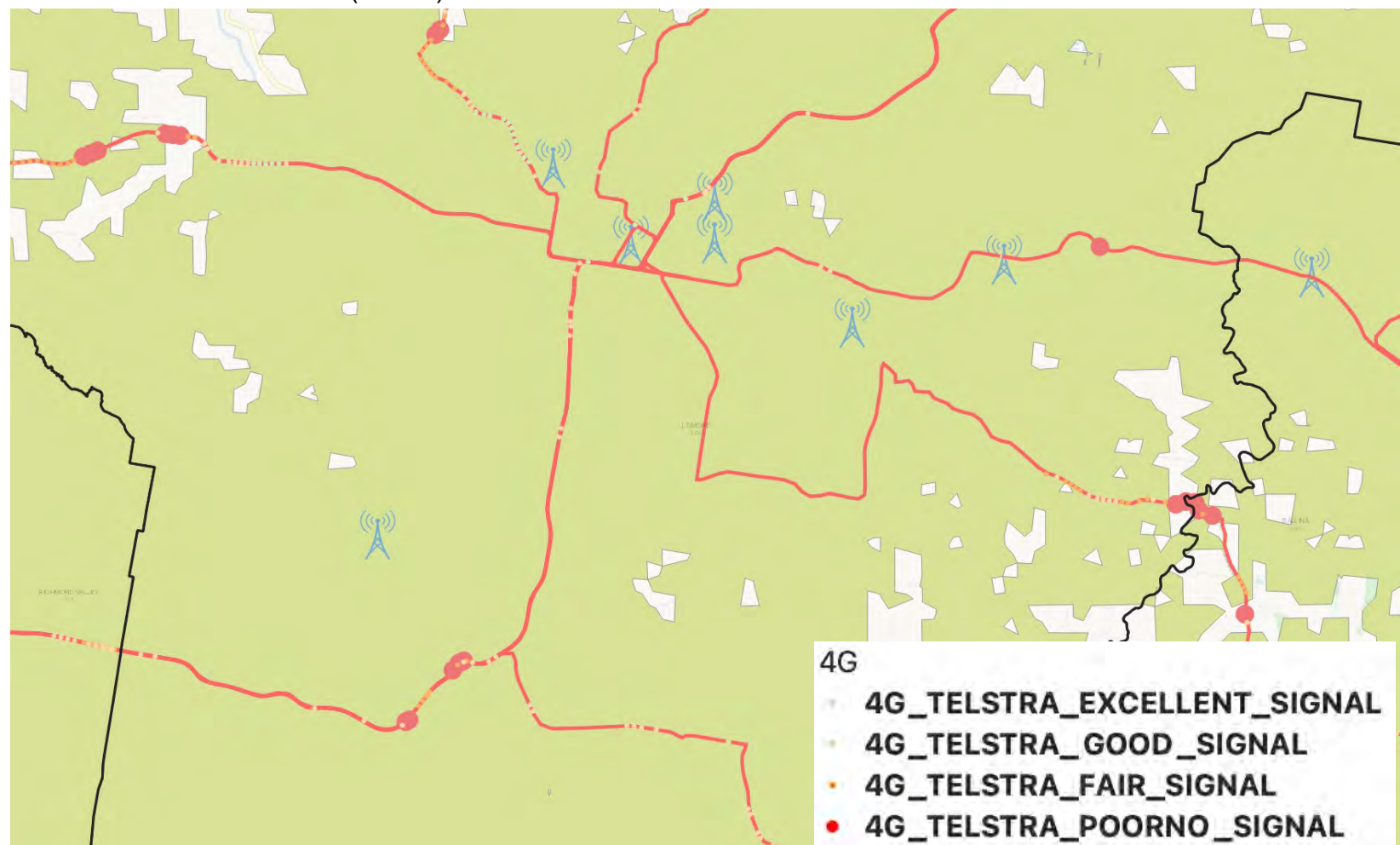
Lismore City Analysis

Bruxner Highway



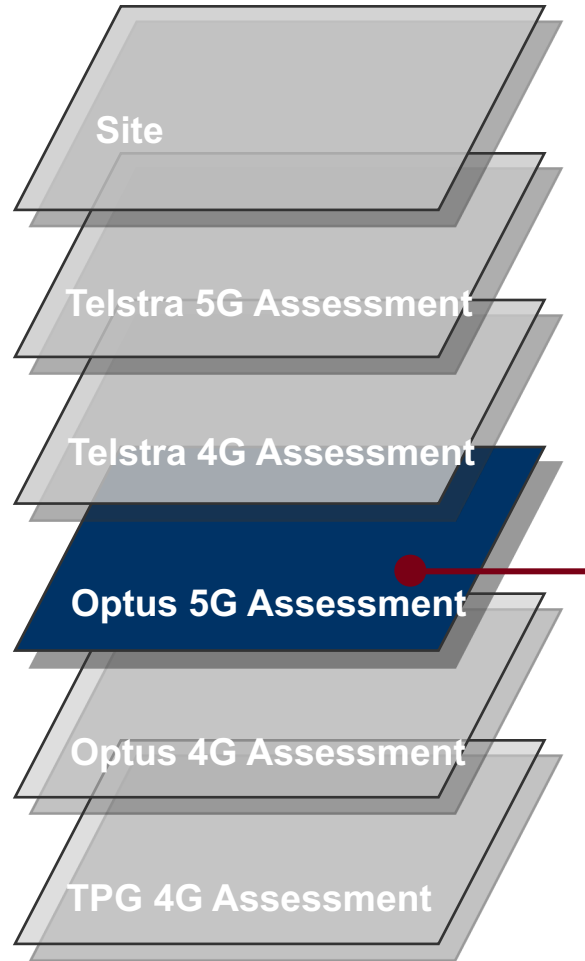
Assessment - Patchy 4G coverage south west of Lismore

Action – Telstra / Fed Govt (MBSP) – 1 new 4G Tower sites



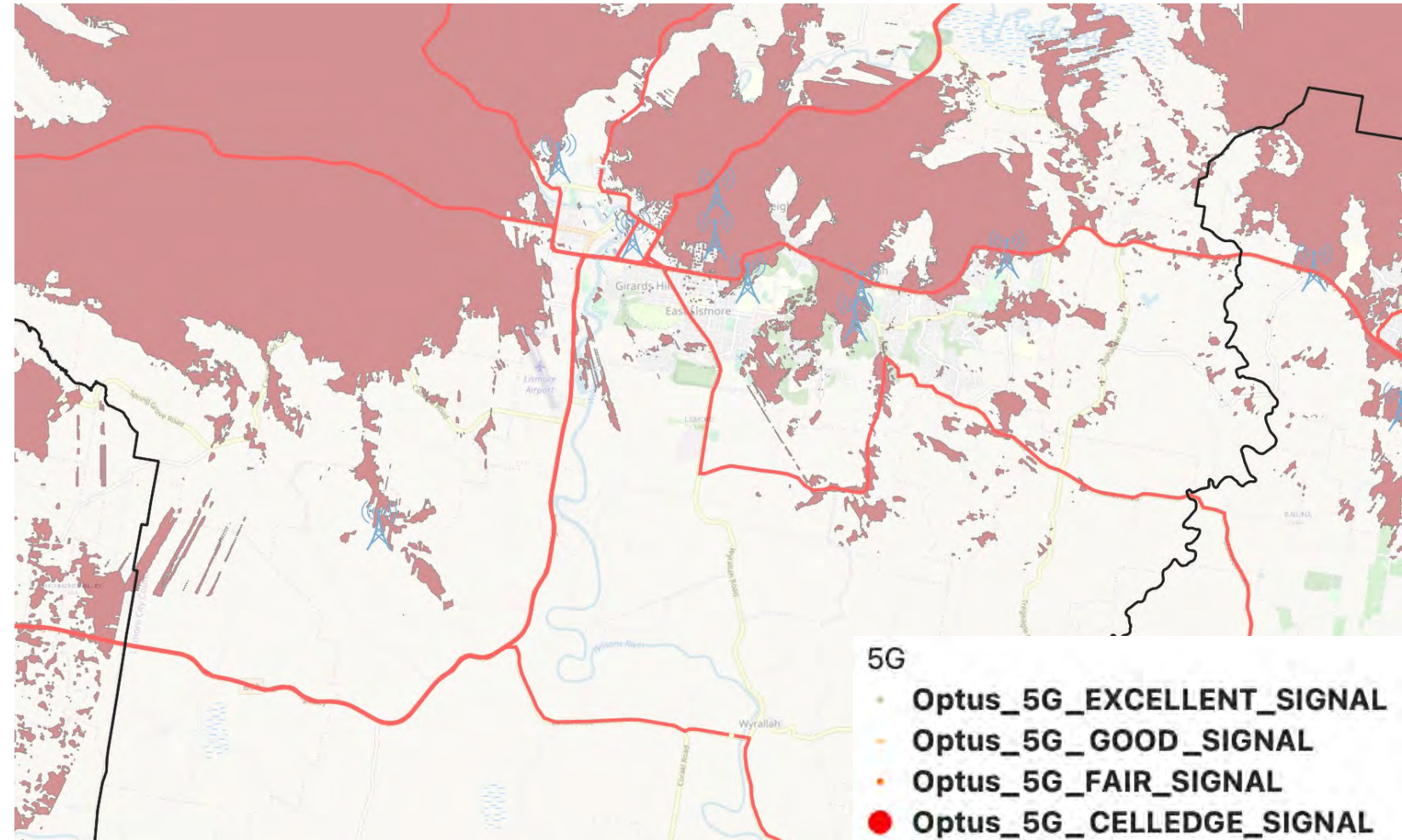
Lismore City Analysis

Bruxner Highway



Assessment - No current Optus 5G coverage

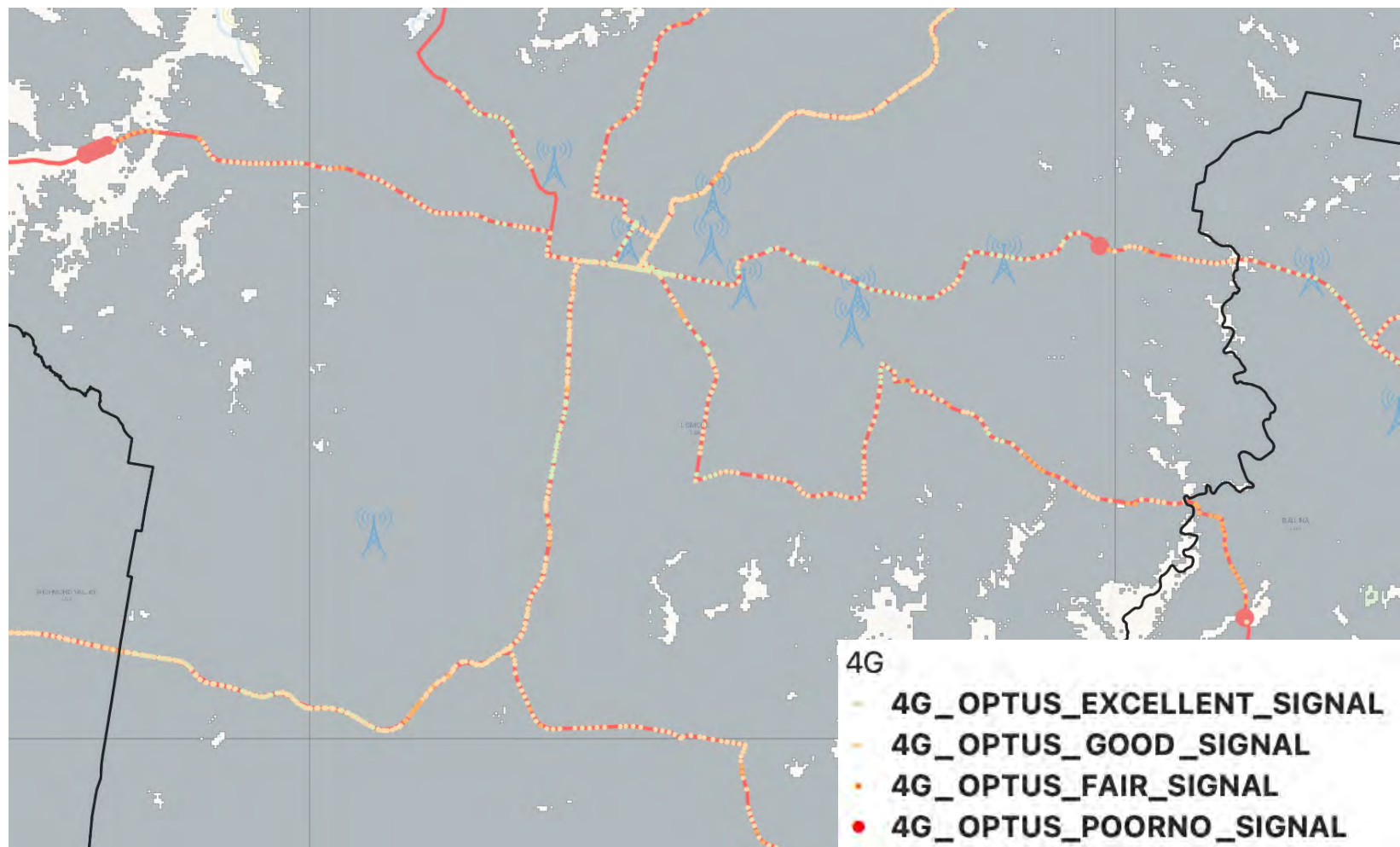
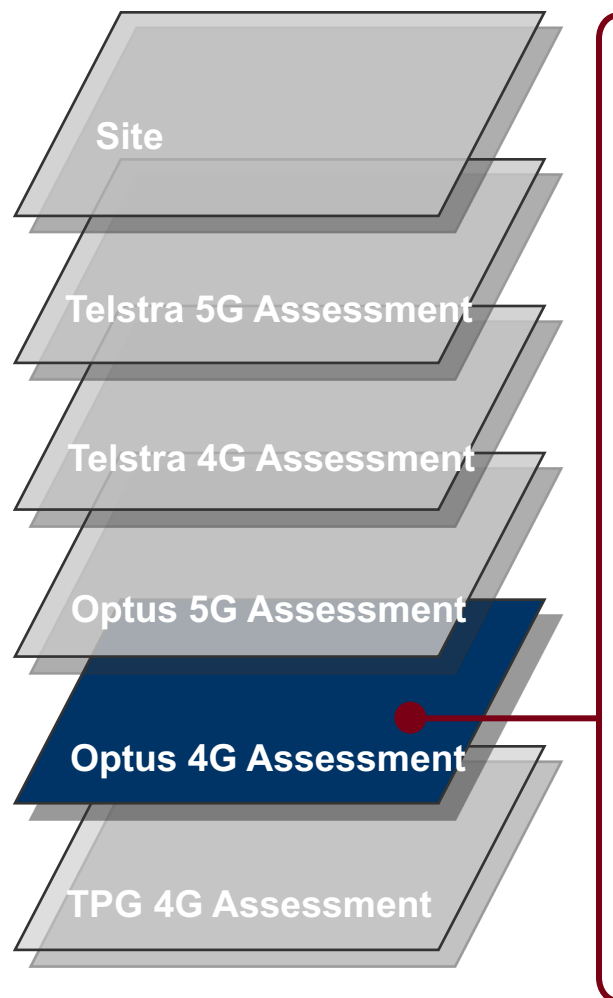
Action – Optus - Upgrade 3 x Sites to 5G & Optus / Fed Govt – up to 4 new 5G Tower sites



Lismore City Analysis

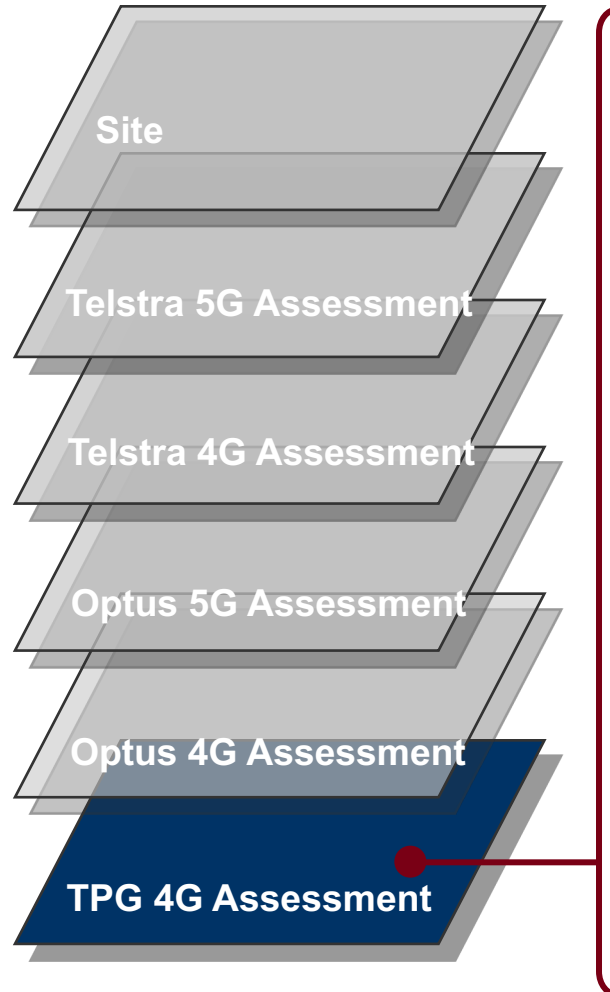
Bruxner Highway

Assessment – Goof 4G coverage



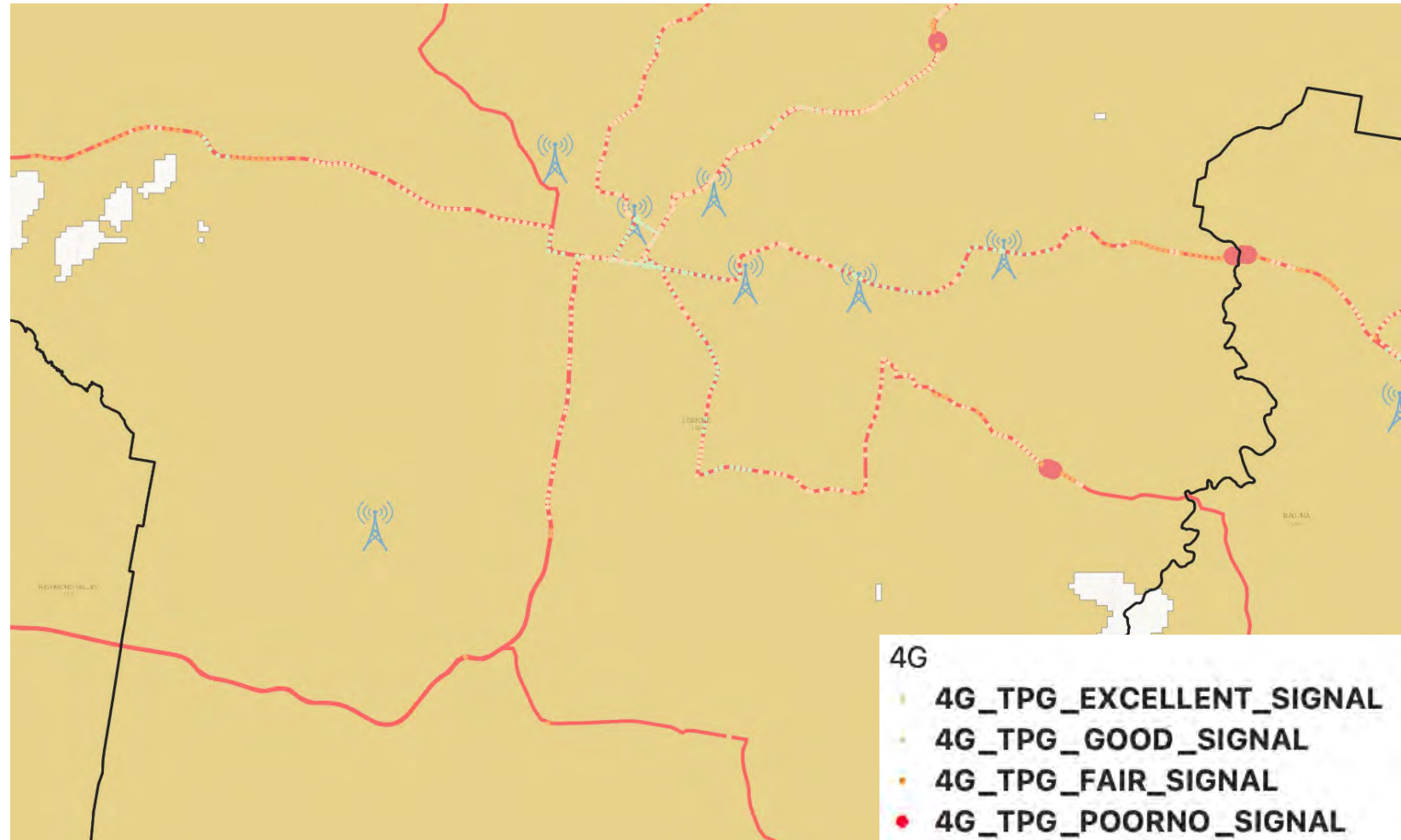
Lismore City Analysis

Bruxner Highway

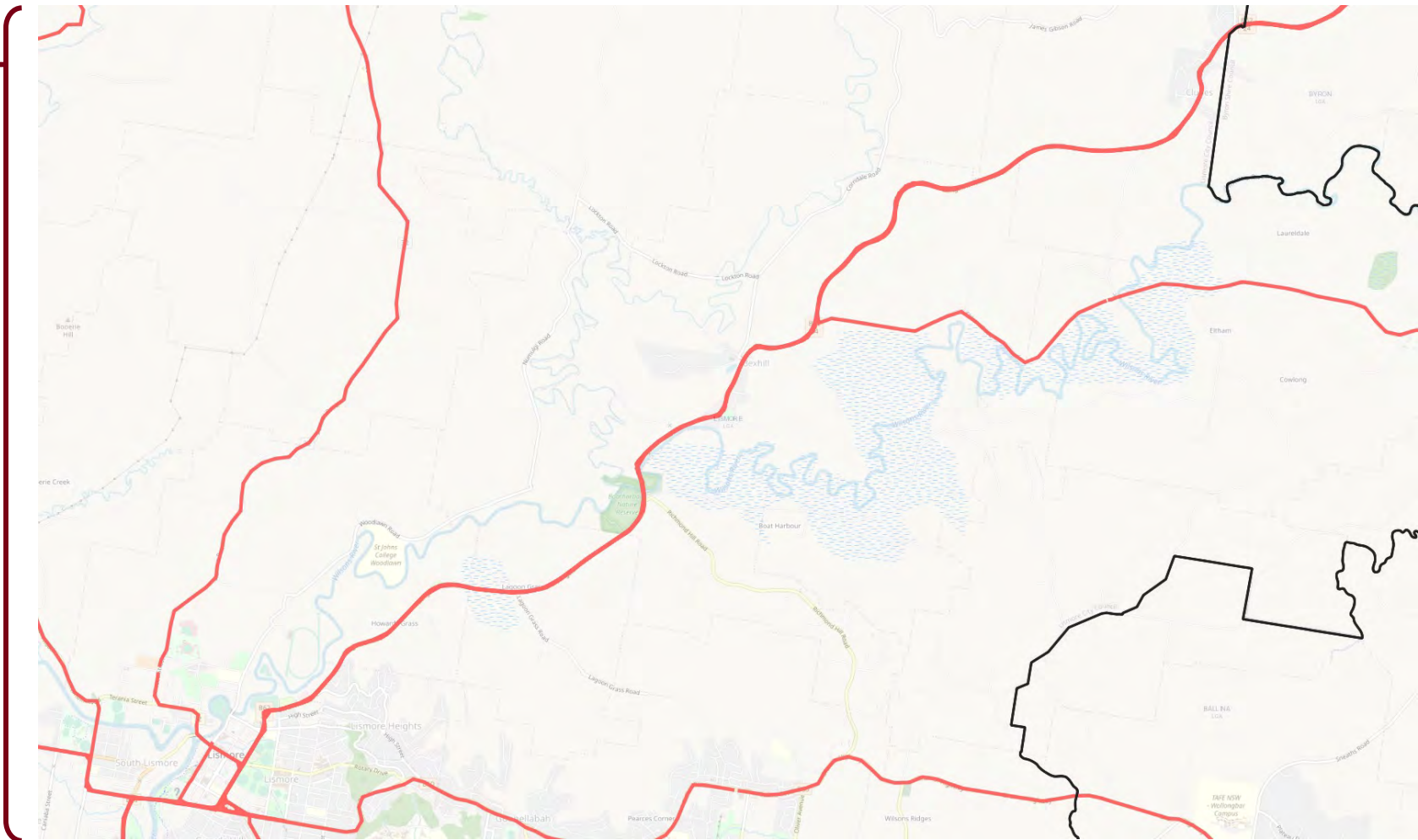


Assessment - Broad 4G blackspots southwest of Lismore

Action – TPG / Fed Govt (MBSP) – up to 3 new 4G Tower sites

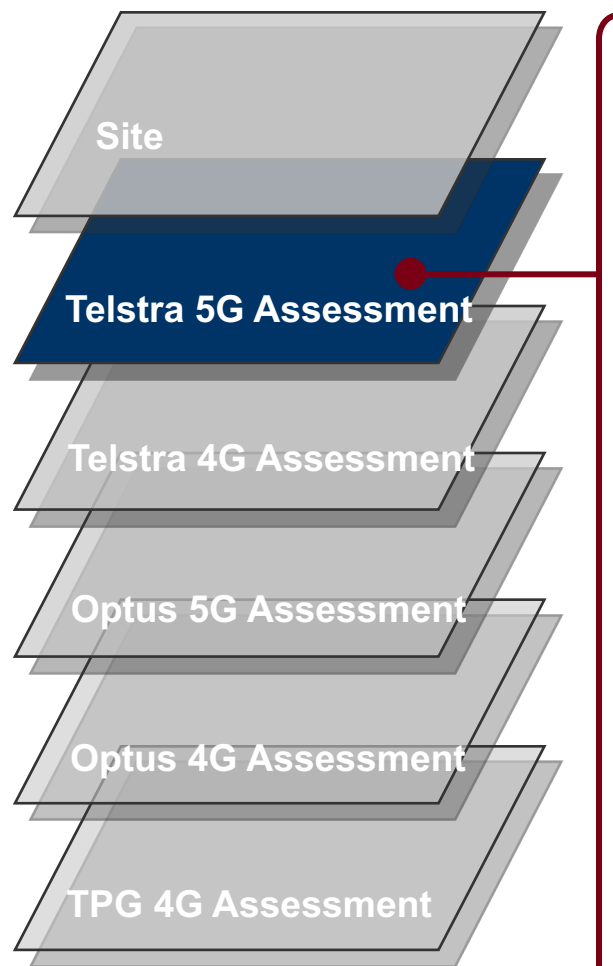


Bangalow Road



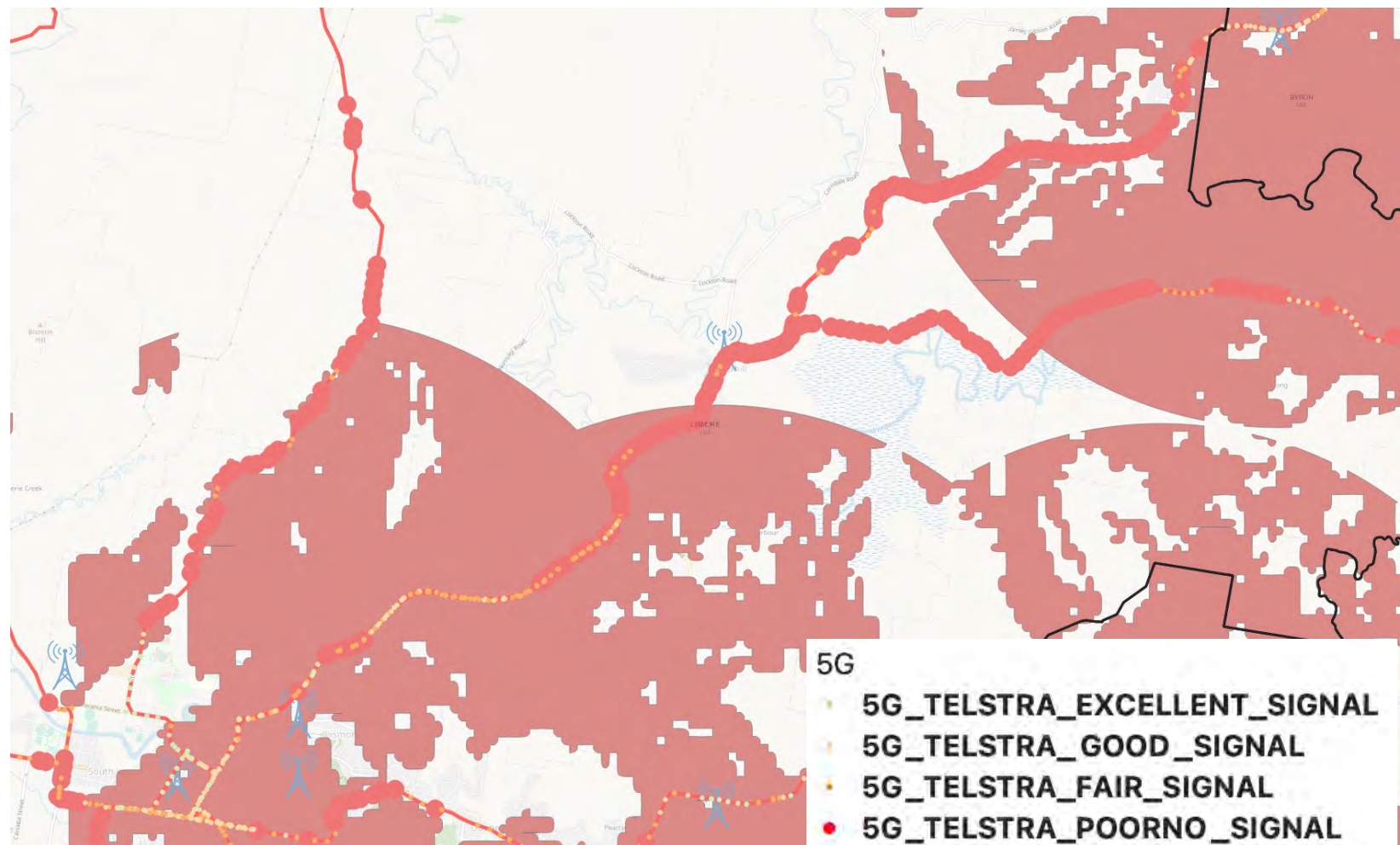
Lismore City Analysis

Bangalow Road



Assessment – Initial 5G coverage areas in Lismore

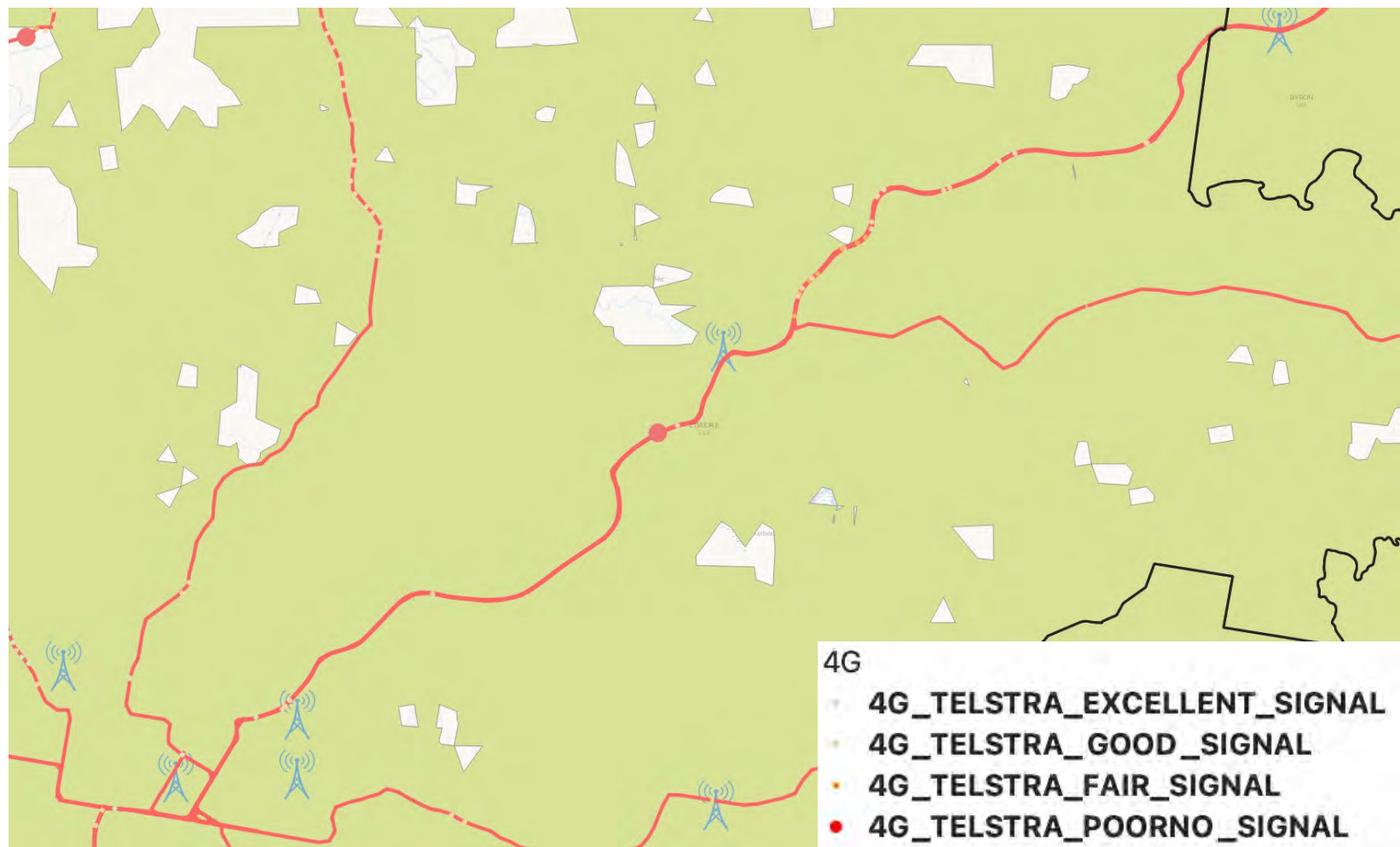
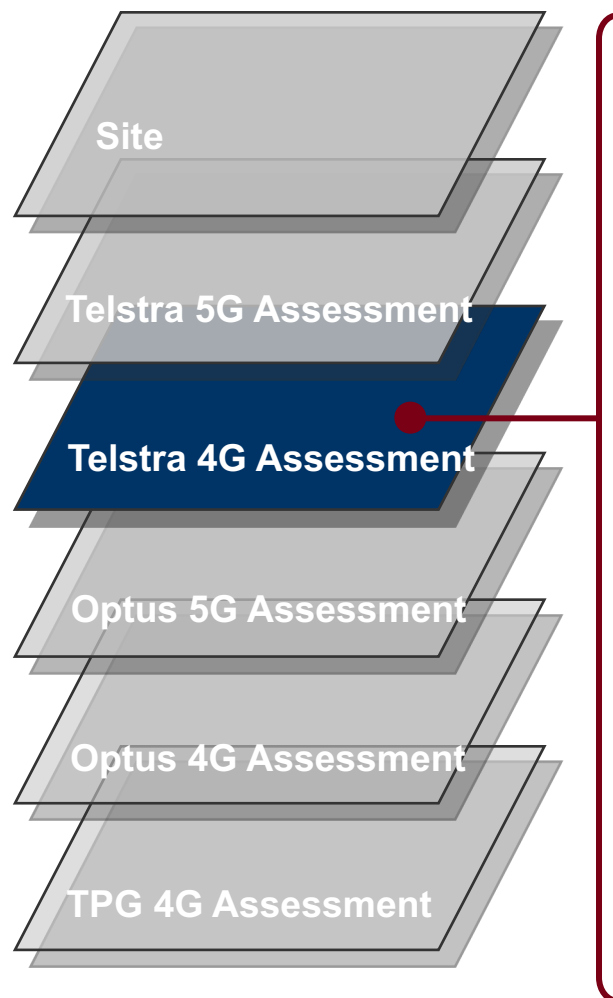
Action – Upgrade 1 x Telstra Tower Sites with 5G



Lismore City Analysis

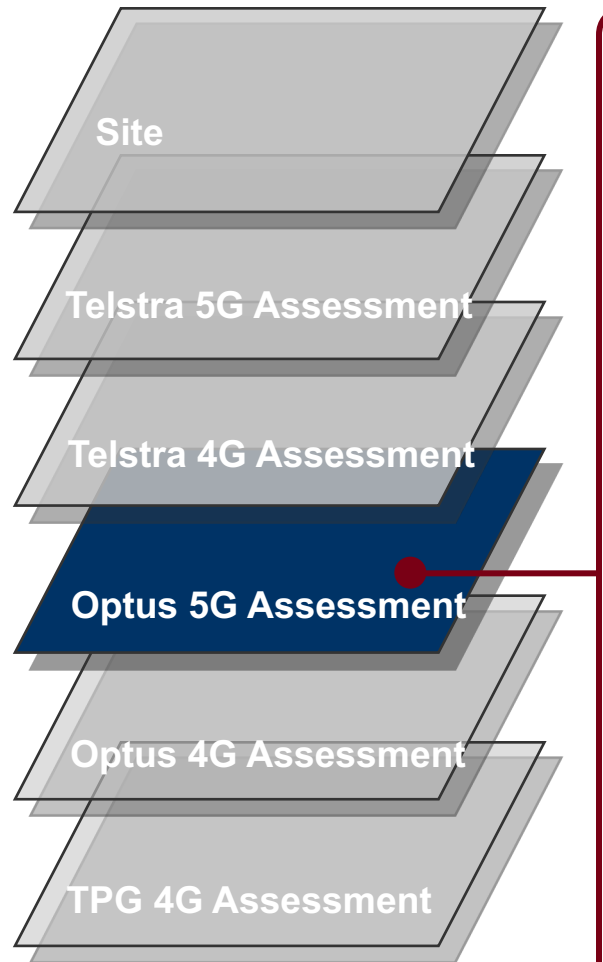
Bangalow Road

Assessment – Good 4G coverage



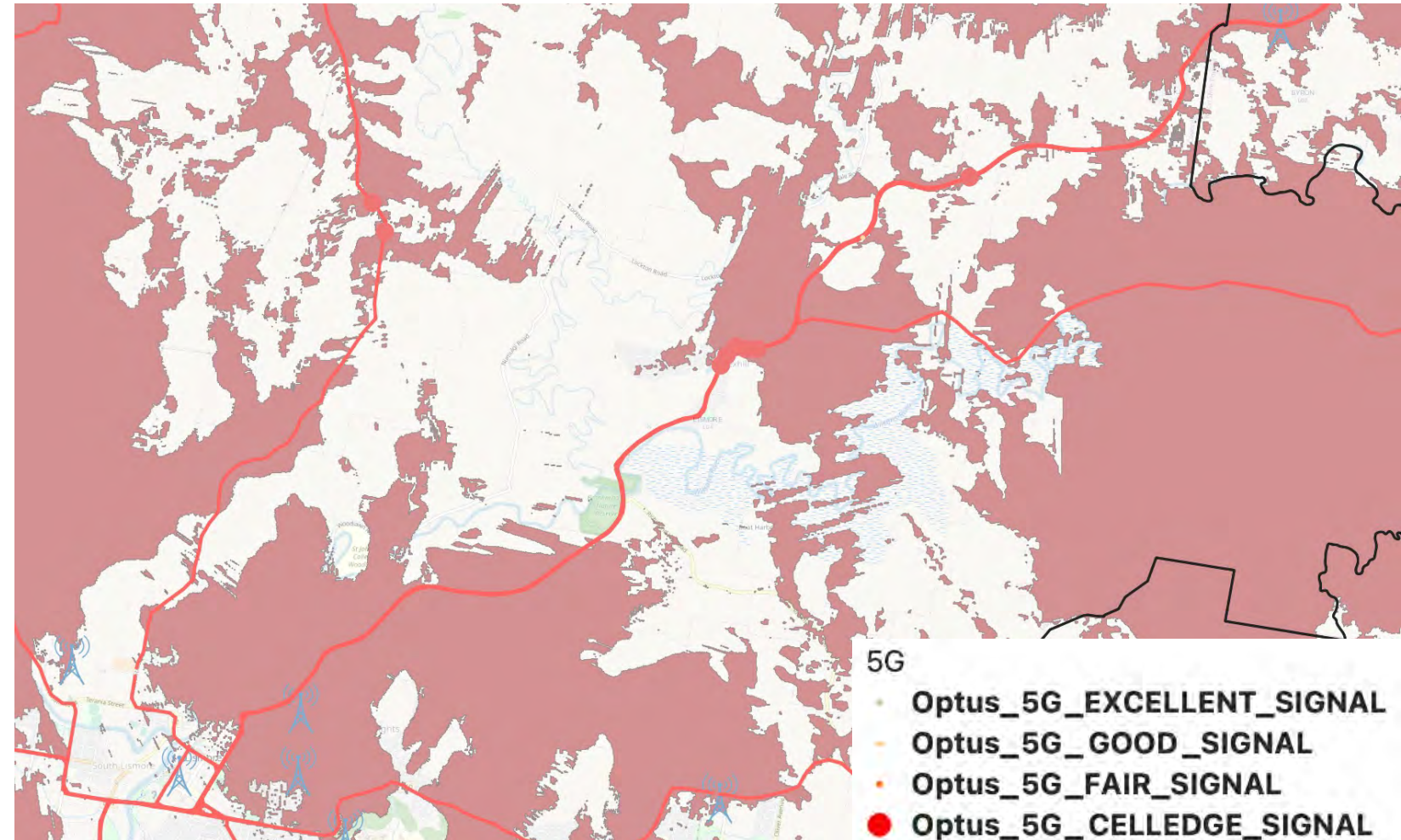
Lismore City Analysis

Bangalow Road



Assessment – Broad areas of 5G blackspots outside and within coverage mapping areas

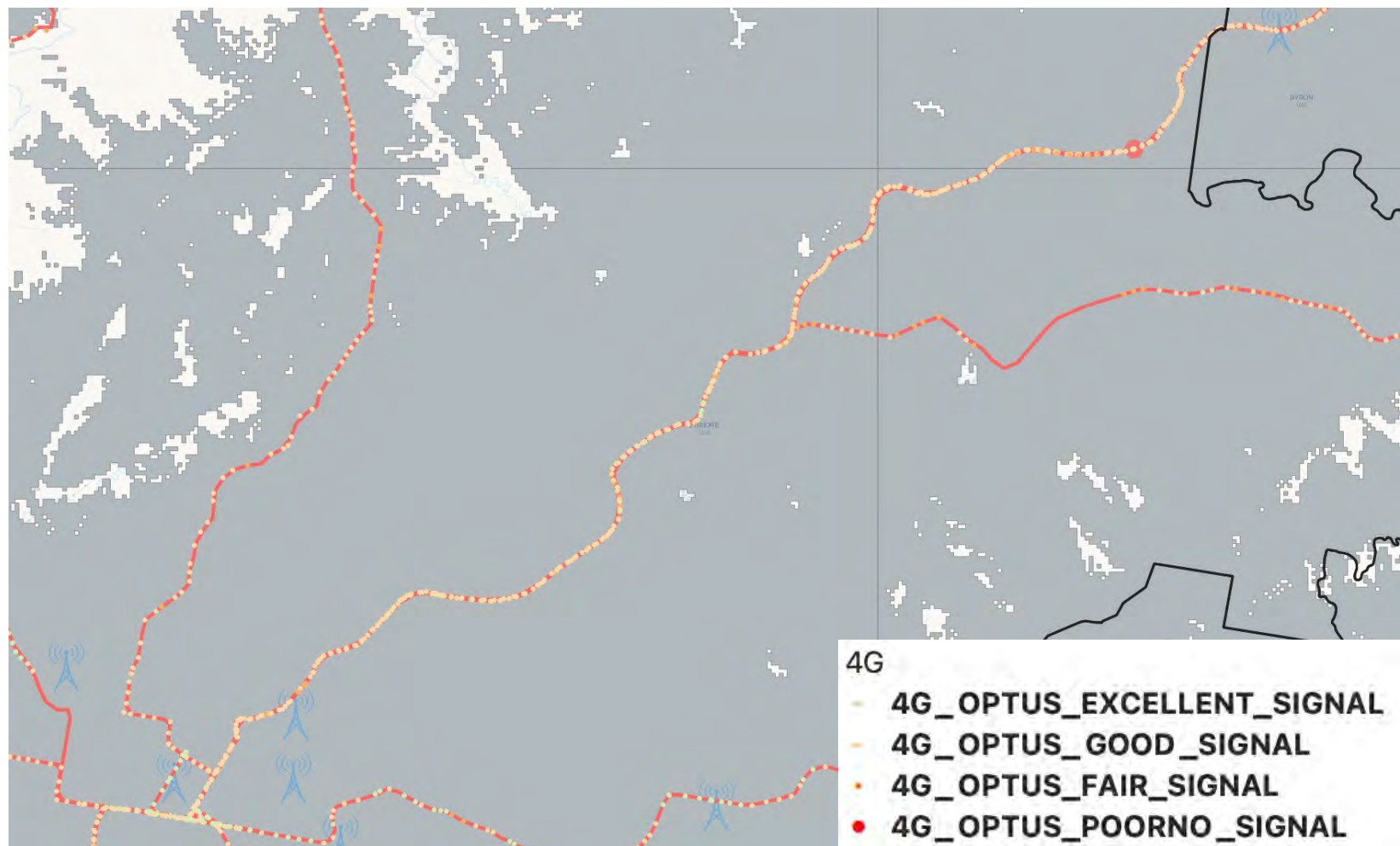
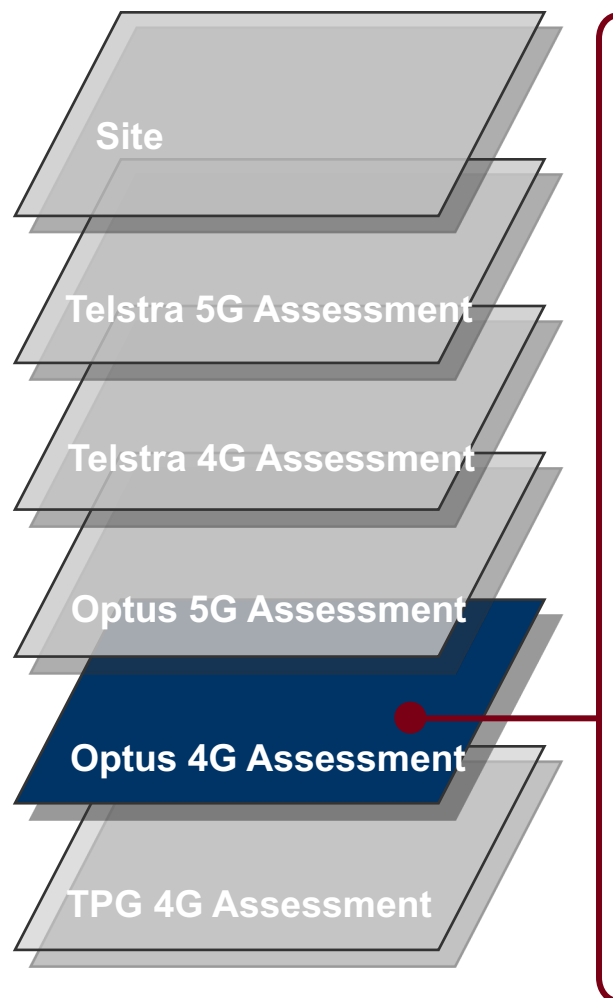
Action – Optus - Upgrade 2 x Site to 5G & Optus / Fed Govt – 2 new 5G Tower sites



Lismore City Analysis

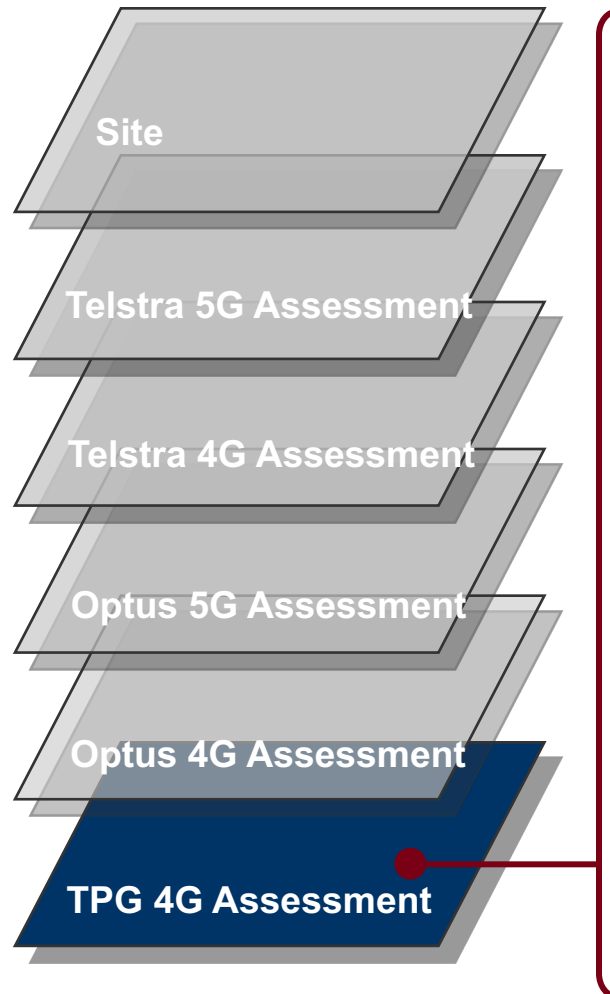
Bangalow Road

Assessment – Good 4G coverage



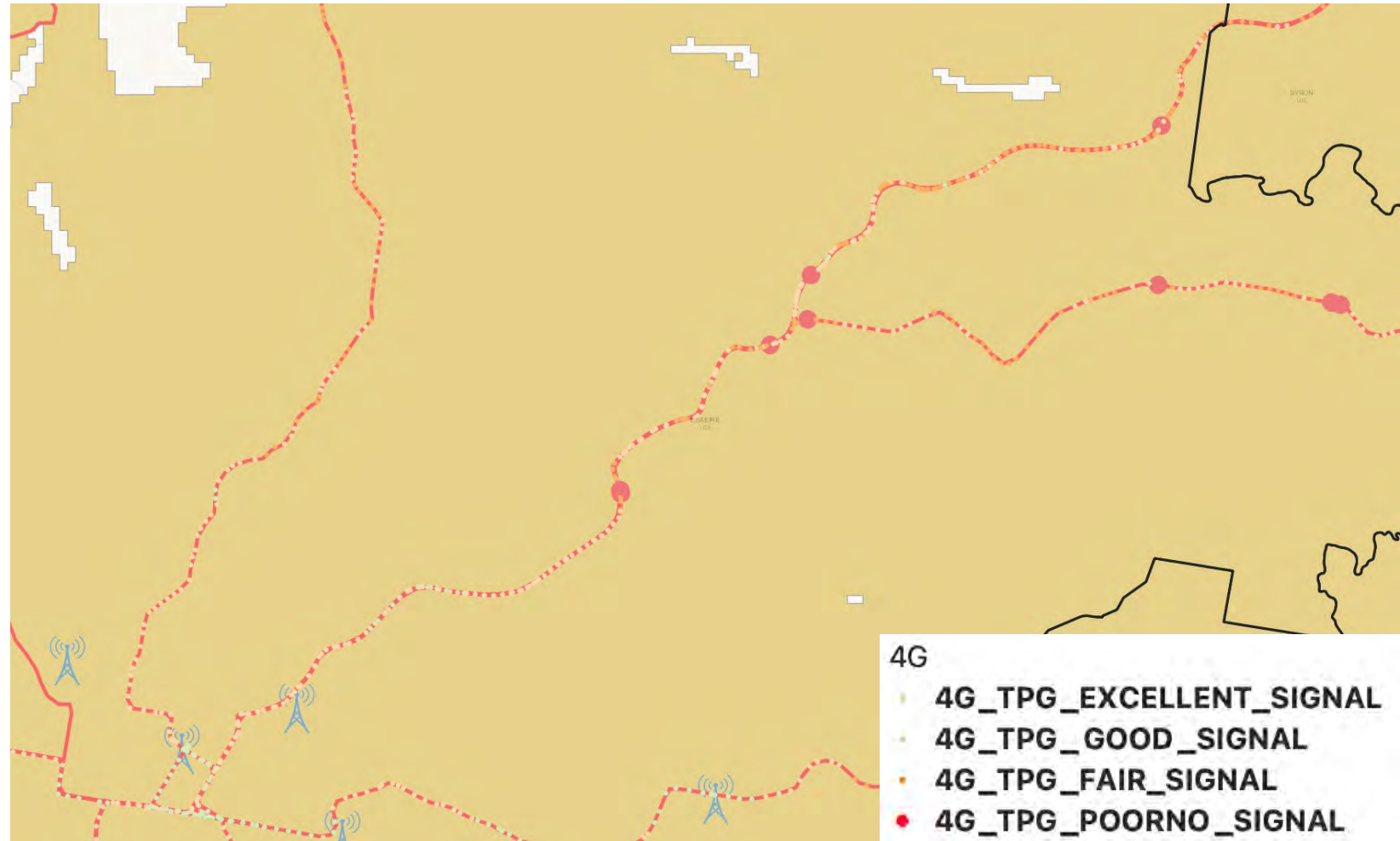
Lismore City Analysis

Bangalow Road



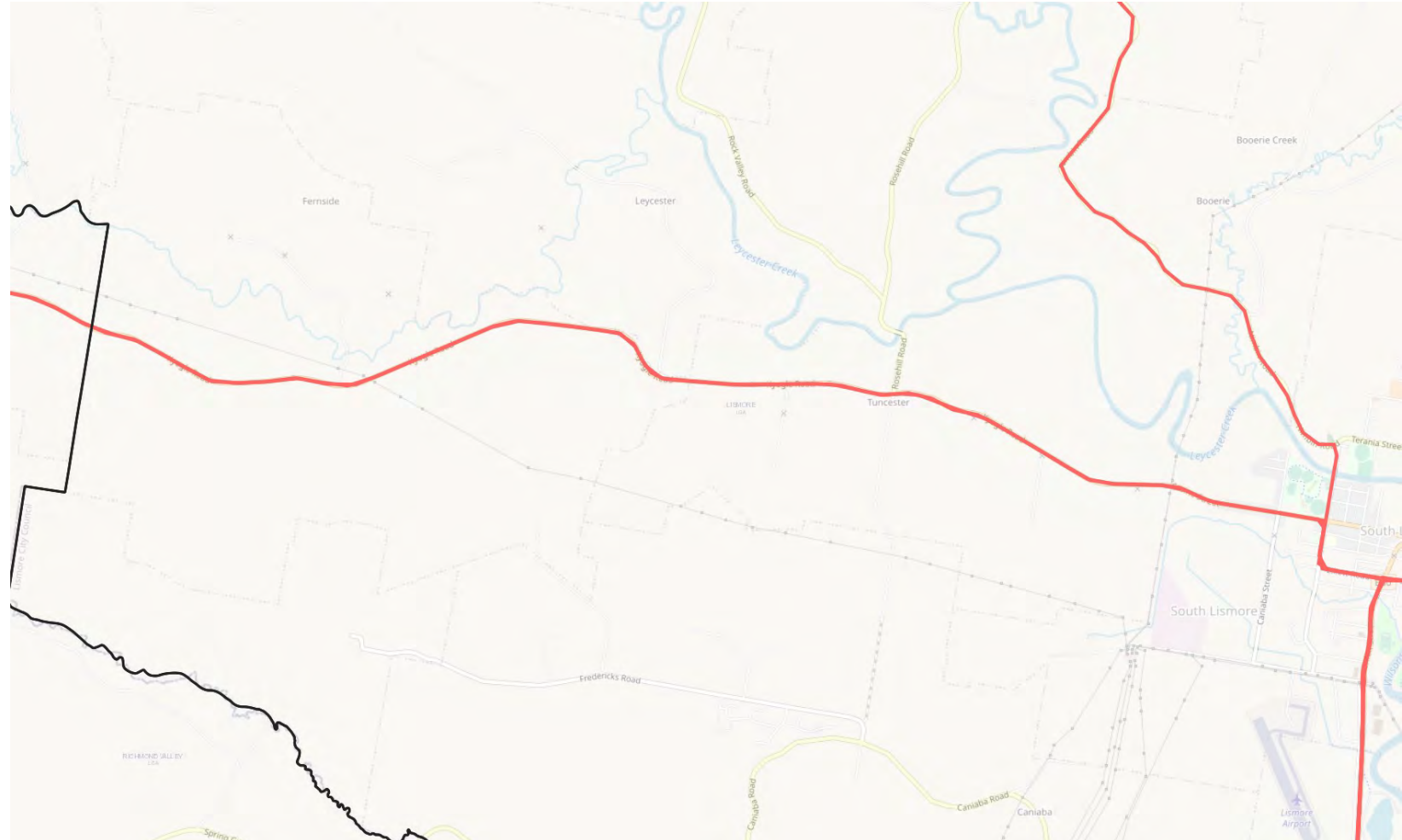
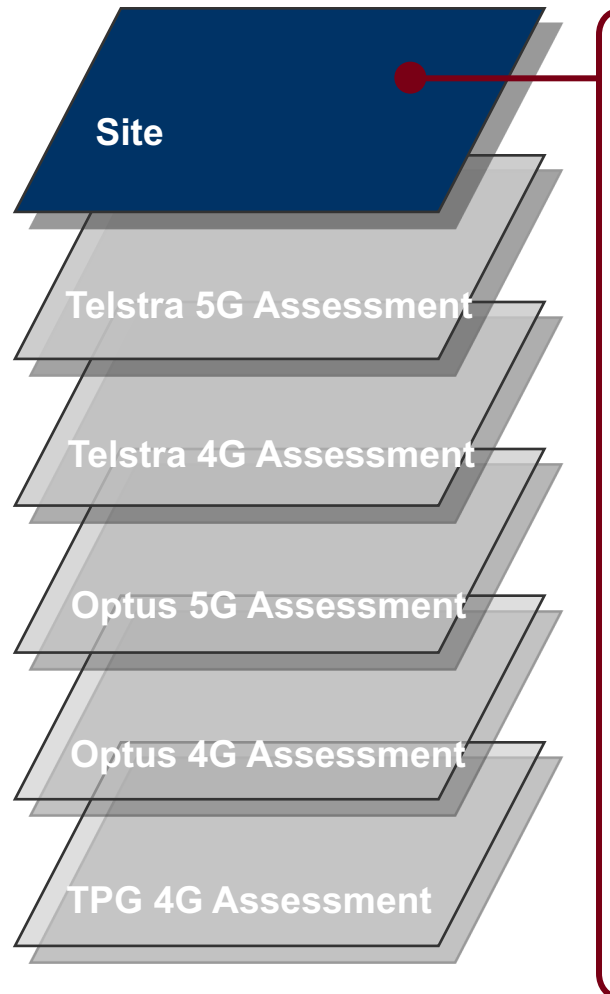
Assessment – Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites



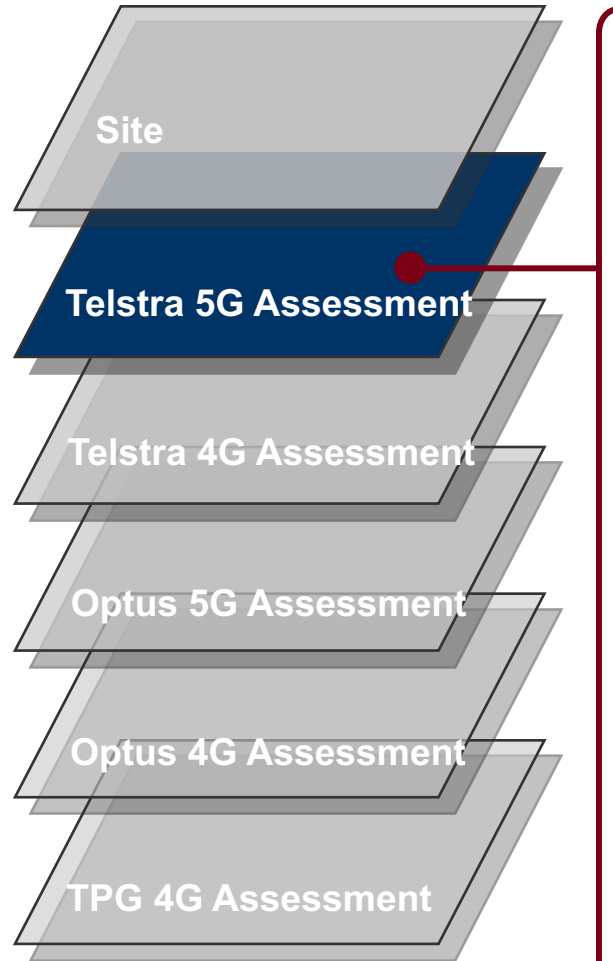
Lismore City Analysis

Kyogle Road



Lismore City Analysis

Kyogle Road



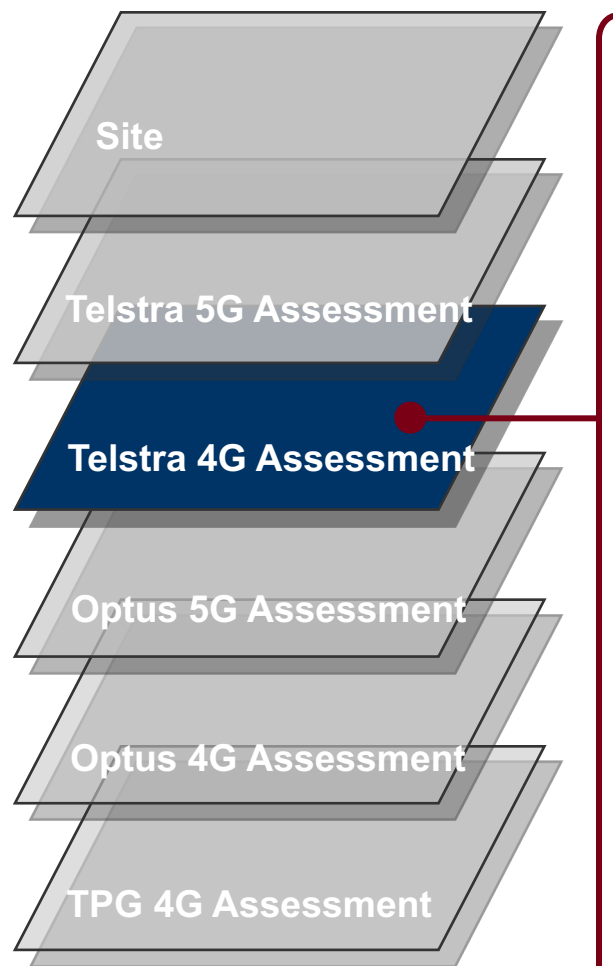
Assessment – Initial 5G coverage near Lismore. Large areas with no current 5G coverage

Action – Telstra / Fed Govt (MBSP) – 1 new 5G Tower Sites required



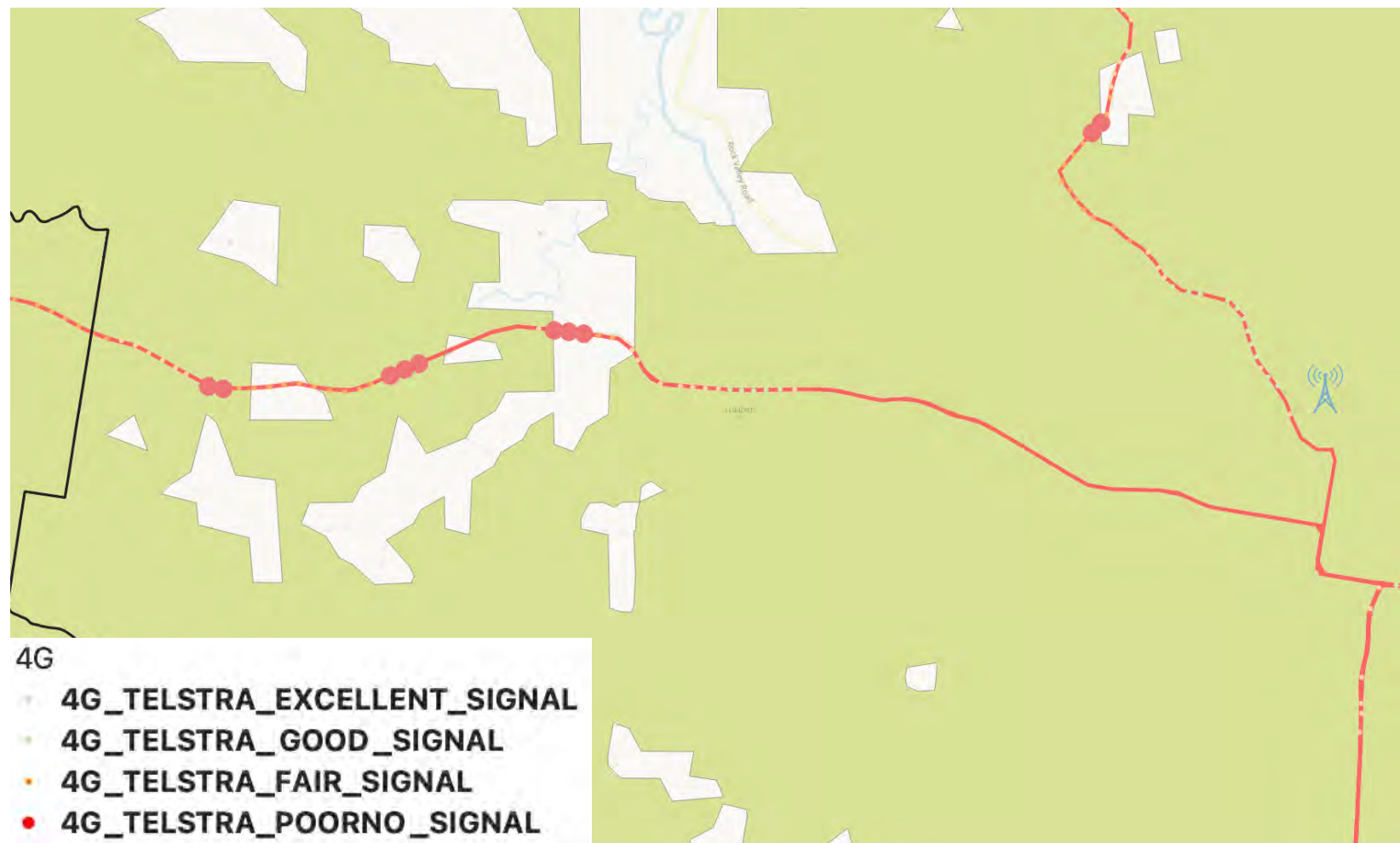
Lismore City Analysis

Kyogle Road



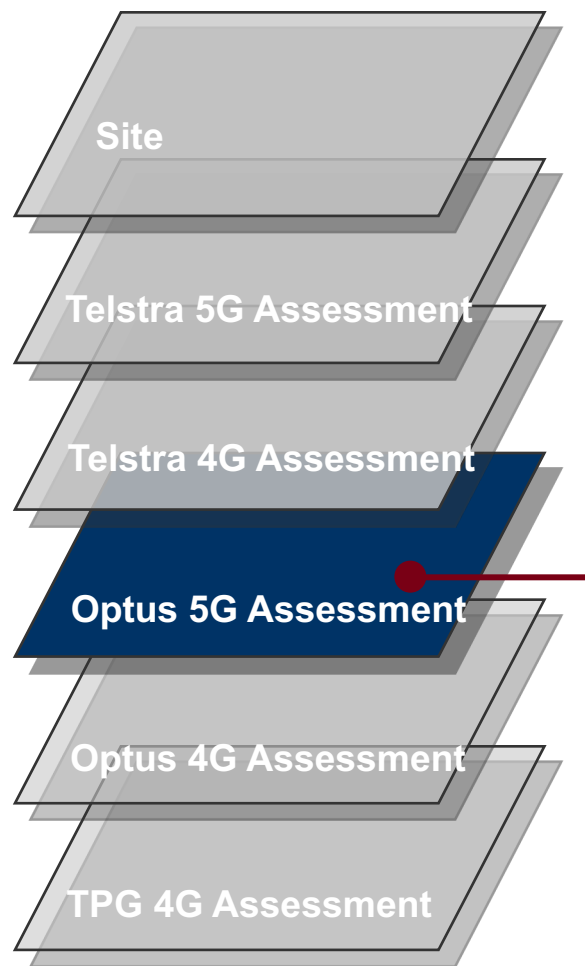
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action –Telstra / Fed Govt (MBSP) – 1new 4G sites



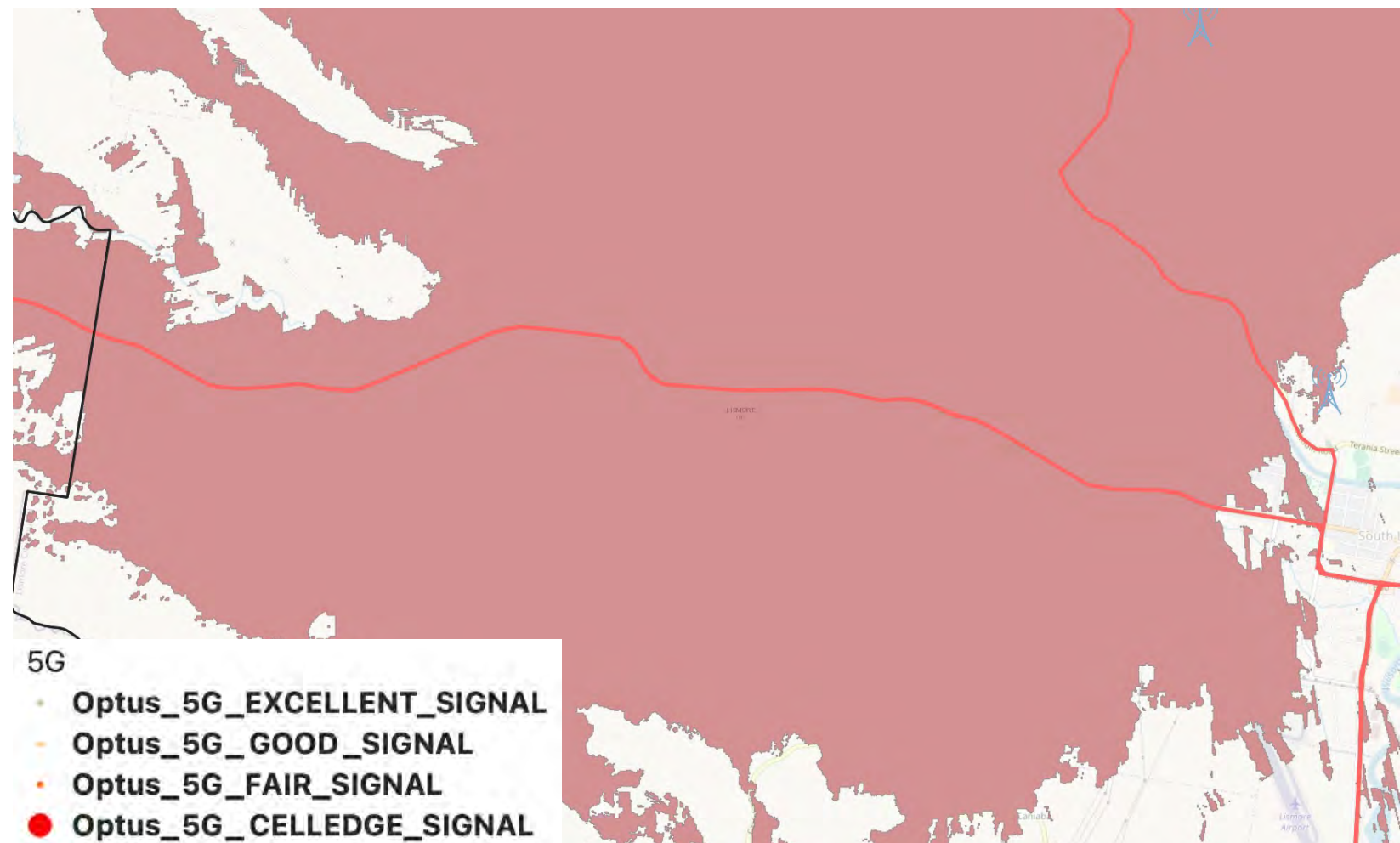
Lismore City Analysis

Kyogle Road



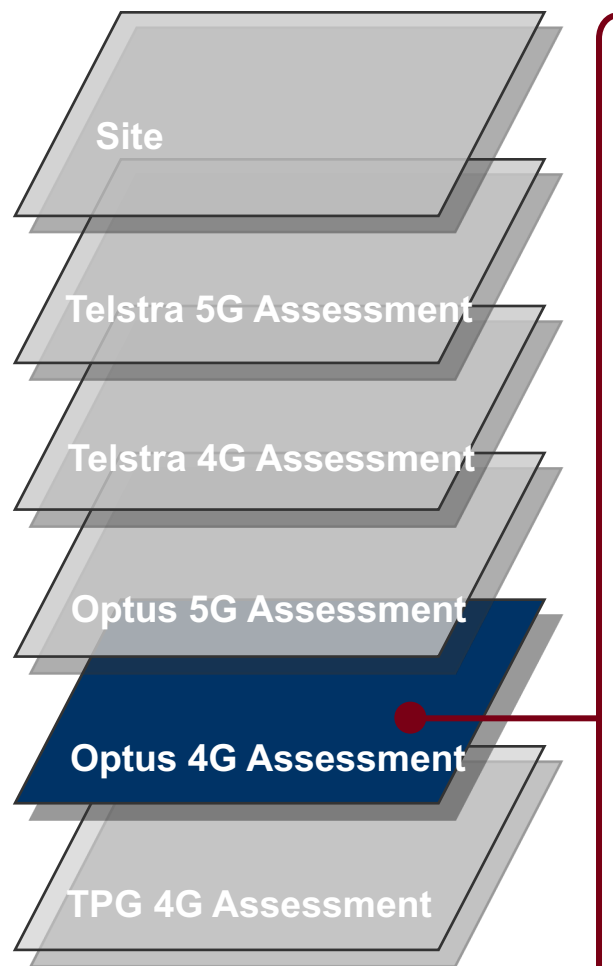
Assessment – Broad areas of 5G blackspots outside and within coverage mapping areas

Action – Optus - Upgrade 2 x Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



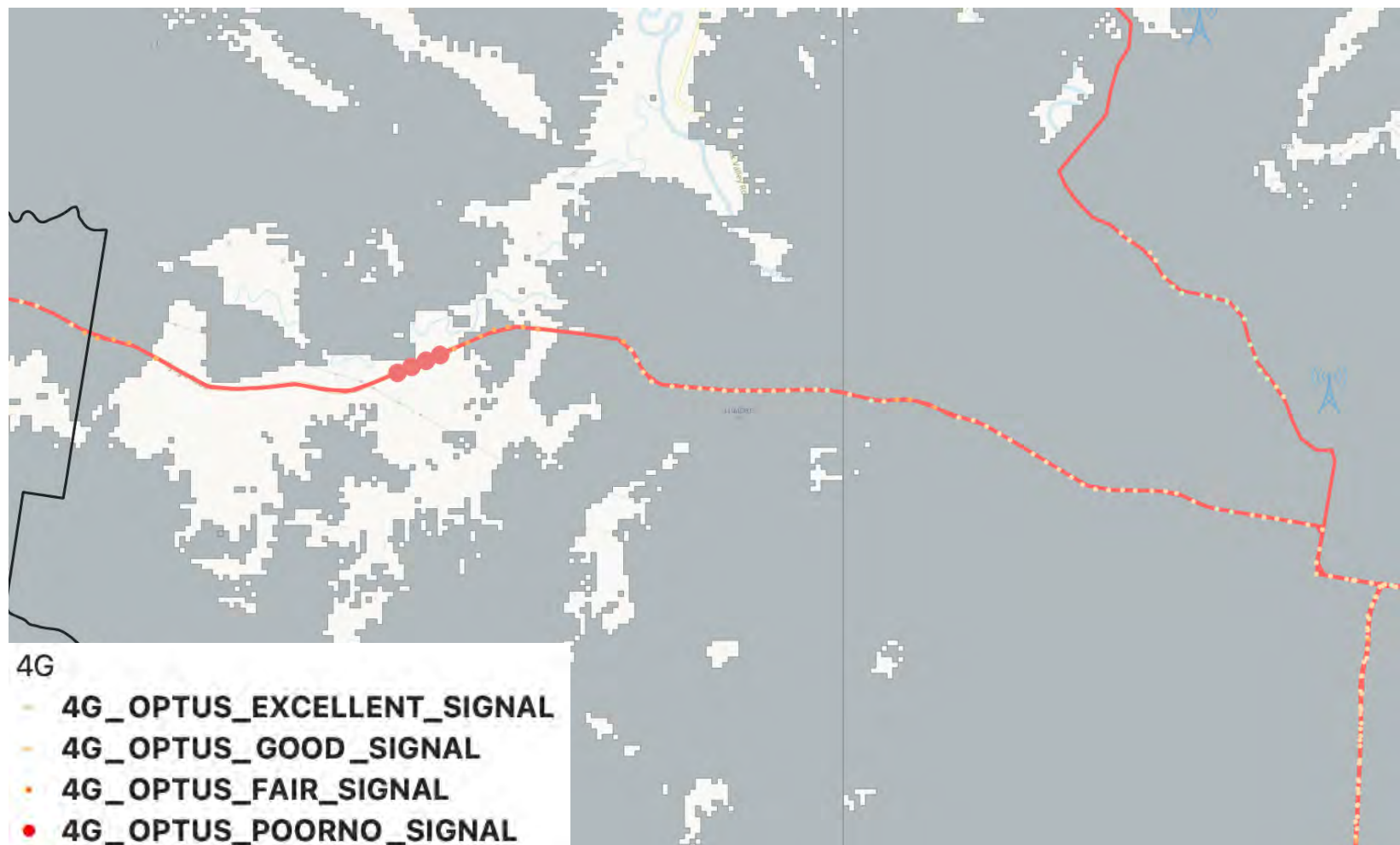
Lismore City Analysis

Kyogle Road



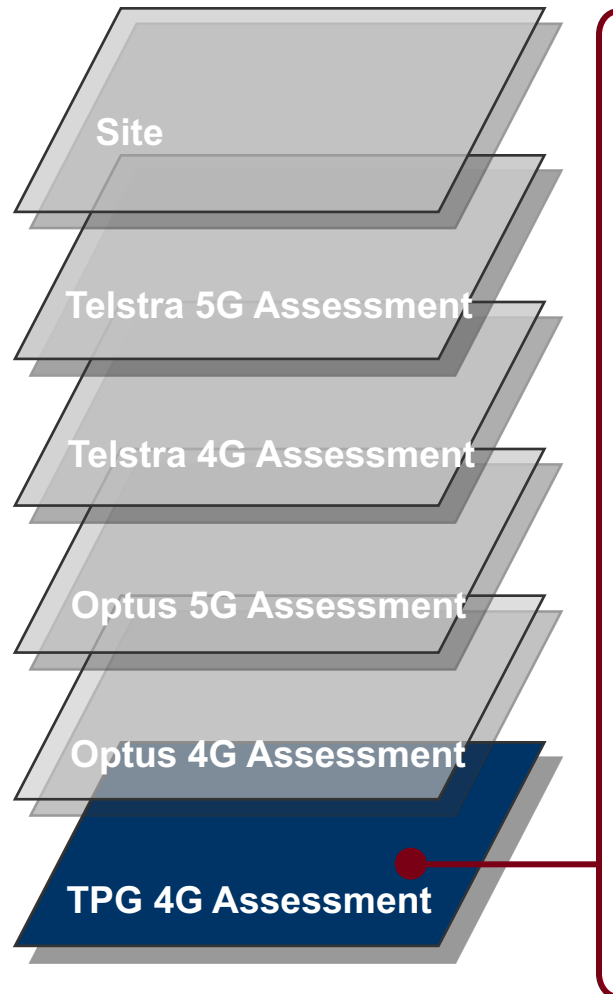
Assessment – Good 4G coverage with a broad 4G blackspots

Action – Optus / Fed Govt – 1 new 4G Tower sites



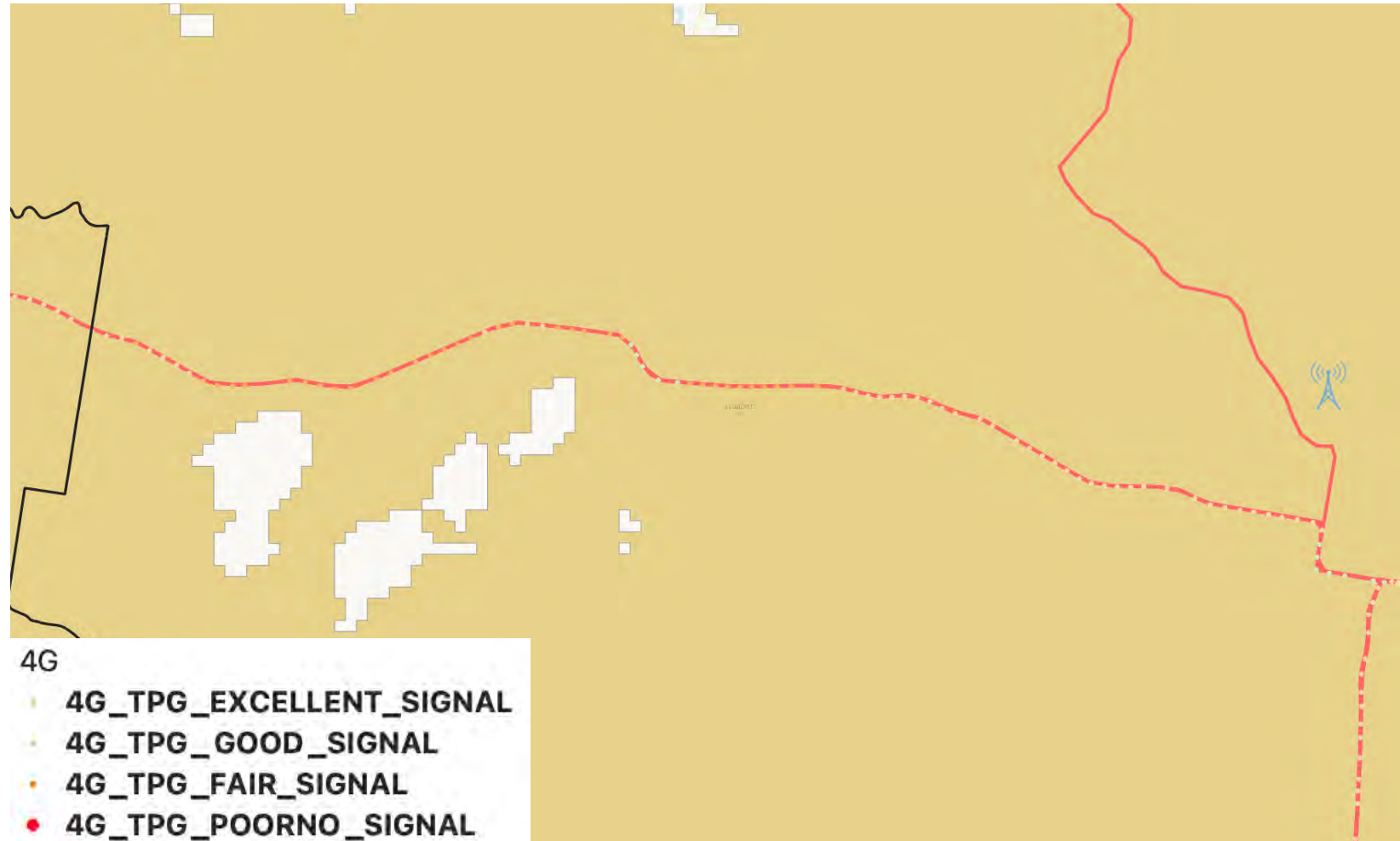
Lismore City Analysis

Kyogle Road



Assessment - Mixture of Good and Poor / Fair 4G coverage

Action –TPG / Fed Govt (MBSP) – 1 new 4G sites

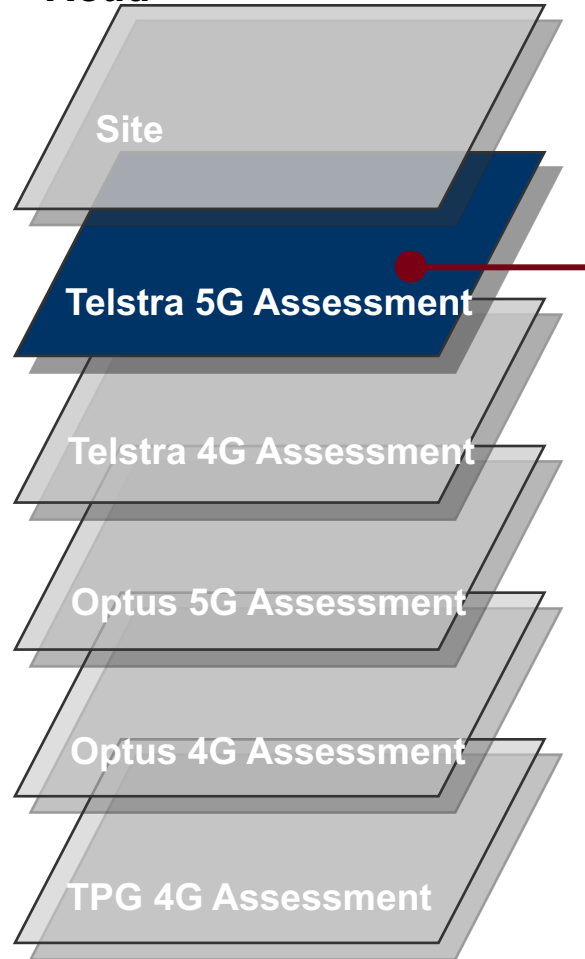


Nimbin Road / Blue Knob Road



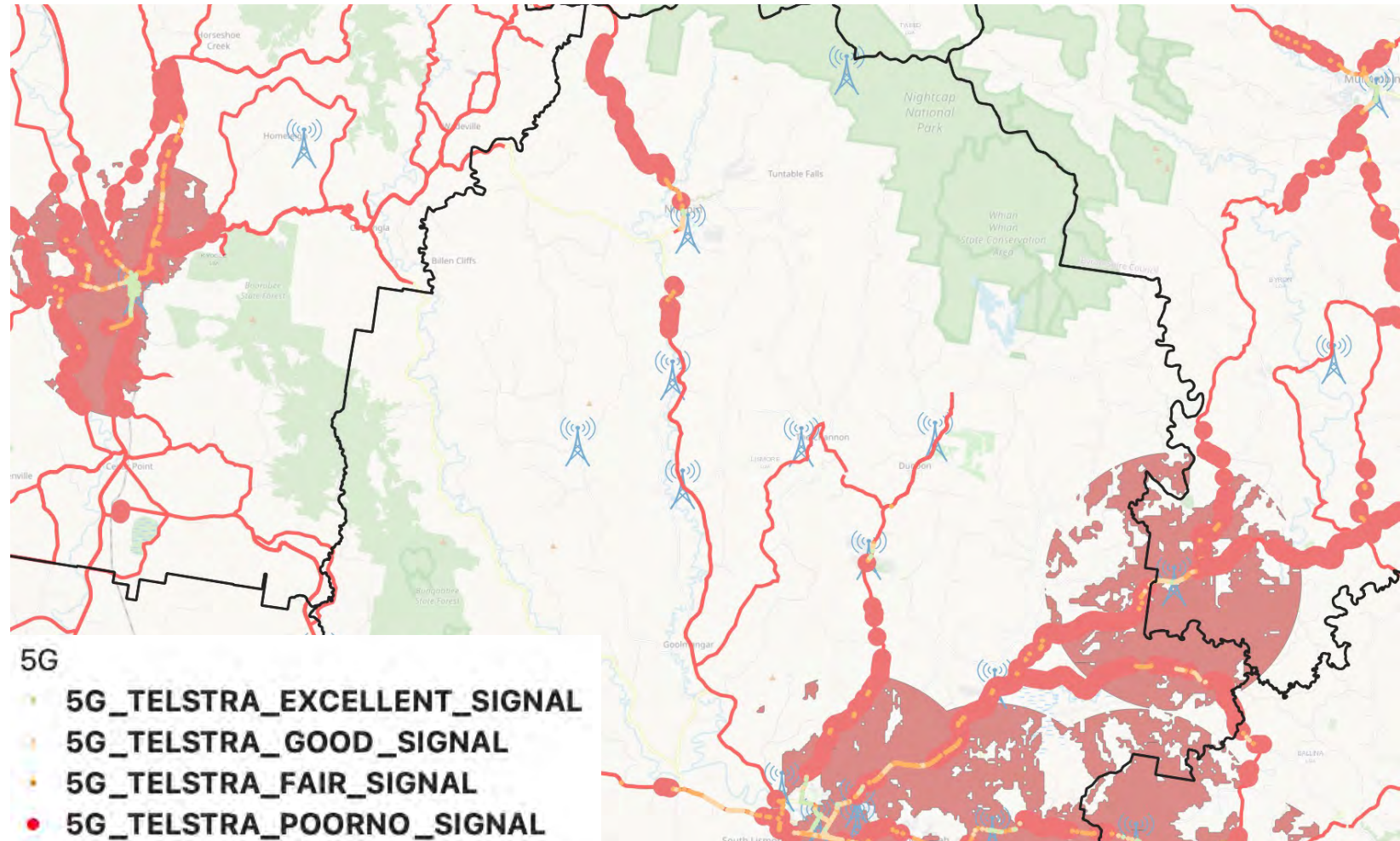
Lismore City Analysis

Nimbin Road / Blue Knob Road



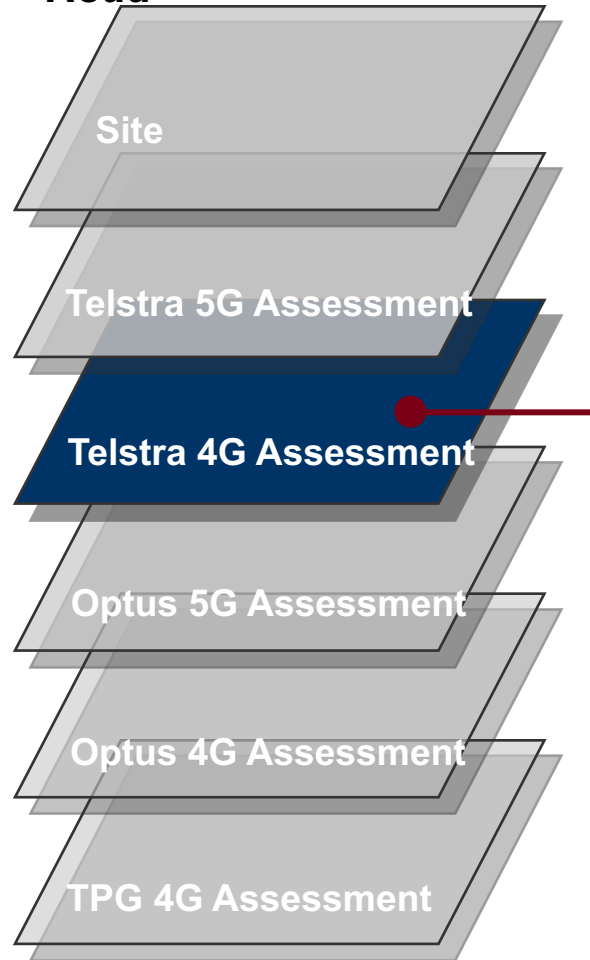
Assessment – No current 5G coverage

Action - Telstra - Upgrade 1 x Site to 5G & Telstra / Fed Govt – 1 new 5G Tower sites

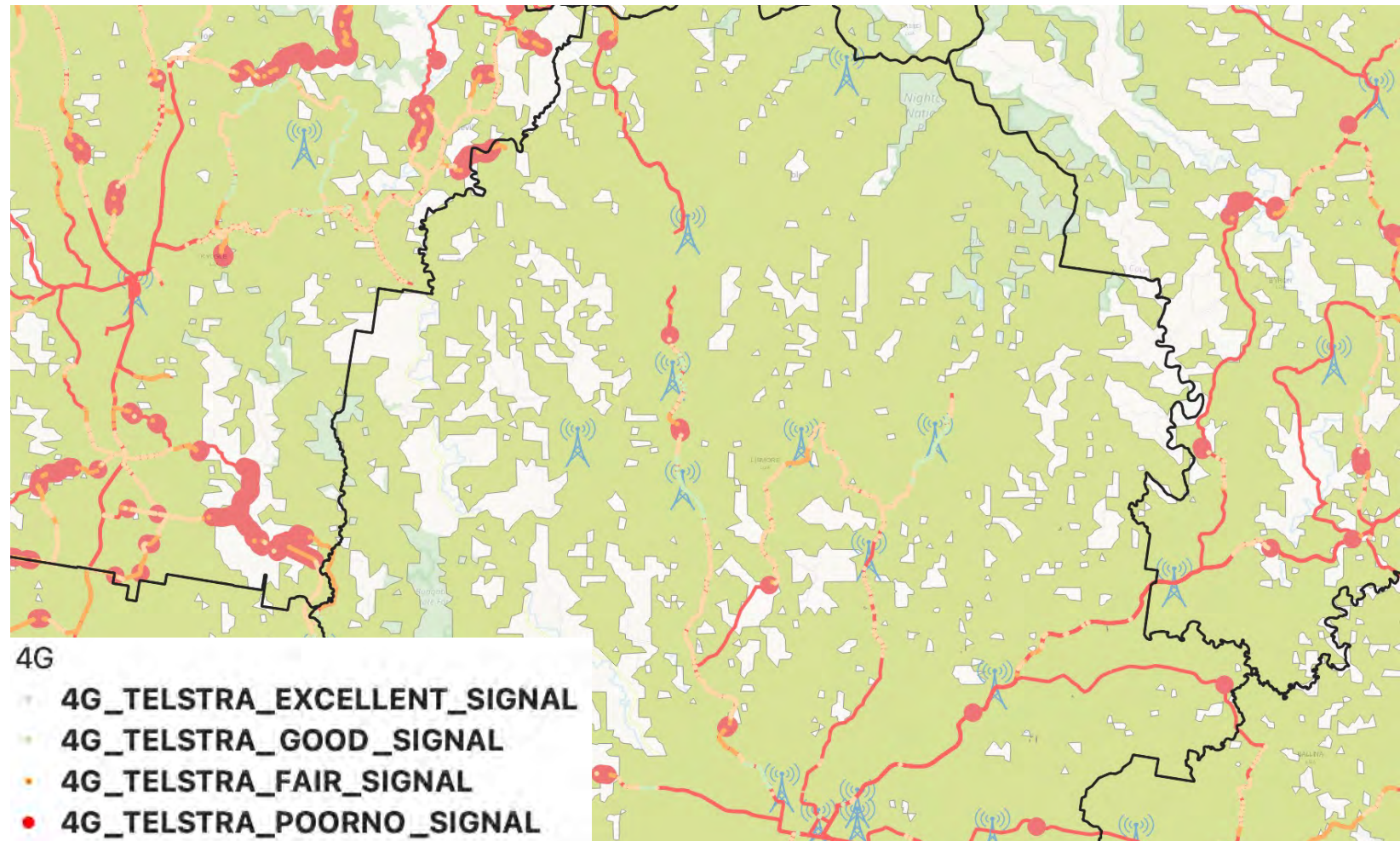


Lismore City Analysis

Nimbin Road / Blue Knob Road

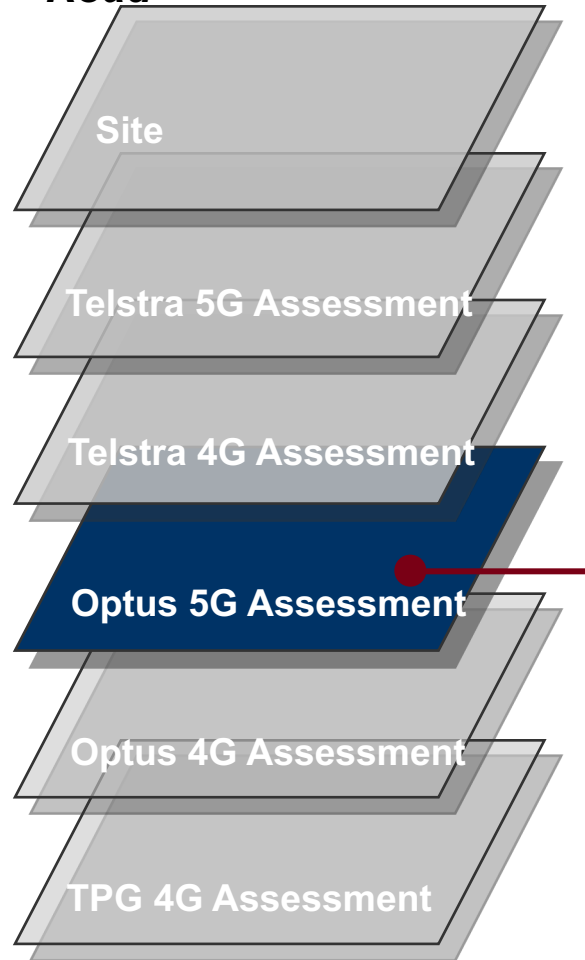


Assessment - Mixture of Good and Poor / Fair 4G coverage. Broad 4G blackspots north of Nimbin
Action – Telstra - Upgrade 4 Sites to 4G midband & Telstra / Fed Govt (MBSP) – up to 3 new 4G sites



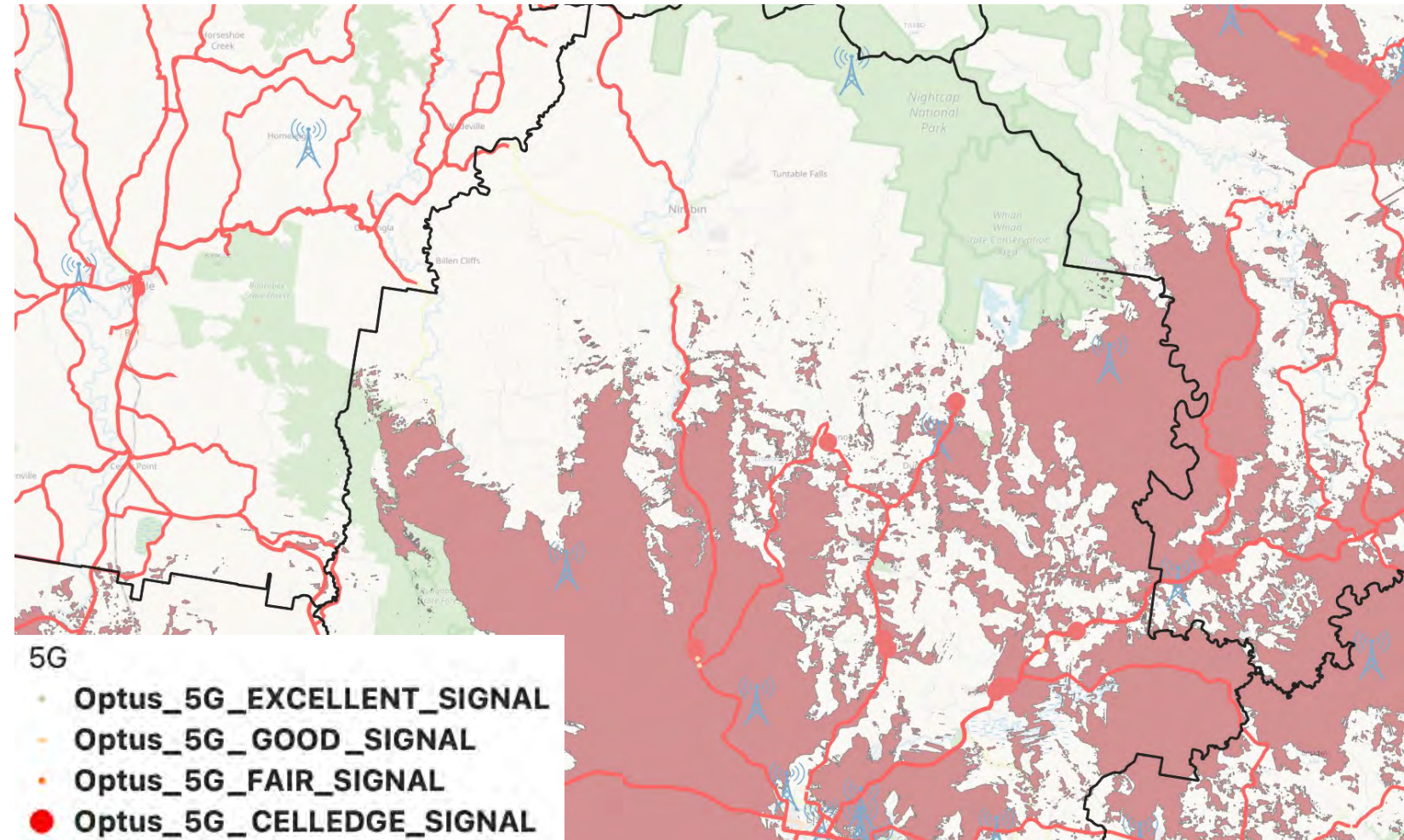
Lismore City Analysis

Nimbin Road / Blue Knob Road



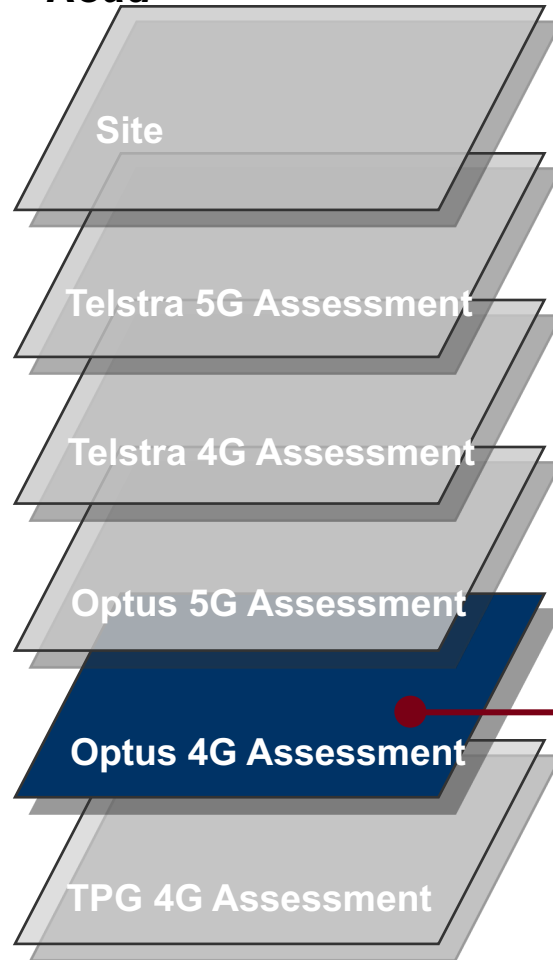
Assessment – 5G coverage mixed inside and outside of coverage mapping. Broad 5G blackspot areas.

Action – Optus - Upgrade 2 x Site to 5G & Telstra / Fed Govt – up to 4 new 5G Tower sites



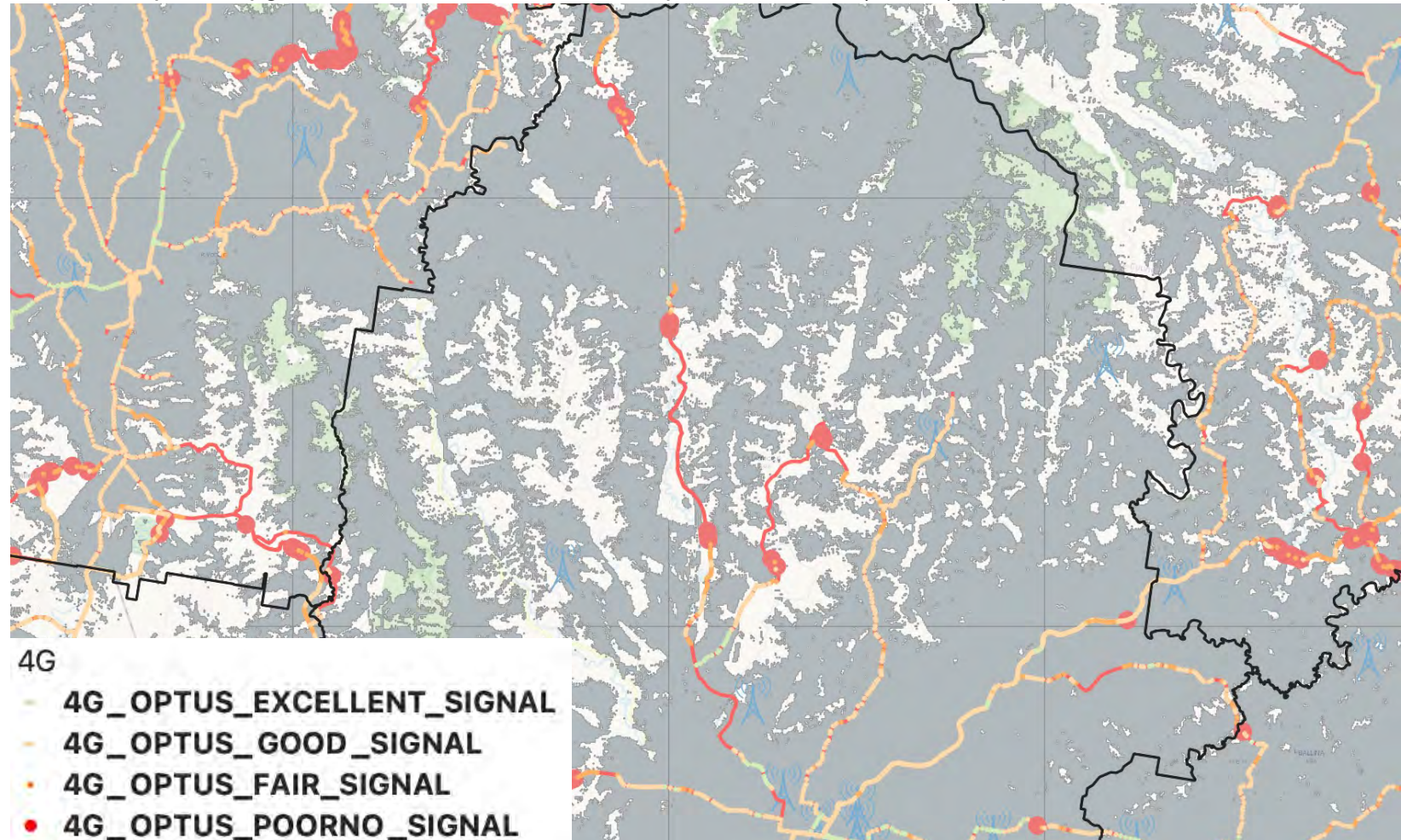
Lismore City Analysis

Nimbin Road / Blue Knob Road



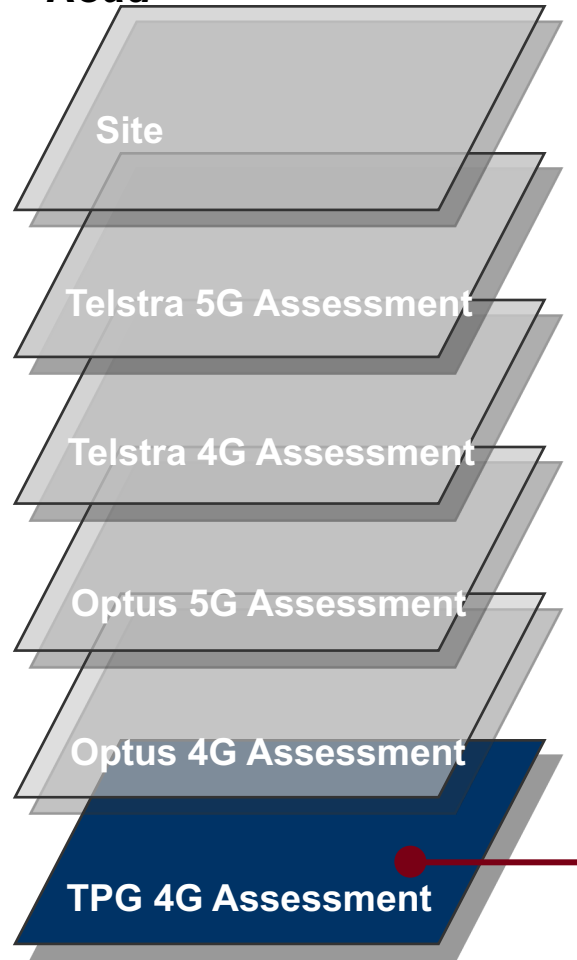
Assessment - Mixture of Good and Poor / Fair 4G coverage. Broad 4G blackspots halfway between Nimbin & Lismore

Action – Optus - Upgrade 2 Sites to 4G midband & Optus / Fed Govt (MBSP) – up to 3 new 4G sites



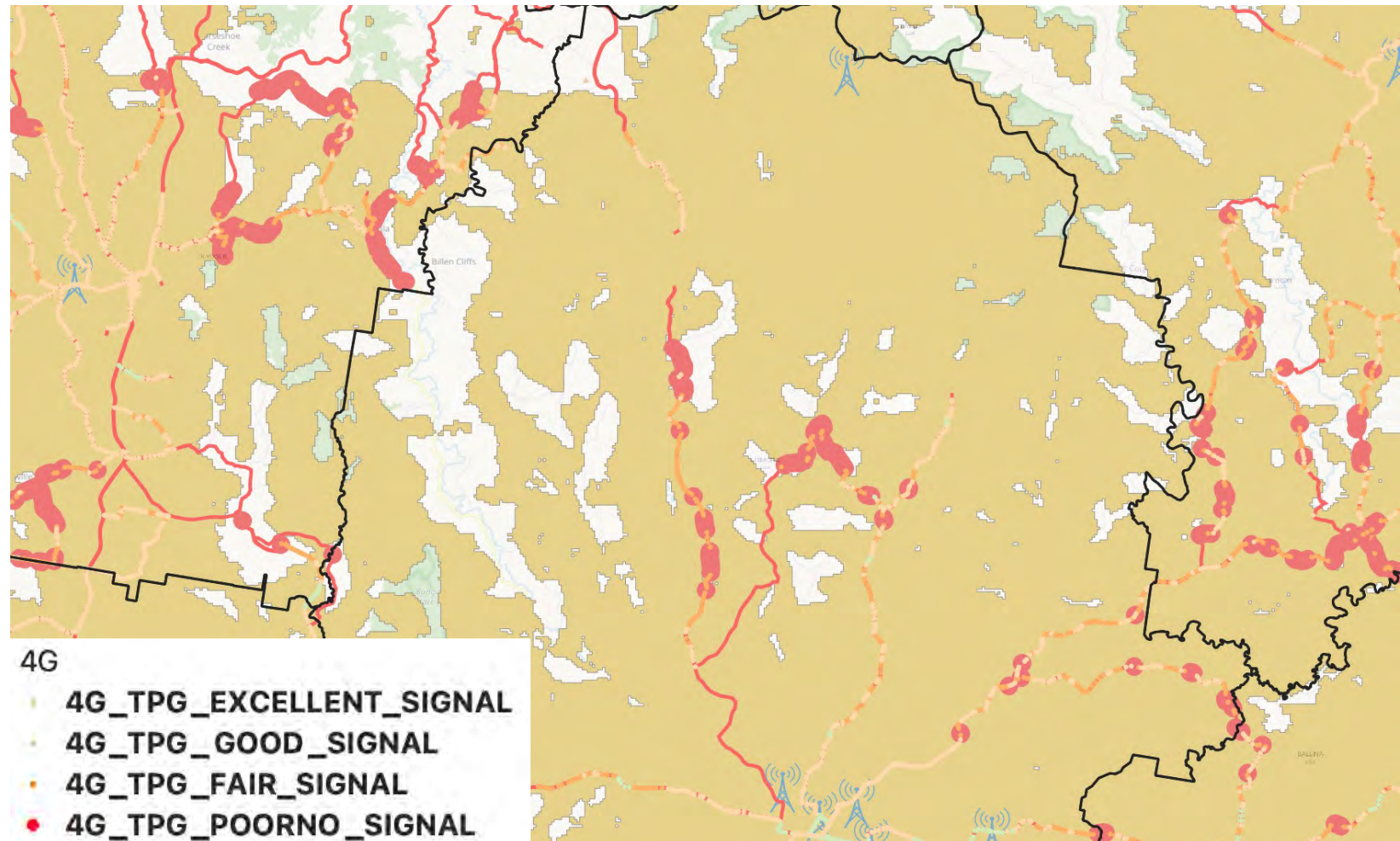
Lismore City Analysis

Nimbin Road / Blue Knob Road



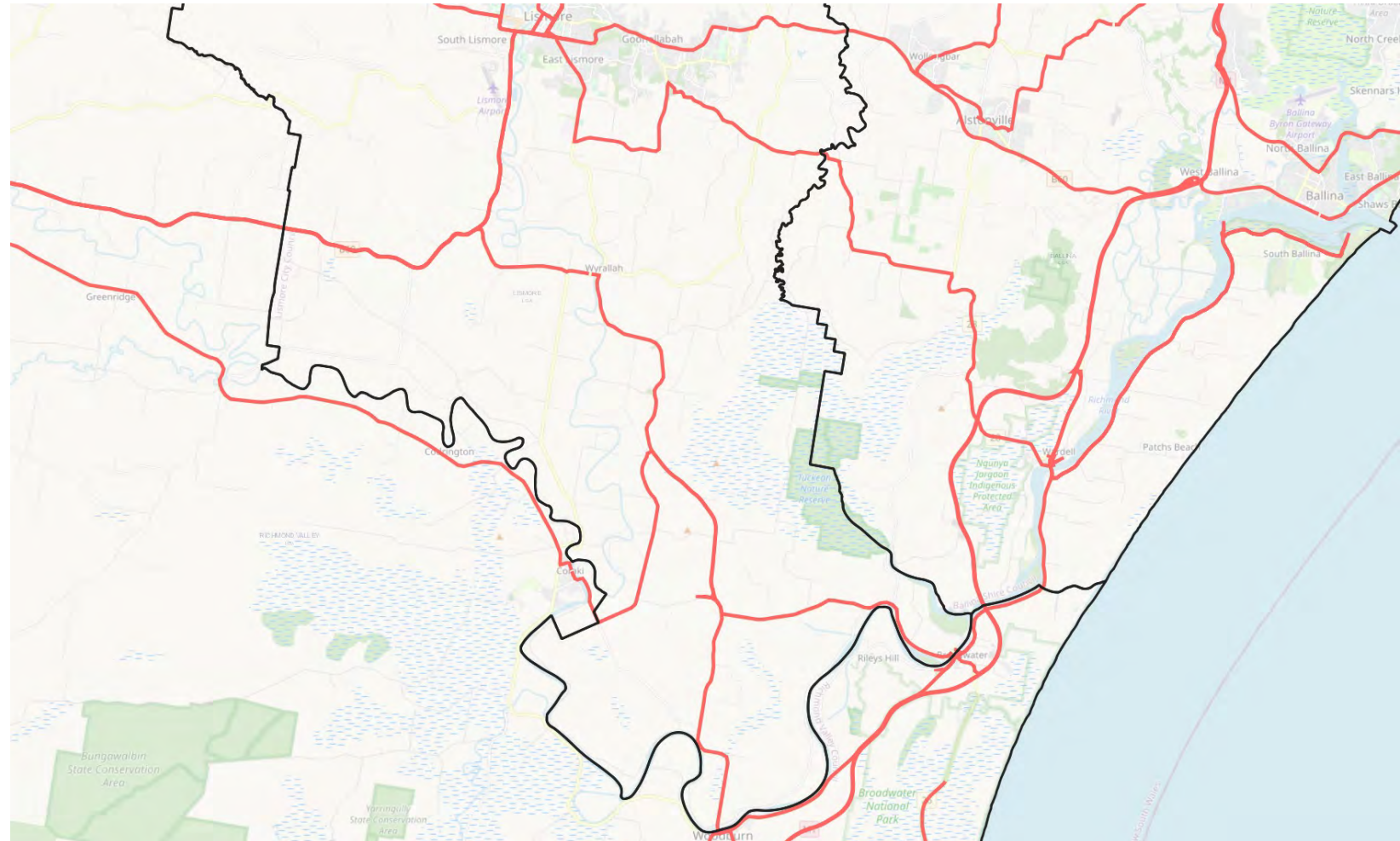
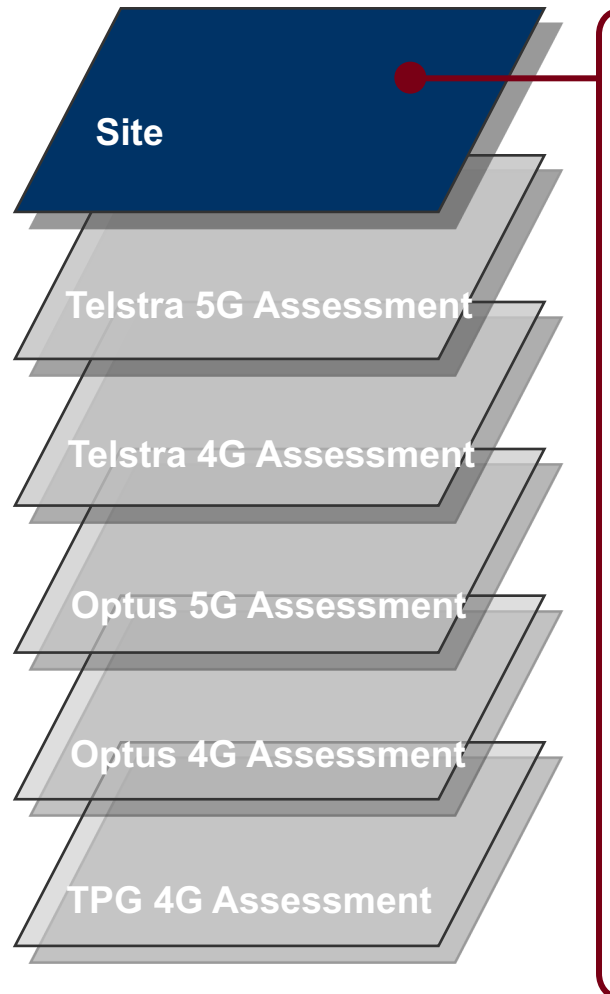
Assessment - Mixture of Good and Poor / Fair 4G coverage. Broad 4G blackspots

Action – TPG - Upgrade 1 Sites to 4G midband & Optus / Fed Govt (MBSP) – up to 4 new 4G sites



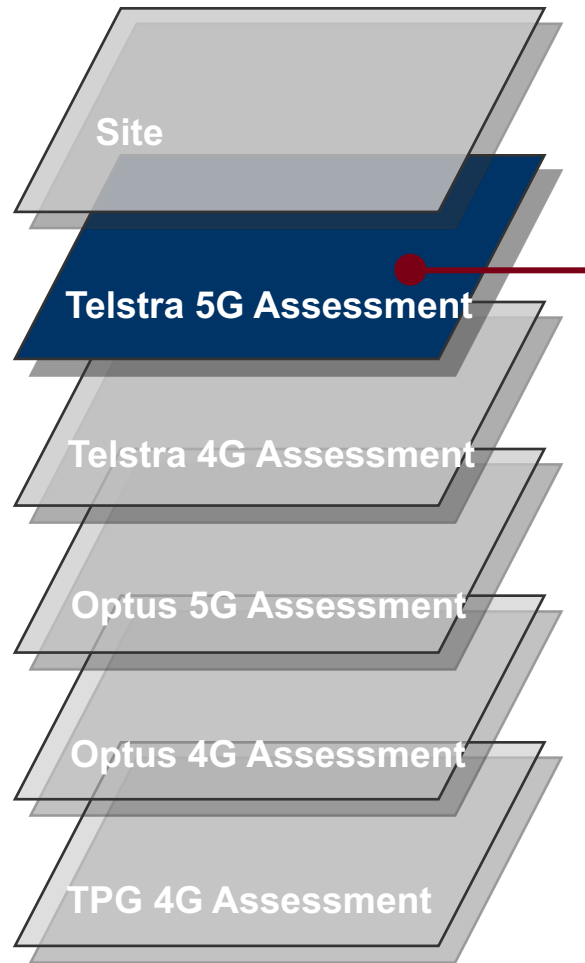
Lismore City Analysis

Wyrallah Road



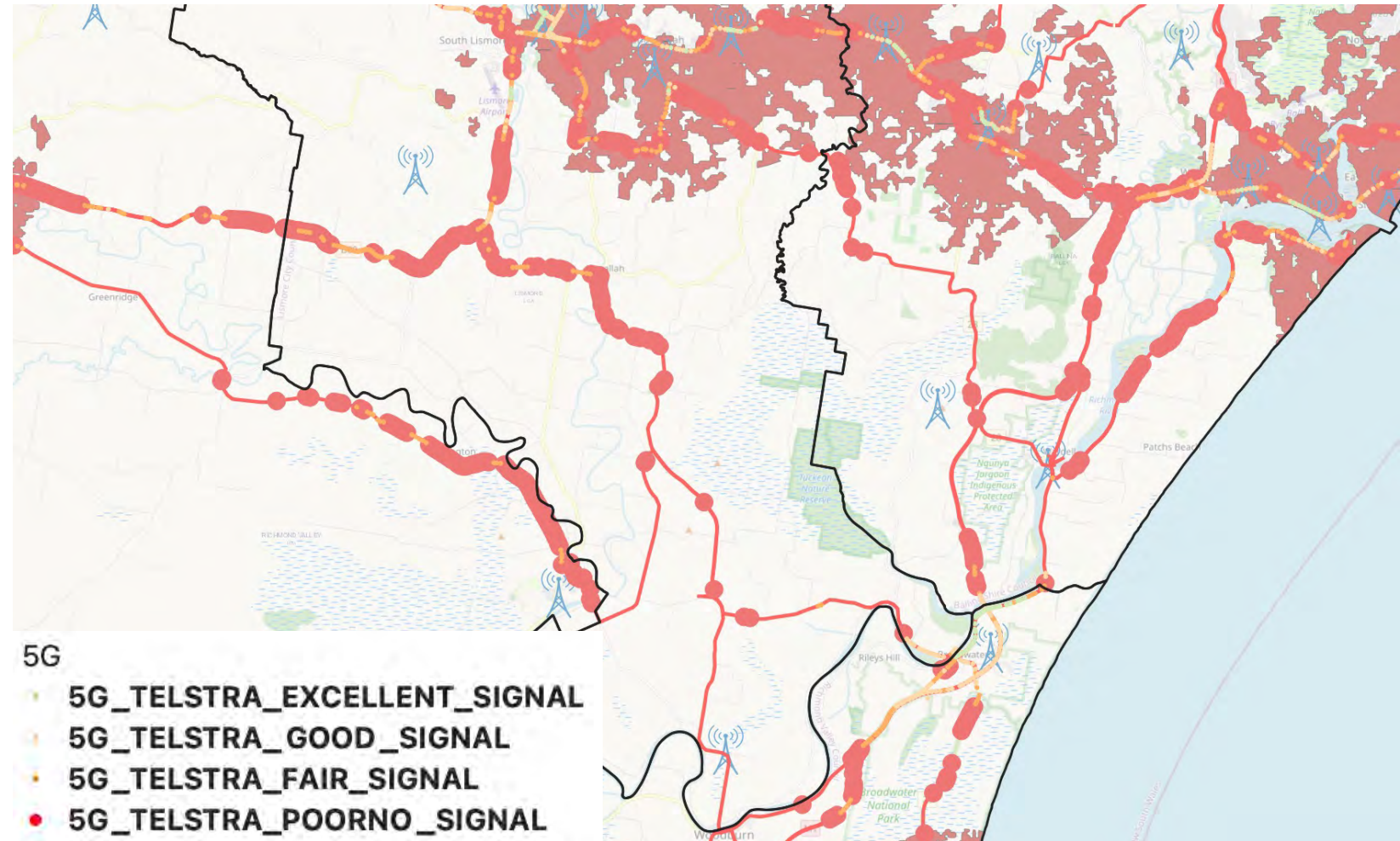
Lismore City Analysis

Wyrallah Road



Assessment – Initial 5G coverage near Lismore. Broad 5G Blackspot areas

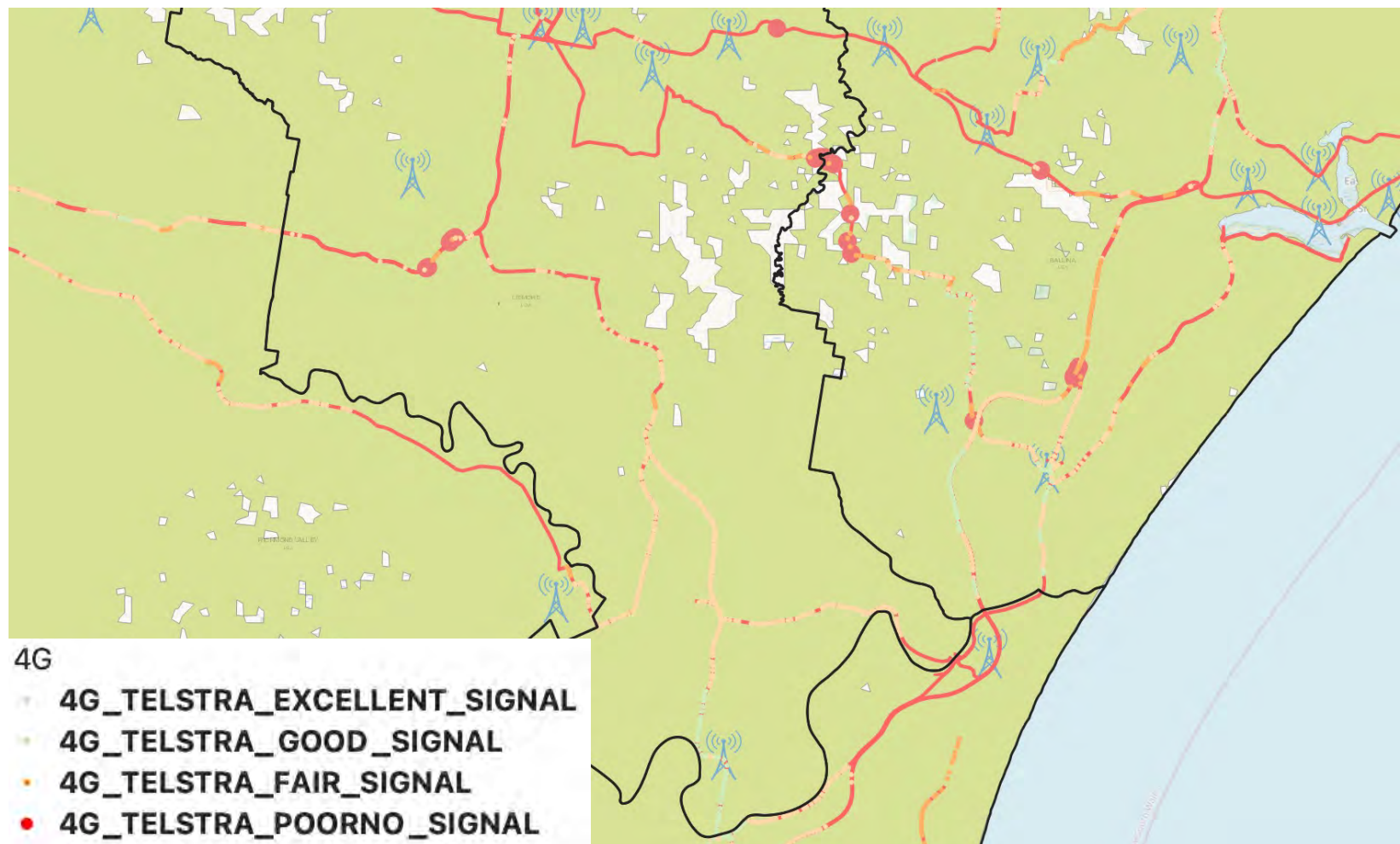
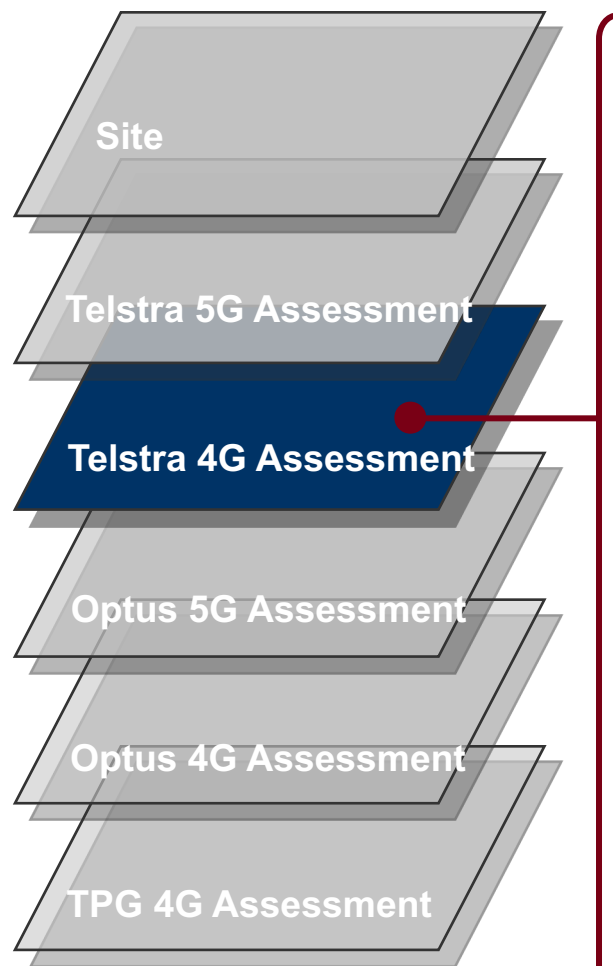
Action – Telstra - Upgrade 3 x Tower Sites with 5G & Telstra / Fed Govt – up to 2 new 5G Tower sites



Lismore City Analysis

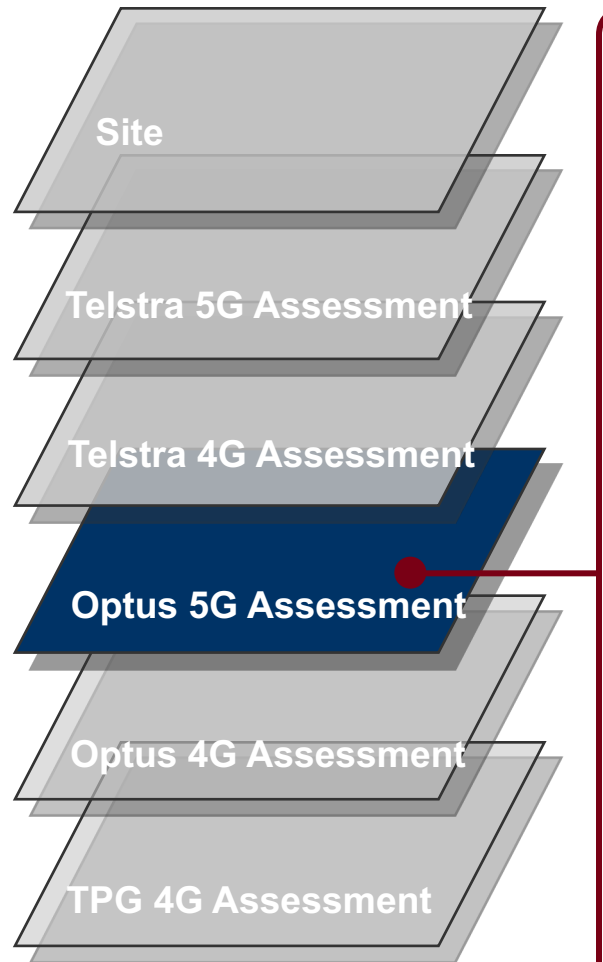
Wyrallah Road

Assessment – Good 4G coverage



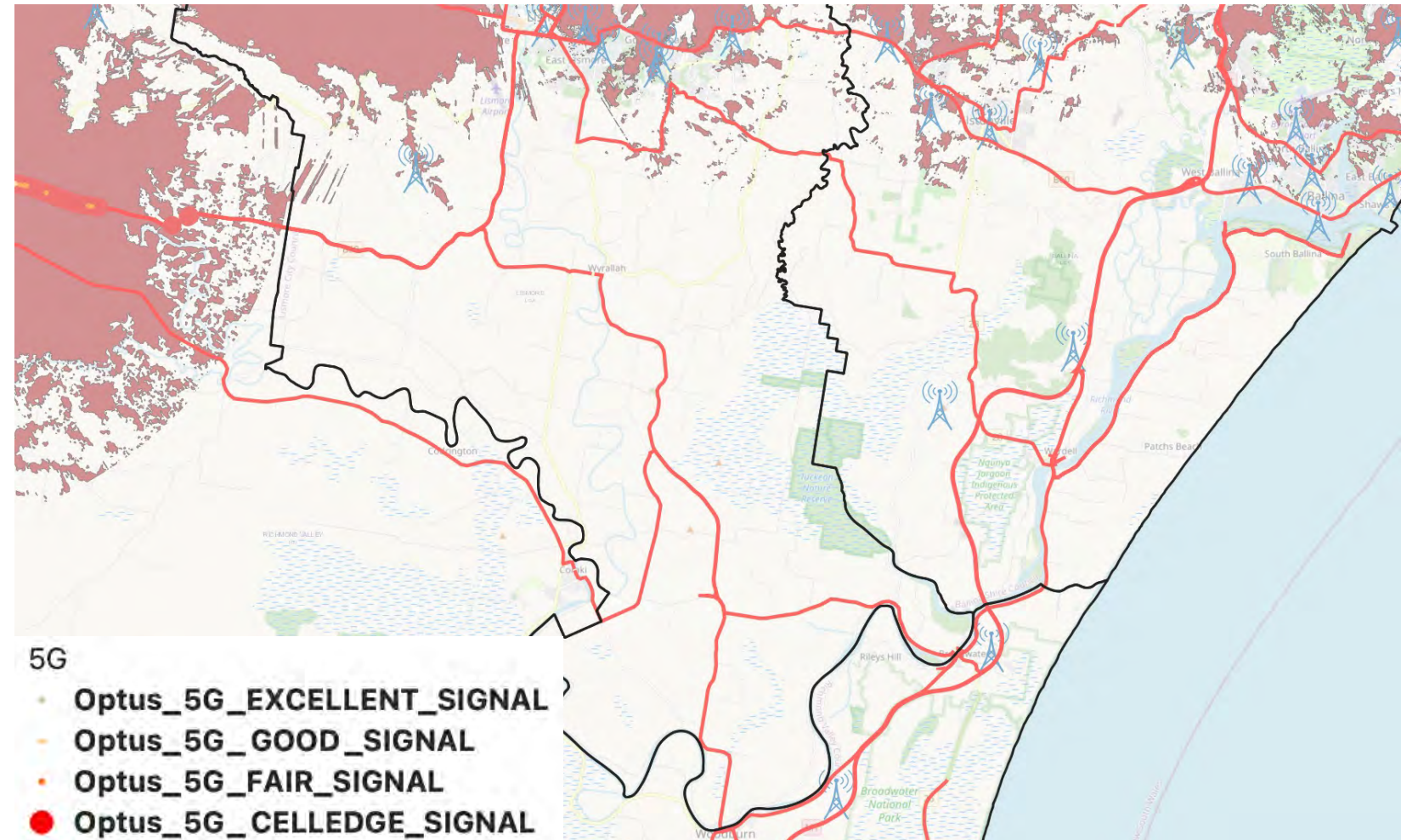
Lismore City Analysis

Wyrallah Road



Assessment - No current Optus 5G coverage

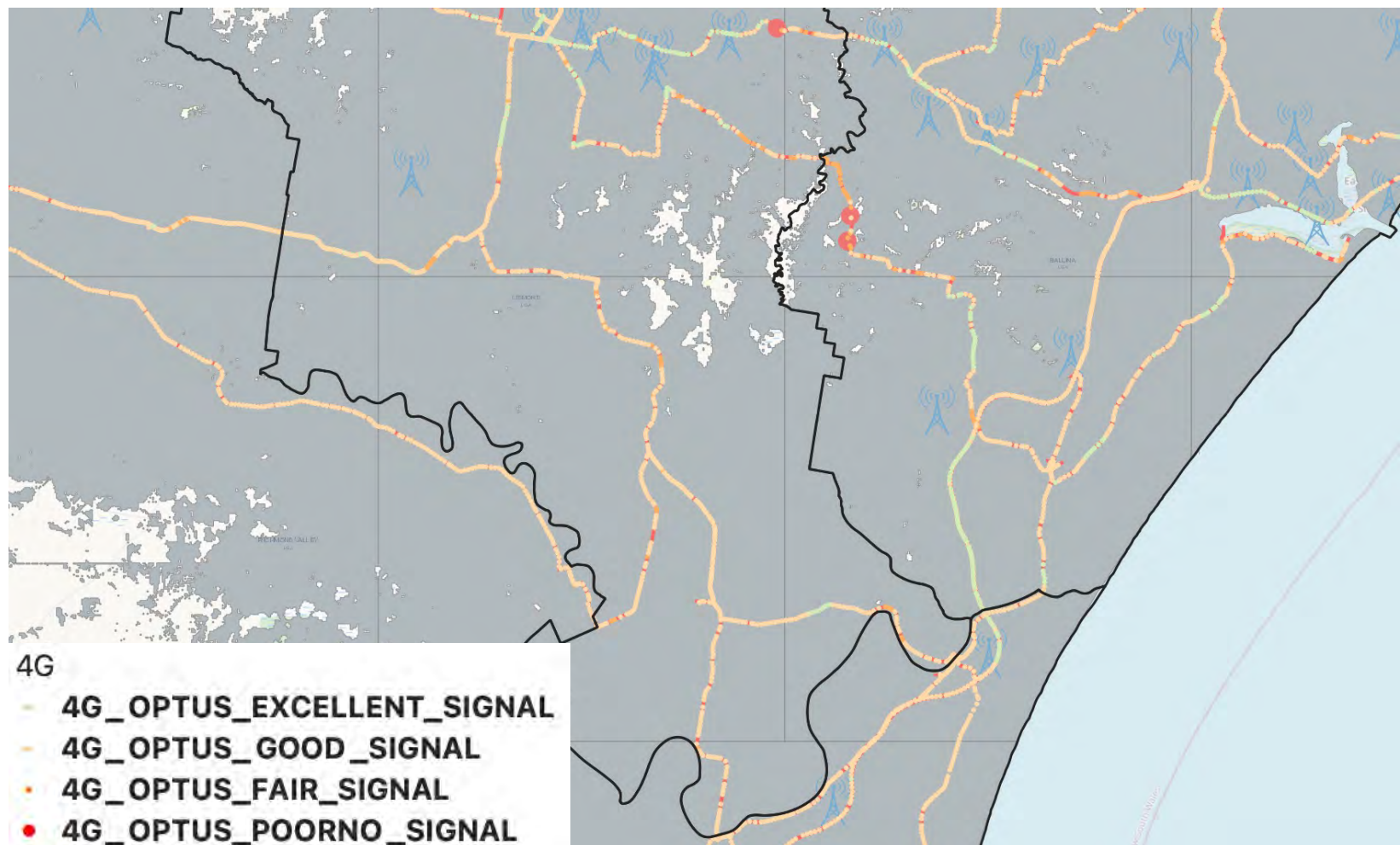
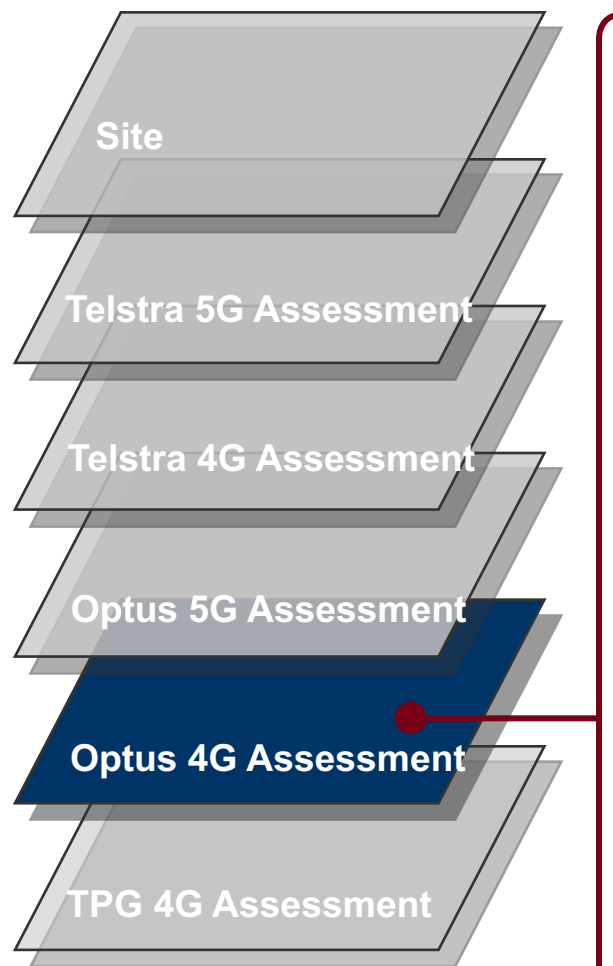
Action – Optus - Upgrade 2 x Sites to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites



Lismore City Analysis

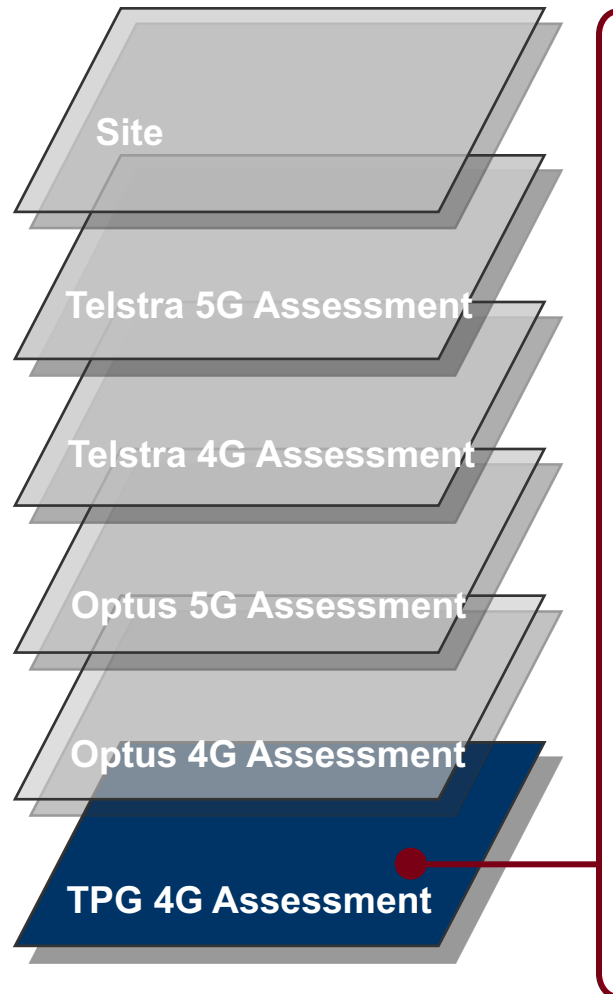
Wyrallah Road

Assessment – Good 4G coverage



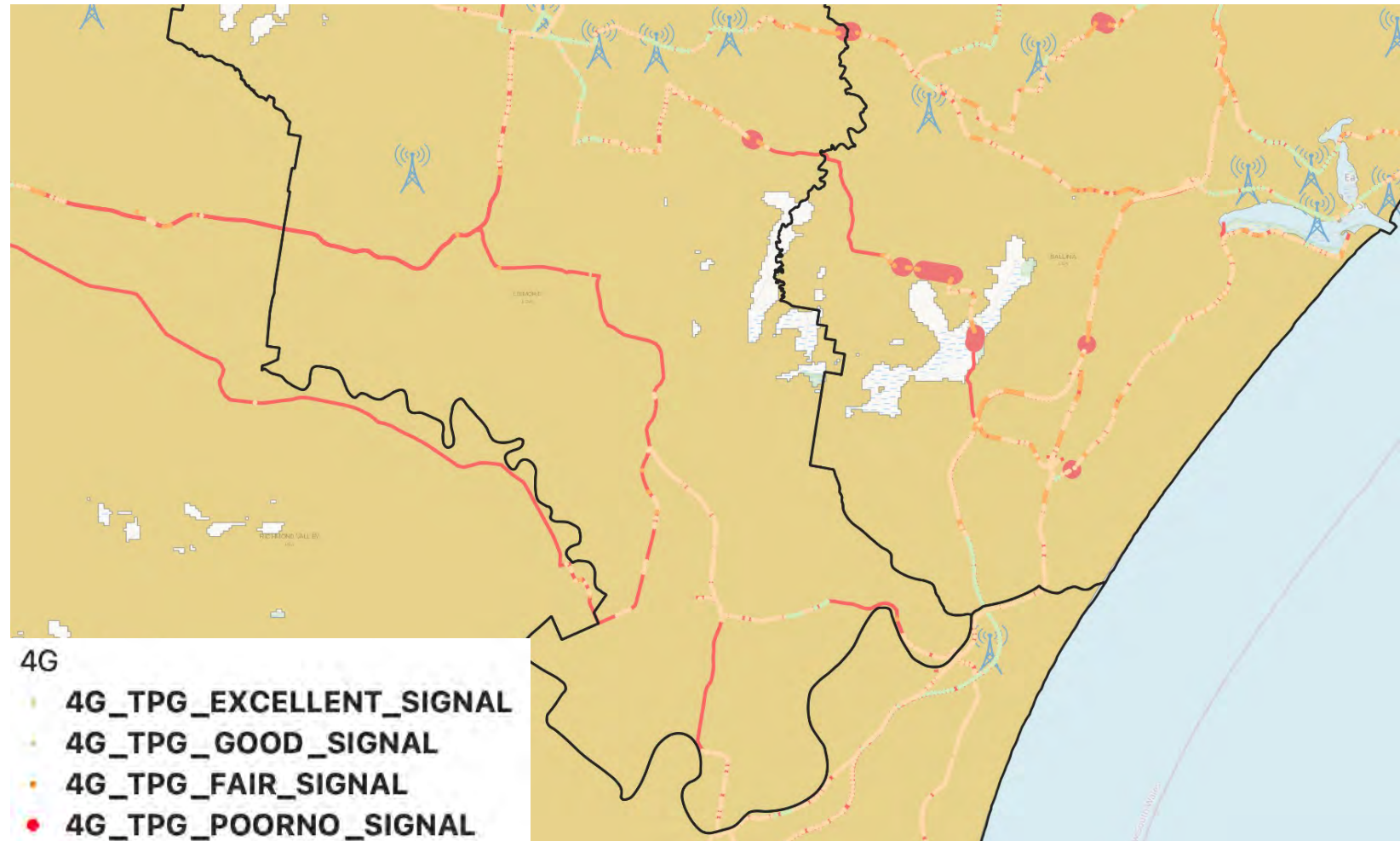
Lismore City Analysis

Wyrallah Road



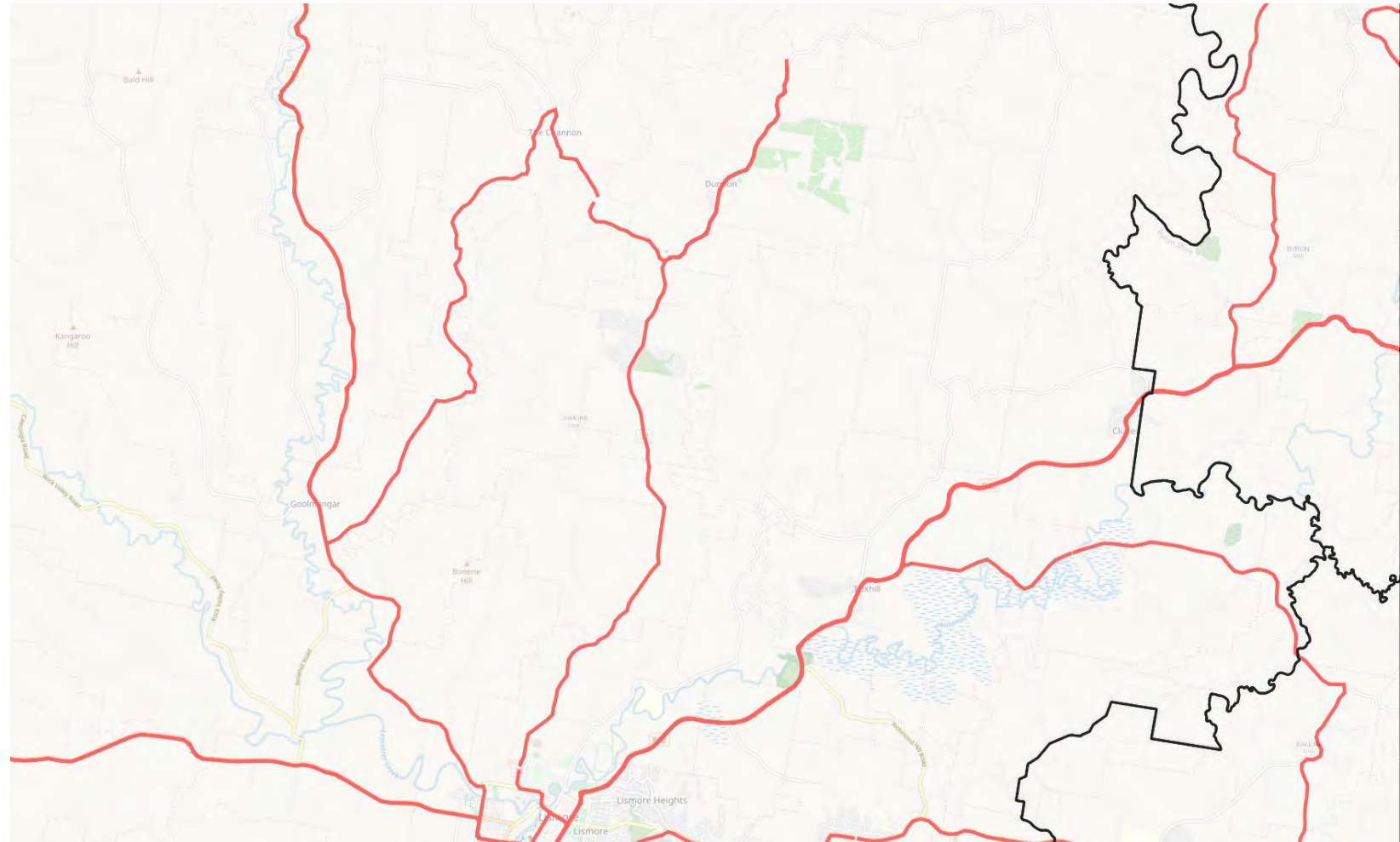
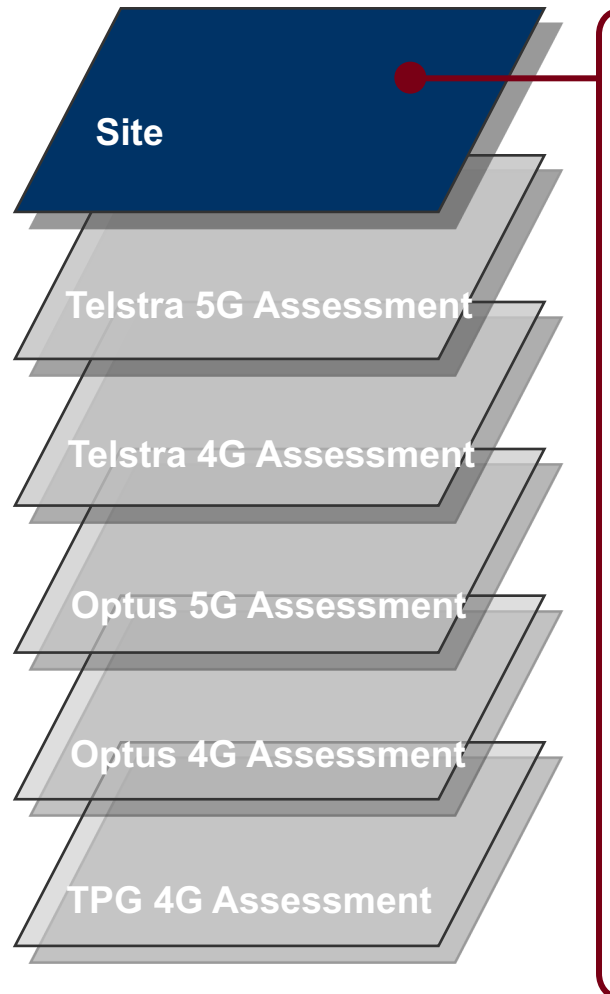
Assessment - Mixture of Good and Poor / Fair 4G coverage with many 4G blackspots

Action – TPG - Upgrade 1 Sites to 4G midband & TPG / Fed Govt (MBSP) – up to 3 new 4G sites



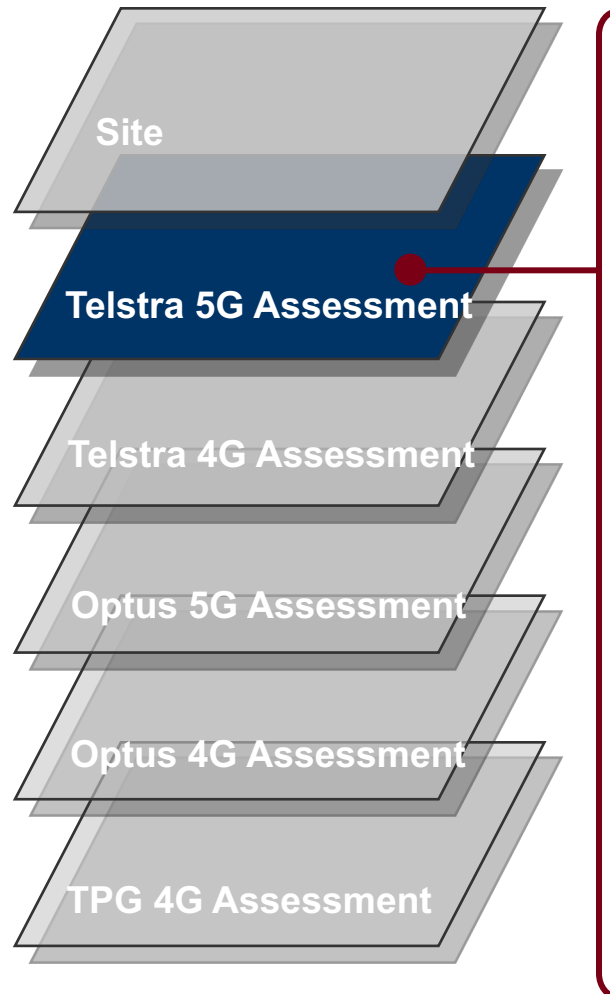
Lismore City Analysis

Dunoon Road



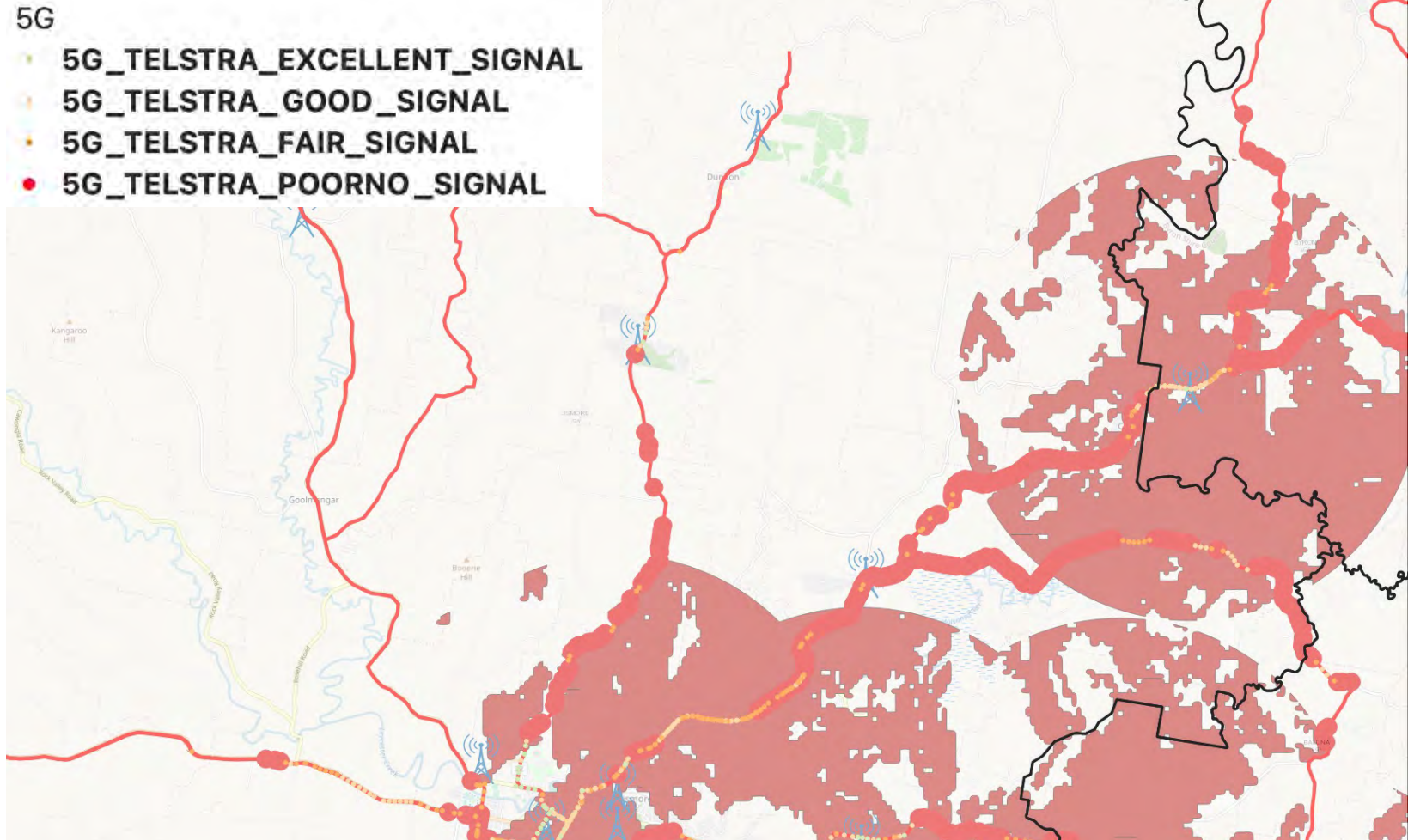
Lismore City Analysis

Dunoon Road



Assessment – Initial 5G coverage nearest to Lismore. Broad 5G blackspot areas.

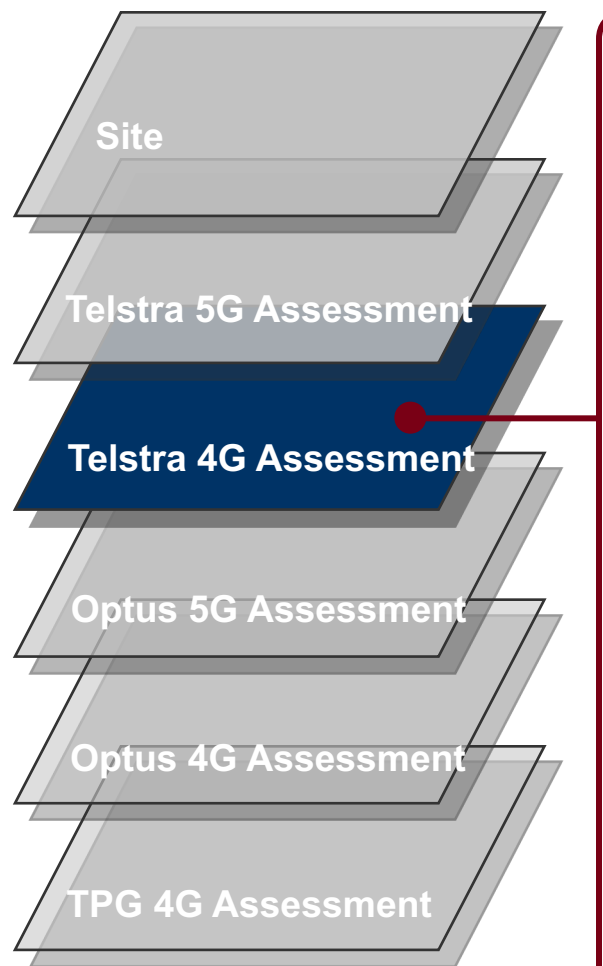
Action – Telstra - Upgrade 3 x Tower Sites with 5G



Lismore City Analysis

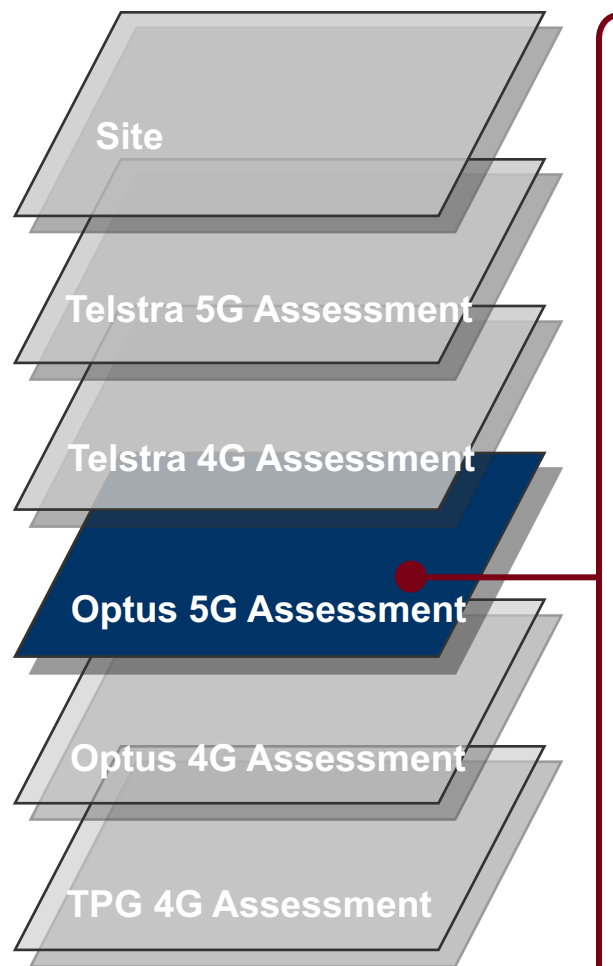
Dunoon Road

Assessment – Good 4G coverage



Lismore City Analysis

Dunoon Road

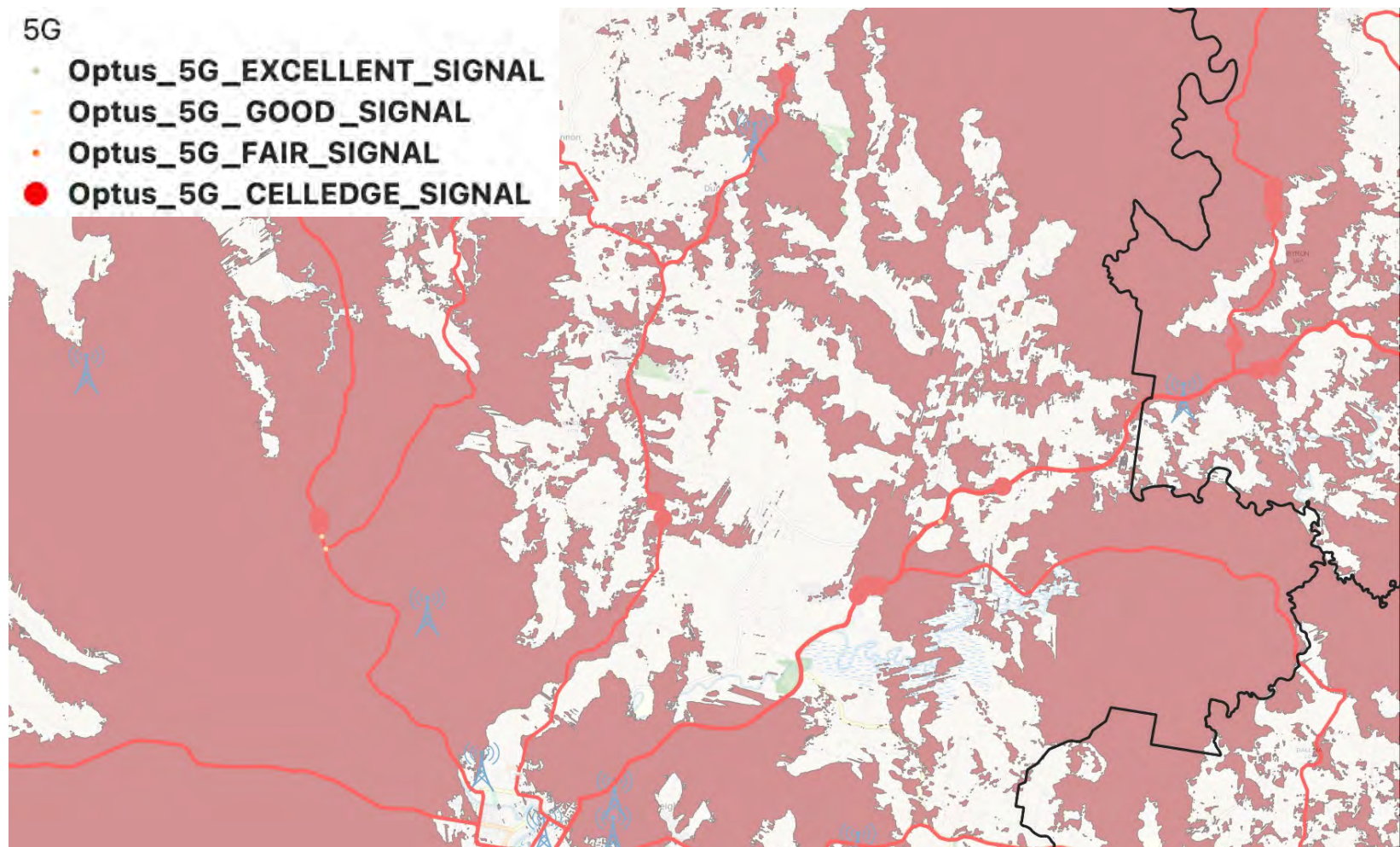


Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 2 x Sites to 5G & Optus / Fed Govt – 1 new 5G Tower sites

5G

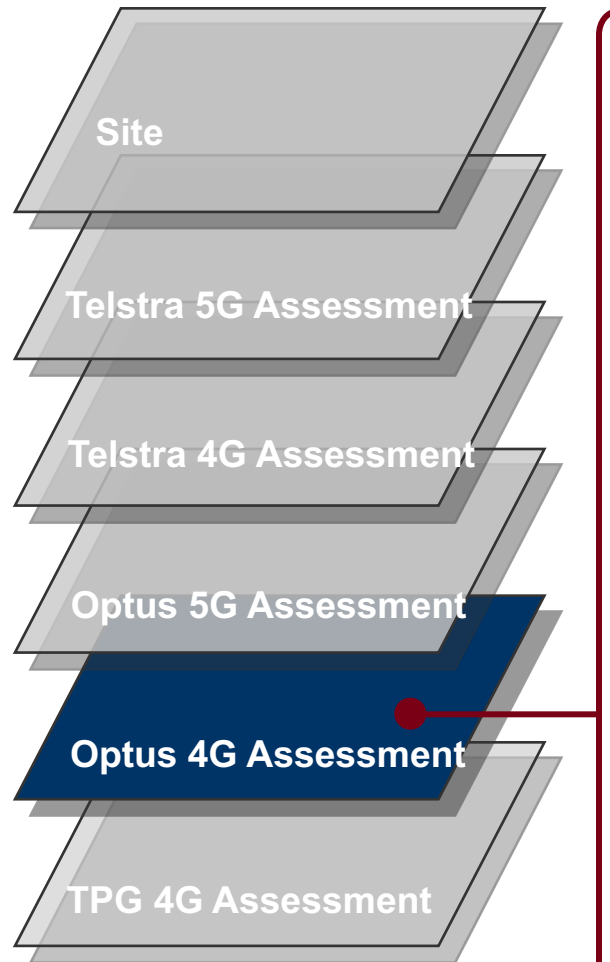
- Optus_5G_EXCELLENT_SIGNAL
- Optus_5G_GOOD_SIGNAL
- Optus_5G_FAIR_SIGNAL
- Optus_5G_CELLEDGE_SIGNAL



Lismore City Analysis

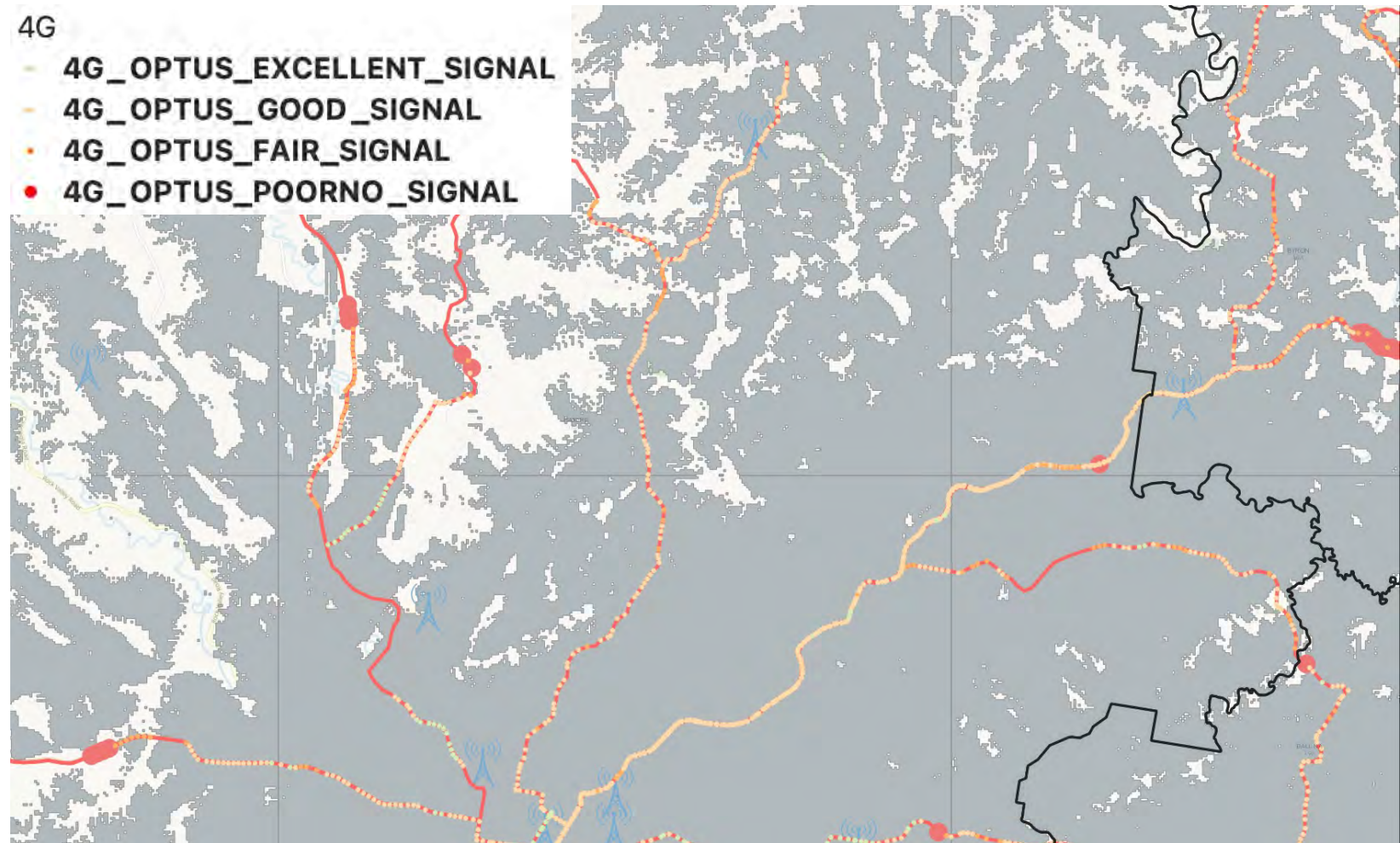
Dunoon Road

Assessment – Good 4G coverage



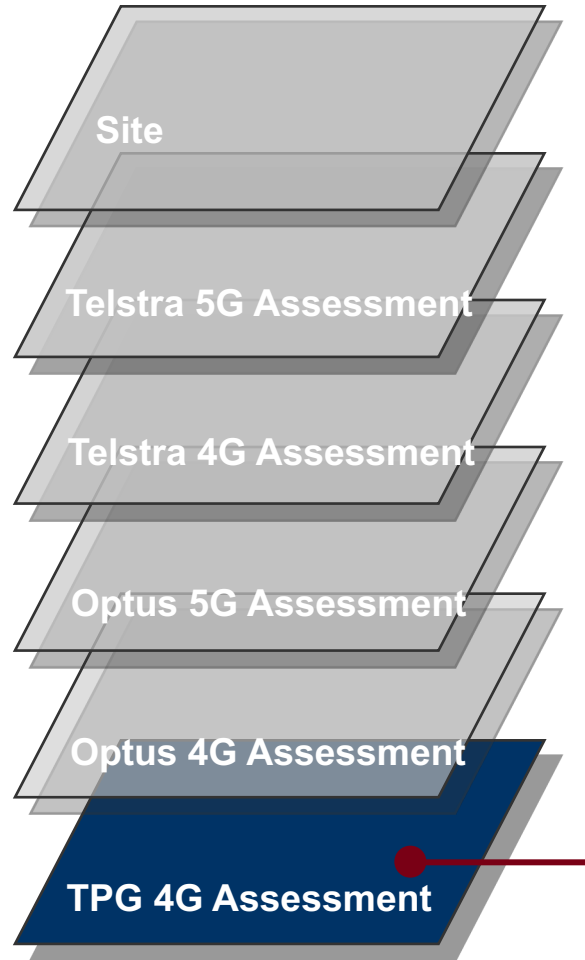
4G

- 4G_OPTUS_EXCELLENT_SIGNAL
- 4G_OPTUS_GOOD_SIGNAL
- 4G_OPTUS_FAIR_SIGNAL
- 4G_OPTUS_POORNO_SIGNAL



Lismore City Analysis

Dunoon Road



Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – TPG - Upgrade 1 Sites to 4G midband & TPG / Fed Govt (MBSP) – up to 3 new 4G sites

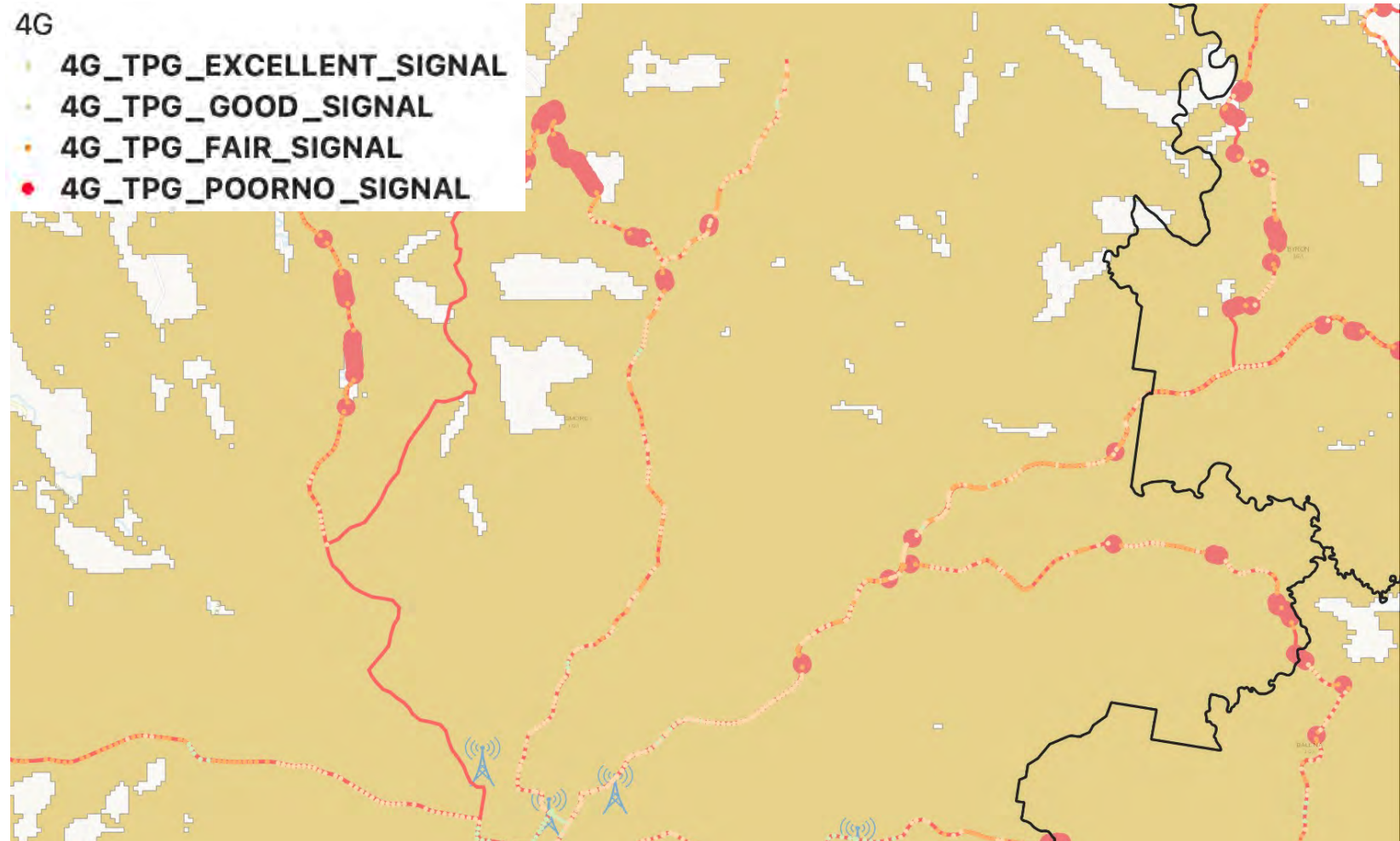
4G

4G_TPG_EXCELLENT_SIGNAL

4G_TPG_GOOD_SIGNAL

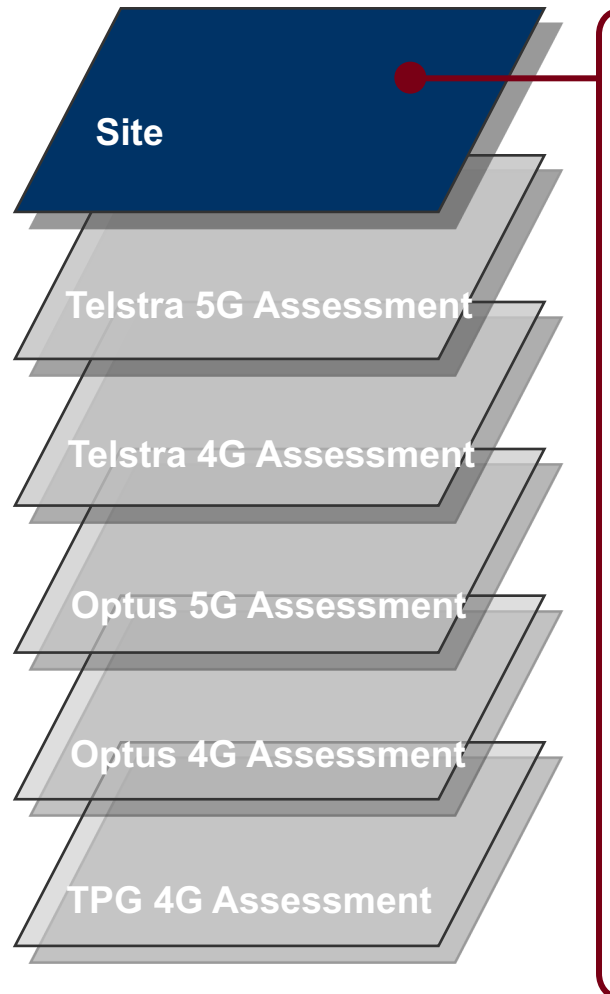
4G_TPG_FAIR_SIGNAL

4G_TPG_POORNO_SIGNAL



Lismore City Analysis

The Channon / Pinchin Road



The Channon / Pinchin Road

Action – Telstra / Fed Govt – 1 new 5G Tower sites



Telstra 5G Assessment

Telstra 4G Assessment

Optus 5G Assessment

Optus 4G Assessment

TPG 4G Assessment



5G_TELSTRA_EXCELLENT_SIGNAL

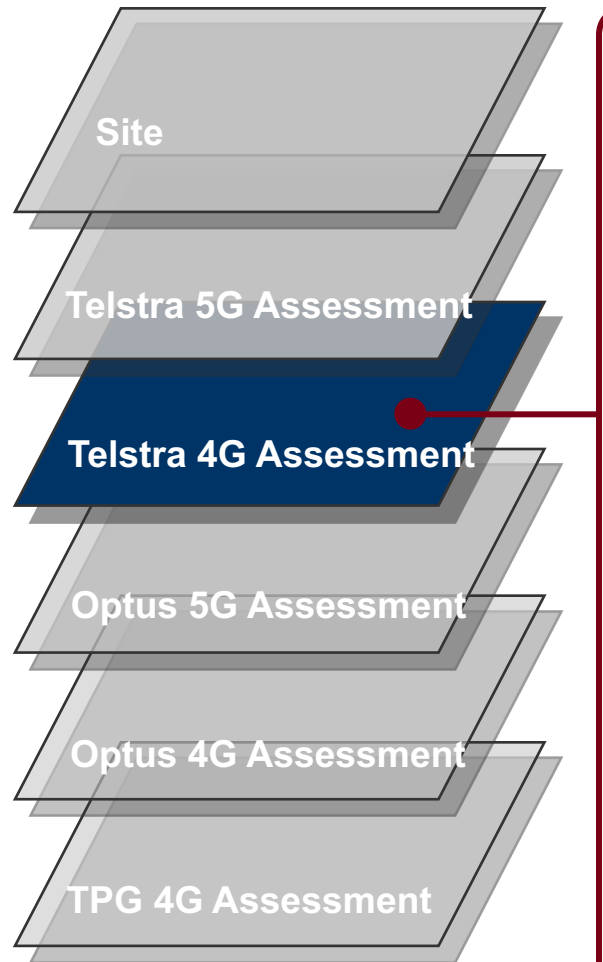
5G TELSTRA GOOD SIGNAL

5G_TELSTRA_FAIR_SIGNAL

5G_TELSTRA_POORNO_SIGNAL

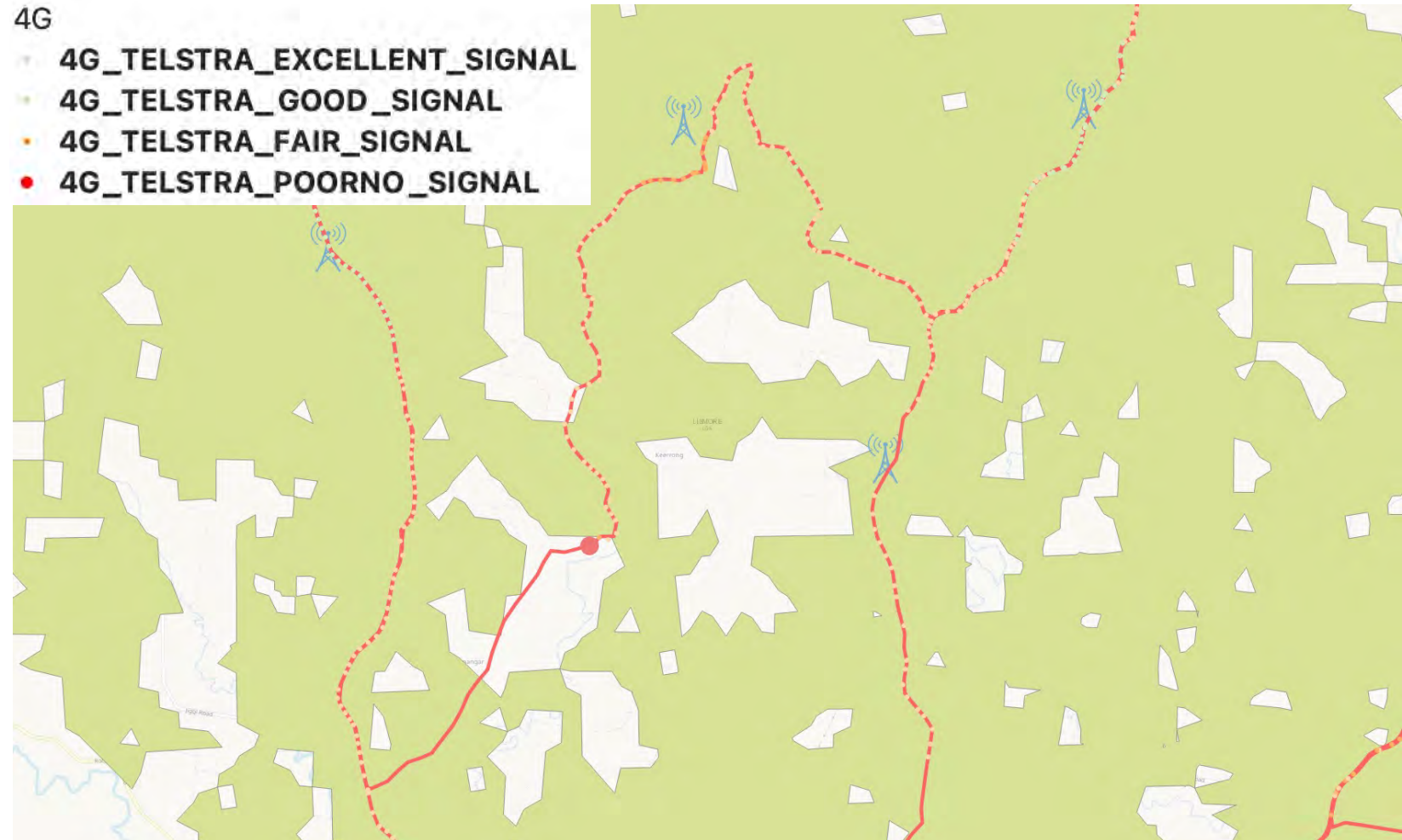
Lismore City Analysis

The Channon / Pinchin Road



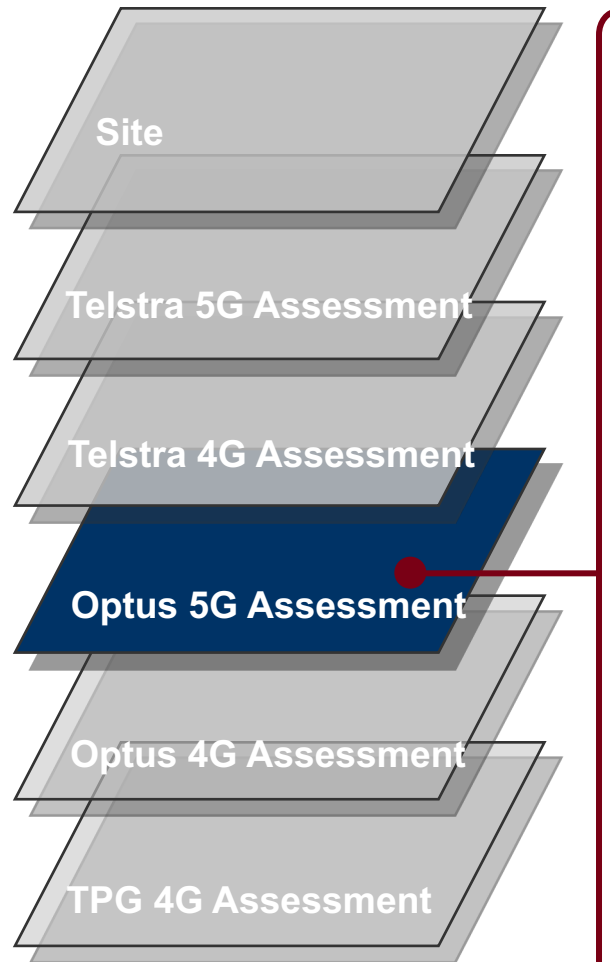
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – Telstra - Upgrade 2 Sites to 4G midband & Telstra / Fed Govt (MBSP) – 1 new 4G sites



Lismore City Analysis

The Channon / Pinchin Road

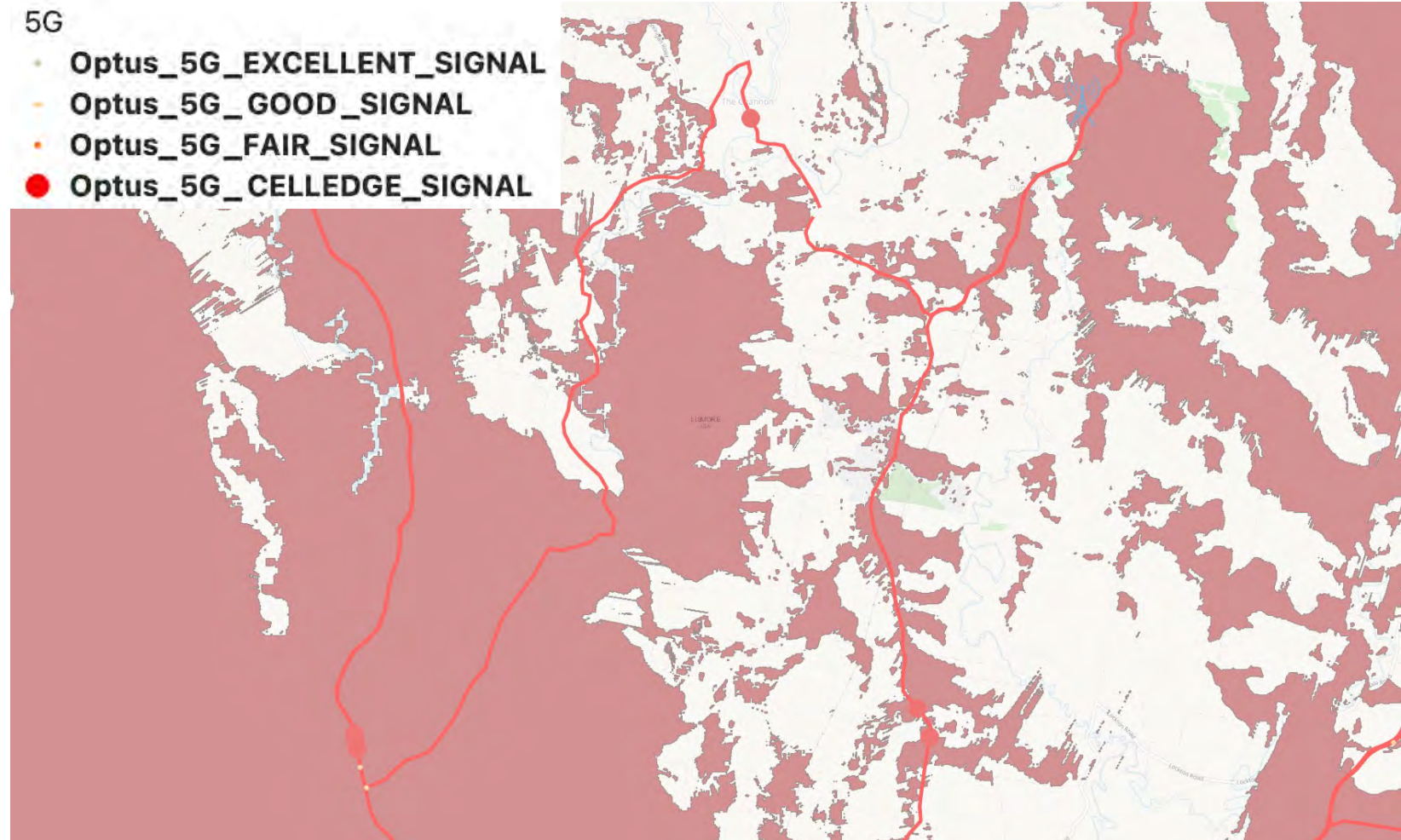


Assessment - No current Optus 5G coverage inside or outside of coverage mapping

Action –Optus / Fed Govt – up to 2 new 5G Tower sites

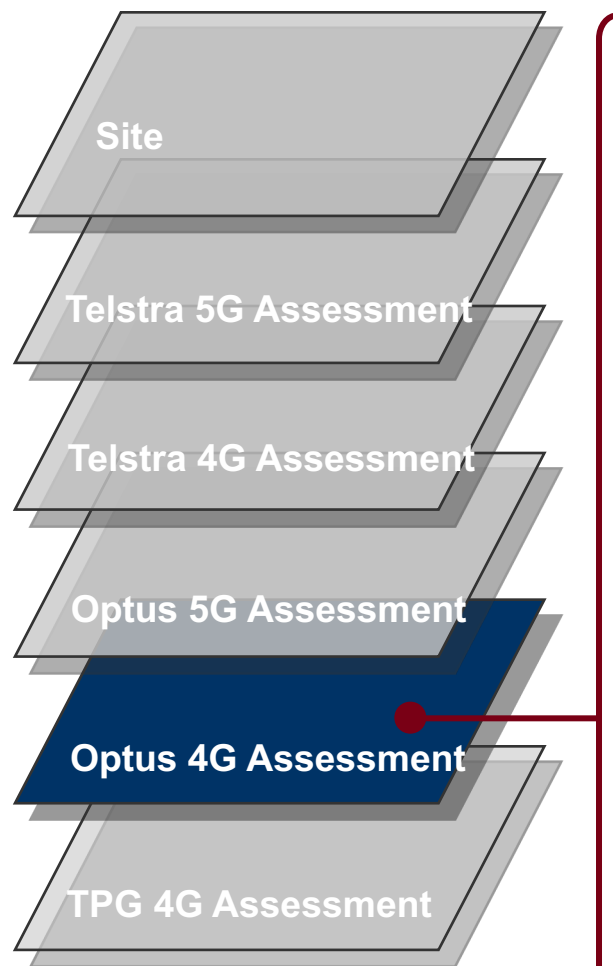
5G

- Optus_5G_EXCELLENT_SIGNAL
- Optus_5G_GOOD_SIGNAL
- Optus_5G_FAIR_SIGNAL
- Optus_5G_CELLEDGE_SIGNAL



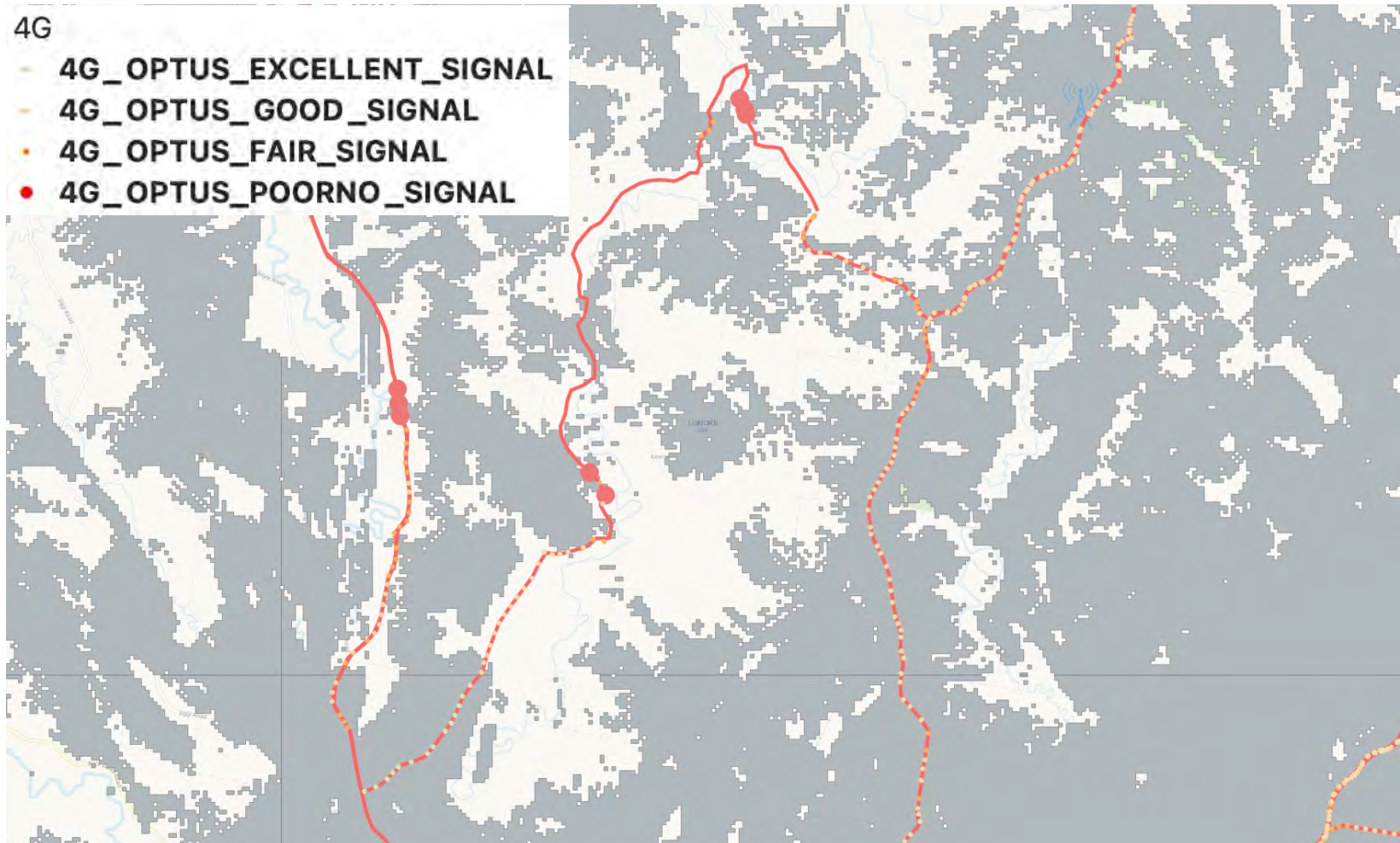
Lismore City Analysis

The Channon / Pinchin Road



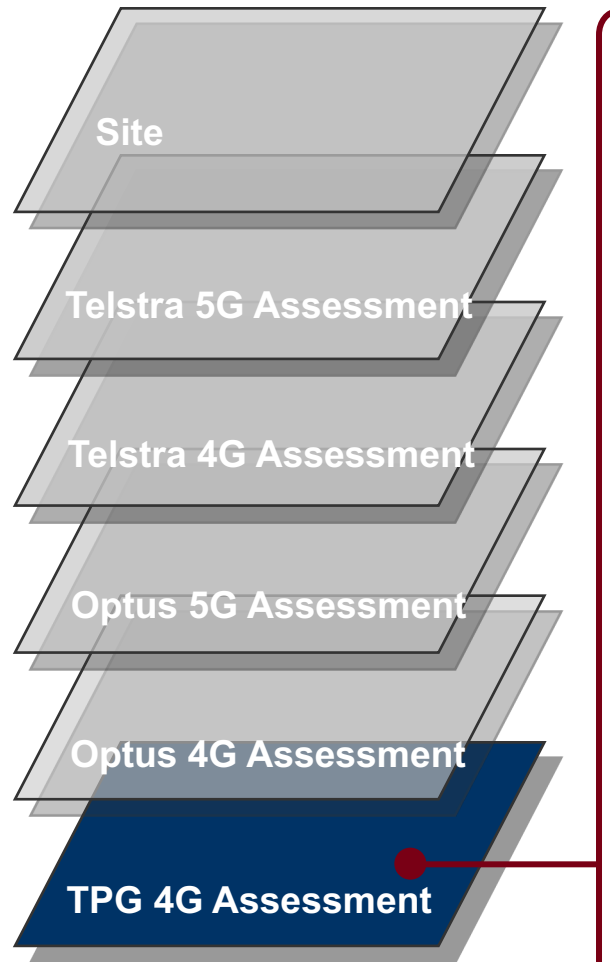
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspot areas

Action – Optus/ Fed Govt (MBSP) – 1 new 4G sites



Lismore City Analysis

The Channon / Pinchin Road



Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspot areas

Action – TPG/ Fed Govt (MBSP) – 1 new 4G sites

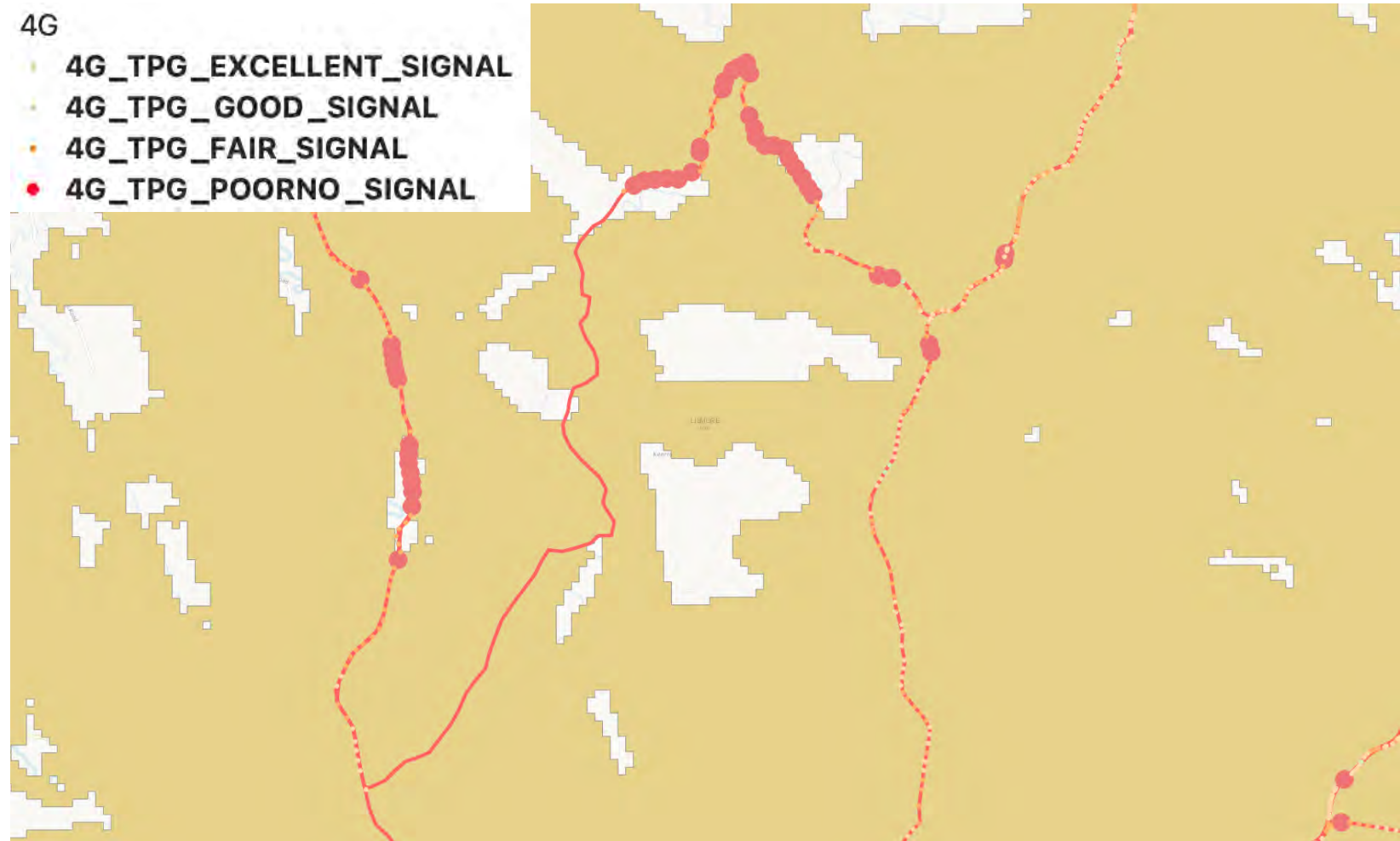
4G

4G_TPG_EXCELLENT_SIGNAL

4G_TPG_GOOD_SIGNAL

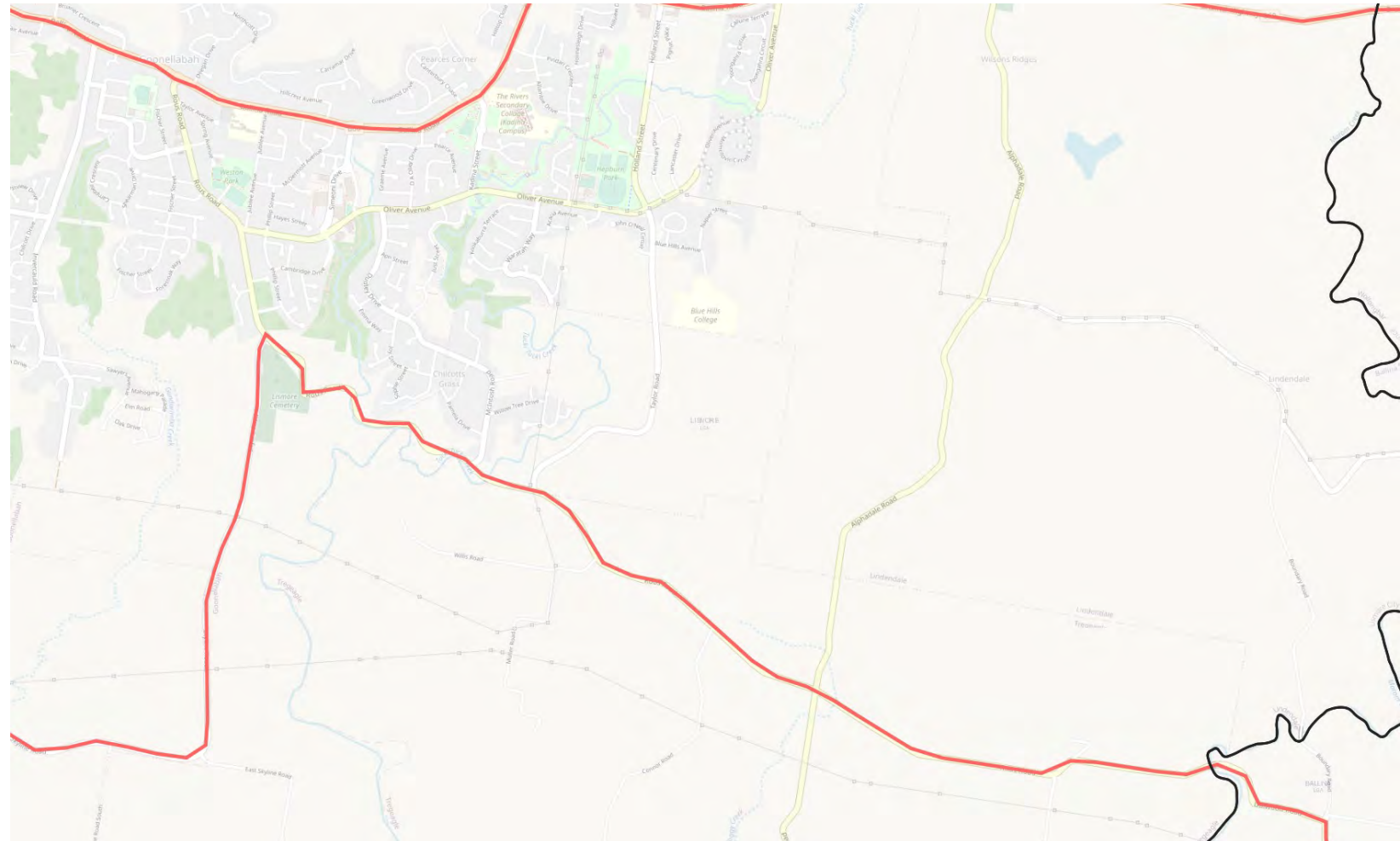
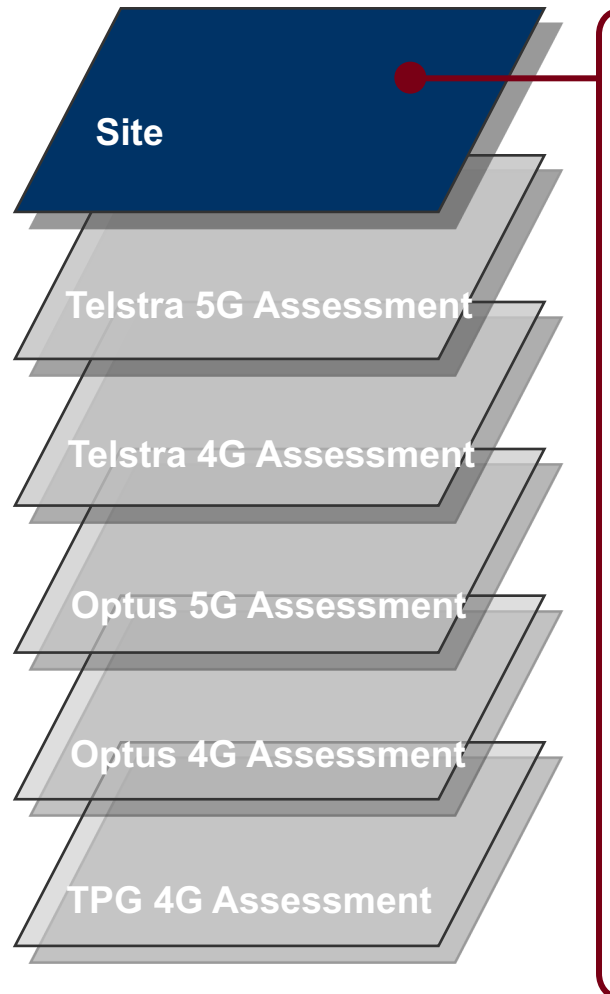
4G_TPG_FAIR_SIGNAL

4G_TPG_POORNO_SIGNAL



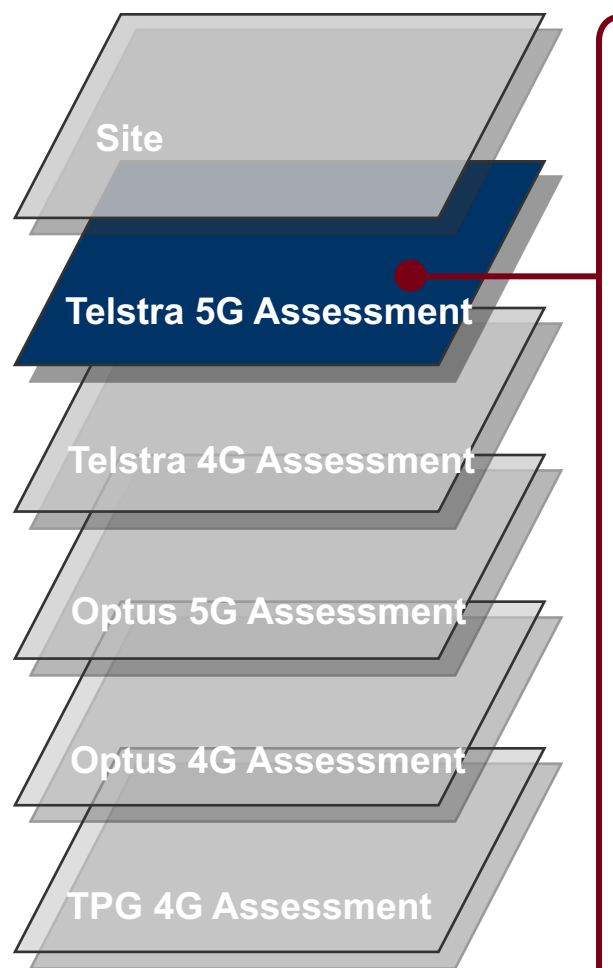
Lismore City Analysis

Rous Road



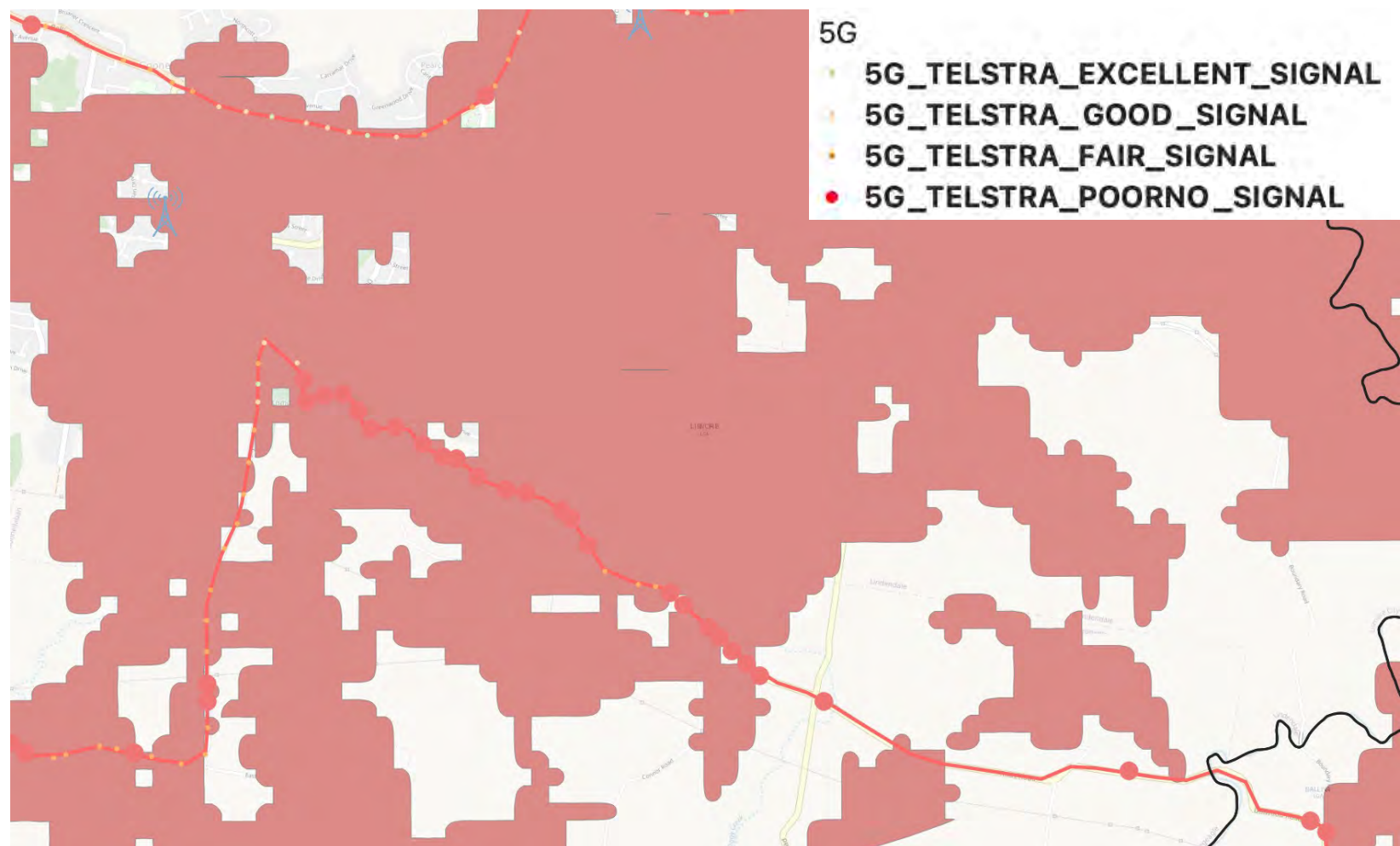
Lismore City Analysis

Rous Road



Assessment – Initial 5G coverage near Lismore. Broad 5G blackspot areas

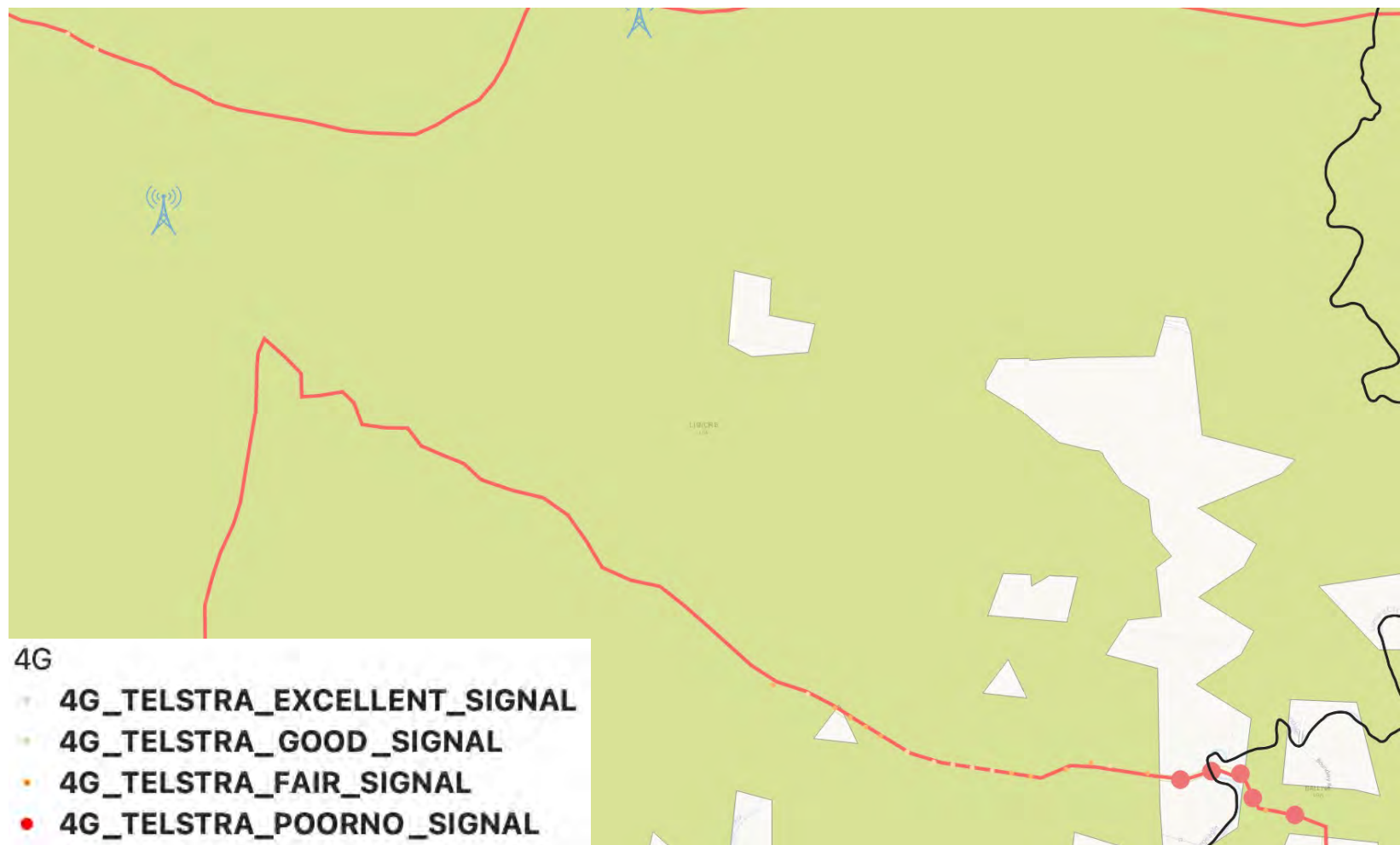
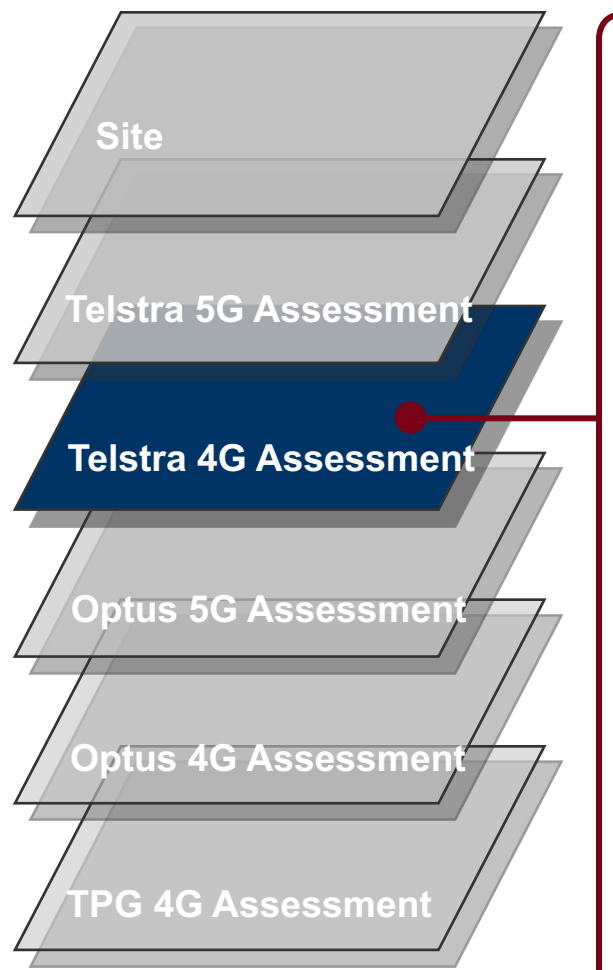
Action – Telstra / Fed Govt – 1 new 5G Tower sites



Lismore City Analysis

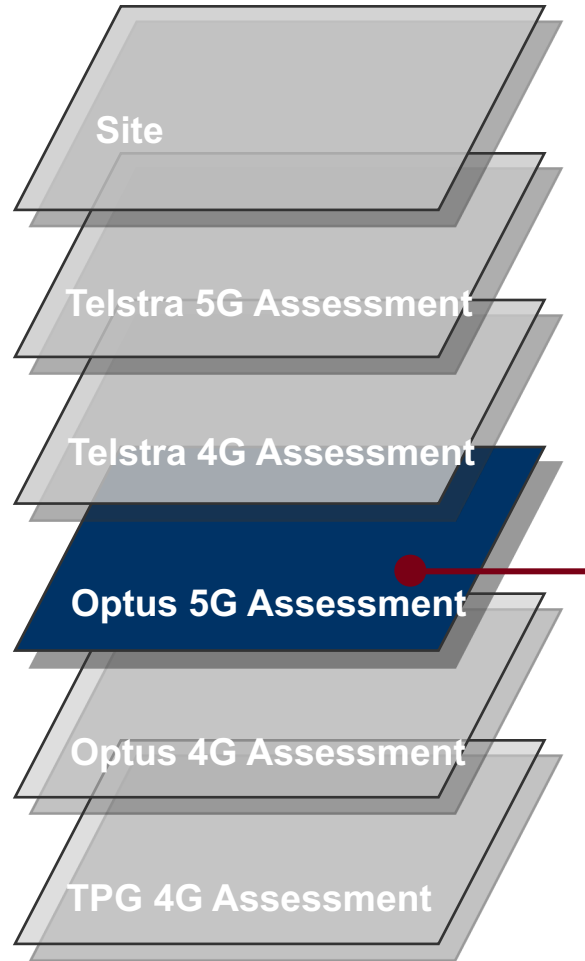
Rous Road

Assessment – Good 4G coverage with Blackspot area at Shire boundary



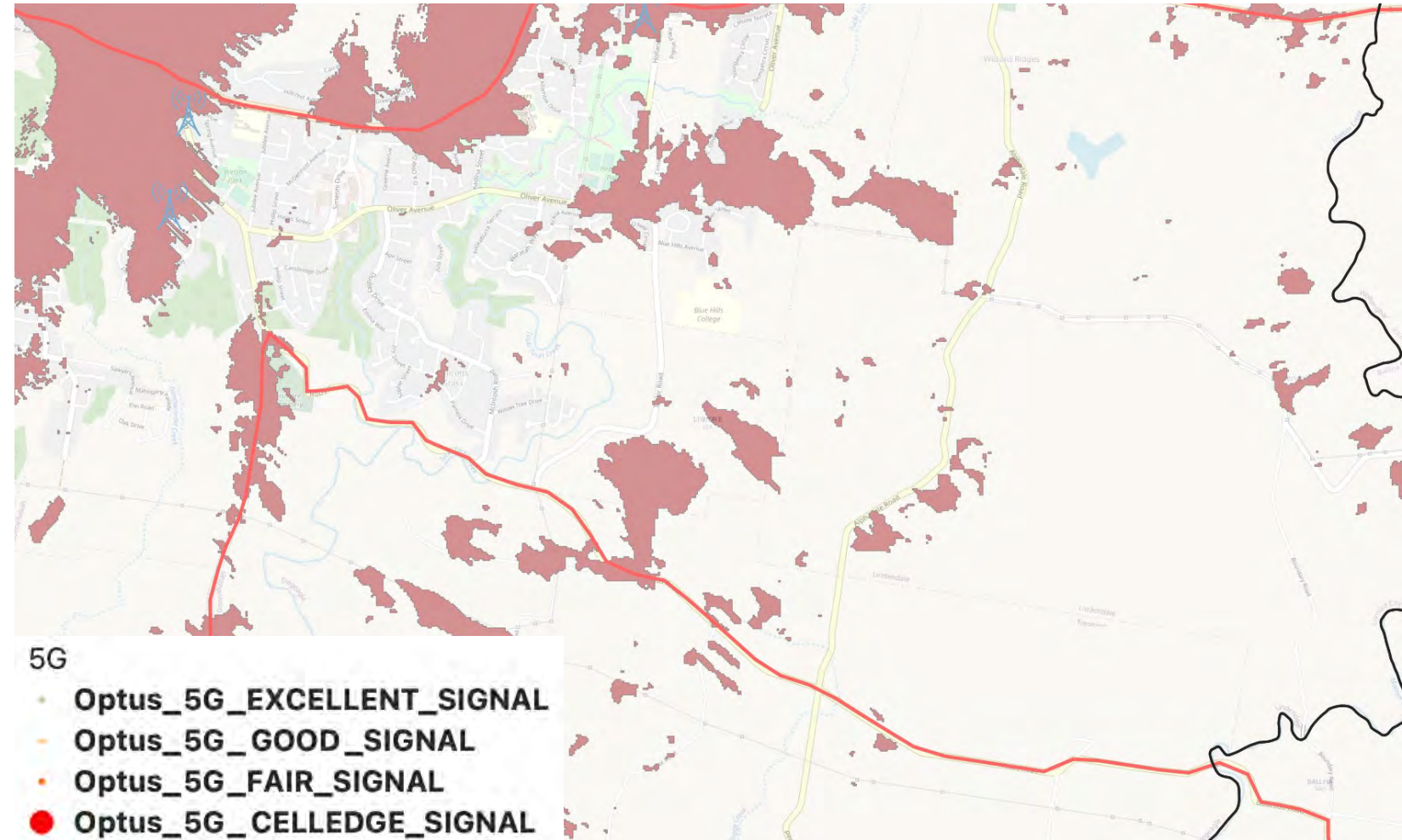
Lismore City Analysis

Rous Road



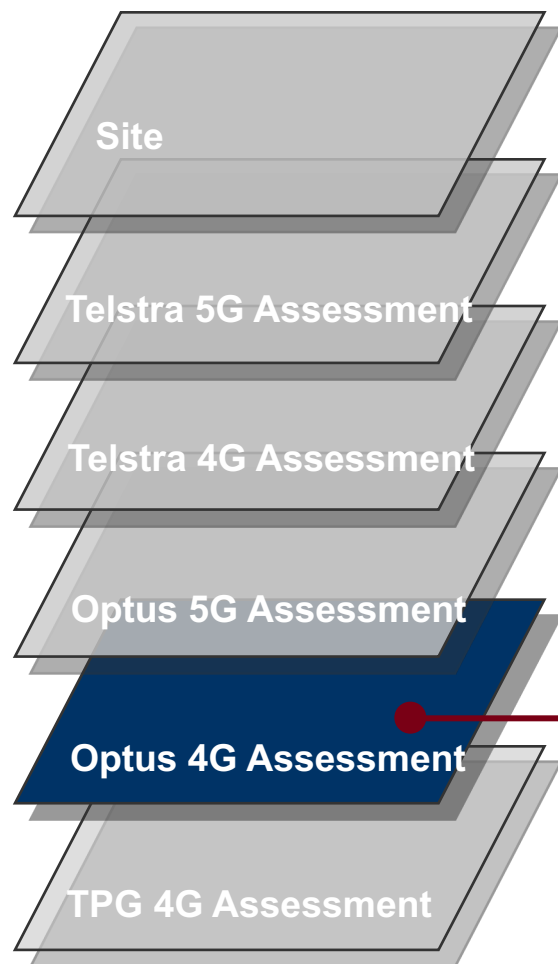
Assessment - No current Optus 5G coverage inside or outside of coverage mapping

Action –Optus / Fed Govt – up to 2 new 5G Tower sites



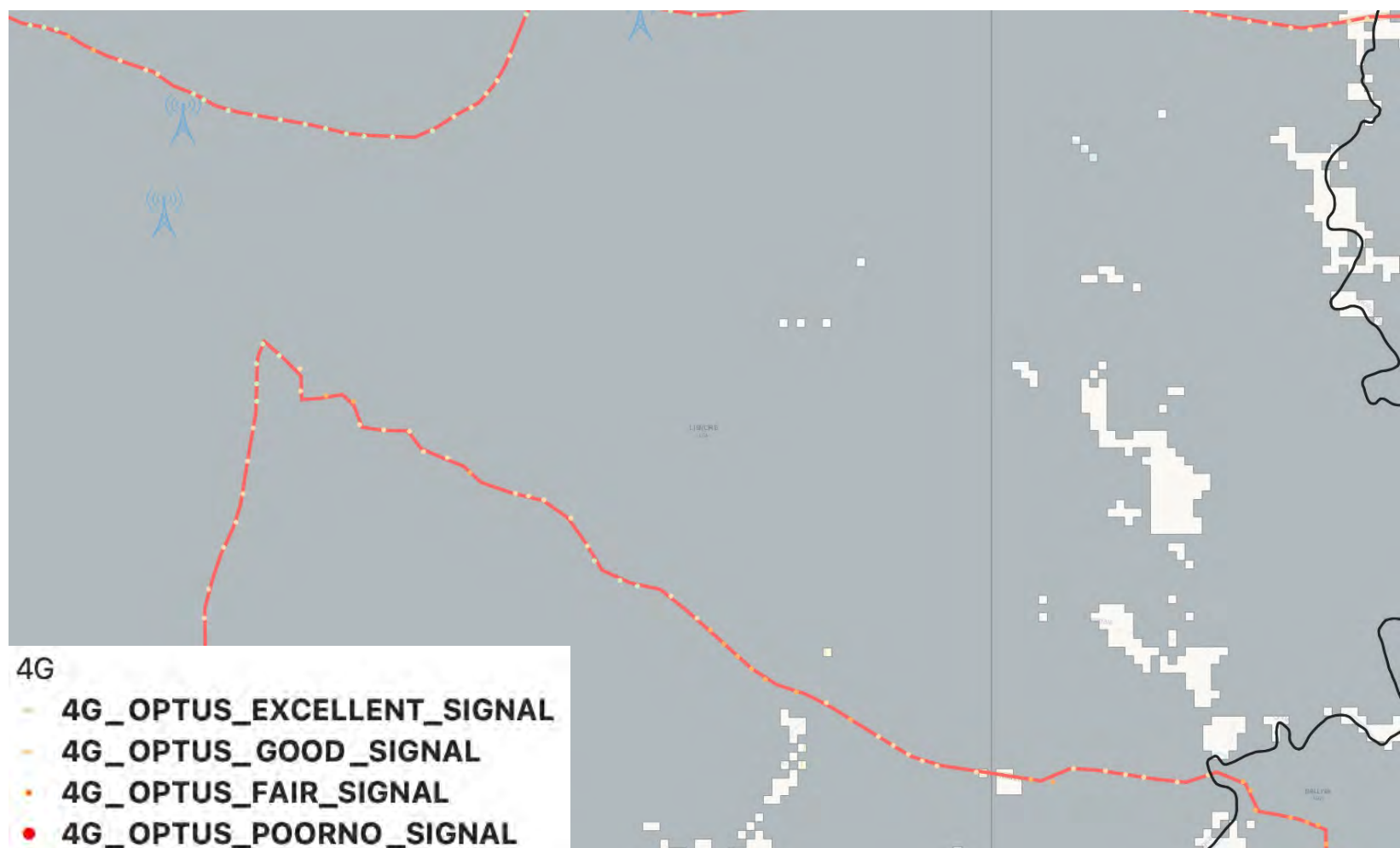
Lismore City Analysis

Rous Road



Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – Optus/ Fed Govt (MBSP) – 1 new 4G sites

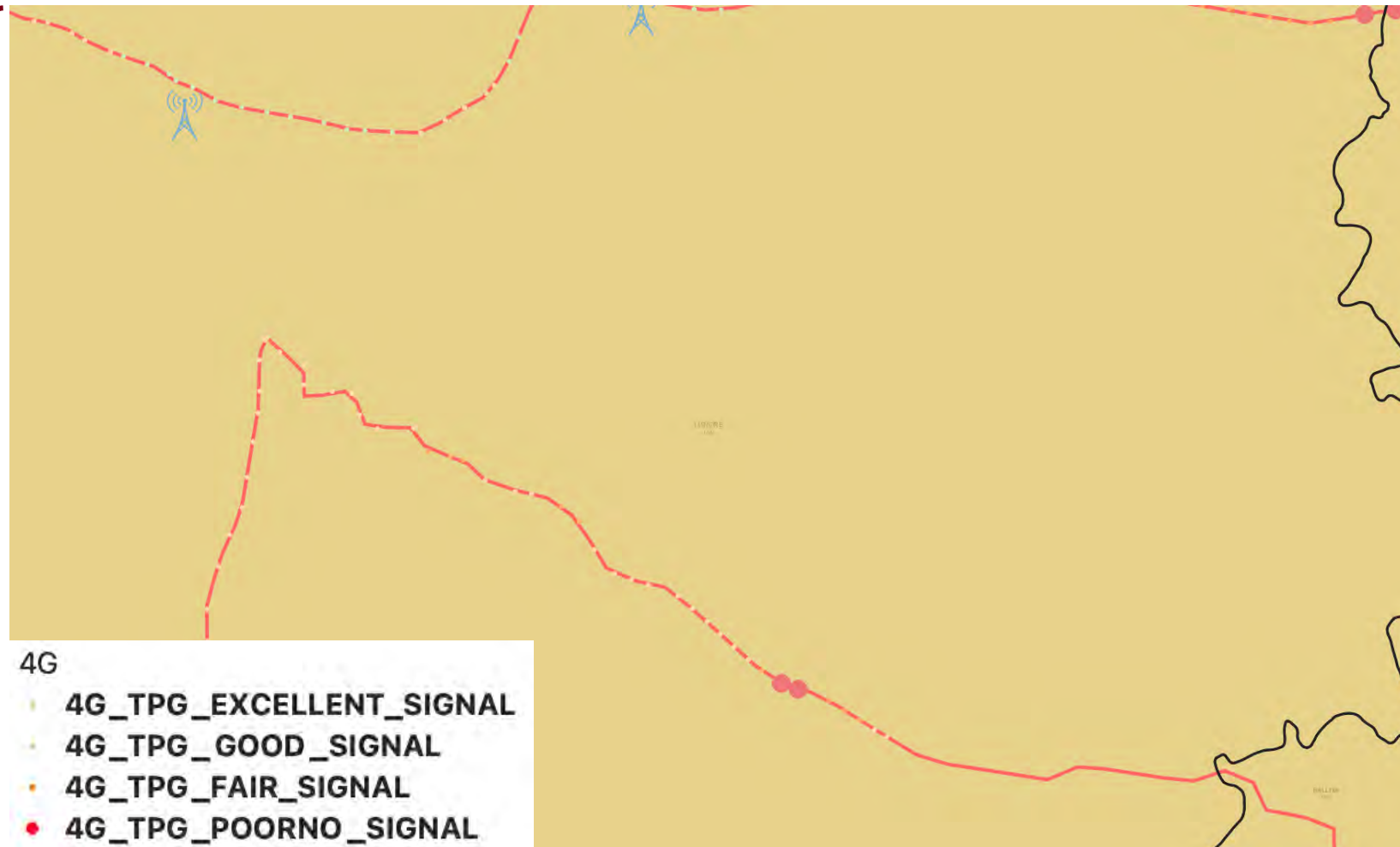
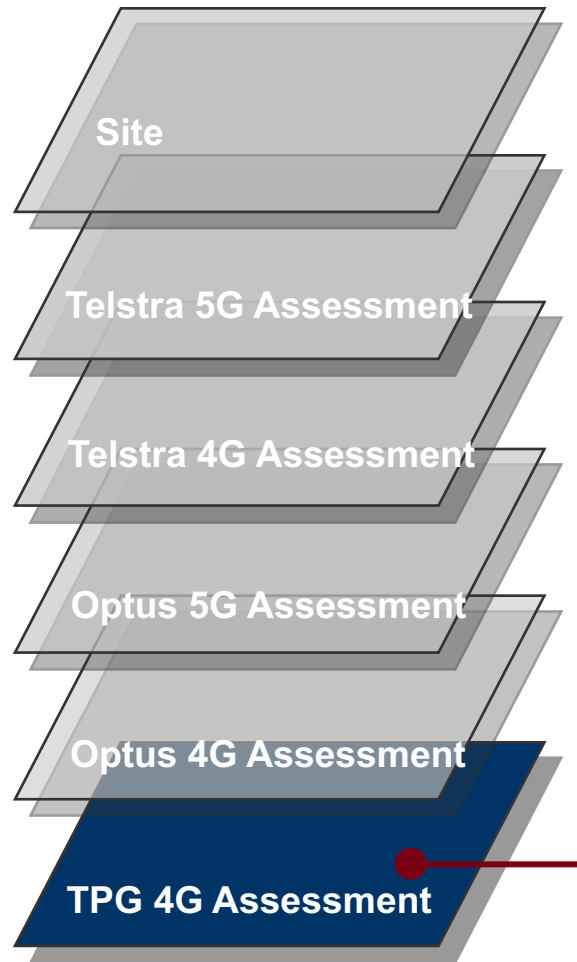


Lismore City Analysis

Rous Road

Assessment - Mixture of Good and Poor / Fair 4G coverage with some Blackspot areas

Action – TPG/ Fed Govt (MBSP) – 1 new 4G sites



1. Ballina Shire Analysis

Ballina Shire Analysis

Signal Testing:

Road name	From	To	Approx Distance
Pacific Highway	Northern shire boundary Newrybar	Southern shire boundary Broadwater	41km
Bruxner Highway	Pacific Highway	Wollongbar	15km
The Coast Road	Ballina	Lennox Head	12km
Byron Bay Road	Northern shire boundary	Lennox Head	12km
Tintenbar Road	Tintenbar	Teven	5km
Teven Road	Teven	Alstonville	9km
River Drive	Wardell		12km
Blackwall Drive	Wardell	Broadwater	8km

Network Bandwidth Point Tests:

- Ballina
- Lennox Head
- Alstonville
- Wollongbar
- Wardell

This section provides an analysis of the change in Mobile Network Operator sites in the Ballina Shire from 2018 to 2022.

Total Number of Sites by MNO

Ballina Shire	2018	2022
Optus	11	16
Telstra	12	12
TPG	8	8

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Ballina Shire	2018	2022
Optus		
900 MHz	11	16
2100 MHz	11	11
Telstra		
850 MHz	11	11
2100 MHz		
TPG		
900 MHz	8	8
2100 MHz	7	1

Note – A single site may host multiple spectrum bands.

Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

Ballina Shire	2018	2022
Optus		
700 MHz	11	16
900 MHz		4
1800 MHz		13
2100 MHz	1	8
2300 MHz		
2600 MHz	5	9
3500 MHz		
Telstra		
700 MHz	11	12
900 MHz		
1800 MHz	5	7
2100 MHz		6
2600 MHz		3
TPG		
700 MHz		
850 MHz	8	8

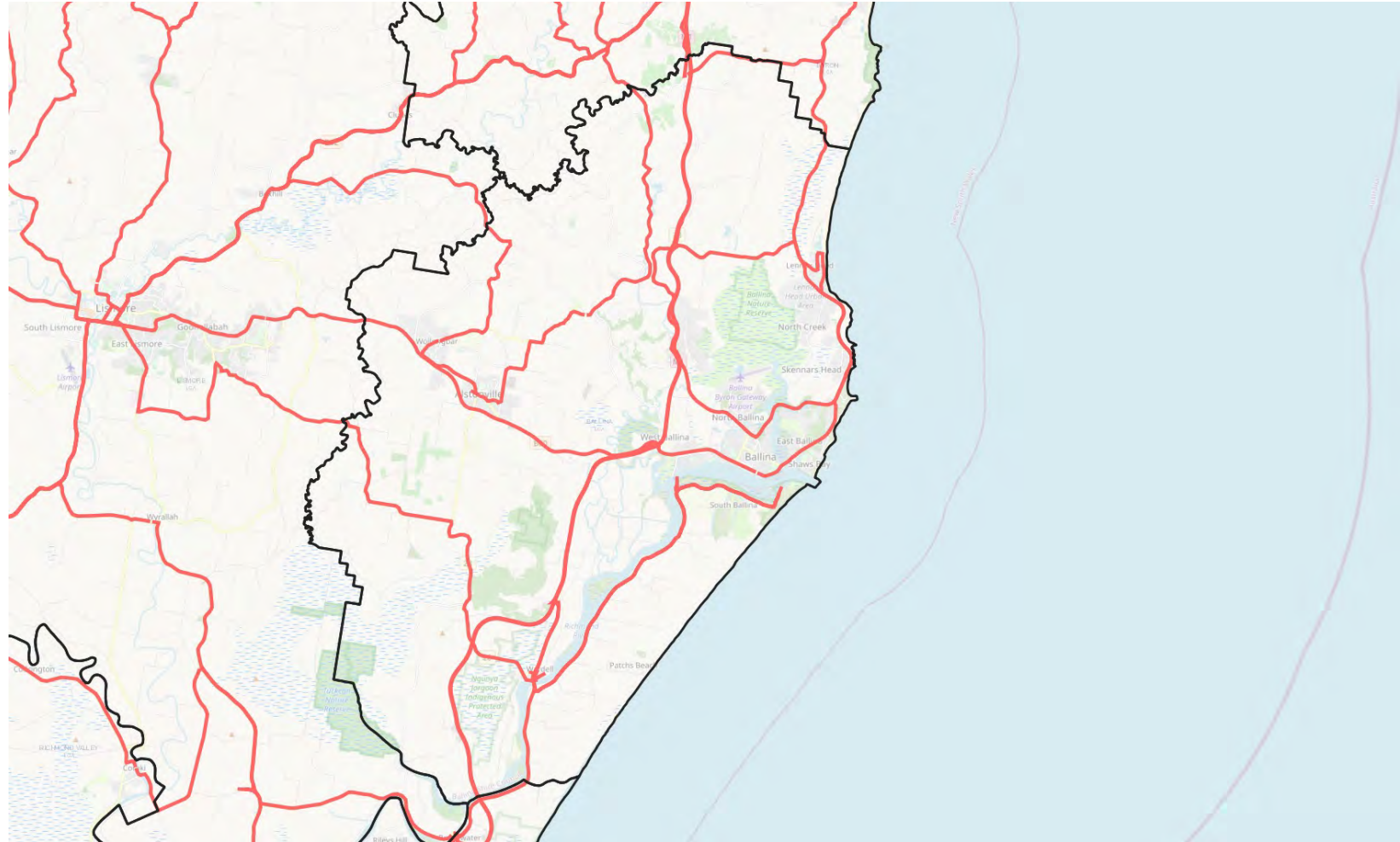
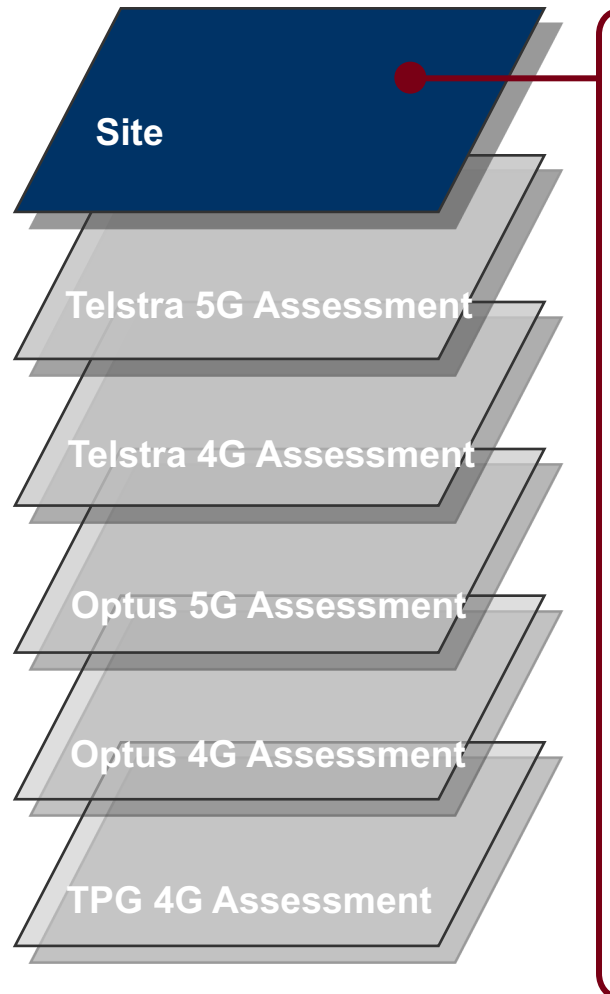
Ballina Shire	2018	2022
1800 MHz		
2100 MHz	6	8
2600 MHz		

Total Number of 5G Sites by MNO

Ballina Shire	2018	2022
Optus		
2100 MHz		1
2300 MHz		-
3500 MHz		-
26000 MHz		-
Telstra		
850 MHz		4
2600 MHz		
3600 MHz		7
TPG		
700 MHz		-
3600 MHz		-

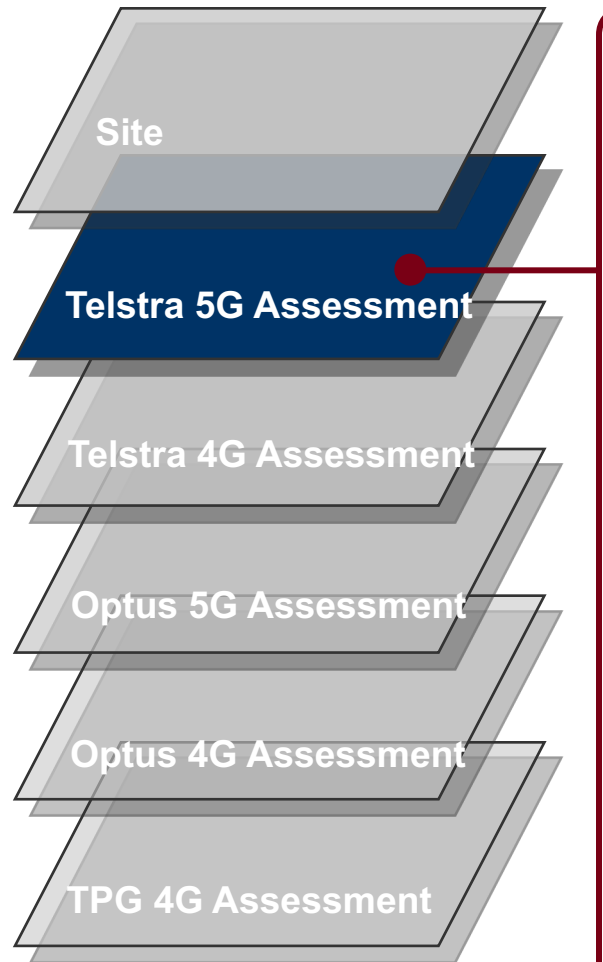
Ballina Shire Analysis

Pacific Highway



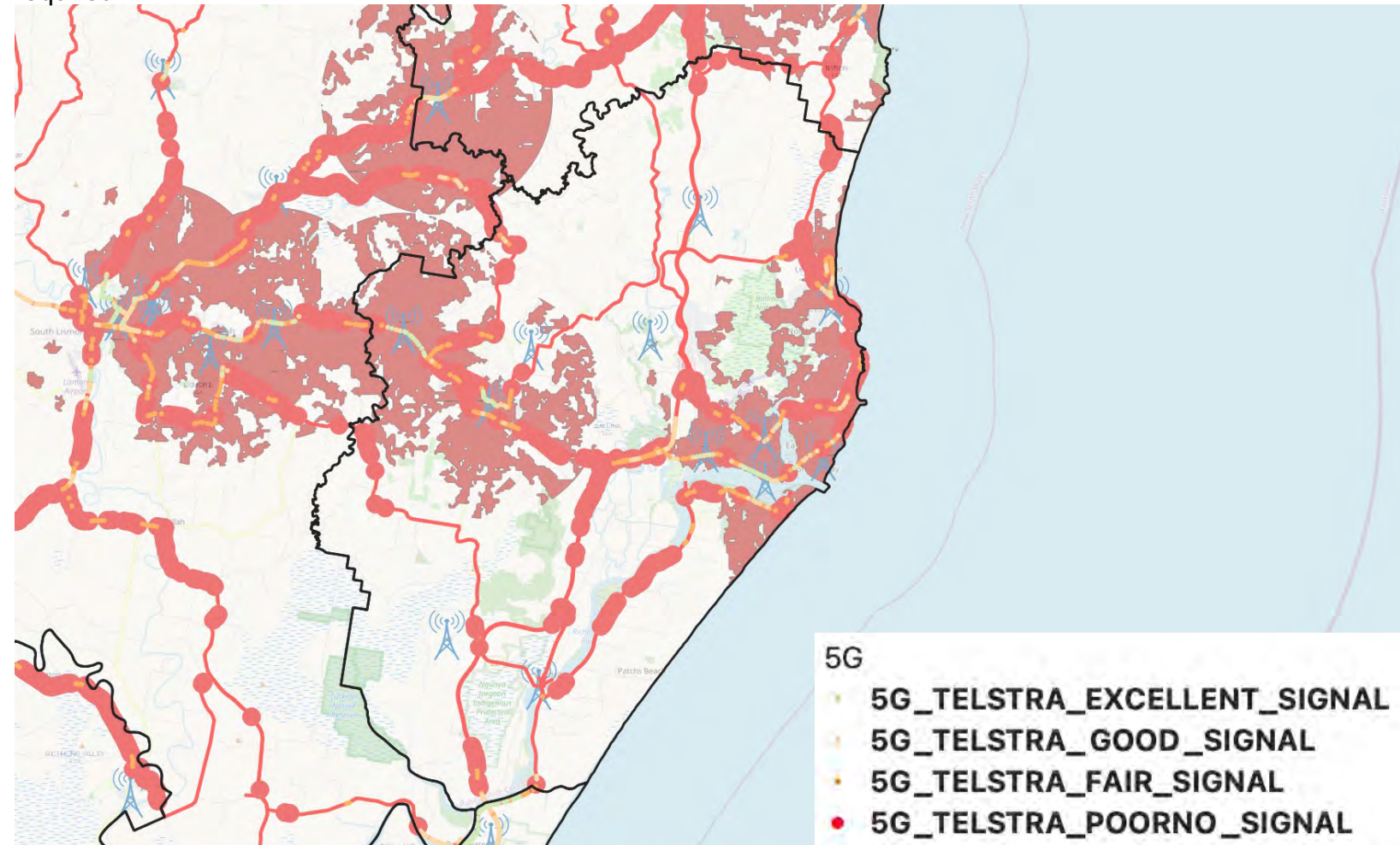
Ballina Shire Analysis

Pacific Highway



Assessment – Good 5G coverage near Ballina. Large areas with no current 5G coverage

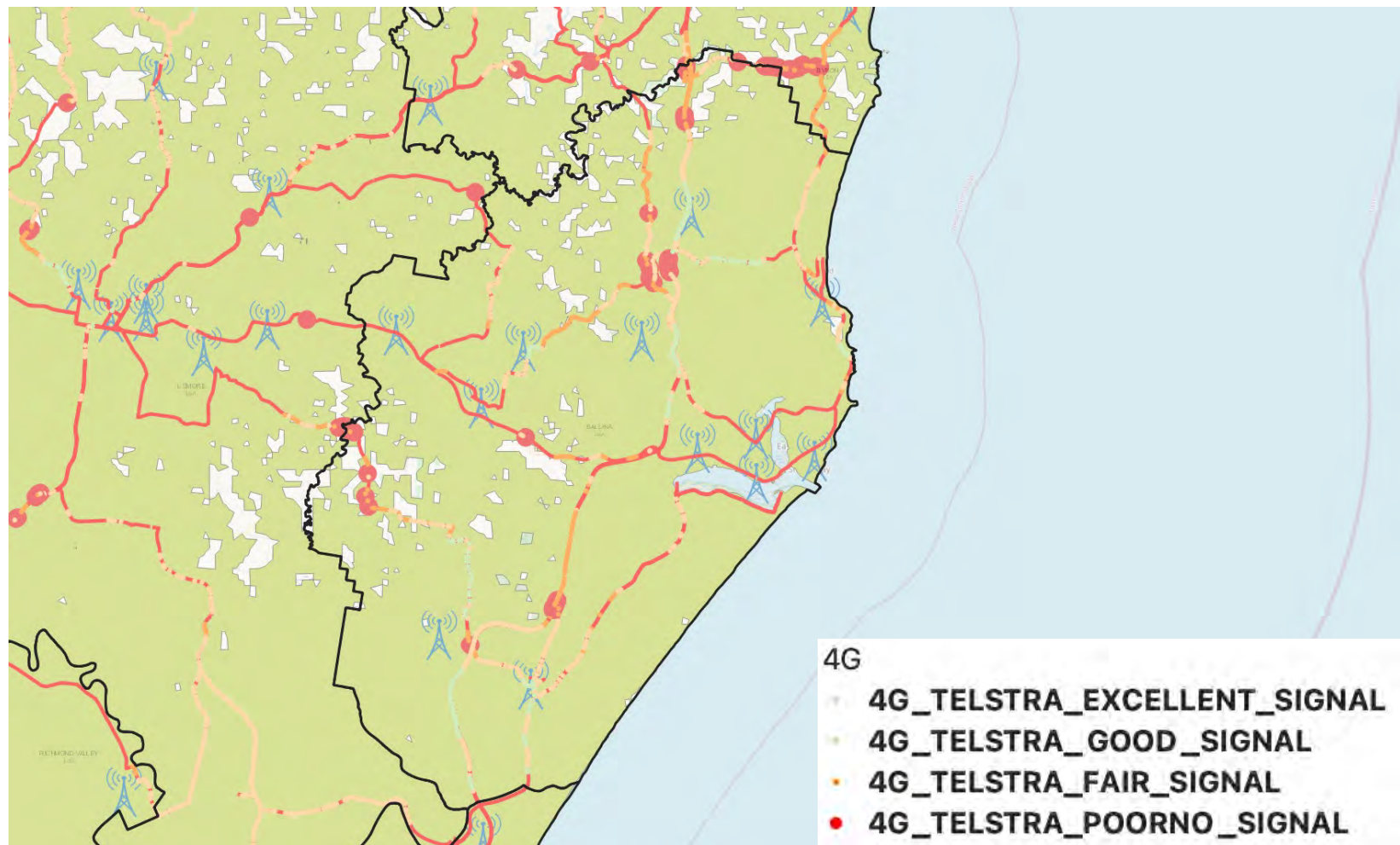
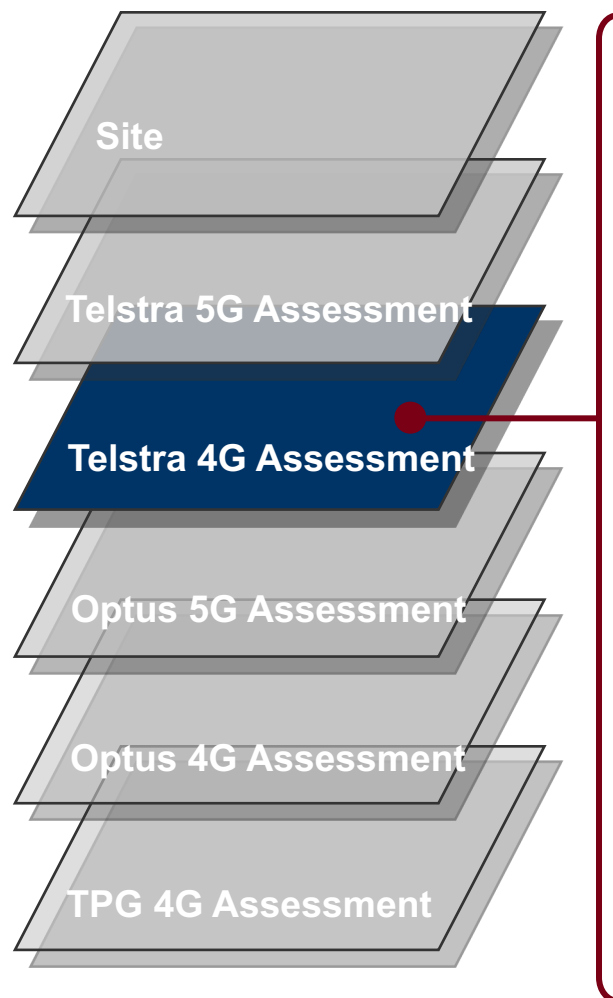
Action – Telstra - Upgrade 3 x Tower Sites with 5G & Telstra / Fed Govt (MBSP) – up to 2 new 5G Tower Sites required



Ballina Shire Analysis

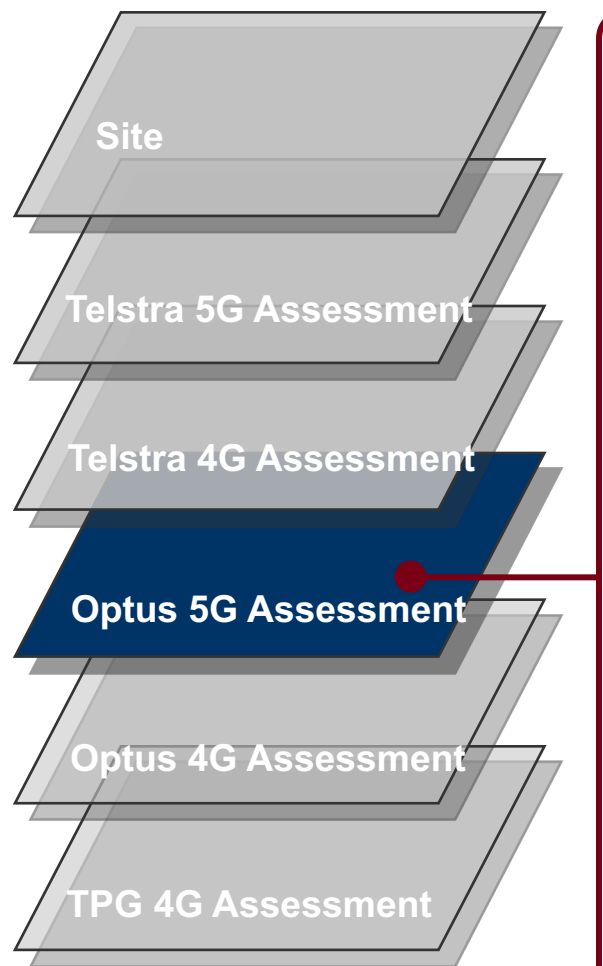
Pacific Highway

Assessment – Good 4G coverage



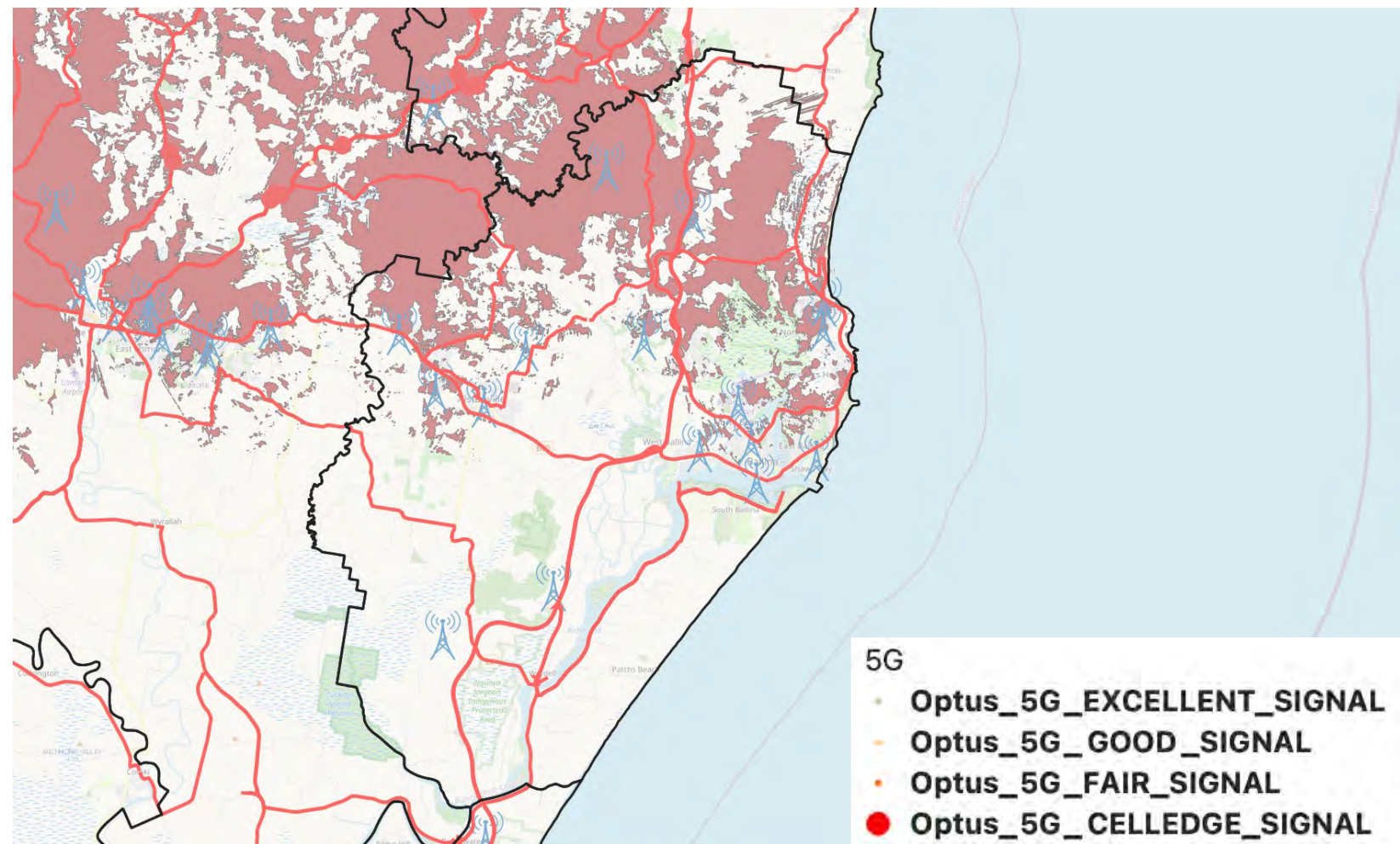
Ballina Shire Analysis

Pacific Highway



Assessment - No current Optus 5G coverage

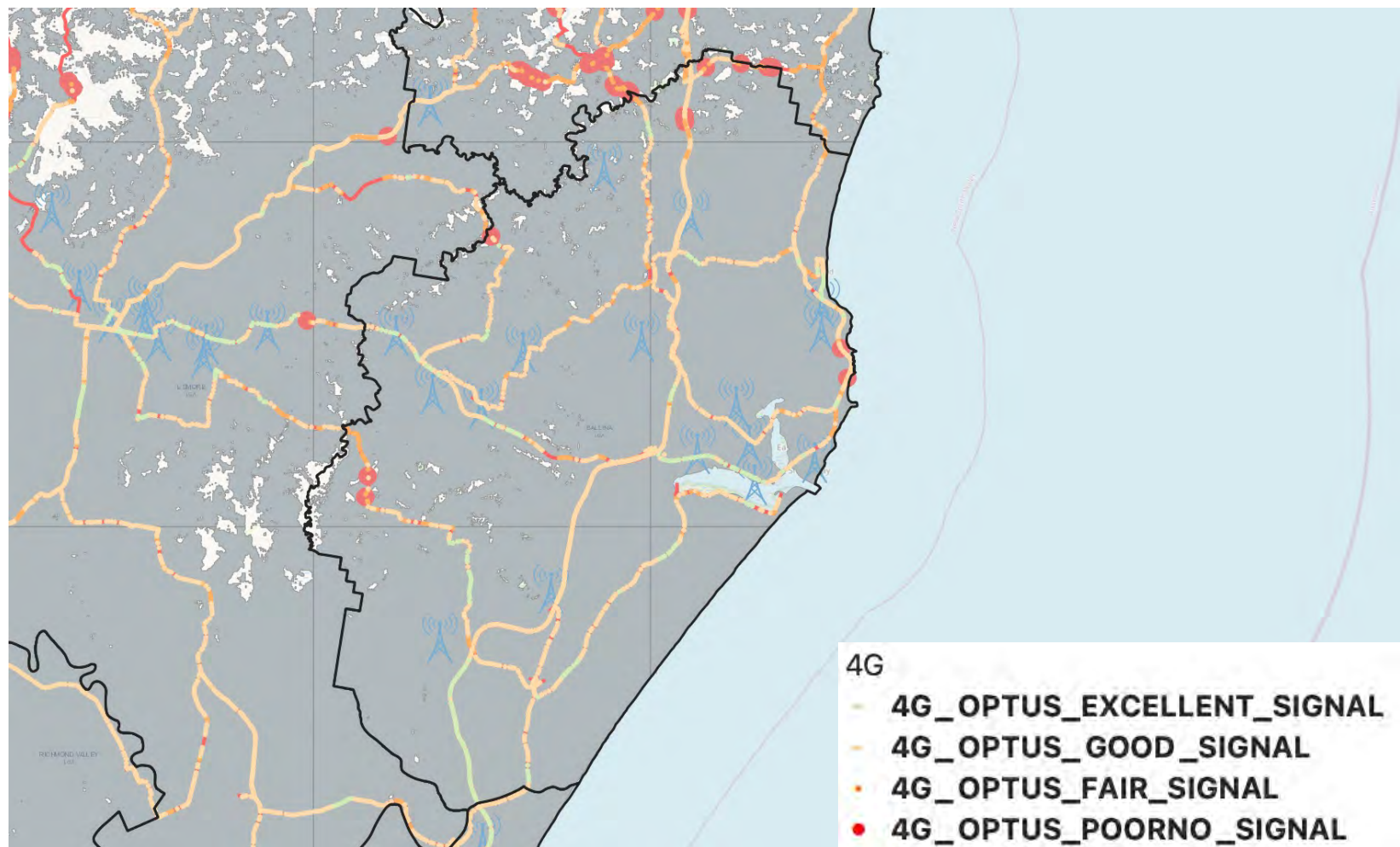
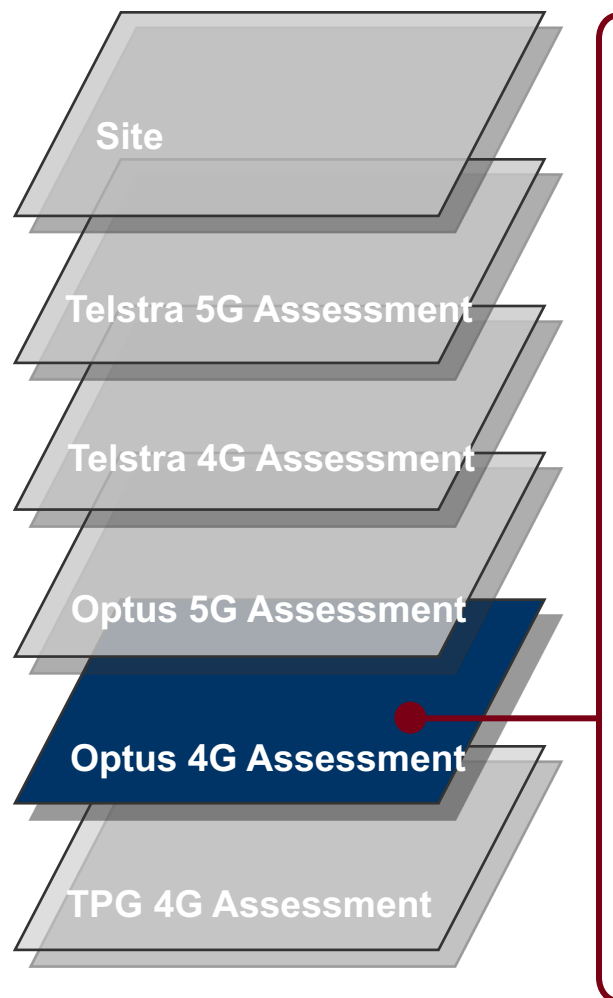
Action – Optus - Upgrade 3 x Sites to 5G & Optus / Fed Govt – up to 3 new 5G Tower sites



Ballina Shire Analysis

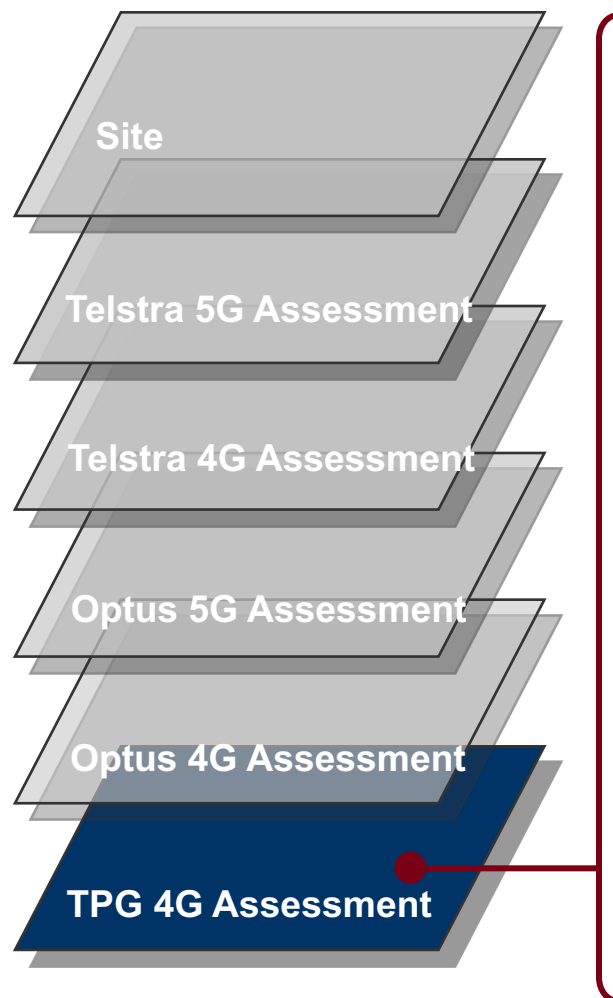
Pacific Highway

Assessment – Good 4G coverage



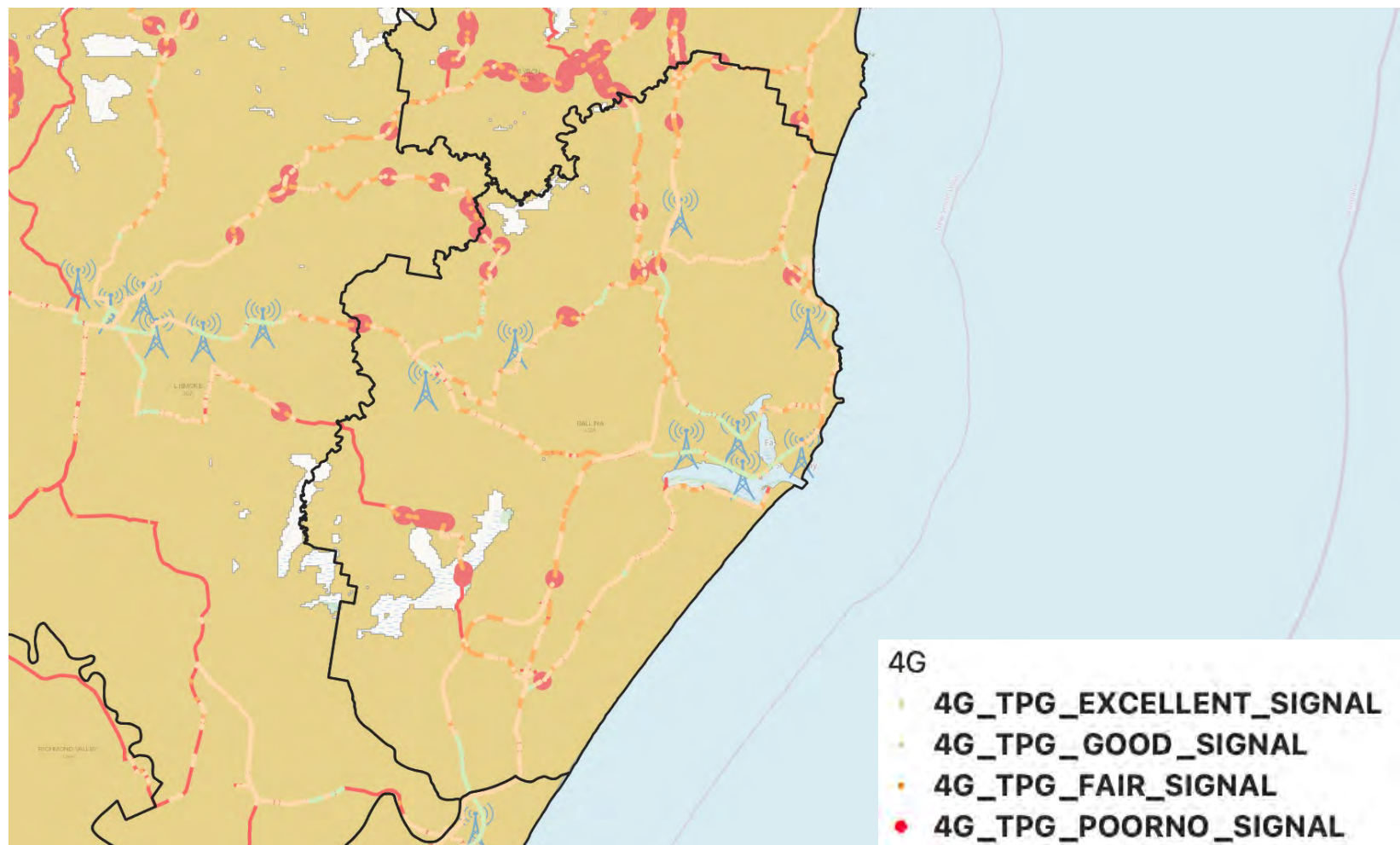
Ballina Shire Analysis

Pacific Highway



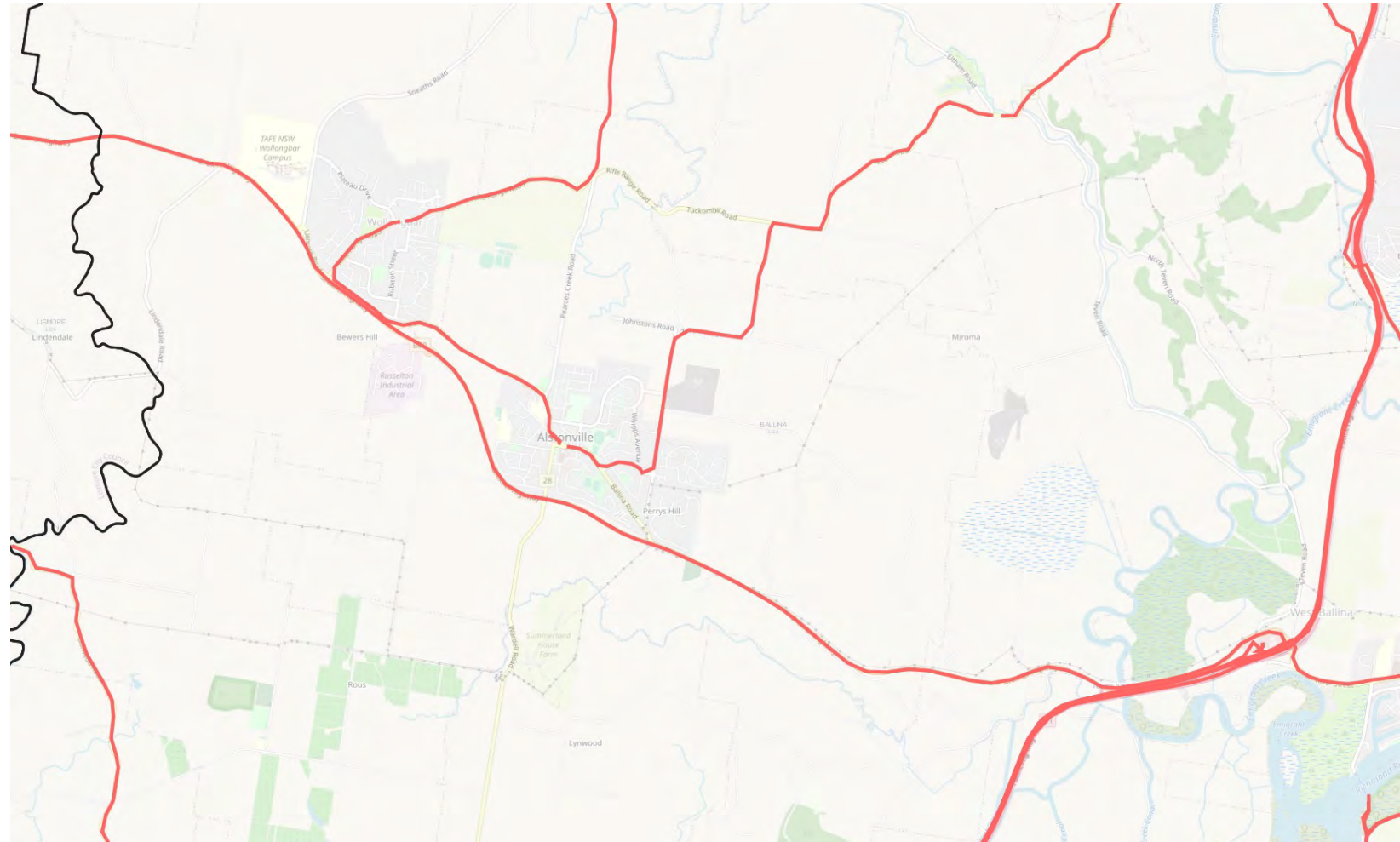
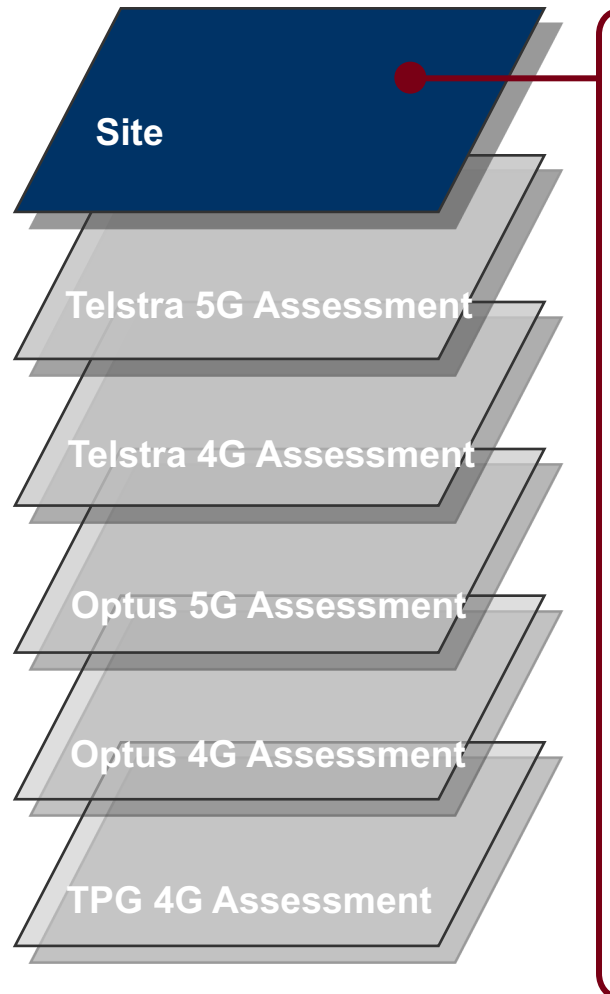
Assessment – Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites



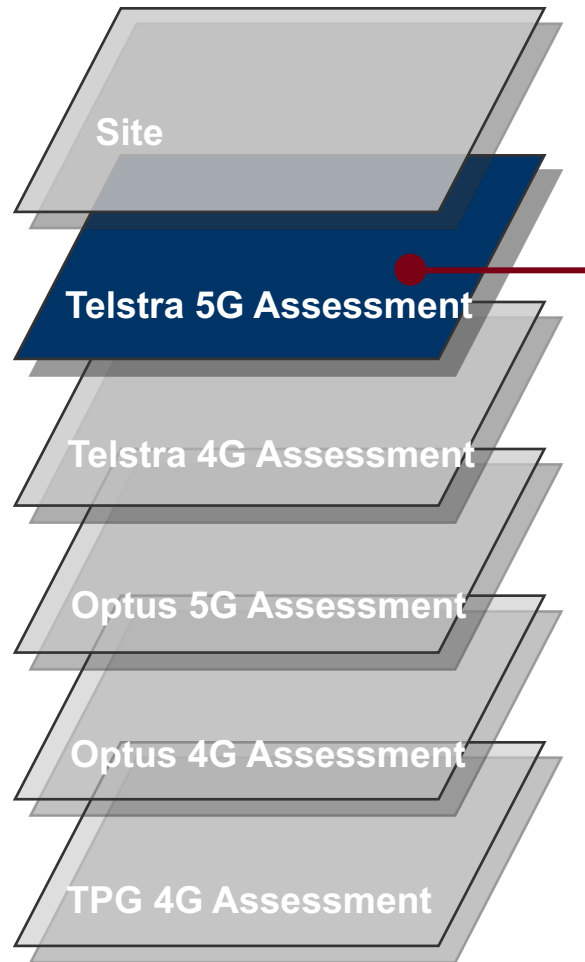
Ballina Shire Analysis

Bruxner Highway



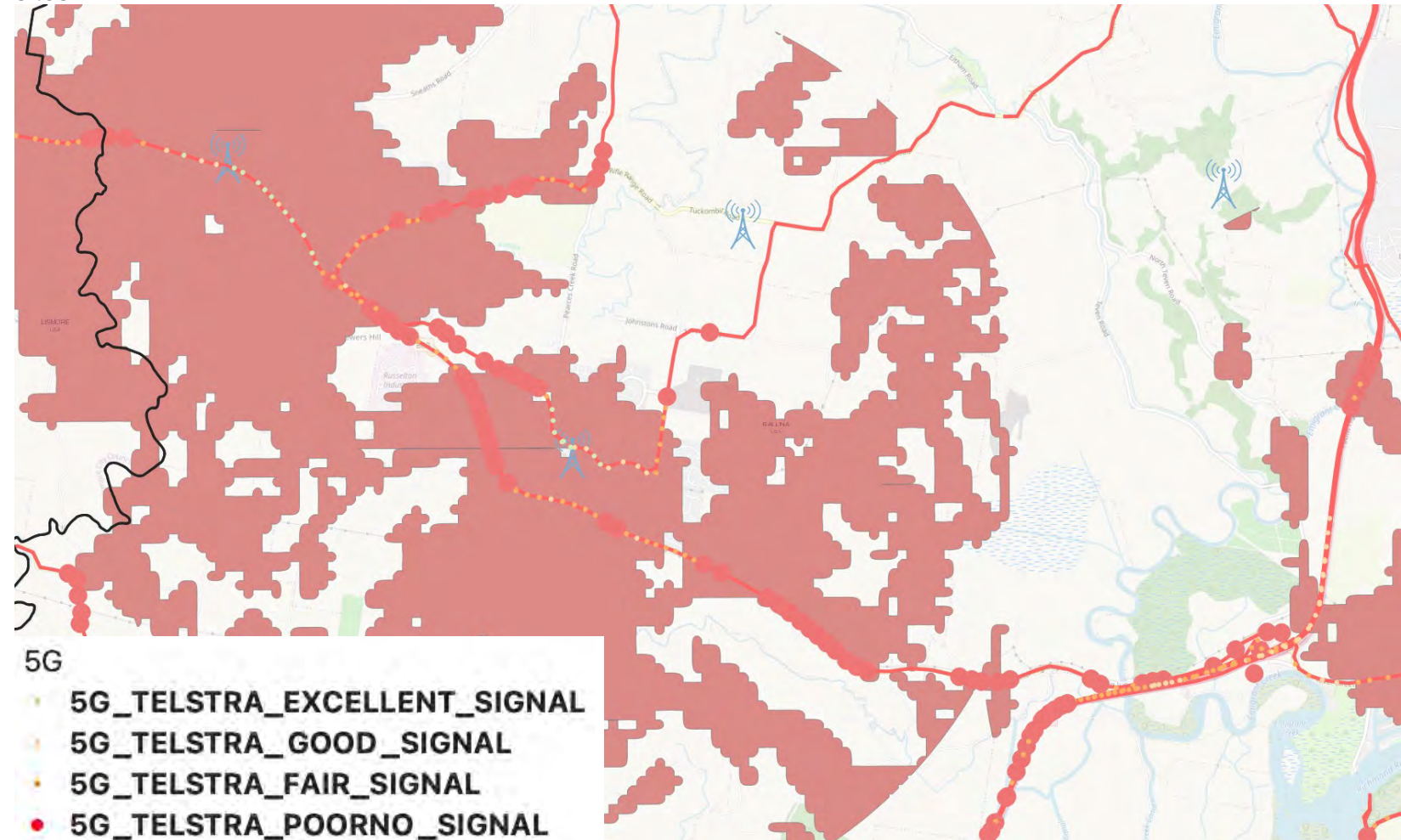
Ballina Shire Analysis

Bruxner Highway



Assessment – Areas of 5G coverage with some 5G Blackspot areas

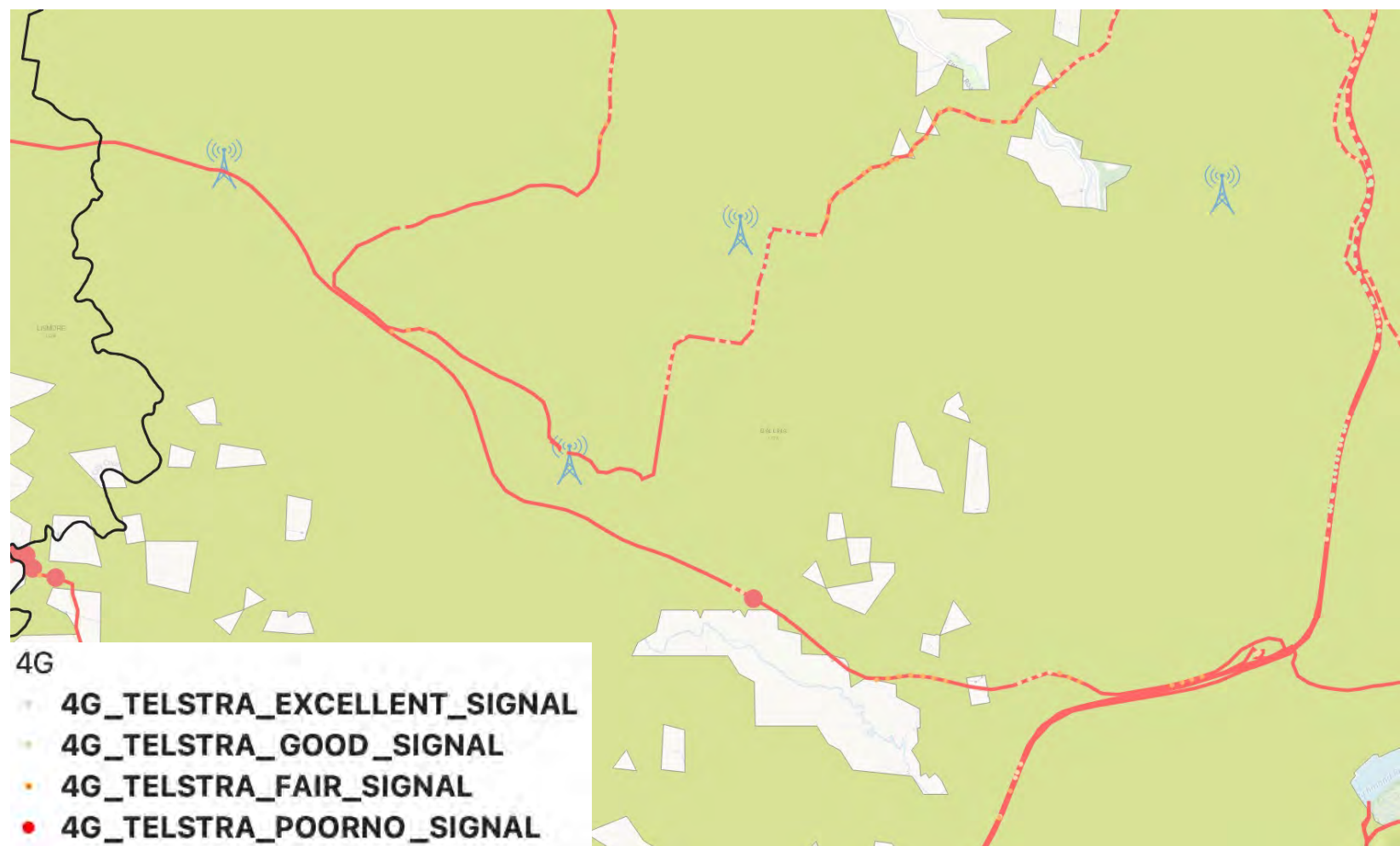
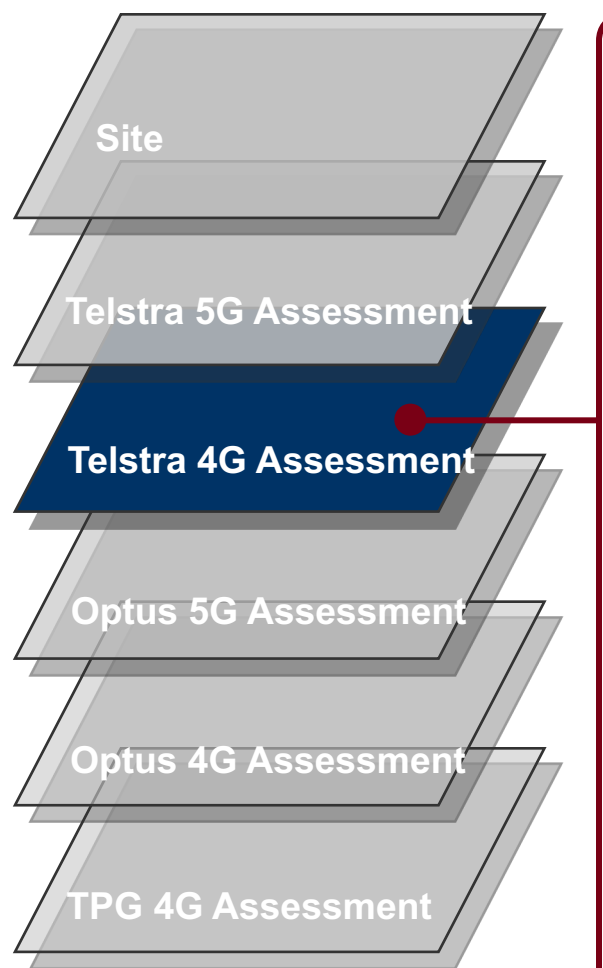
Action – Telstra - Upgrade 1 x Tower Sites with 5G lowband / midband & Telstra / Fed Govt – 1 new 5G Tower sites



Ballina Shire Analysis

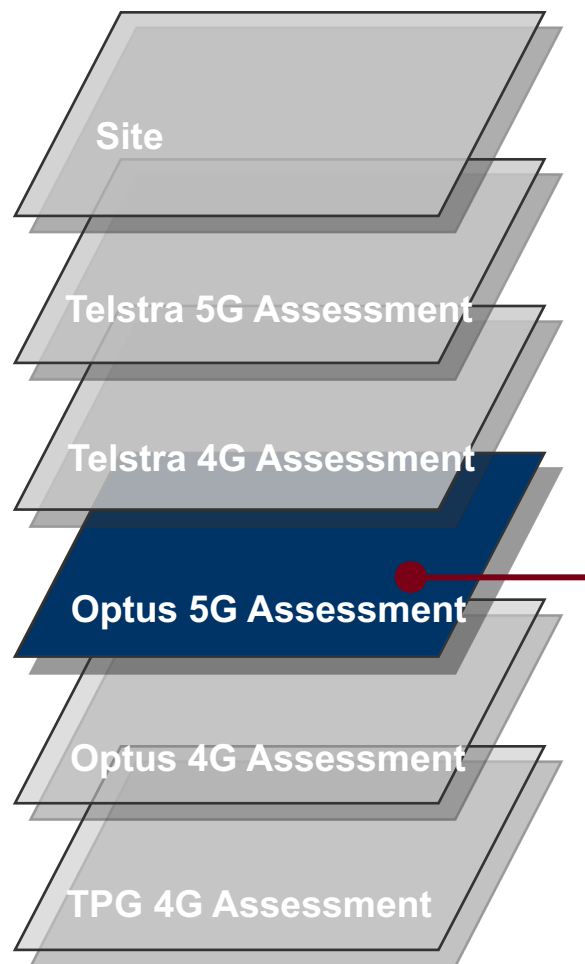
Bruxner Highway

Assessment – Good 4G coverage



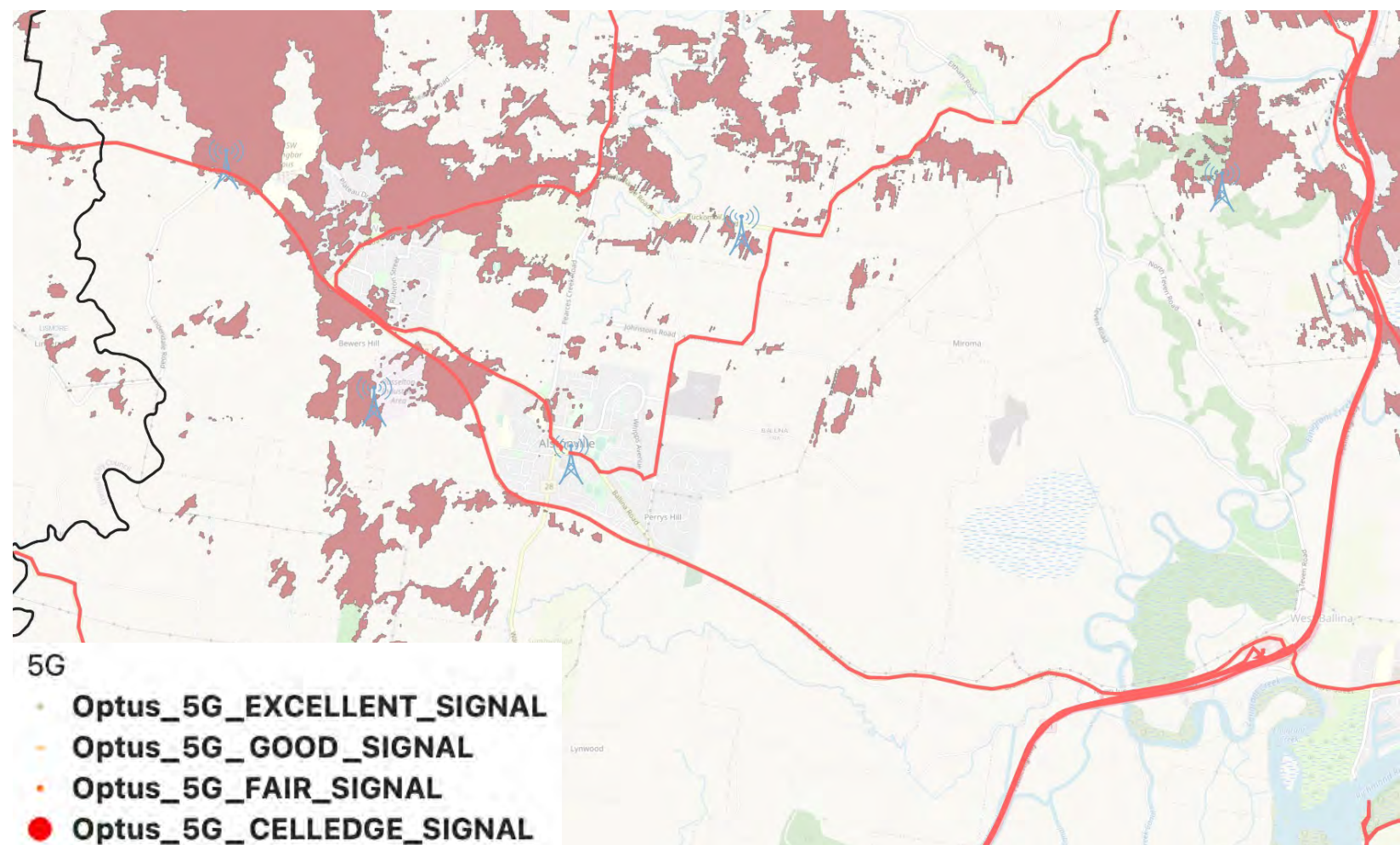
Ballina Shire Analysis

Bruxner Highway



Assessment - No current Optus 5G coverage inside or outside of coverage mapping

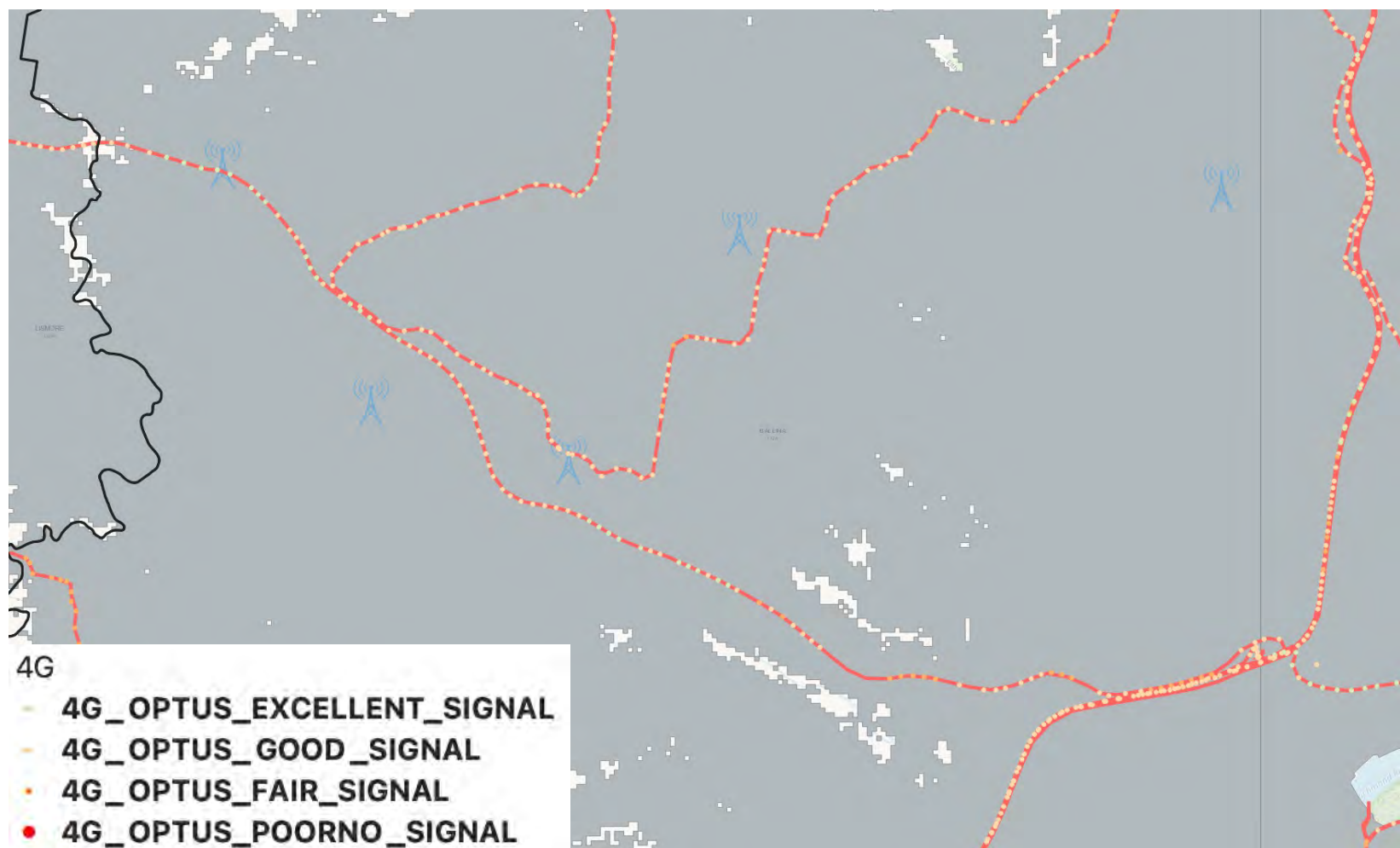
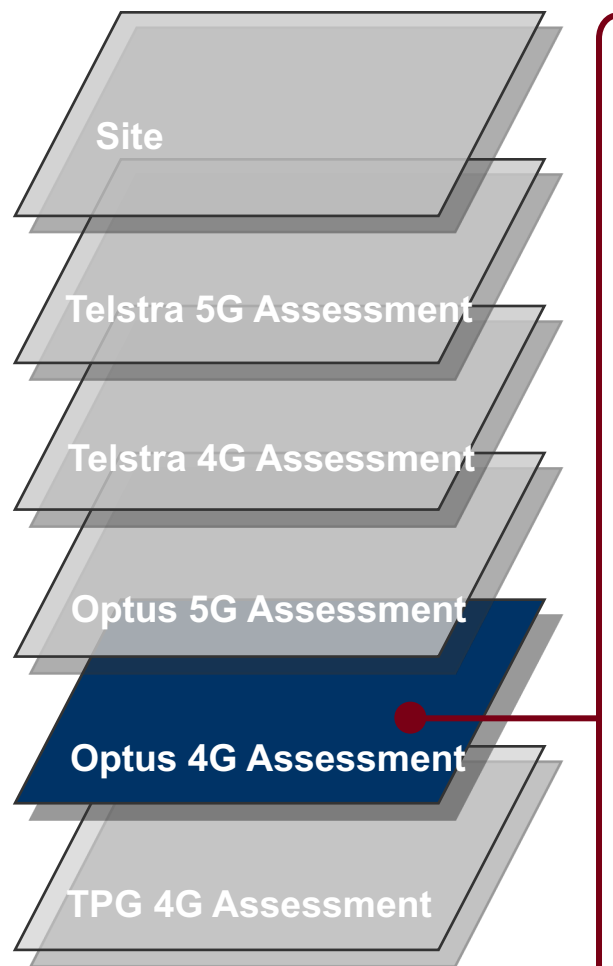
Action – Optus – Upgrade 2 Sites to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites



Ballina Shire Analysis

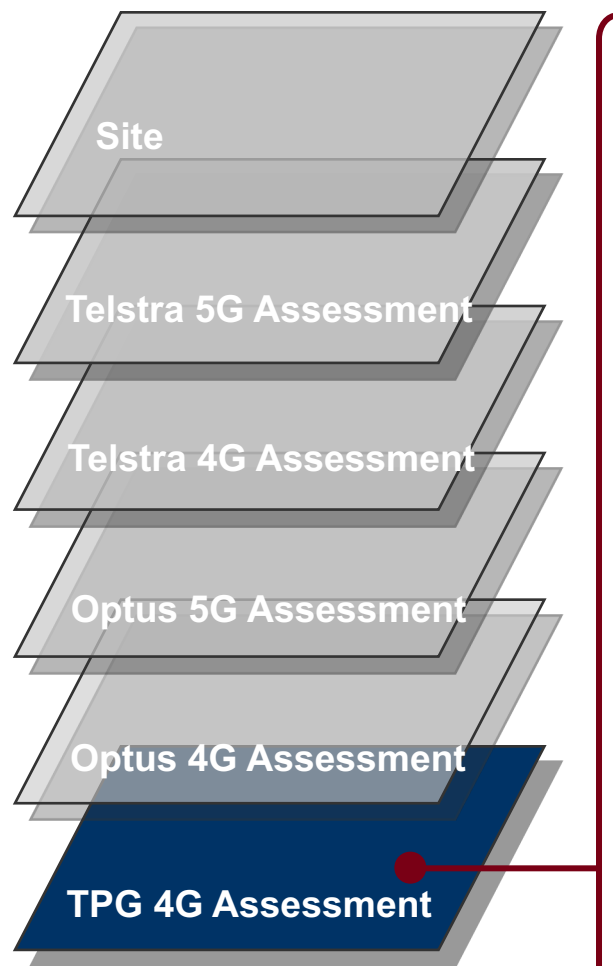
Bruxner Highway

Assessment – Good 4G coverage



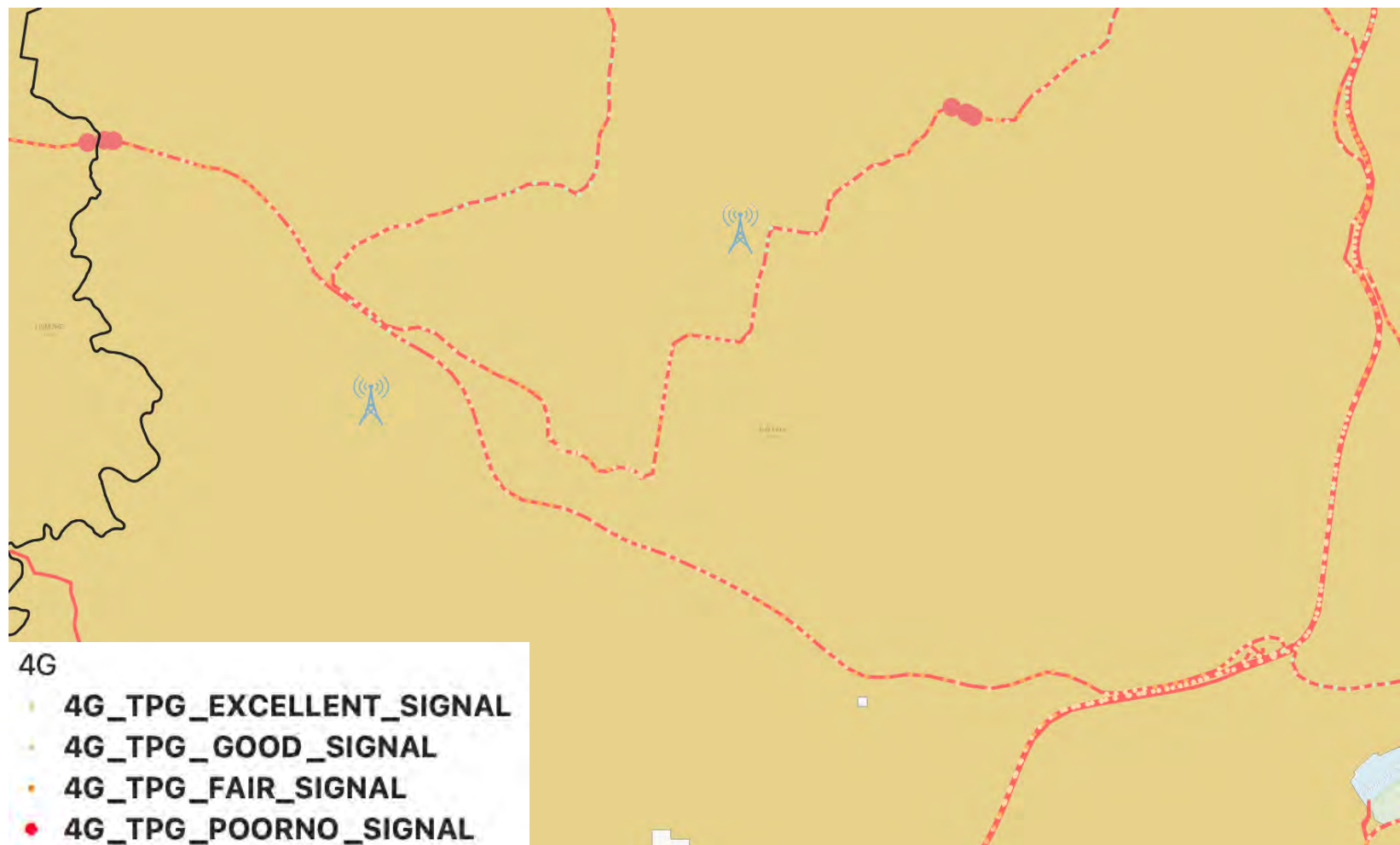
Ballina Shire Analysis

Bruxner Highway



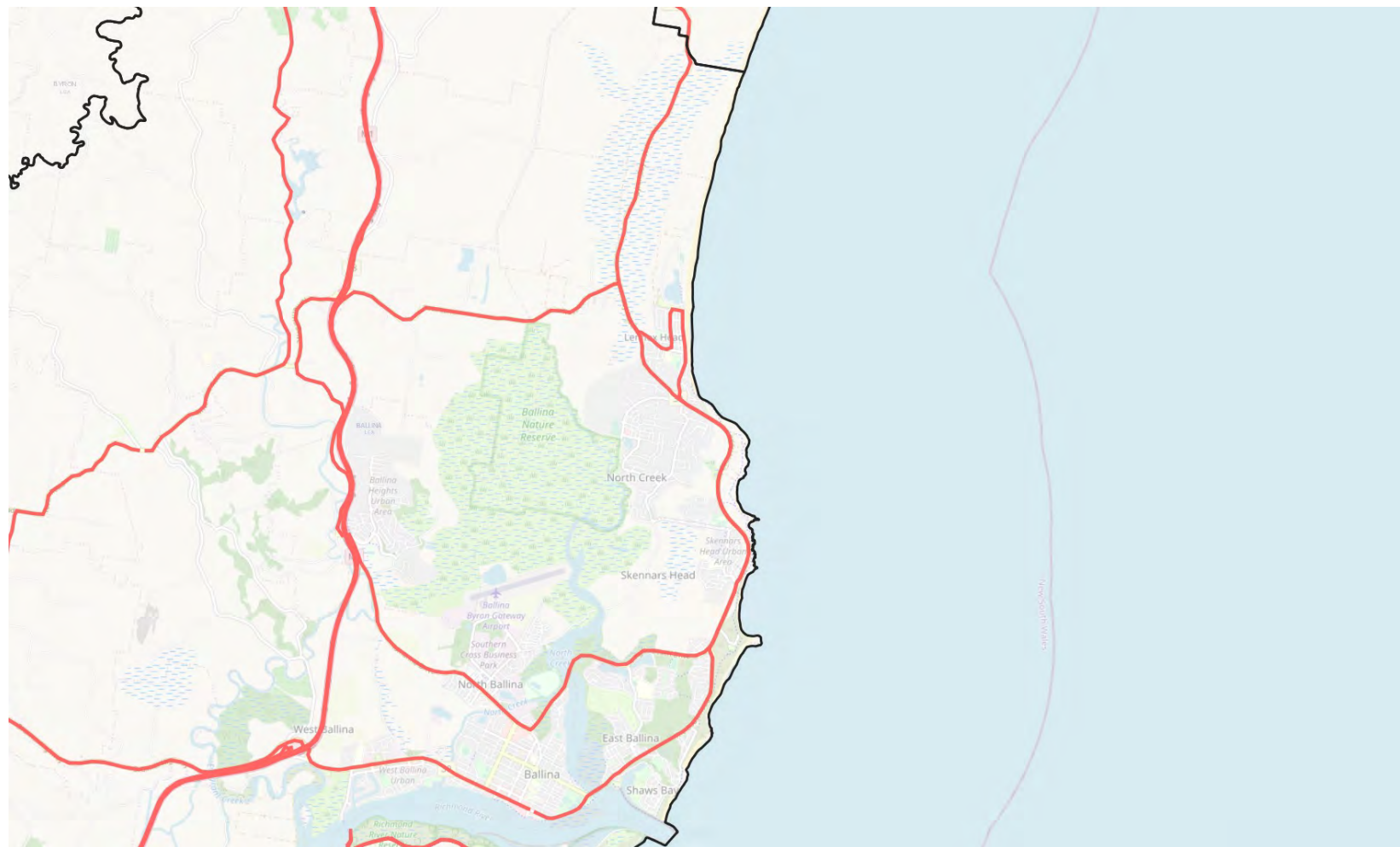
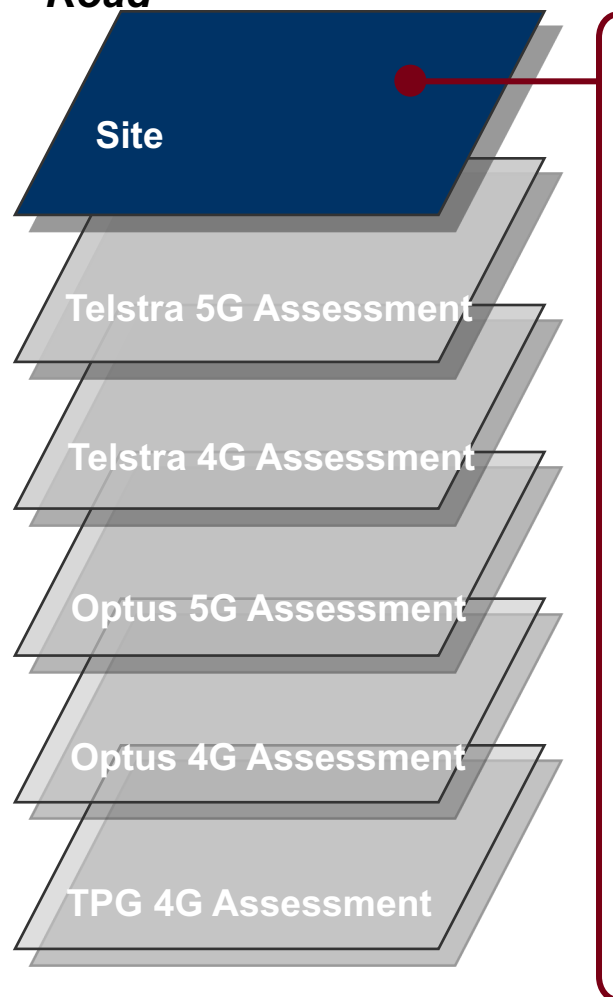
Assessment – Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites



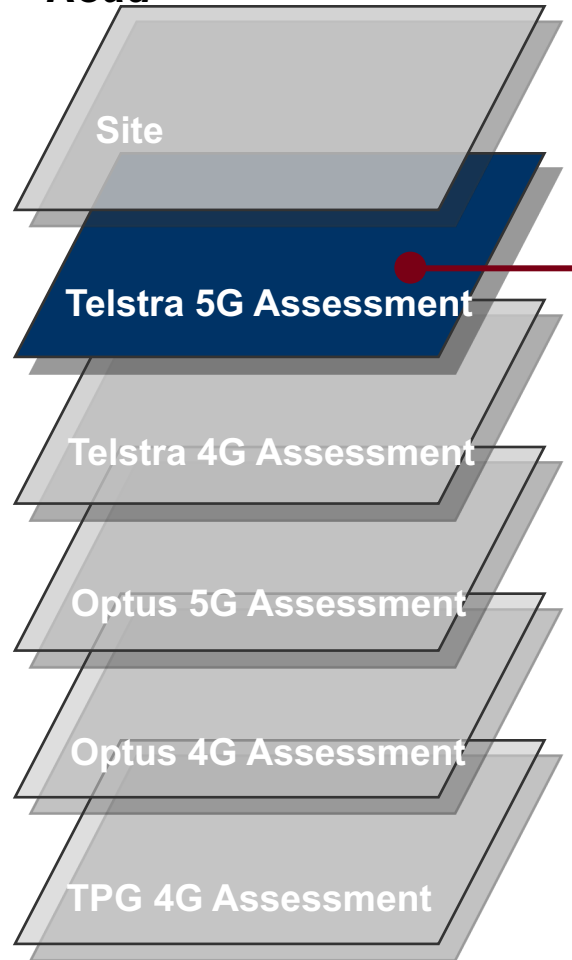
Ballina Shire Analysis

The Coast Road / Byron Bay Road



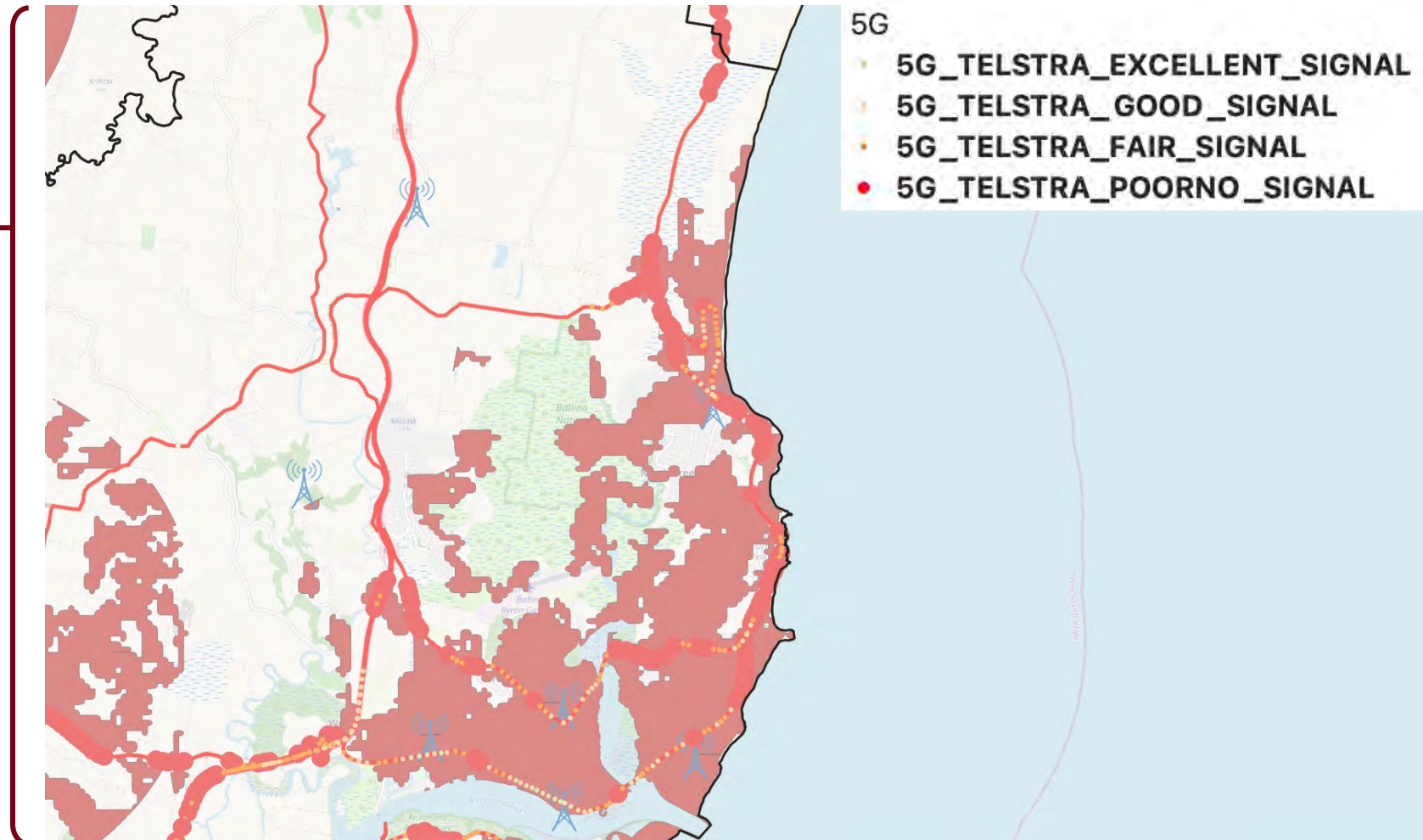
Ballina Shire Analysis

The Coast Road / Byron Bay Road



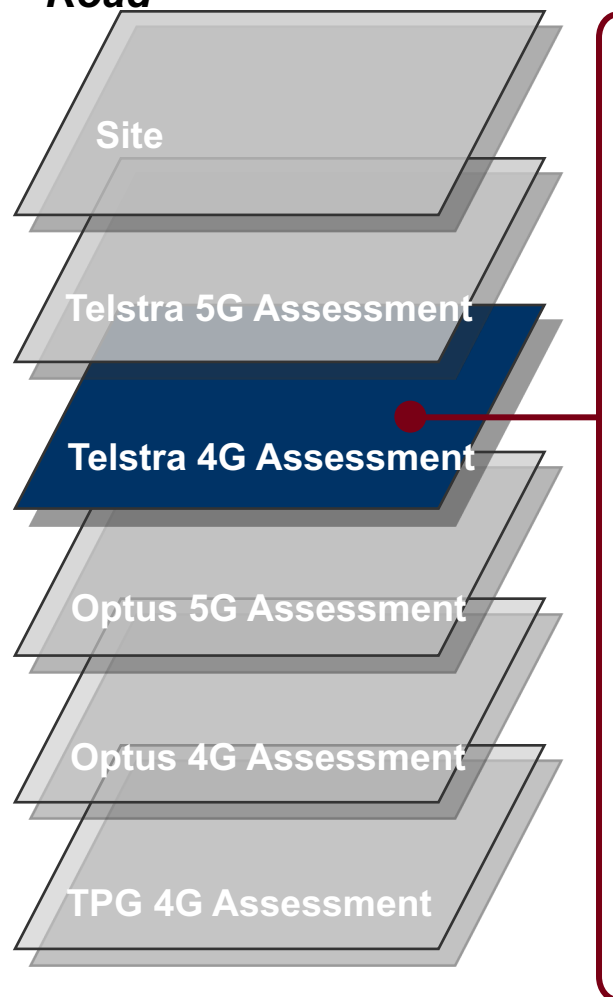
Assessment – Areas of 5G coverage with some 5G Blackspot areas

Action – Telstra / Fed Govt – 1 new 5G Tower sites

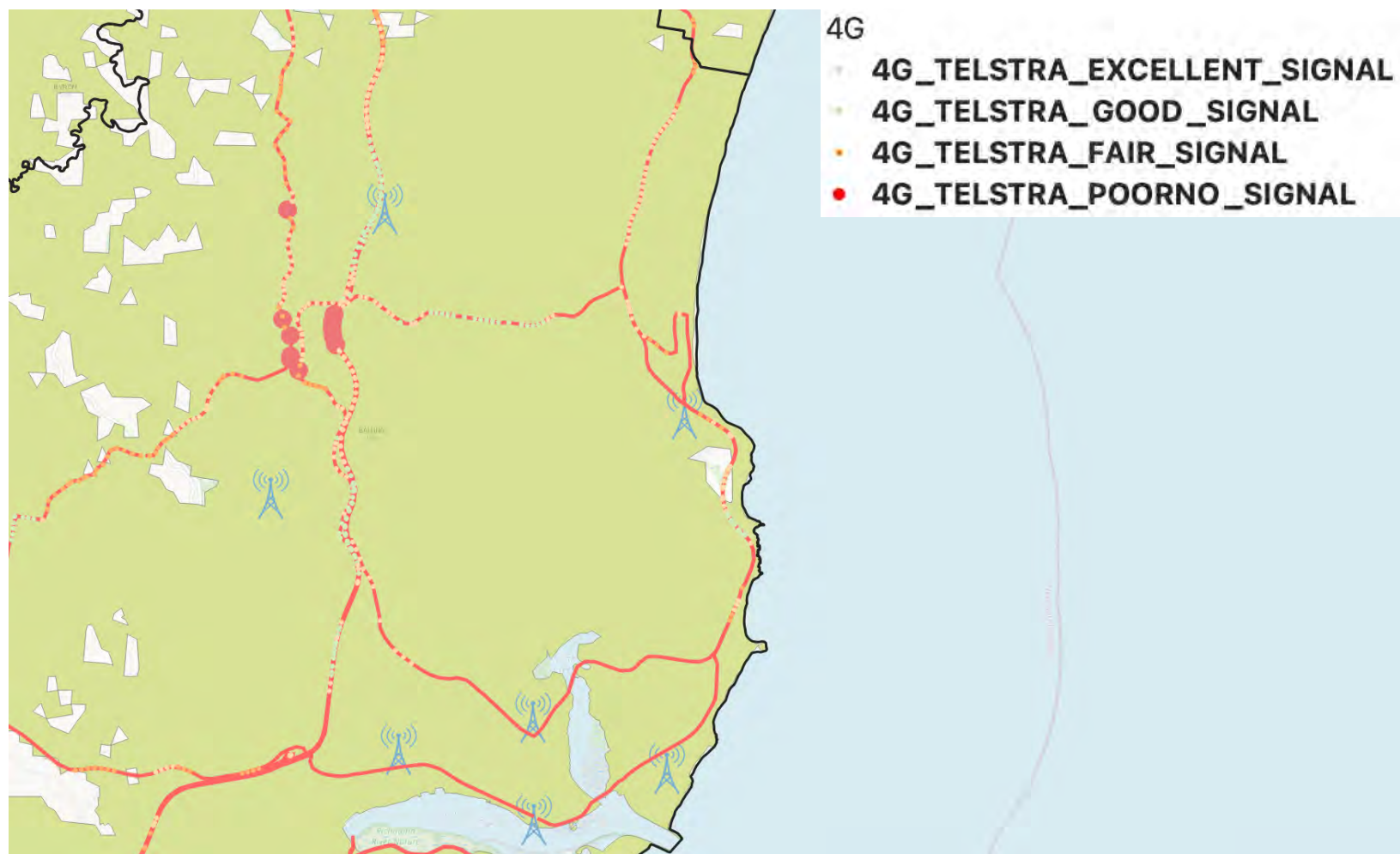


Ballina Shire Analysis

The Coast Road / Byron Bay Road

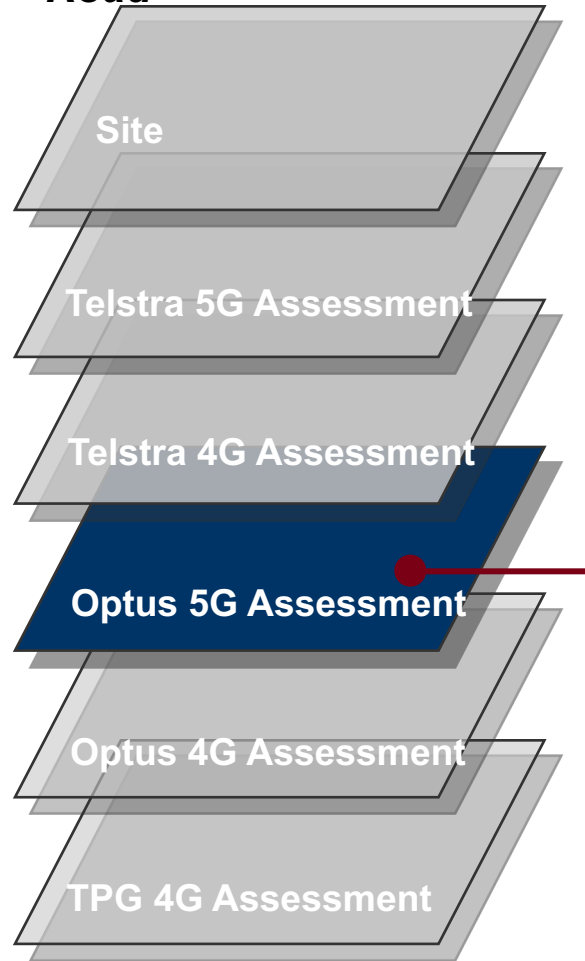


Assessment – Good 4G coverage



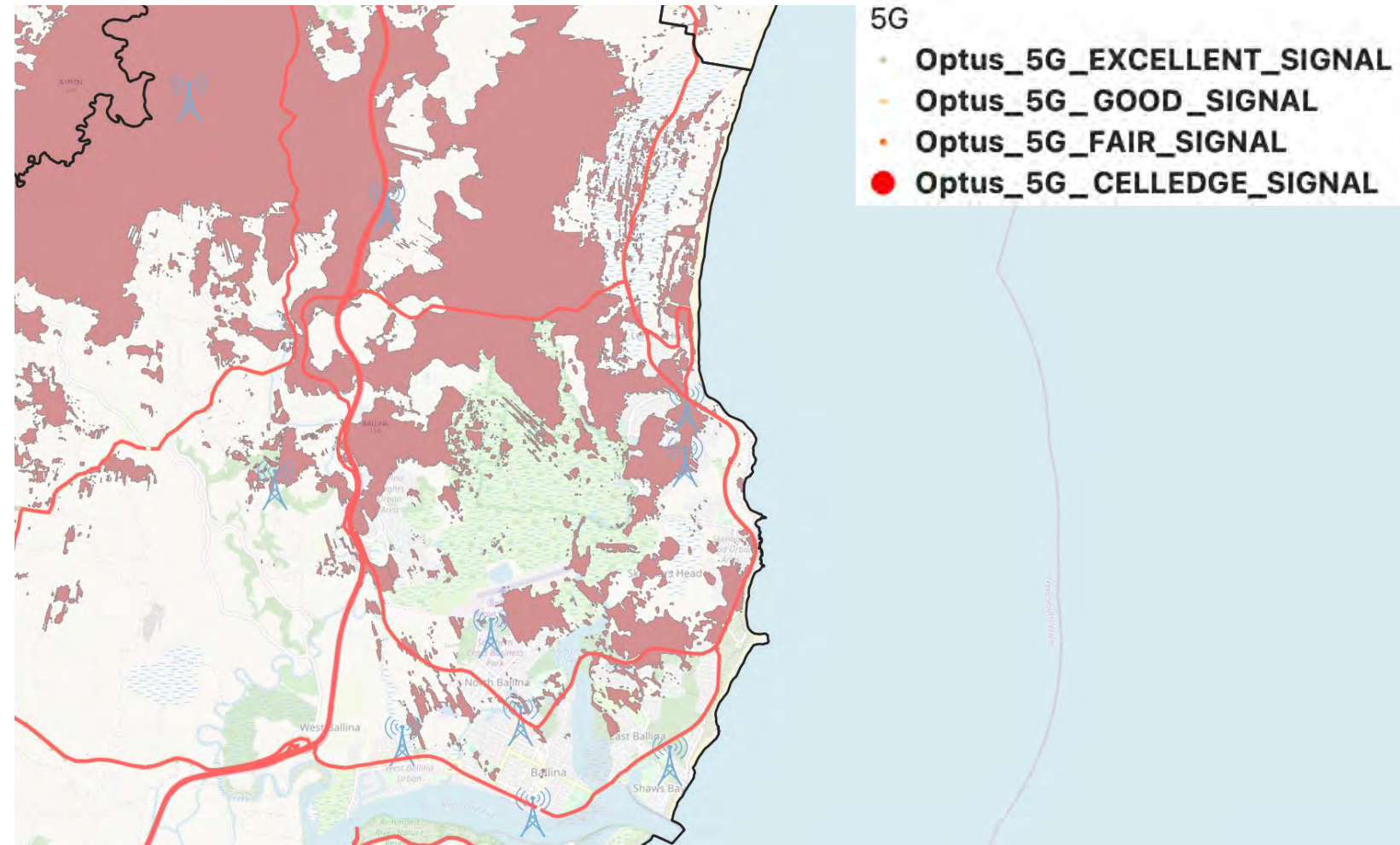
Ballina Shire Analysis

The Coast Road / Byron Bay Road



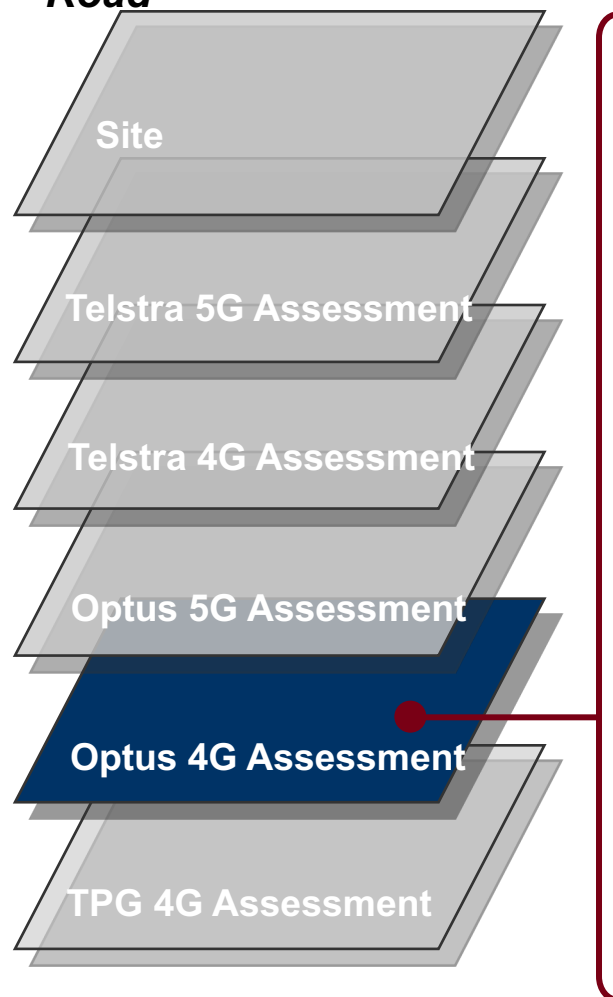
Assessment - No current Optus 5G coverage inside or outside of coverage mapping

Action –Optus / Fed Govt – up to 2 new 5G Tower sites

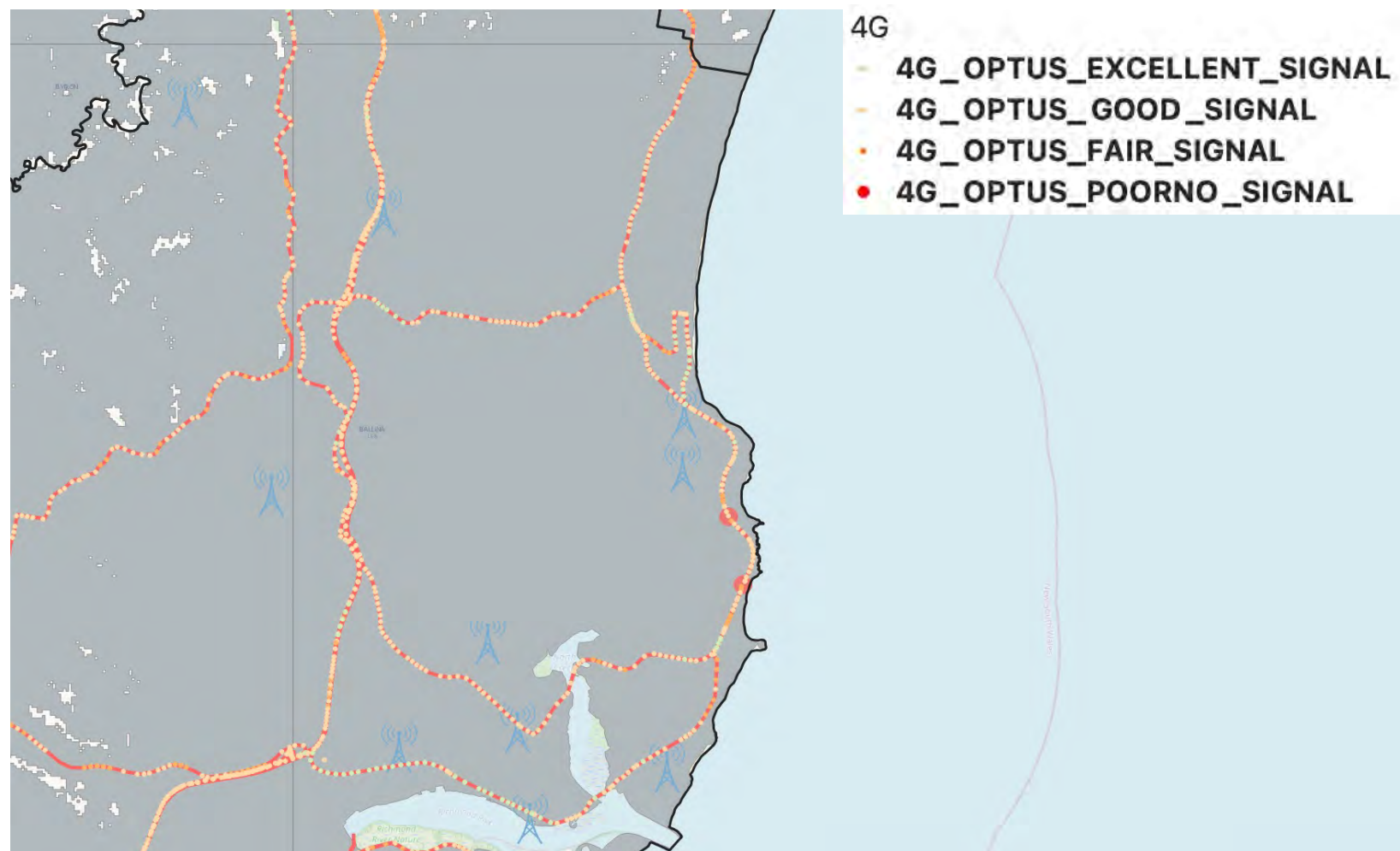


Ballina Shire Analysis

The Coast Road / Byron Bay Road

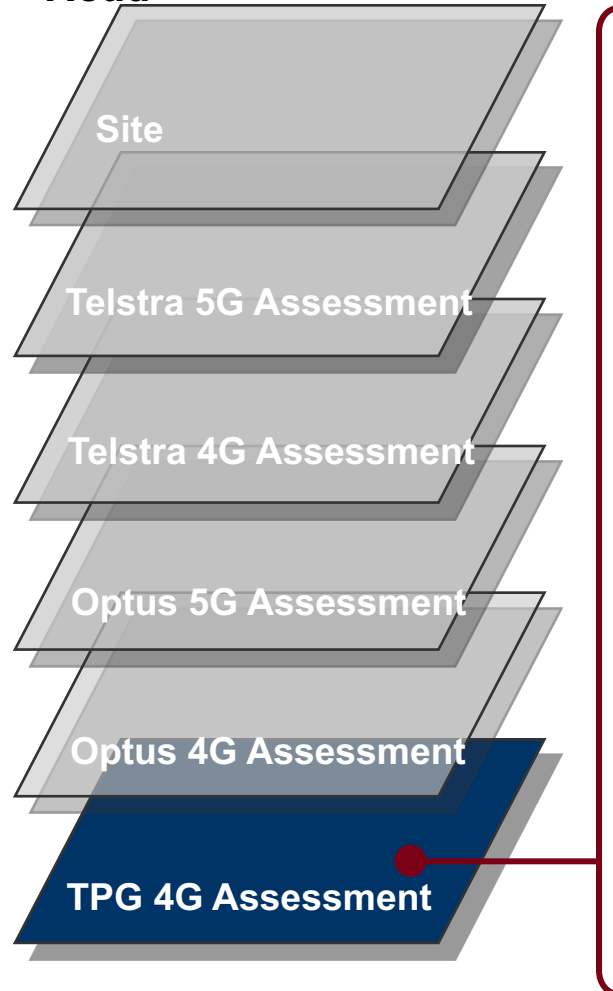


Assessment – Good 4G coverage



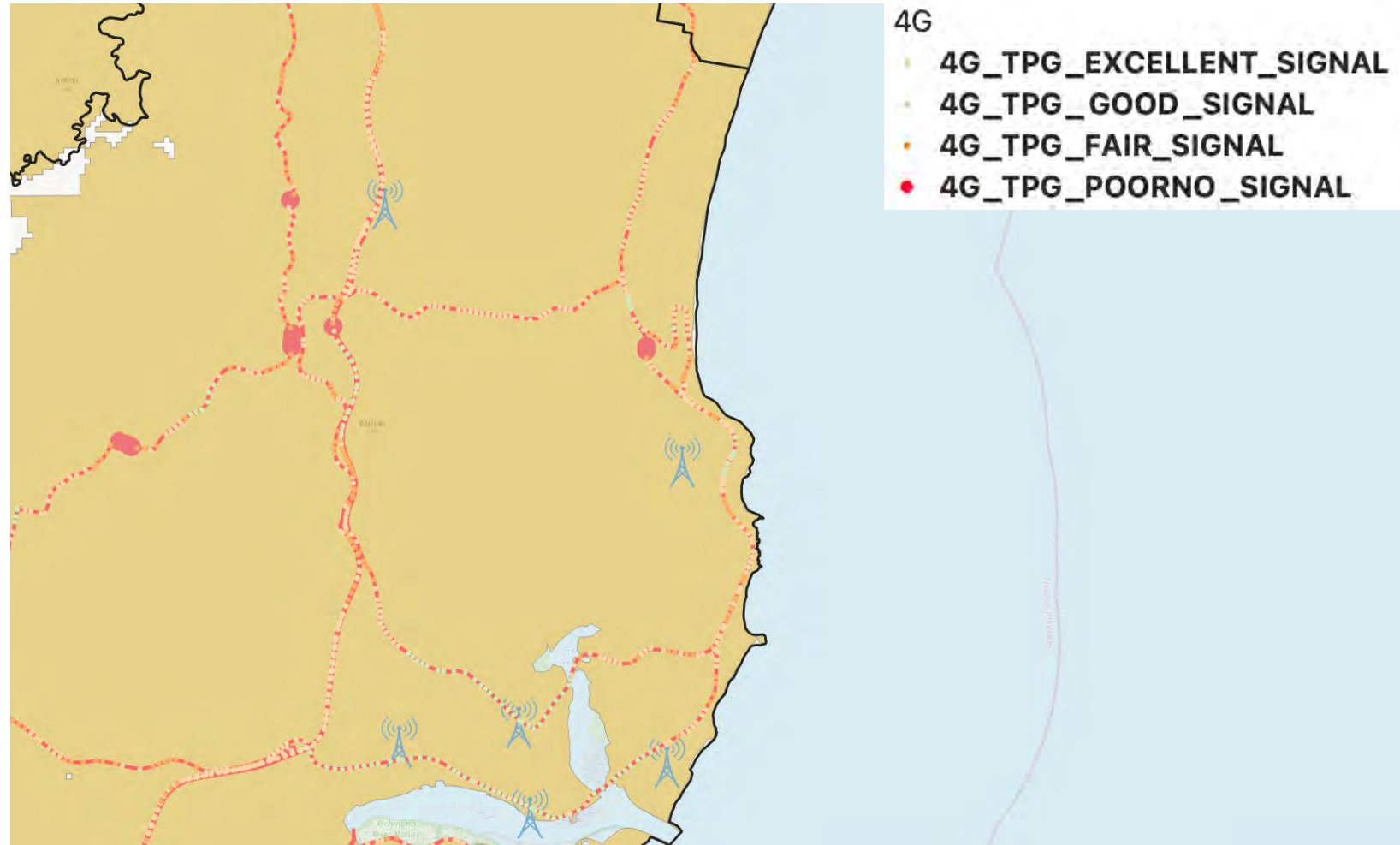
Ballina Shire Analysis

The Coast Road / Byron Bay Road

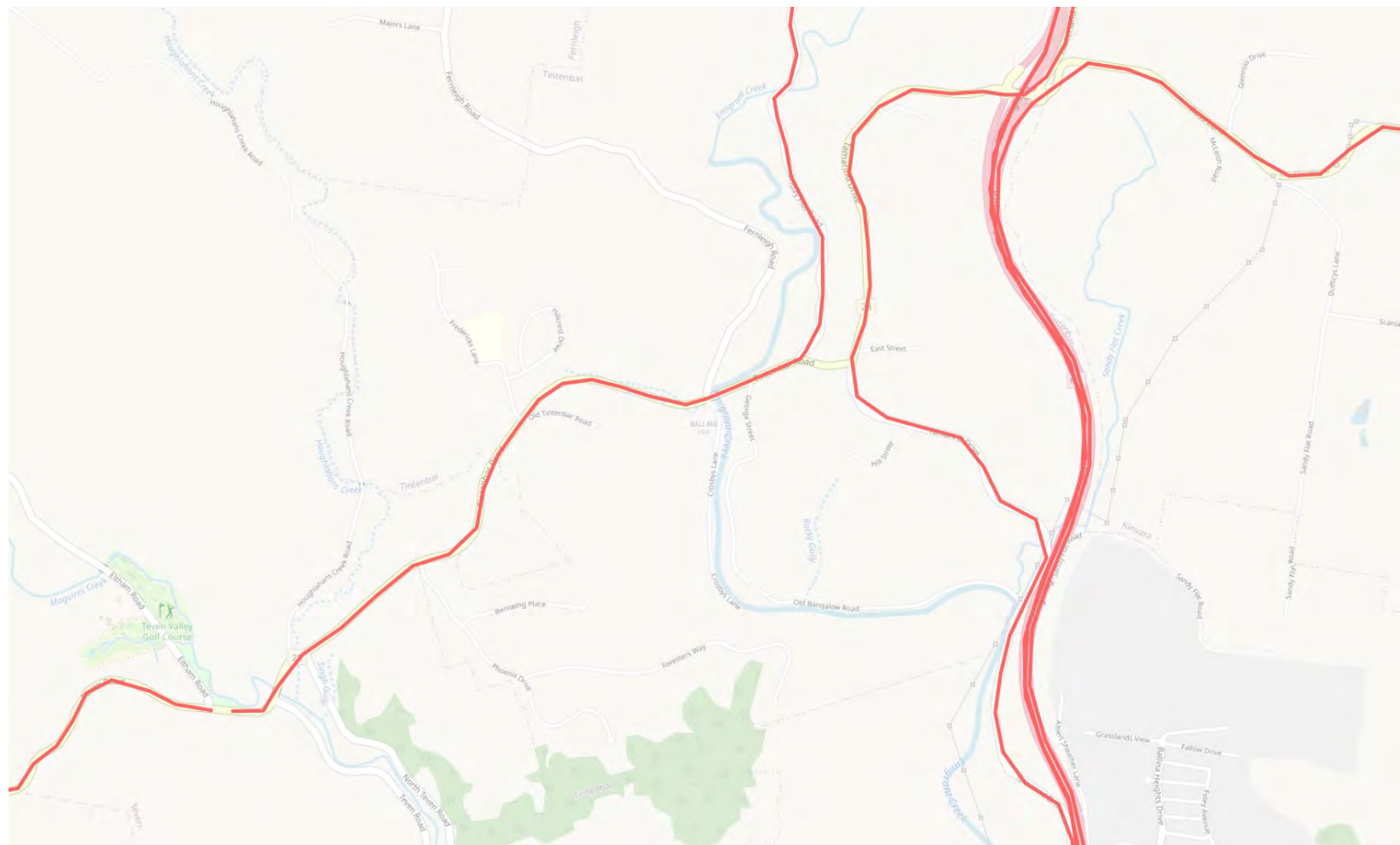


Assessment – Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – up to 2 new 4G Tower sites

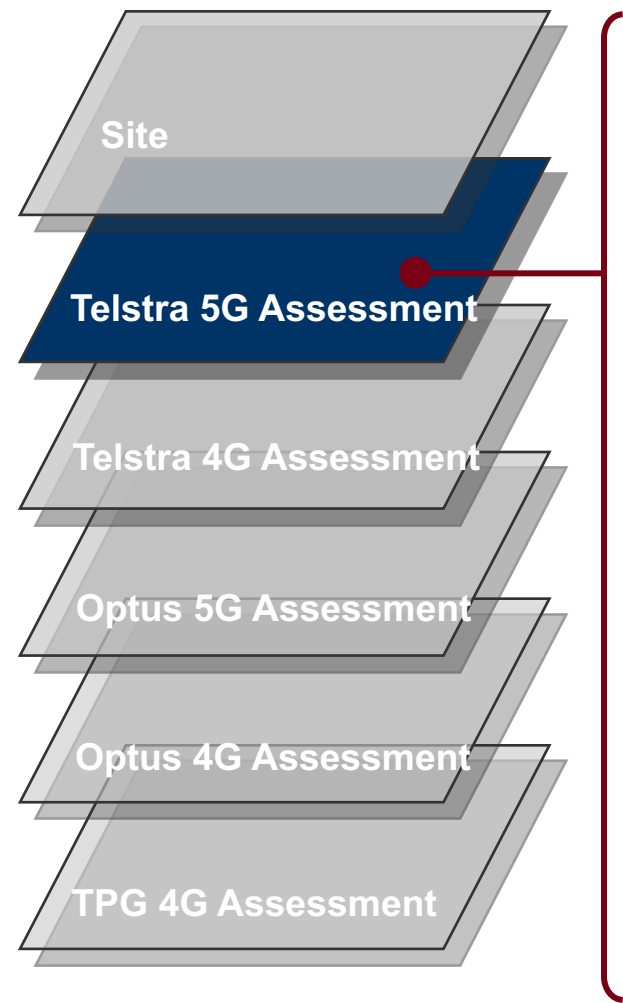


Tintenbar Road



Ballina Shire Analysis

Tintenbar Road

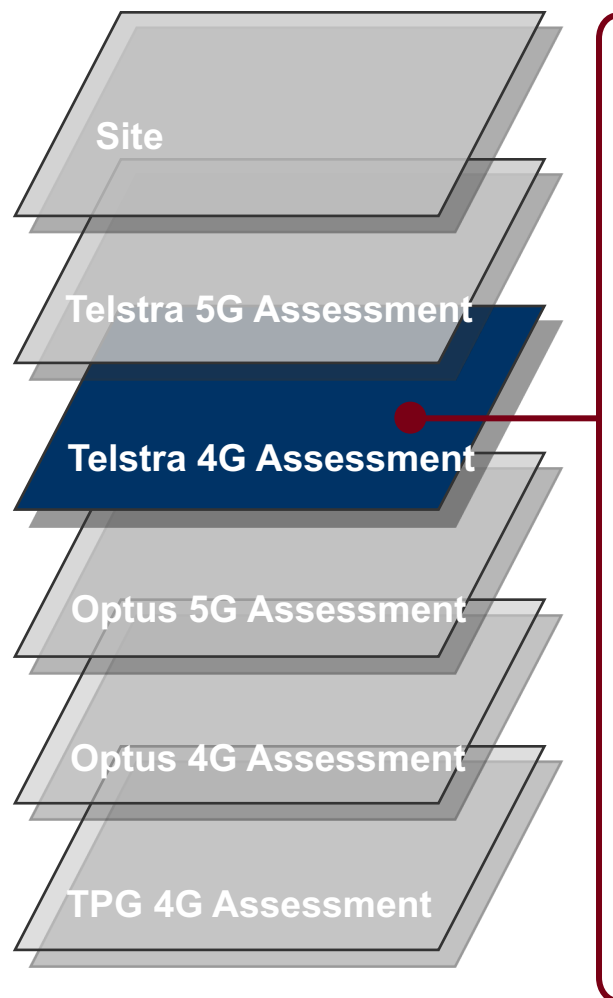


Assessment – No 5G coverage
Action – Telstra / Fed Govt – up to 2 new 5G Tower sites



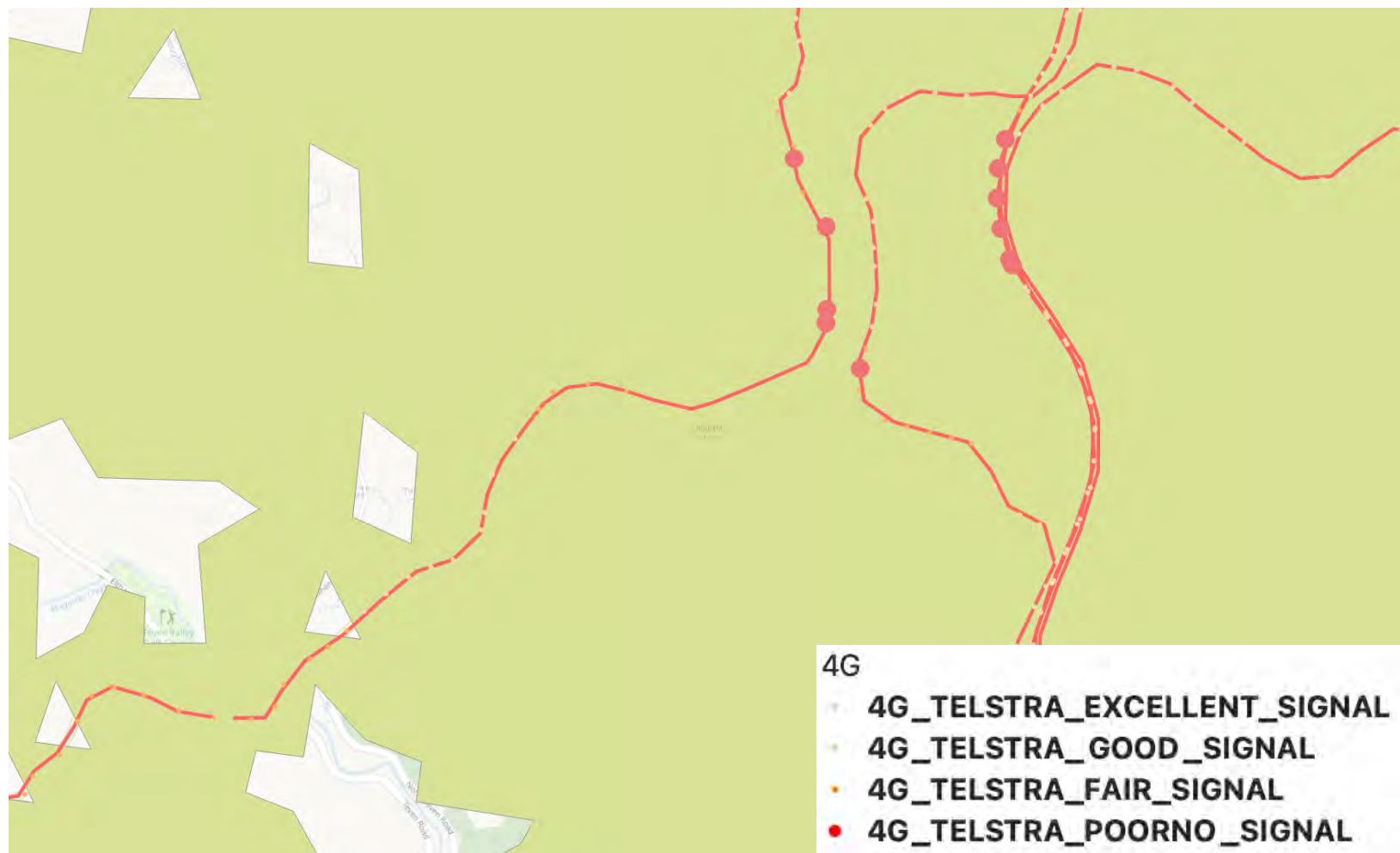
Ballina Shire Analysis

Tintenbar Road



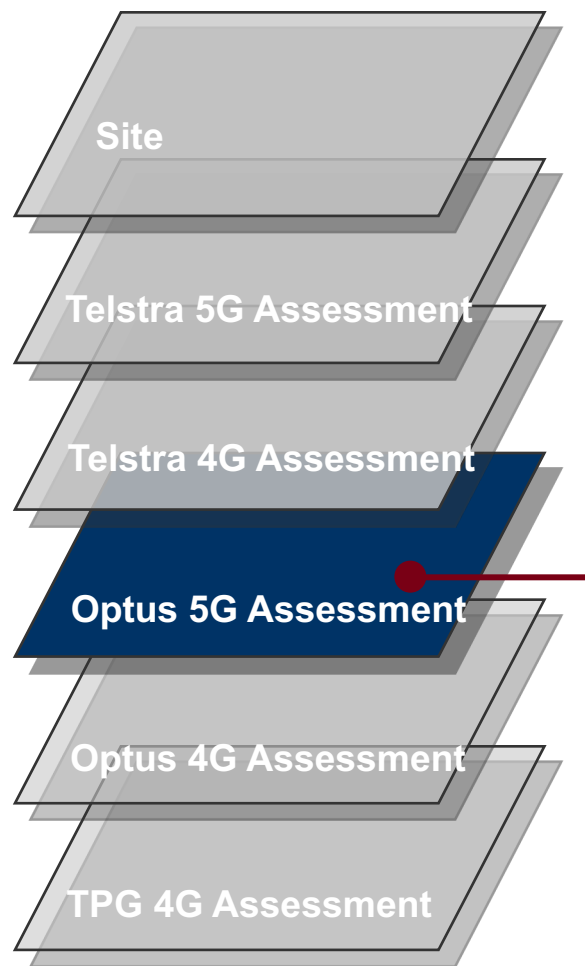
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action –Telstra / Fed Govt (MBSP) – 1 new 4G sites



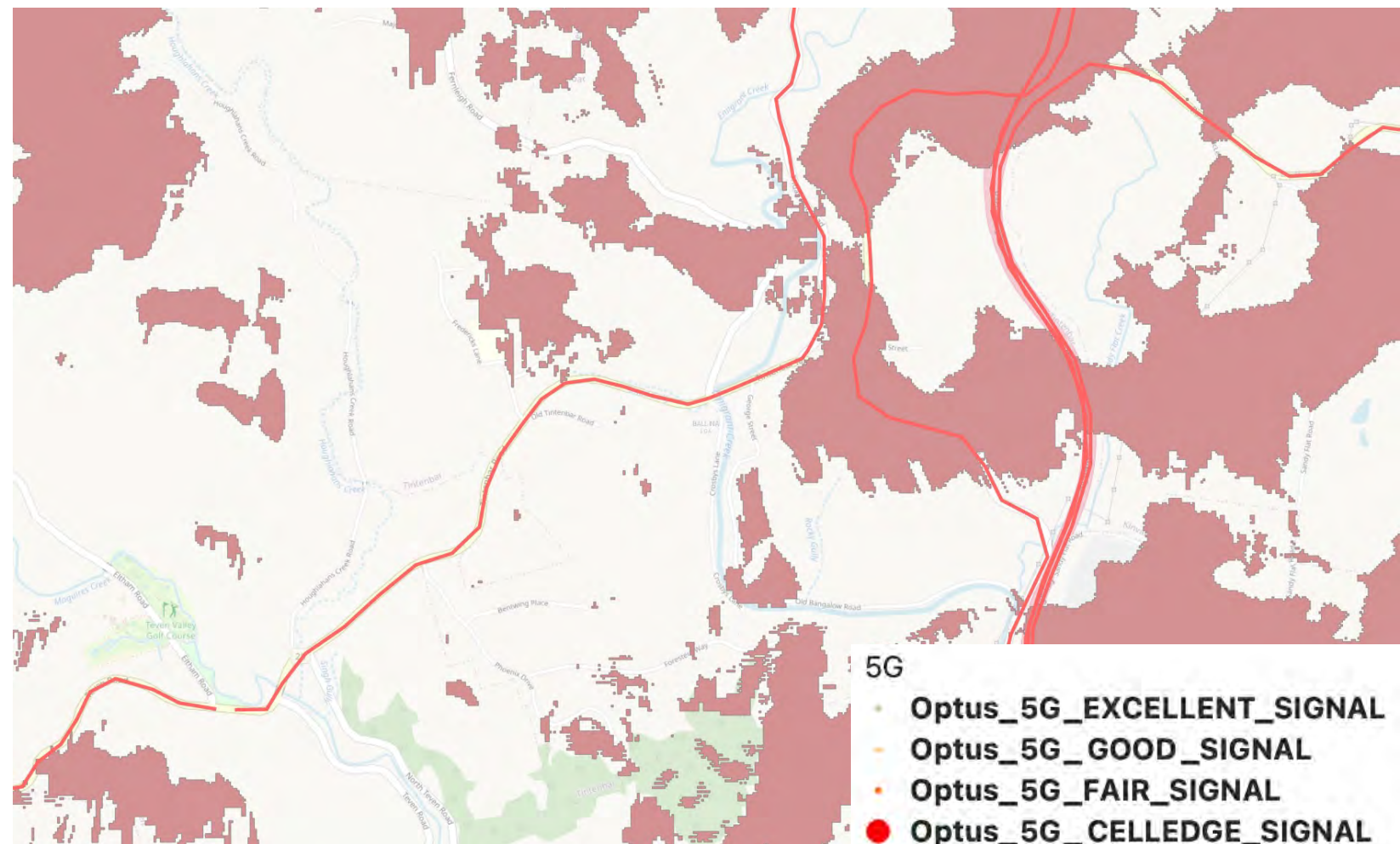
Ballina Shire Analysis

Tintenbar Road



Assessment - No current Optus 5G coverage

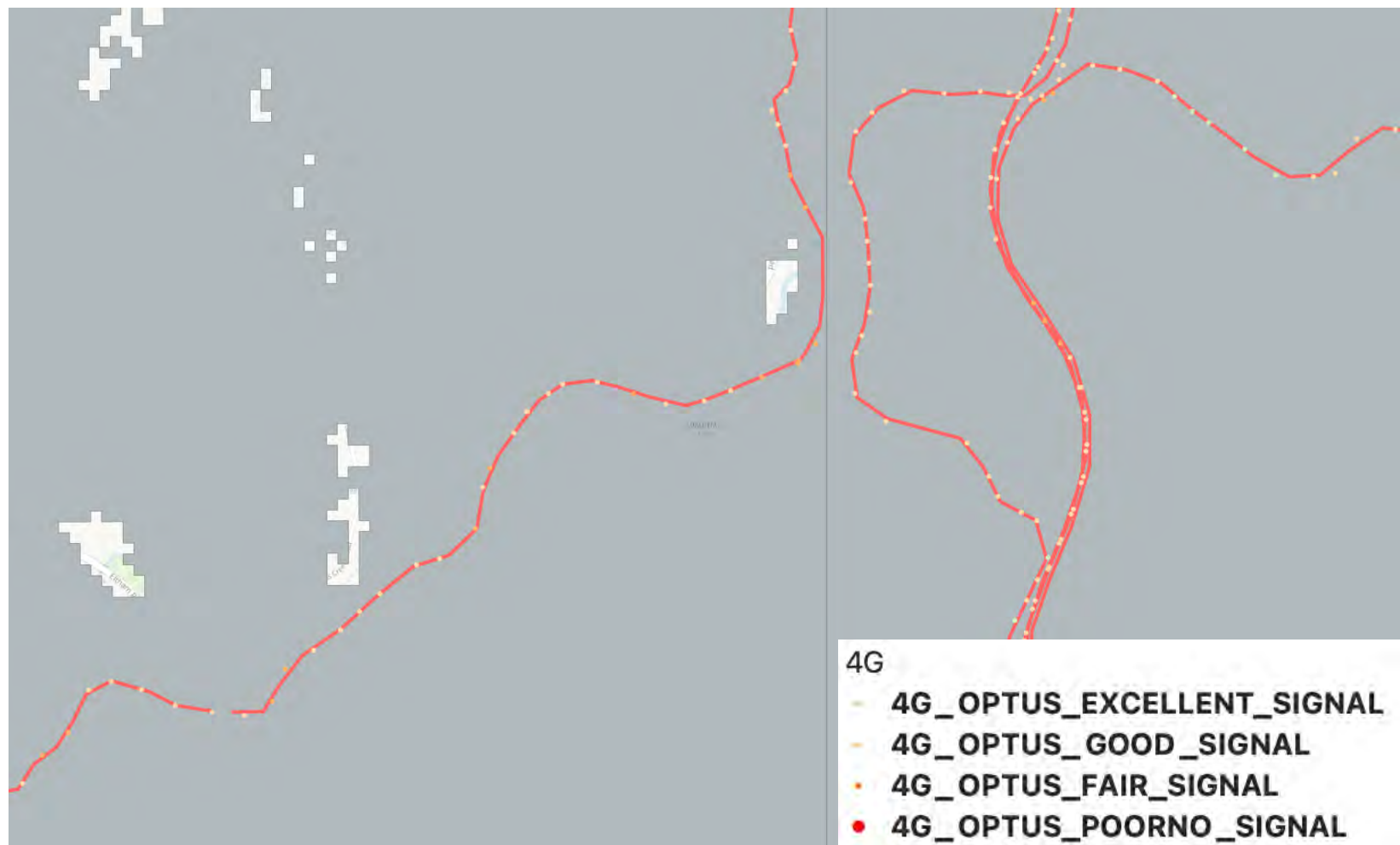
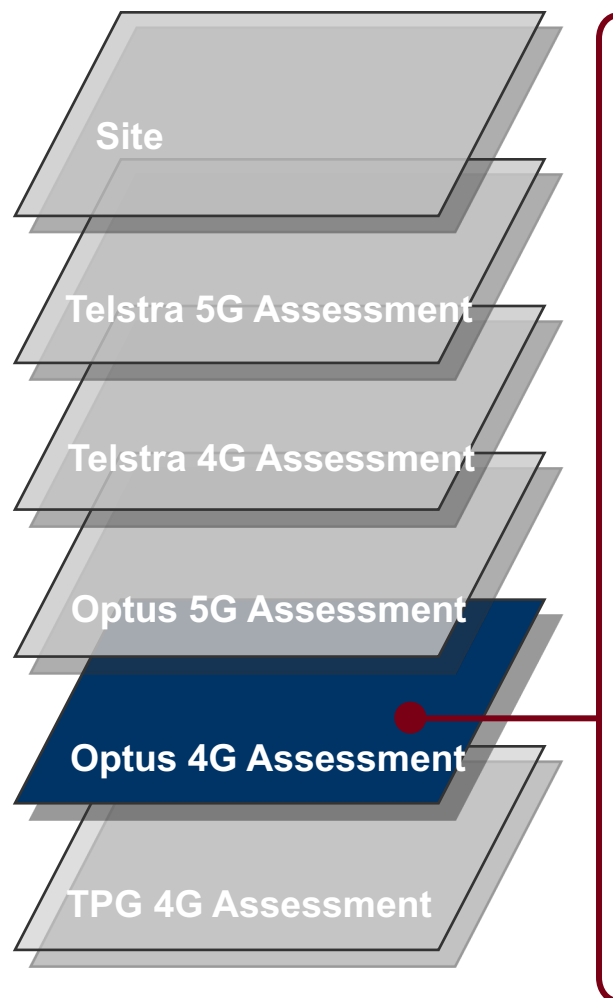
Action –Optus / Fed Govt – up to 2 new 5G Tower sites



Ballina Shire Analysis

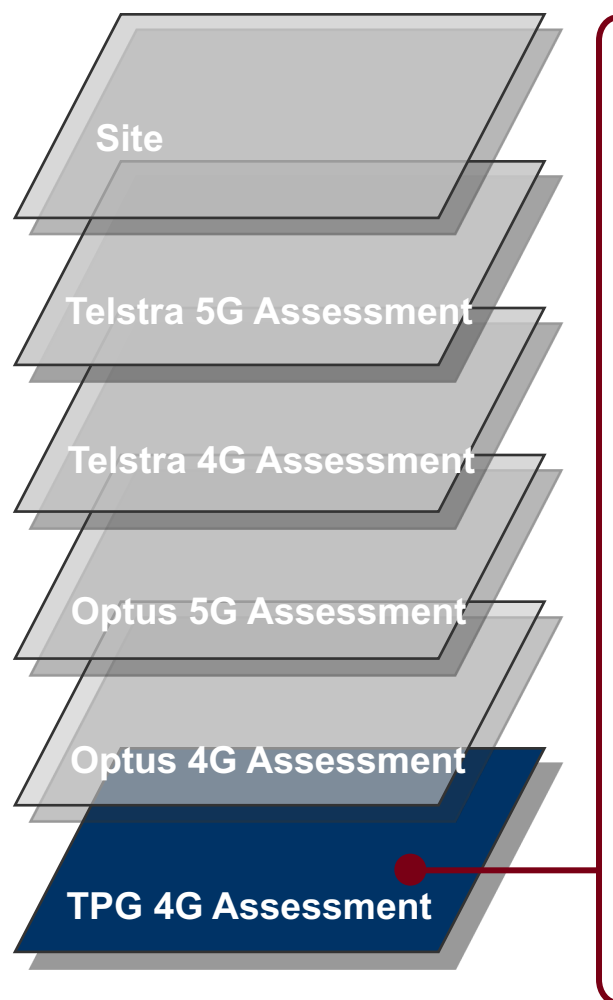
Tintenbar Road

Assessment – Good 4G coverage



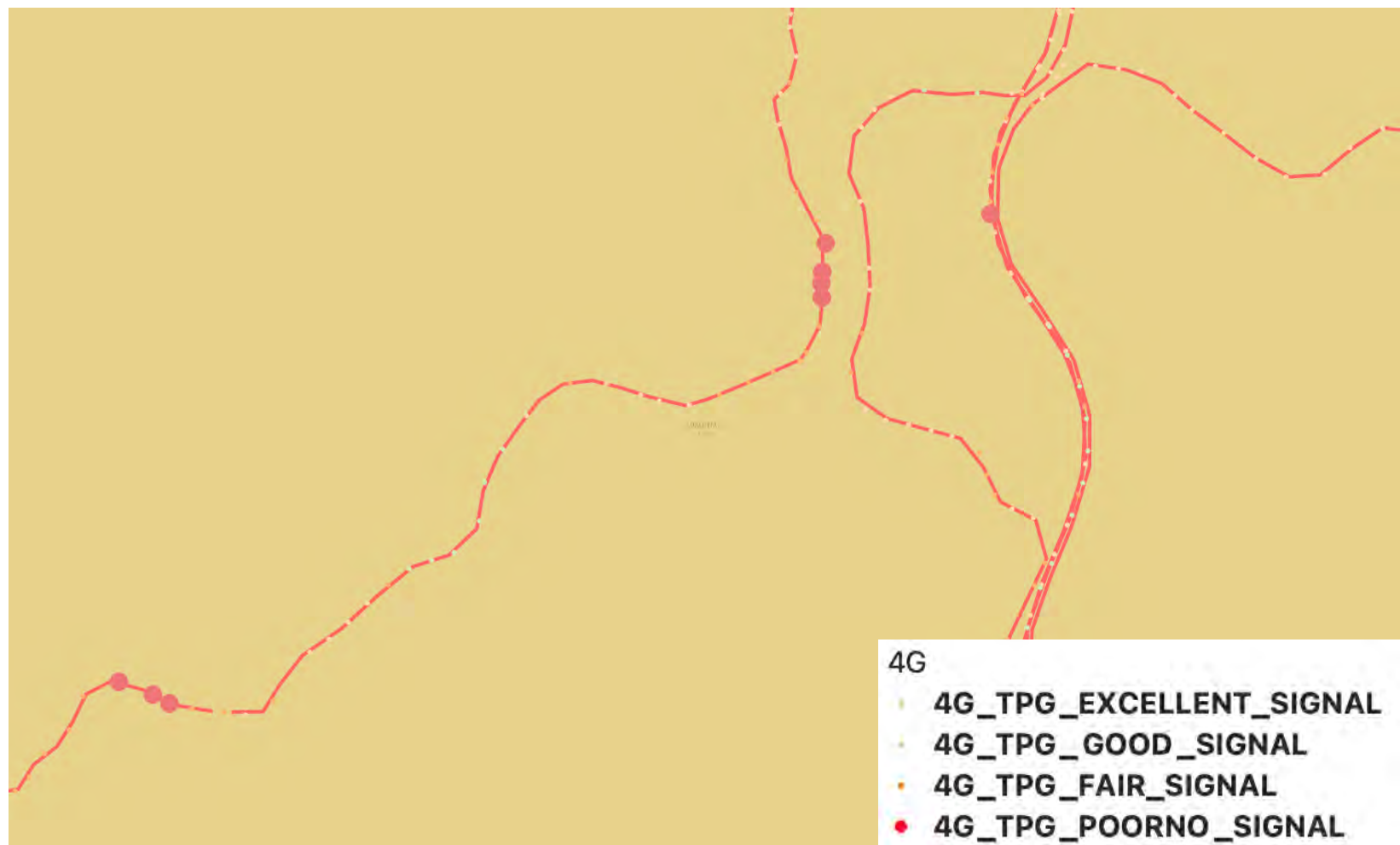
Ballina Shire Analysis

Tintenbar Road



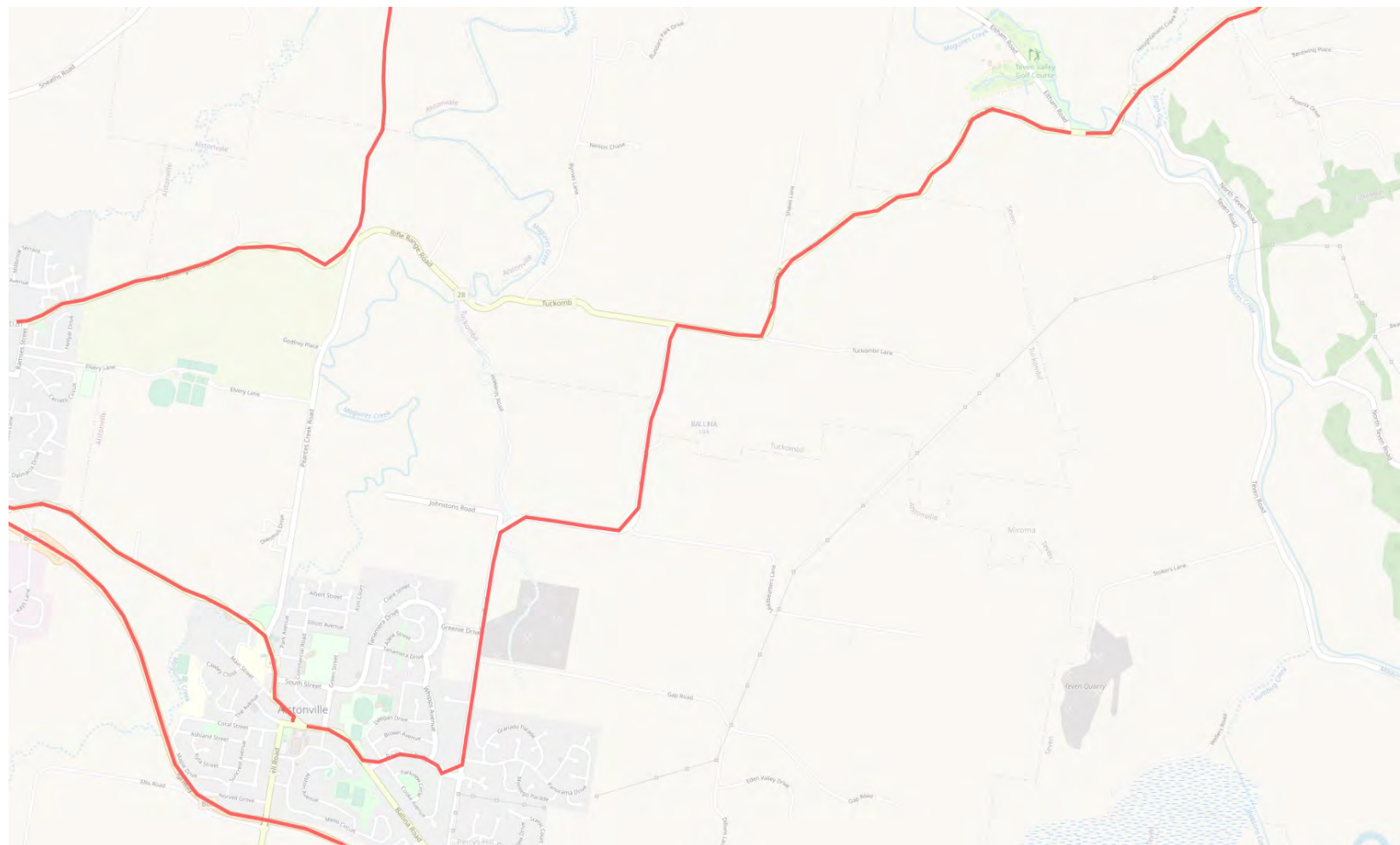
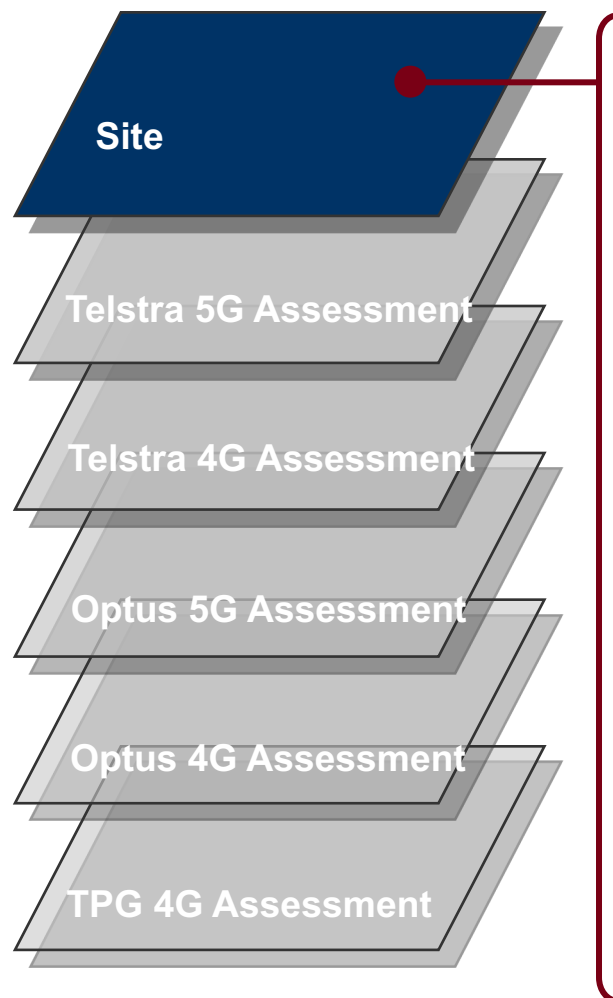
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – TPG / Fed Govt (MBSP) – 1 new 4G sites



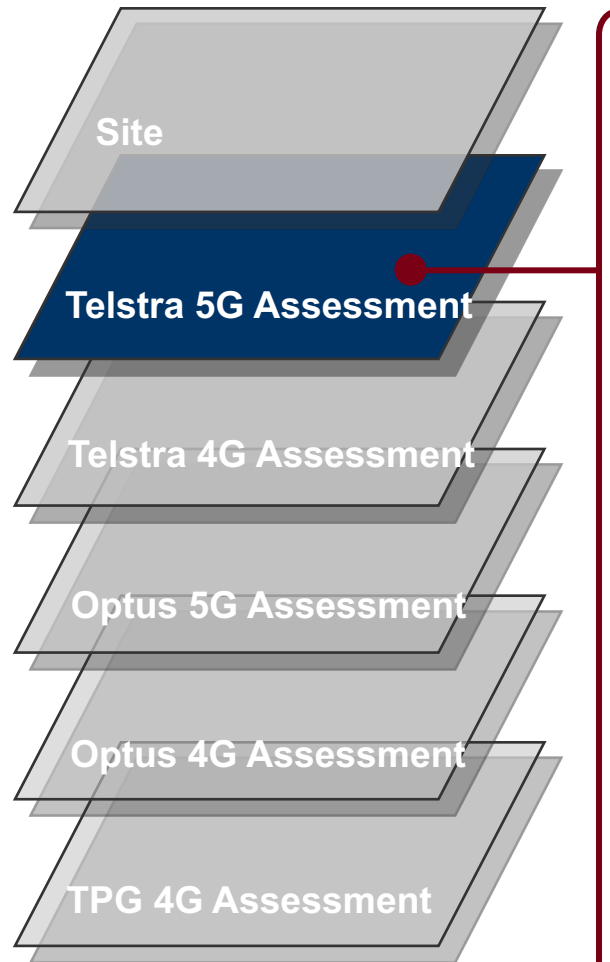
Ballina Shire Analysis

Teven Road



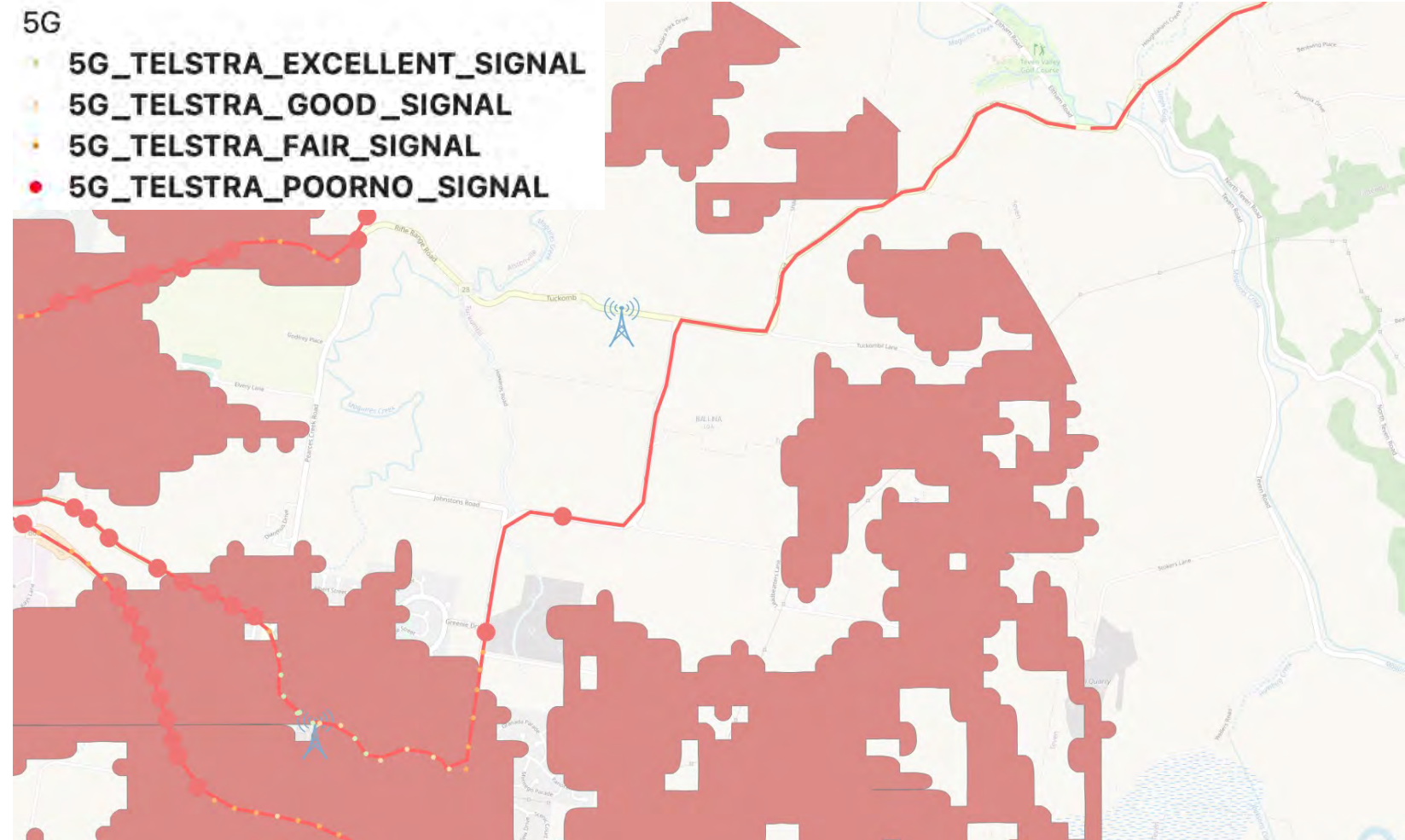
Ballina Shire Analysis

Teven Road



Assessment – Initial 5G coverage near Alstonville. Broad 5G blackspot areas

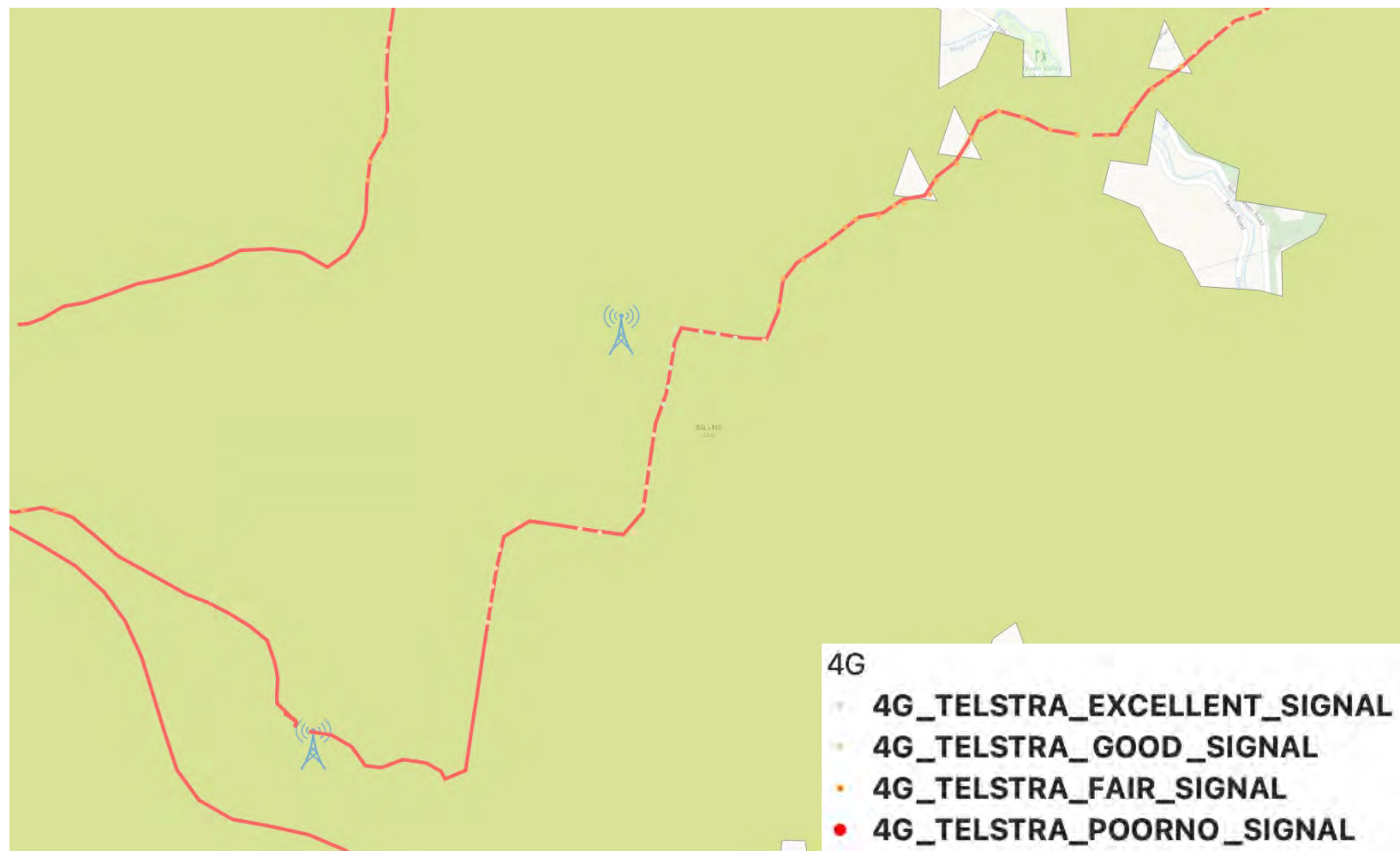
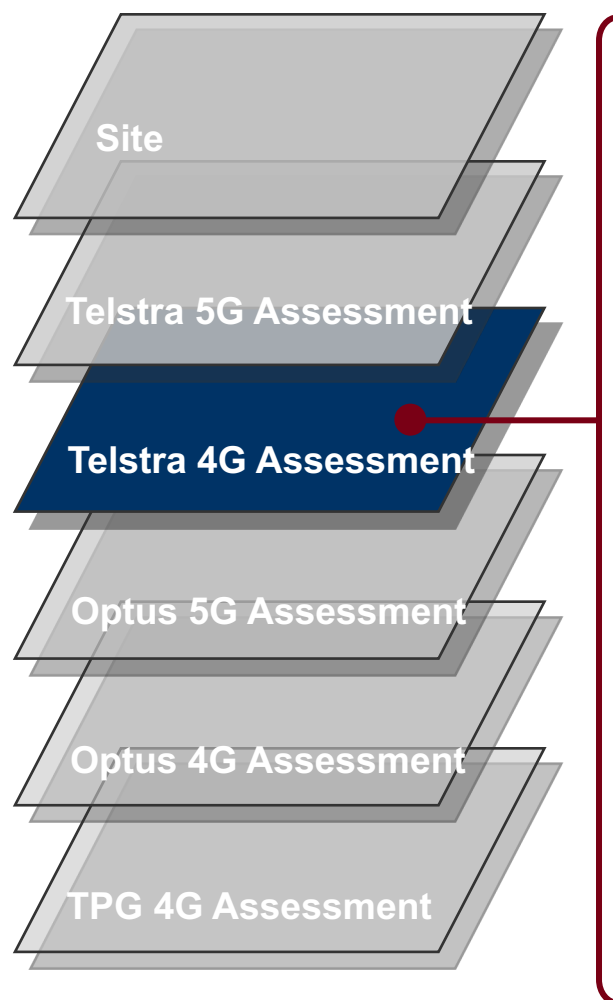
Action – Telstra – Upgrade 1 x Site to 5G & Telstra / Fed Govt – 1 new 5G Tower sites



Ballina Shire Analysis

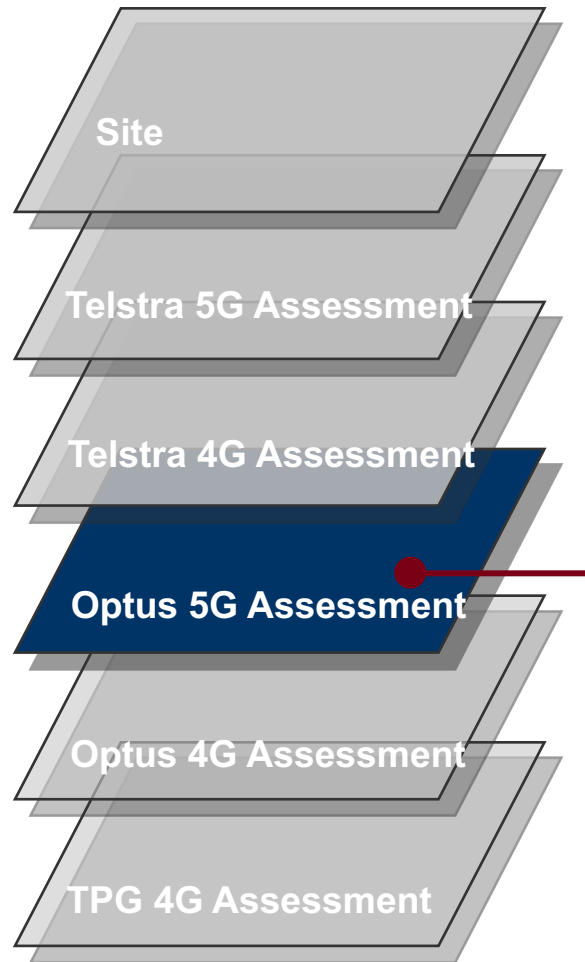
Teven Road

Assessment – Good 4G coverage



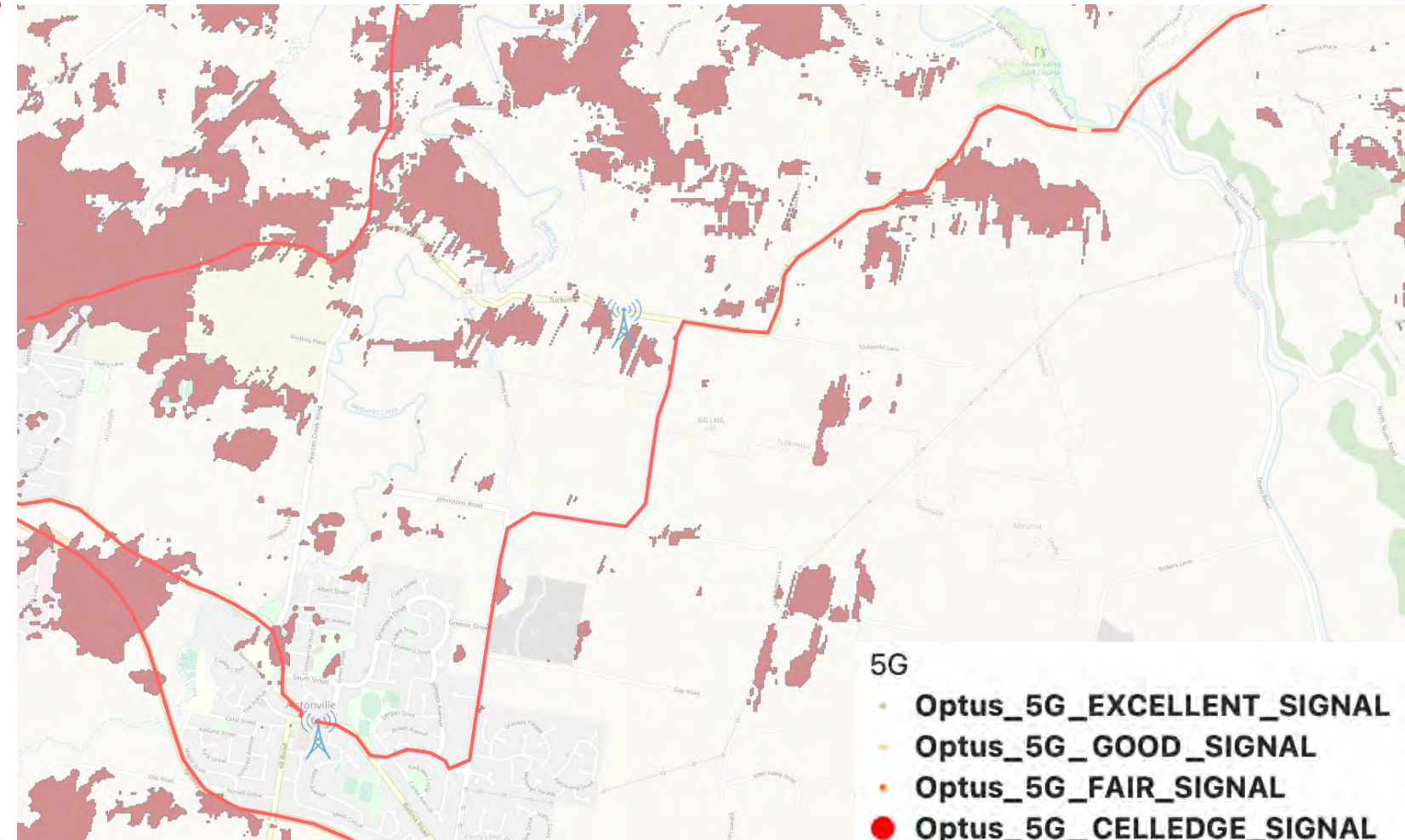
Ballina Shire Analysis

Teven Road



Assessment - No current Optus 5G coverage

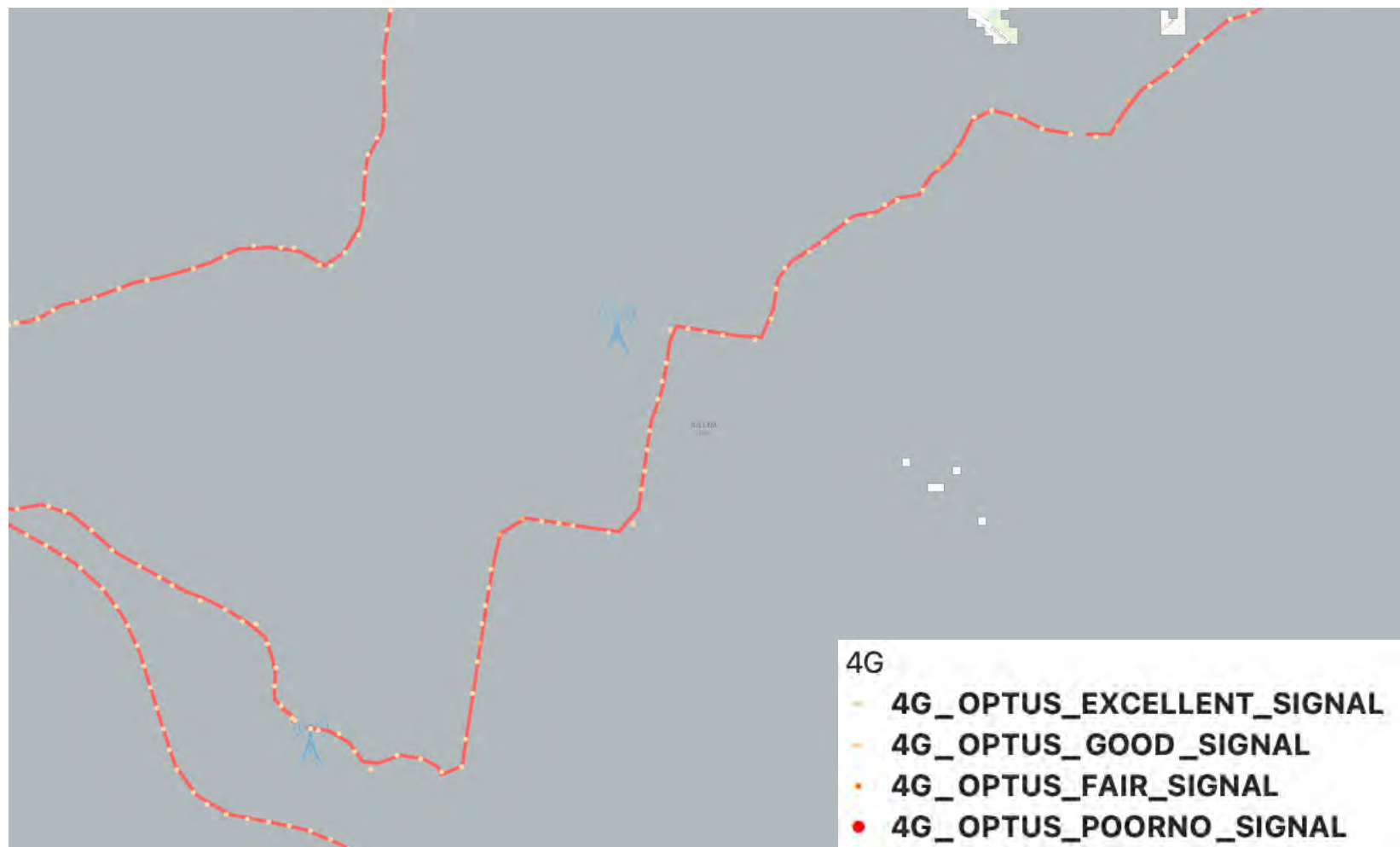
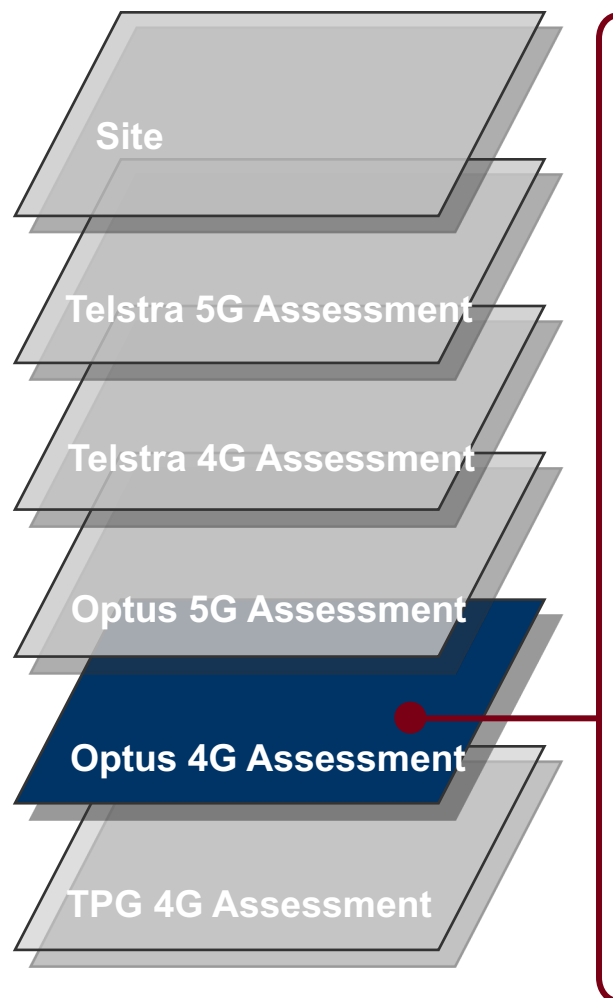
Action – Optus - Upgrade 2 x Sites to 5G lowband / midband & Optus / Fed Govt – up to 2 new 5G Tower sites



Ballina Shire Analysis

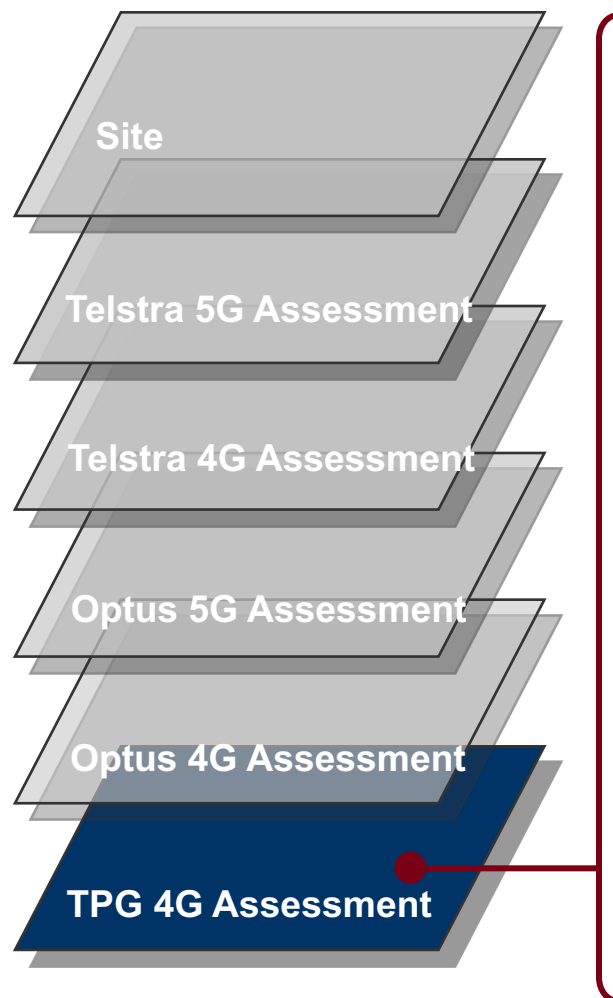
Teven Road

Assessment – Good 4G coverage



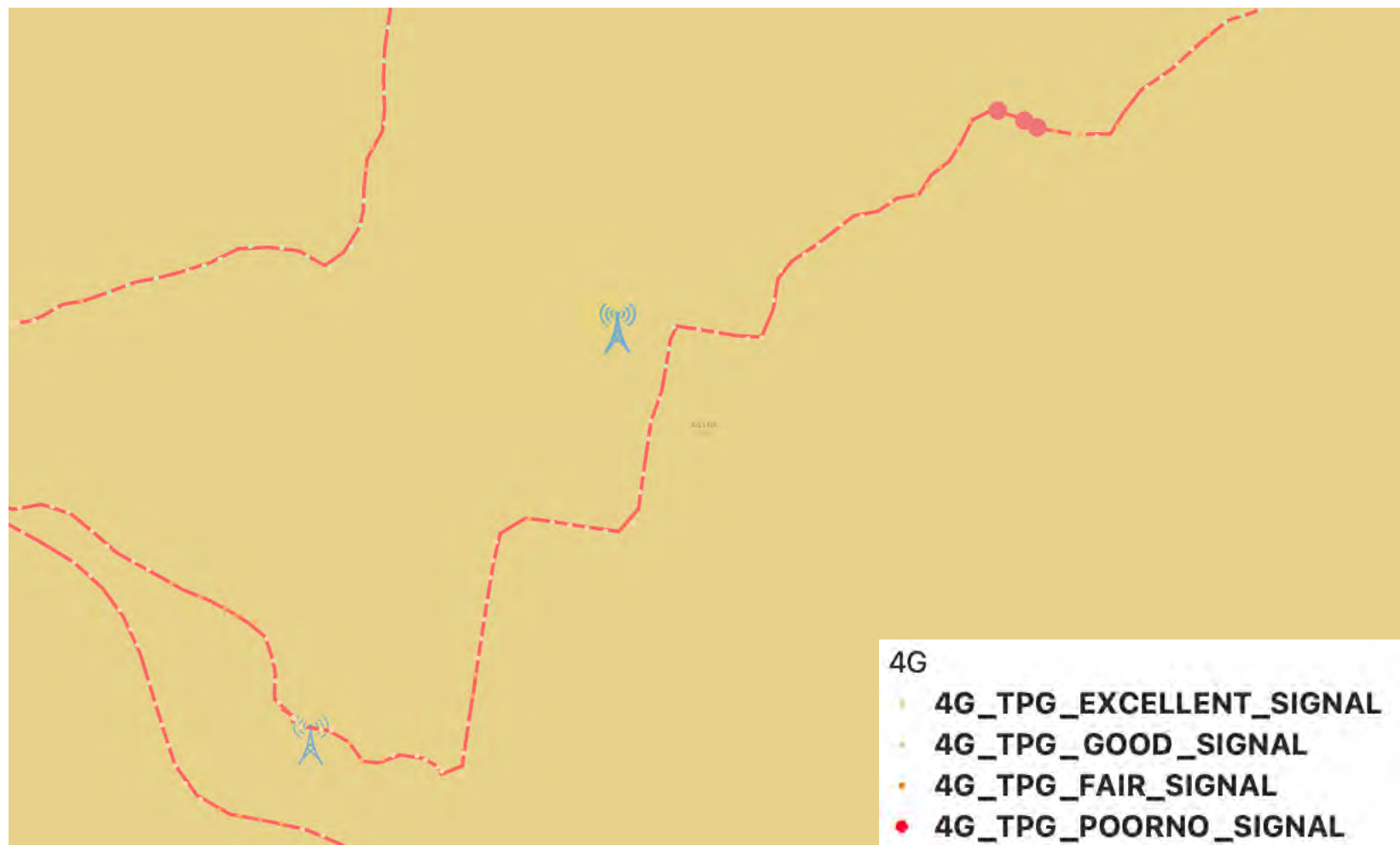
Ballina Shire Analysis

Teven Road



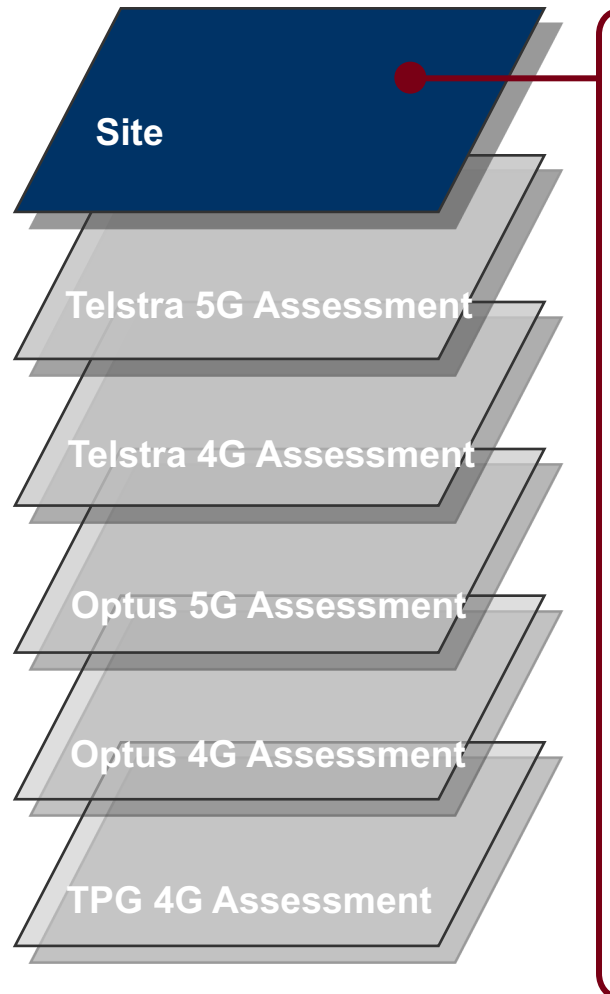
Assessment - Mixture of Good and Poor / Fair 4G coverage with some Blackspot areas

Action – TPG/ Fed Govt (MBSP) – 1 new 4G sites



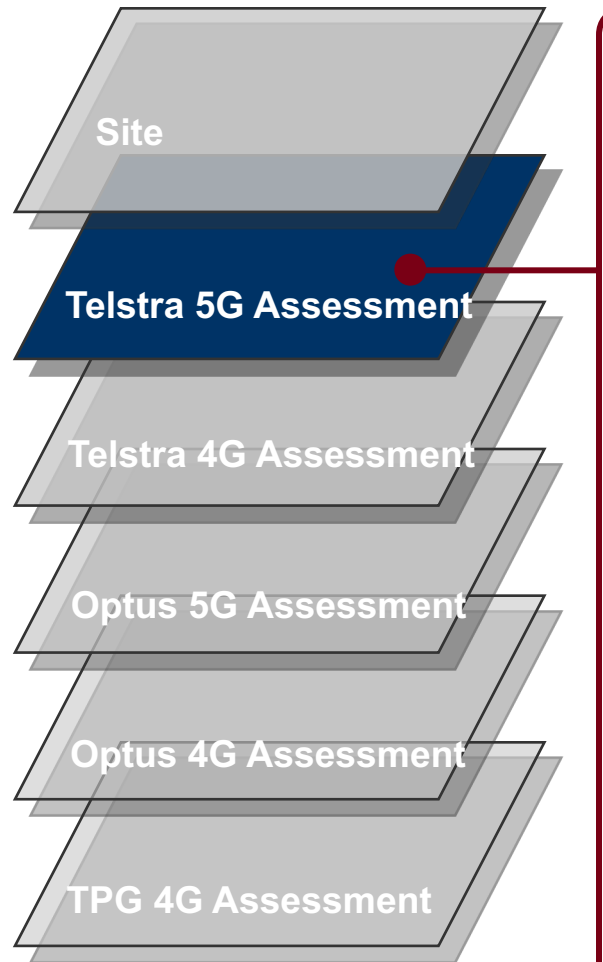
Ballina Shire Analysis

River Drive



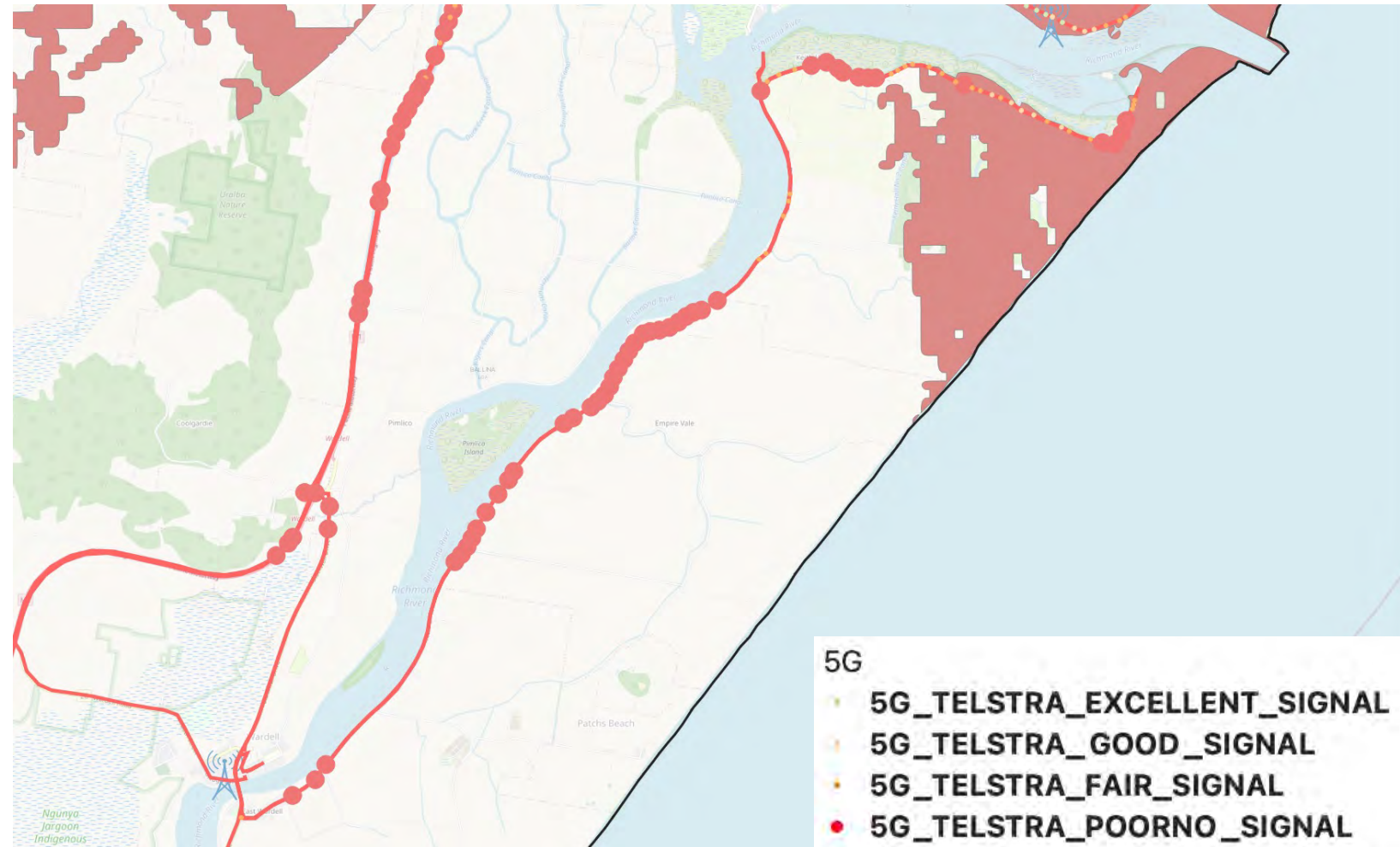
Ballina Shire Analysis

River Drive



Assessment – Initial 5G coverage near Ballina. Broad 5G blackspot areas.

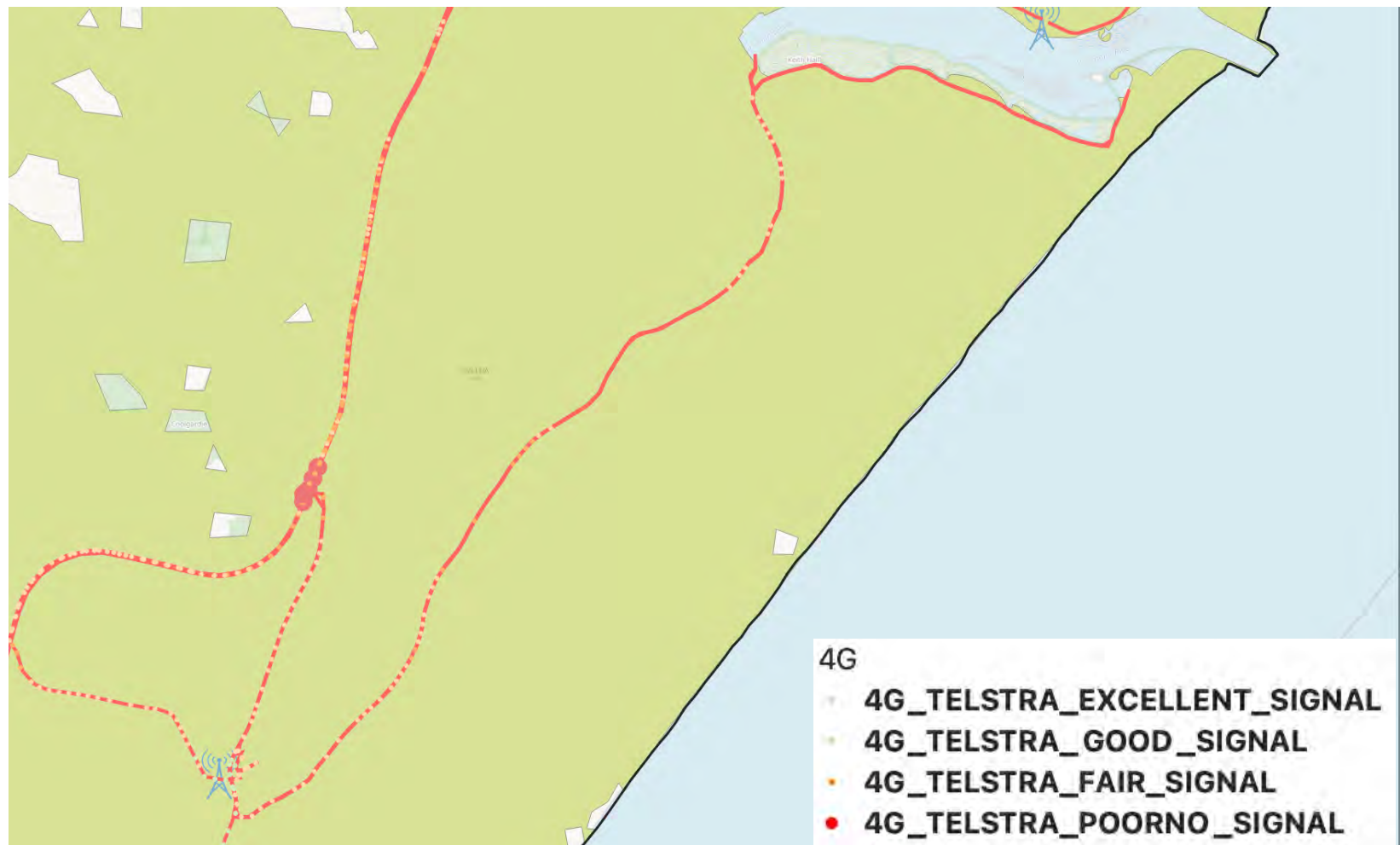
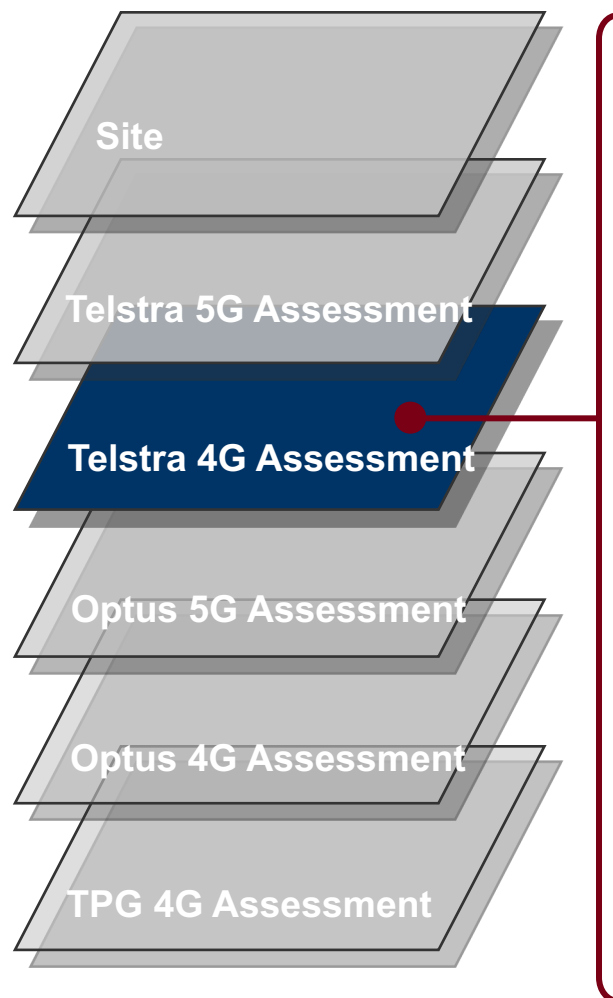
Action – Telstra - Upgrade 1 x Tower Sites with 5G & Telstra / Fed Govt – 1 new 5G Tower sites



Ballina Shire Analysis

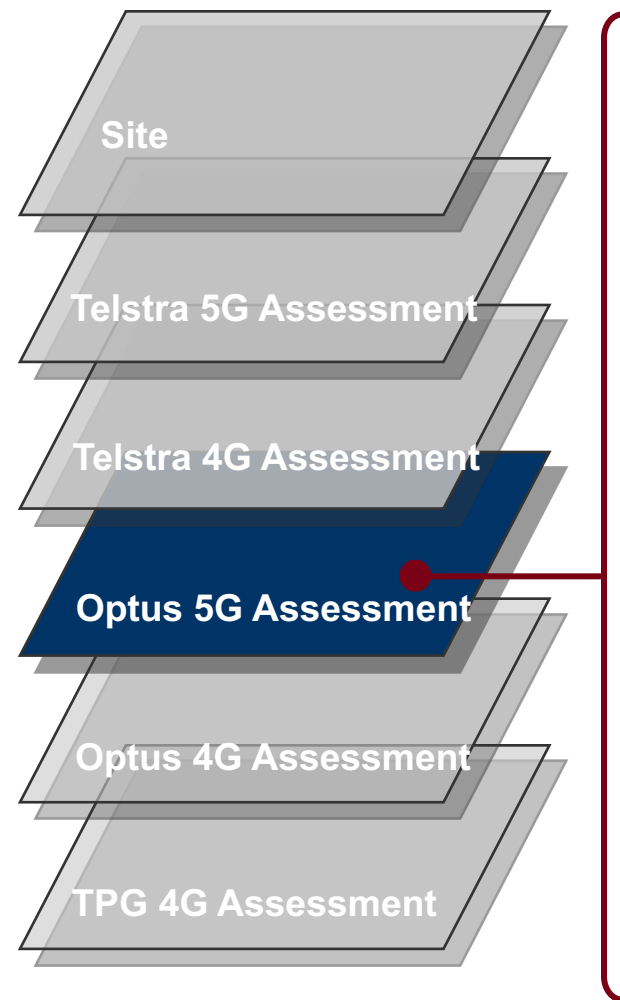
River Drive

Assessment – Good 4G coverage



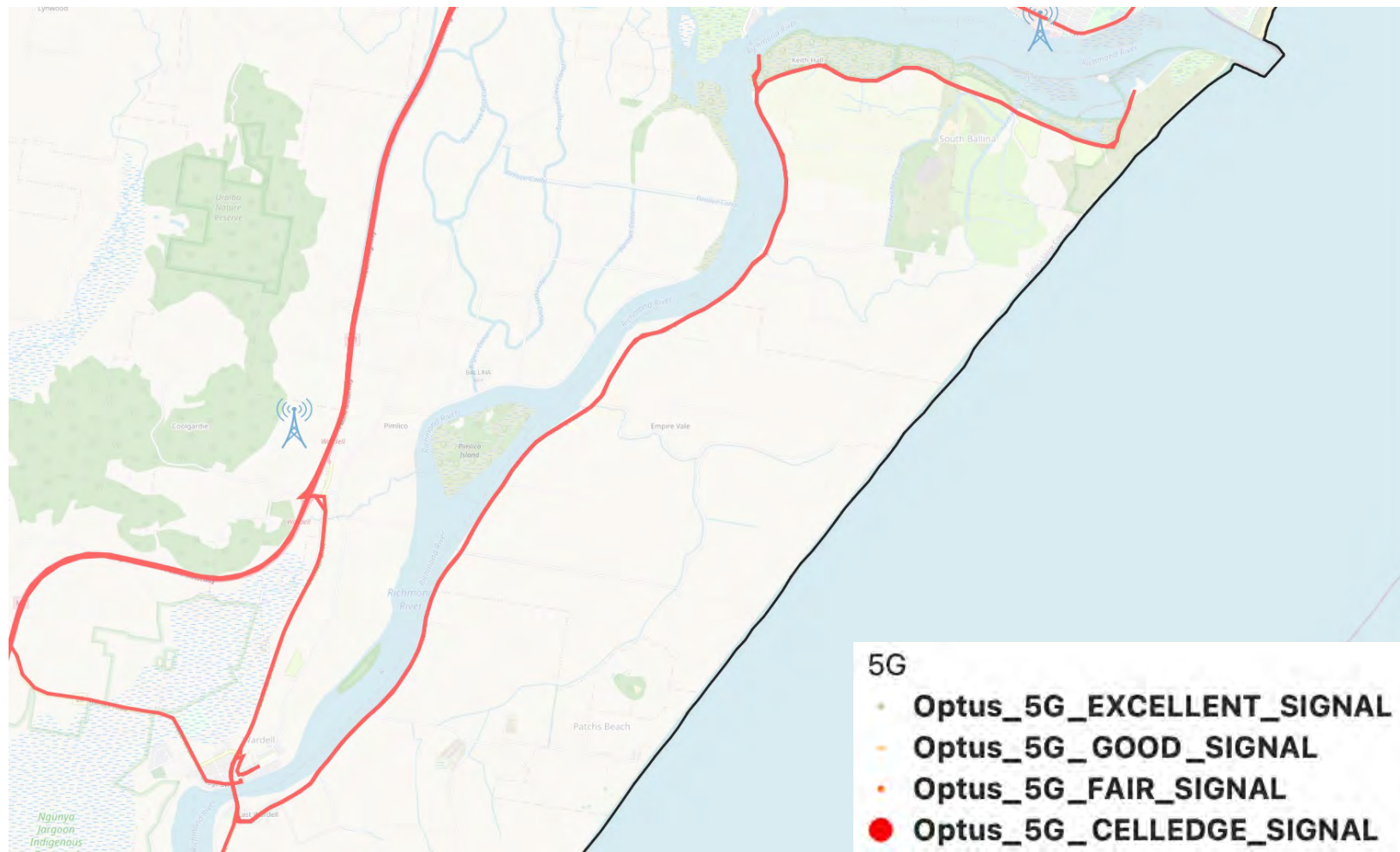
Ballina Shire Analysis

River Drive



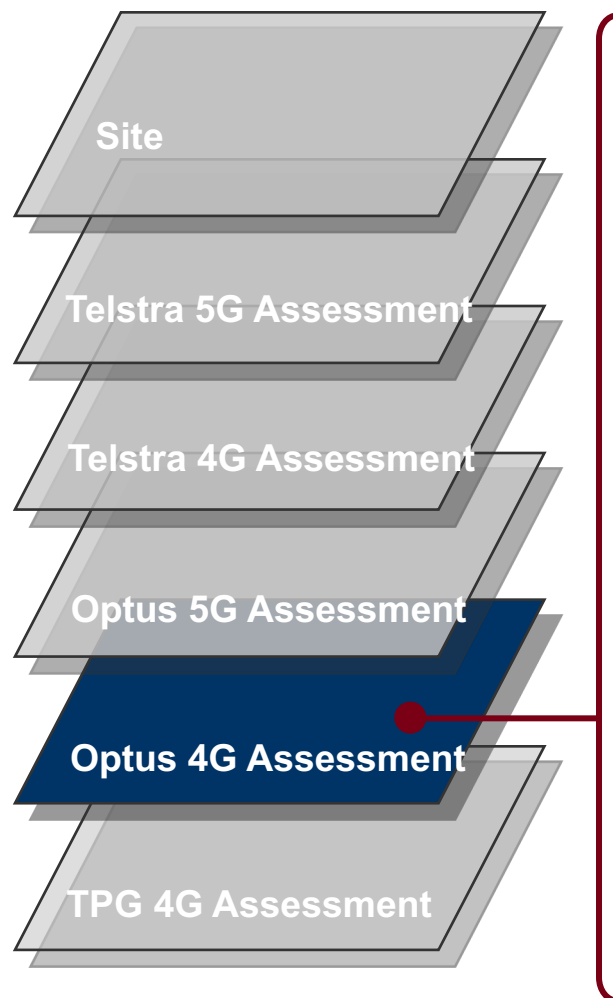
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 2 x Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



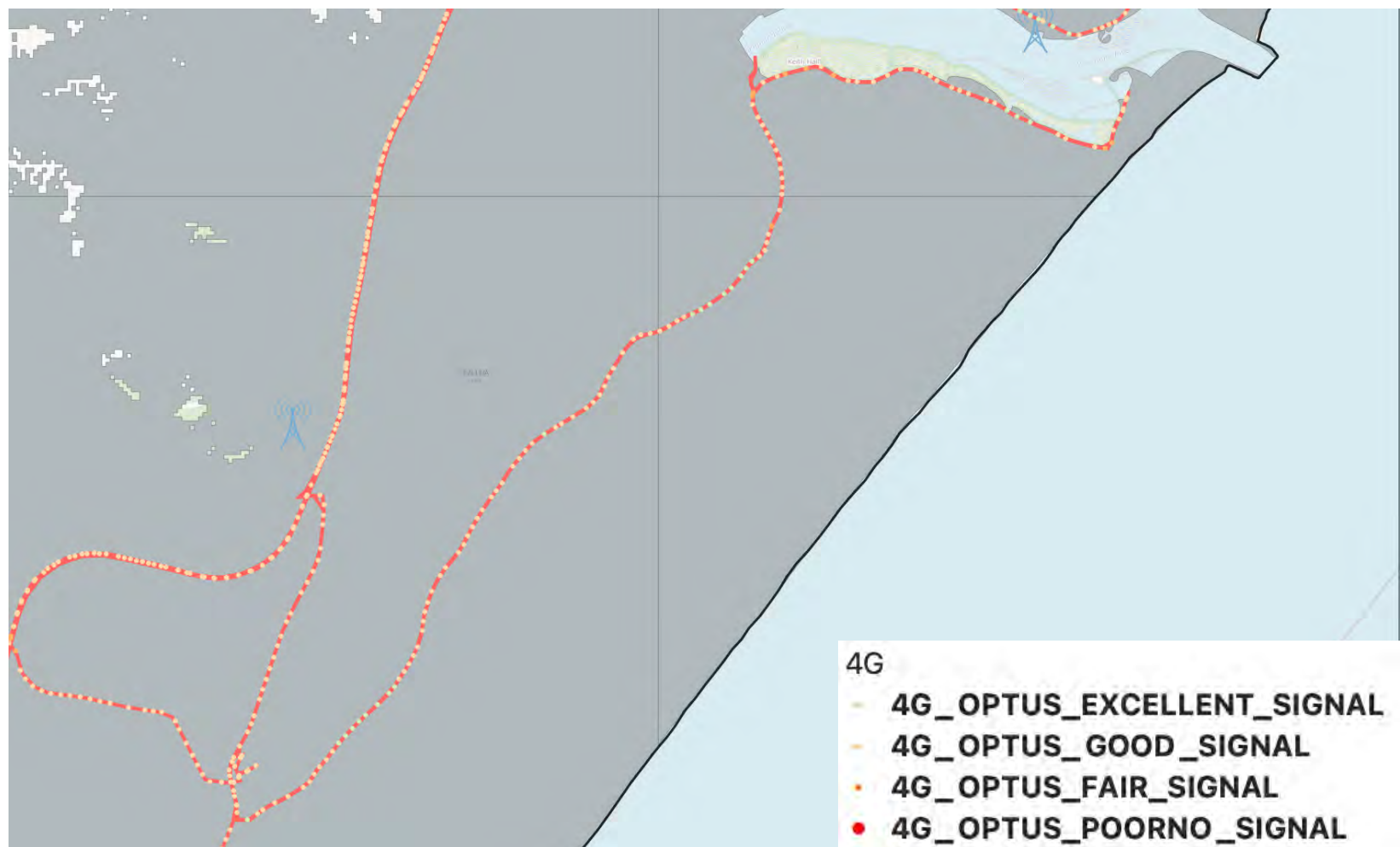
Ballina Shire Analysis

River Drive



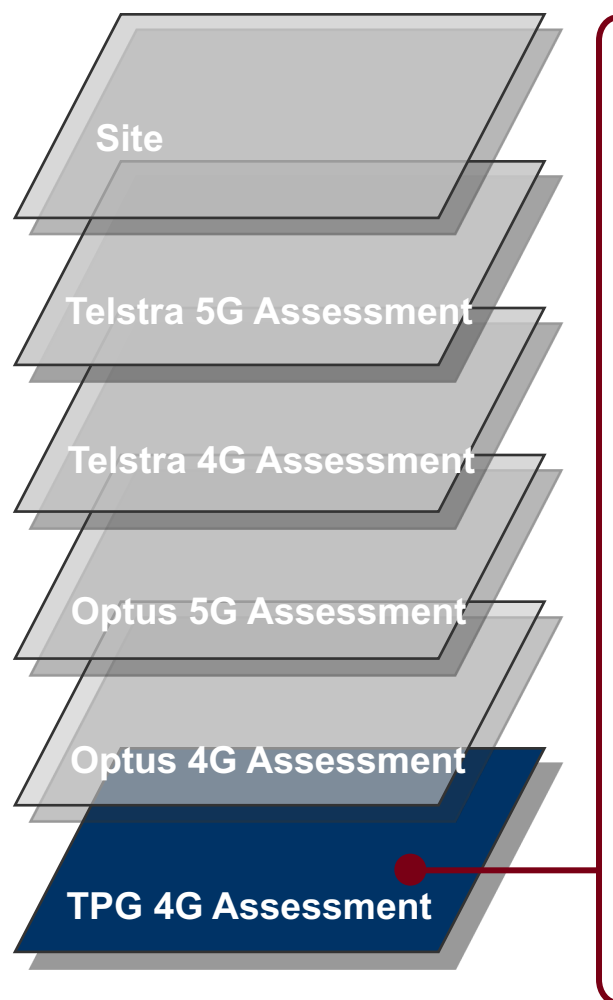
Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – Optus – Upgrade 2 x Sites with 4G midband



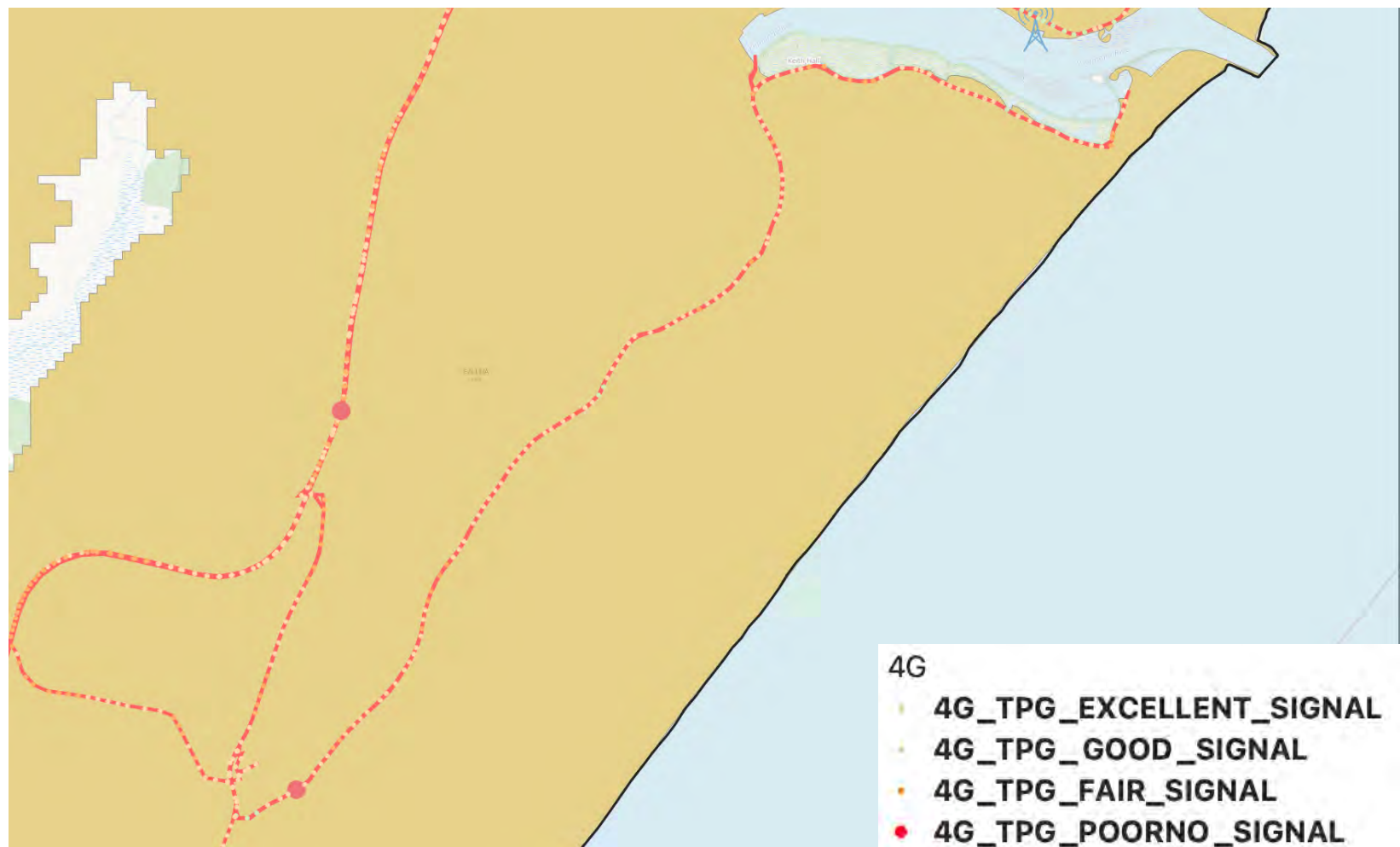
Ballina Shire Analysis

River Drive



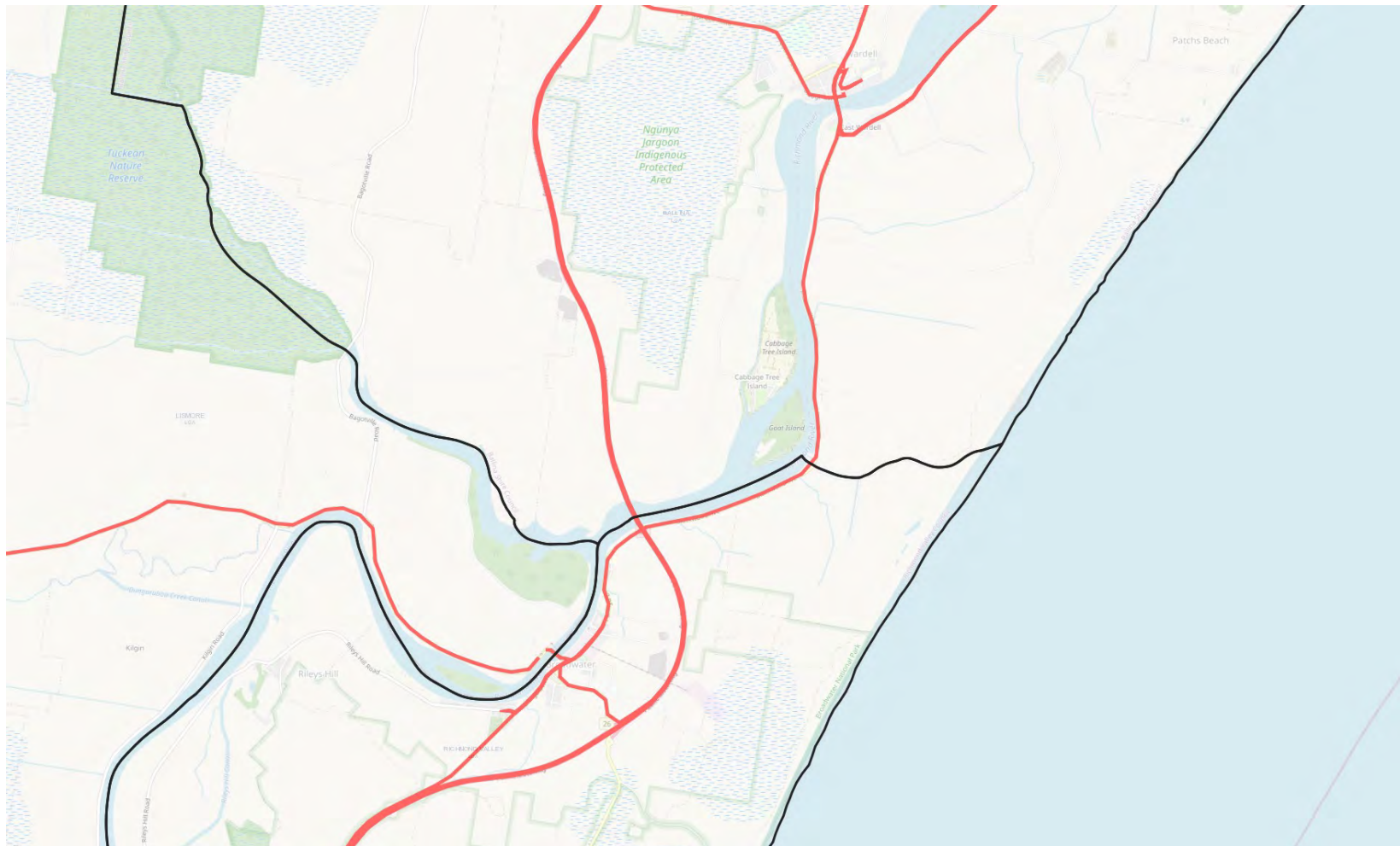
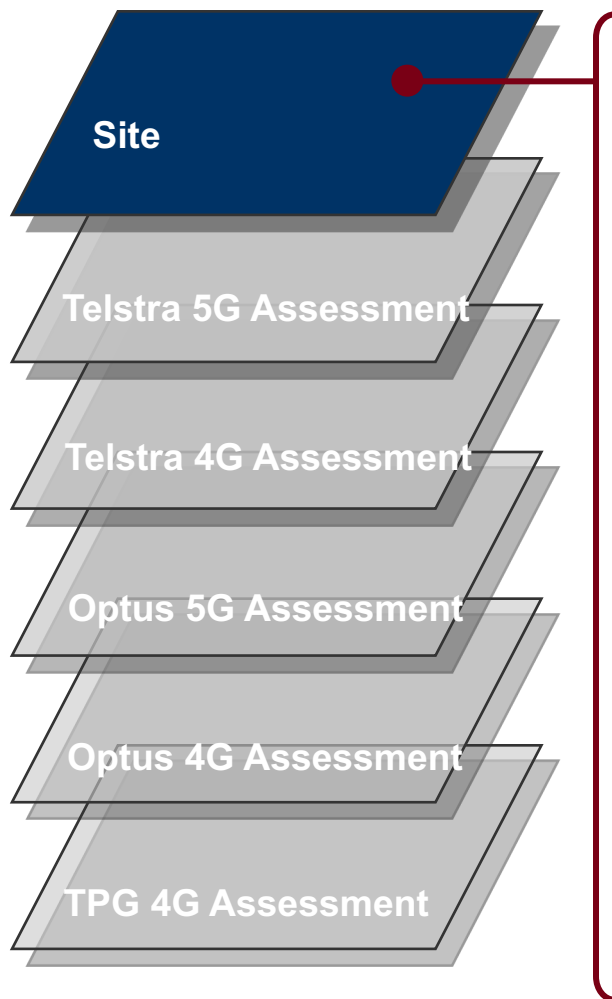
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – TPG - Upgrade 1 Sites to 4G midband



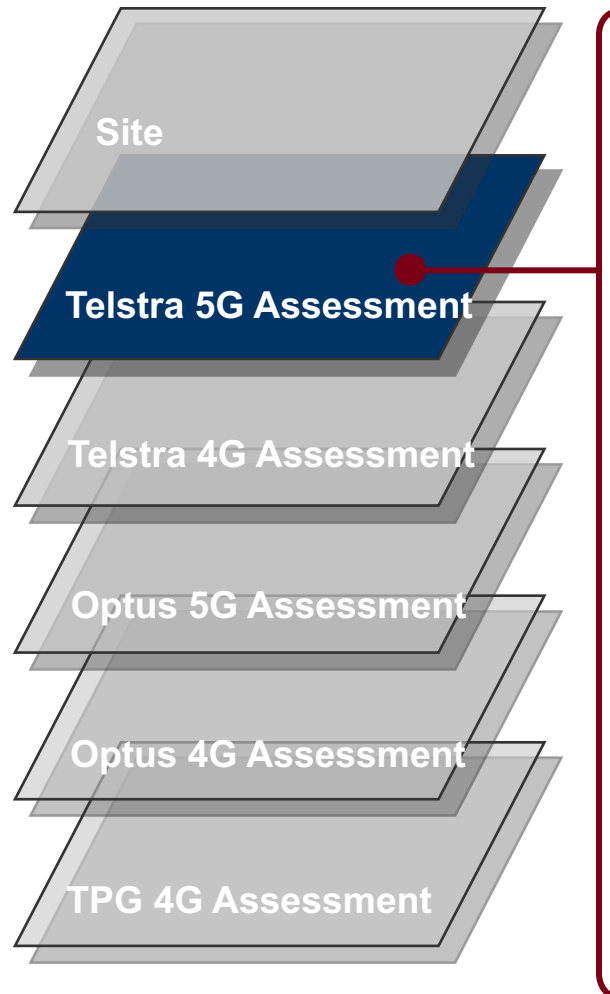
Ballina Shire Analysis

Blackwall Drive



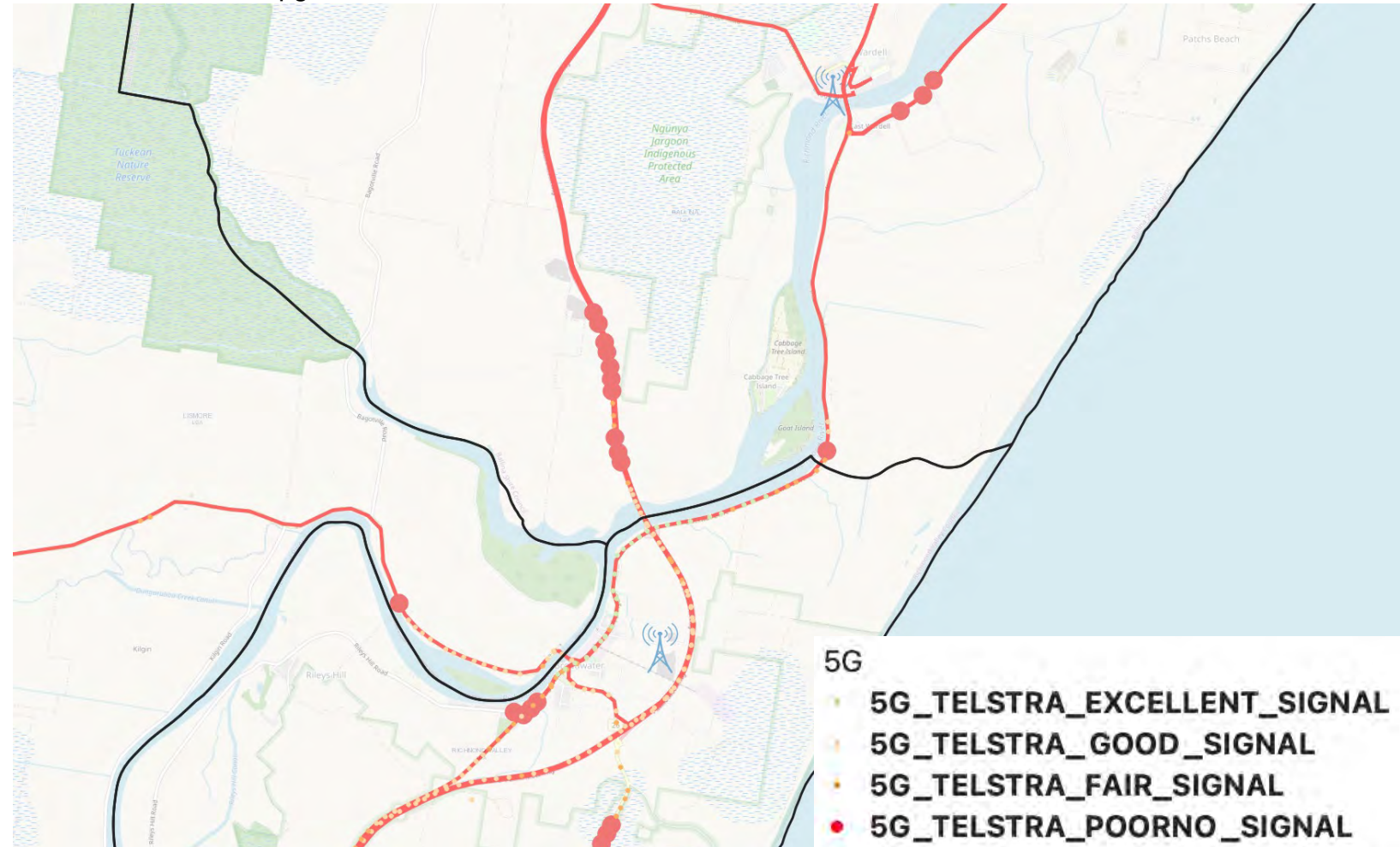
Ballina Shire Analysis

Blackwall Drive



Assessment – Mixture of Good and Poor / Fair 5G coverage with many 5G blackspots

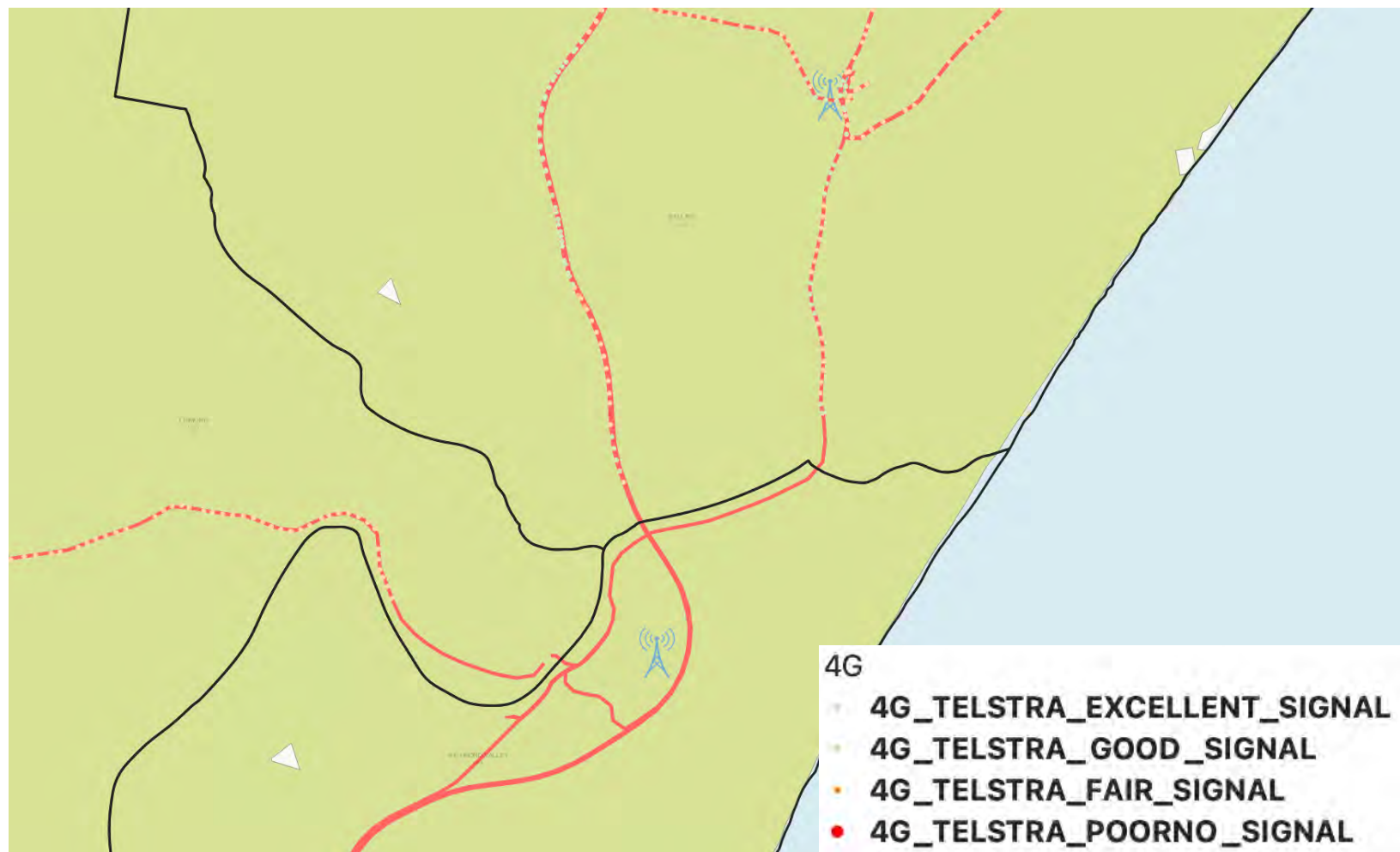
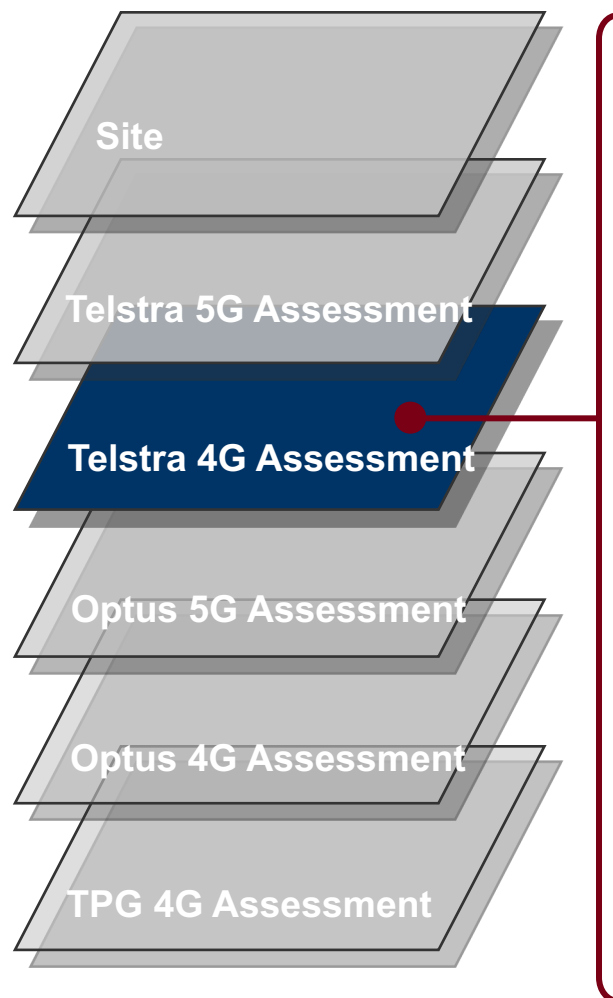
Action – Telstra - Upgrade 1 x Sites with 5G



Ballina Shire Analysis

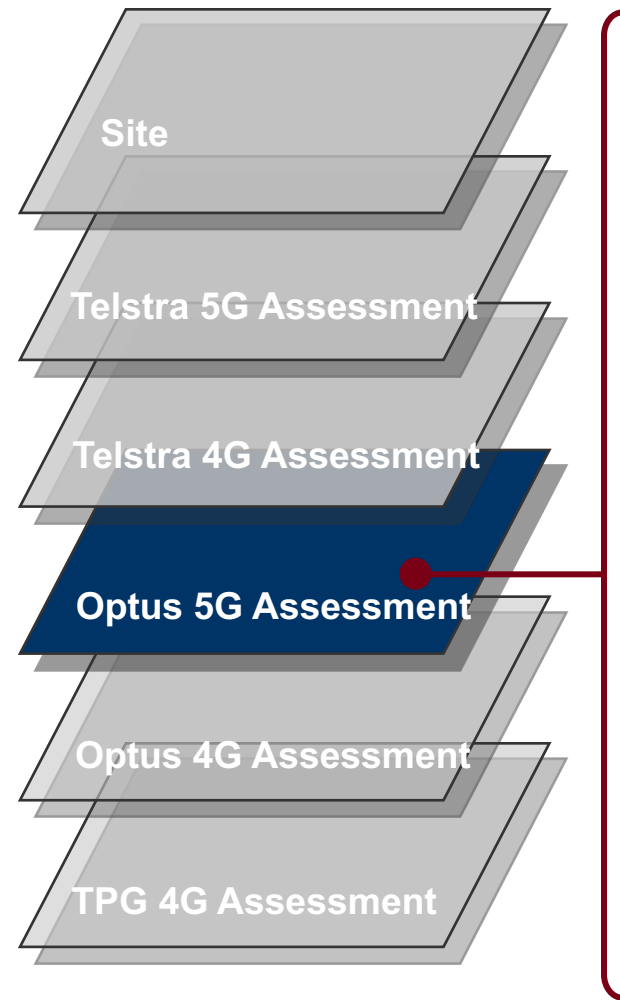
Blackwall Drive

Assessment – Good 4G coverage



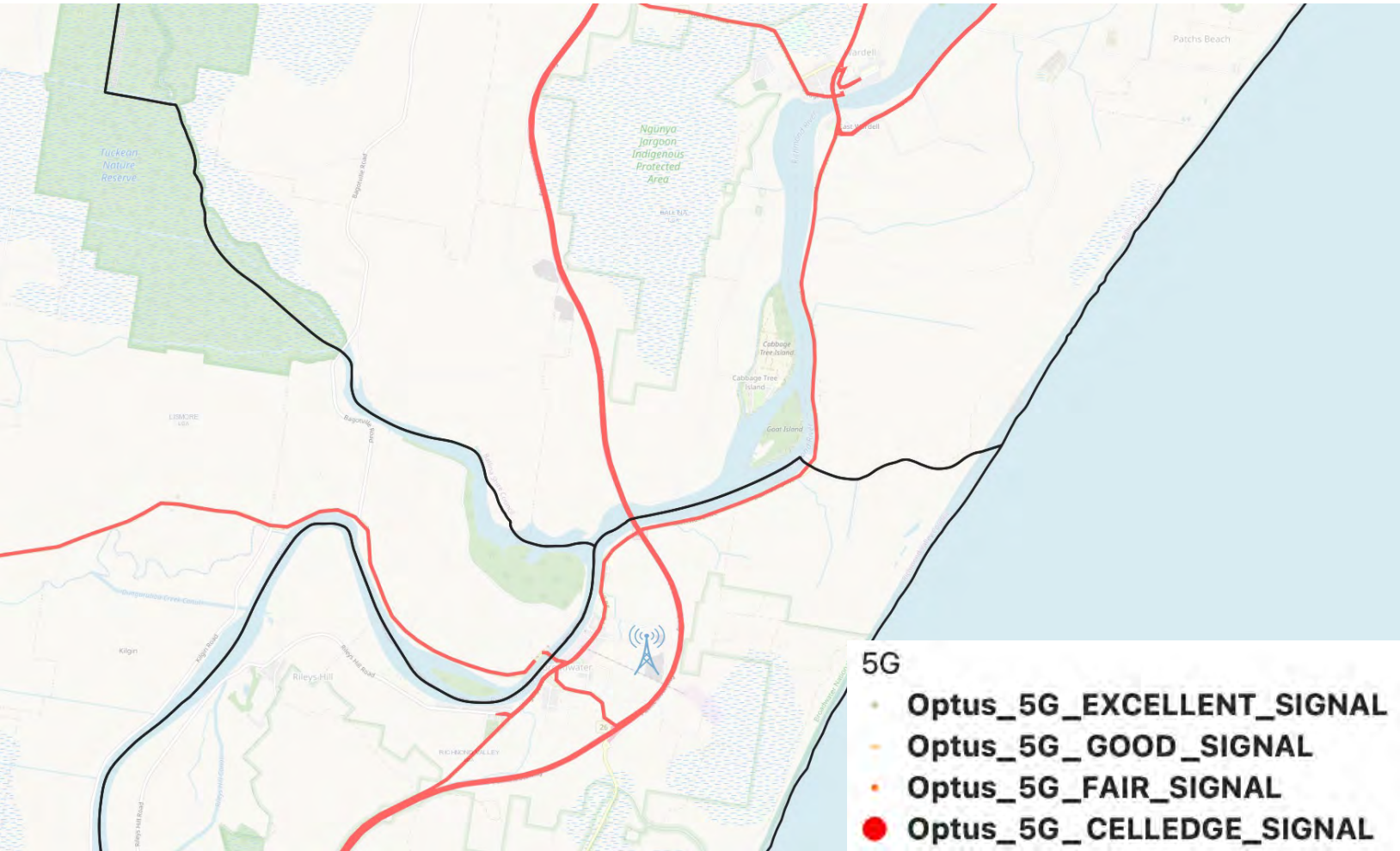
Ballina Shire Analysis

Blackwall Drive



Assessment - No current Optus 5G coverage

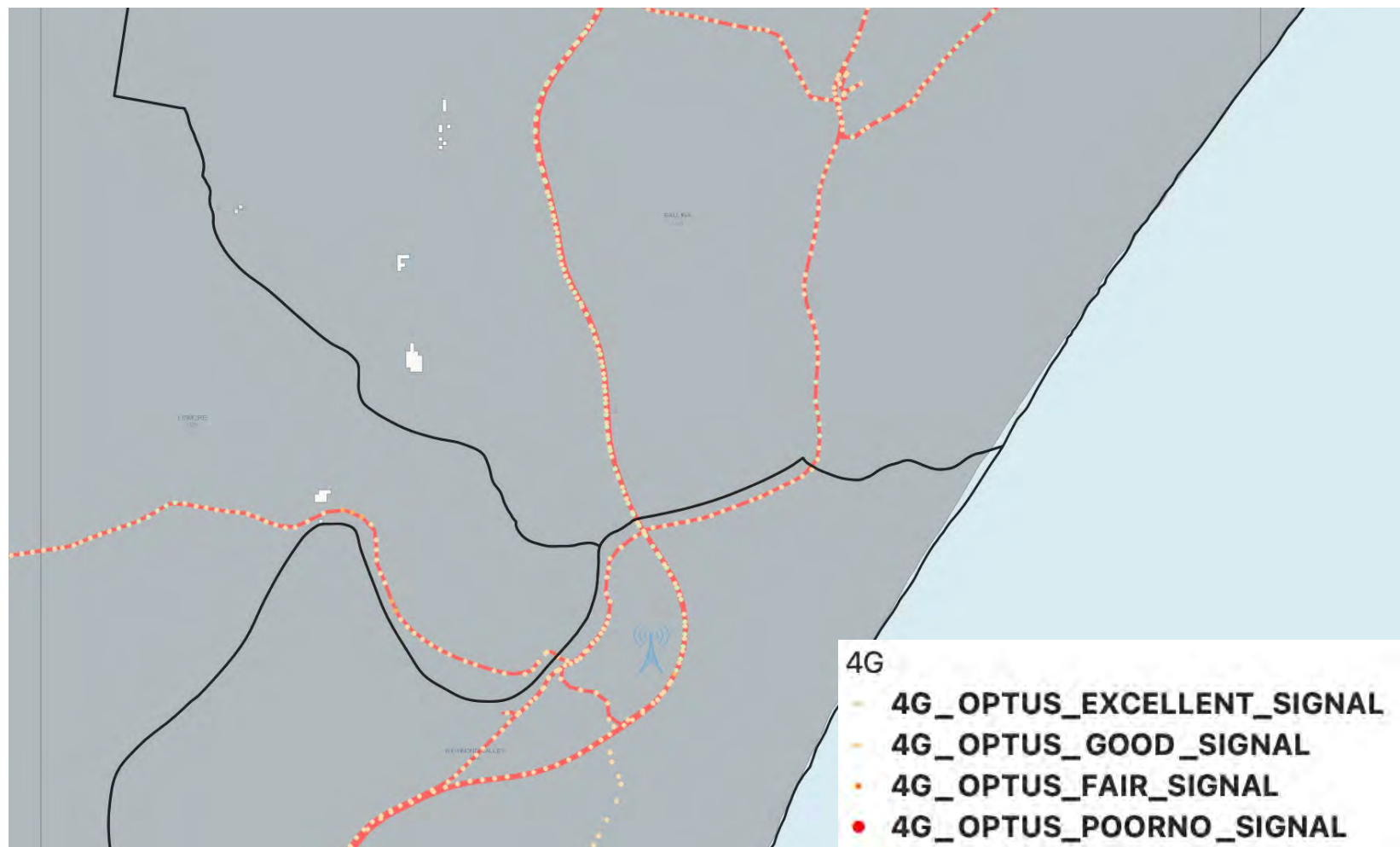
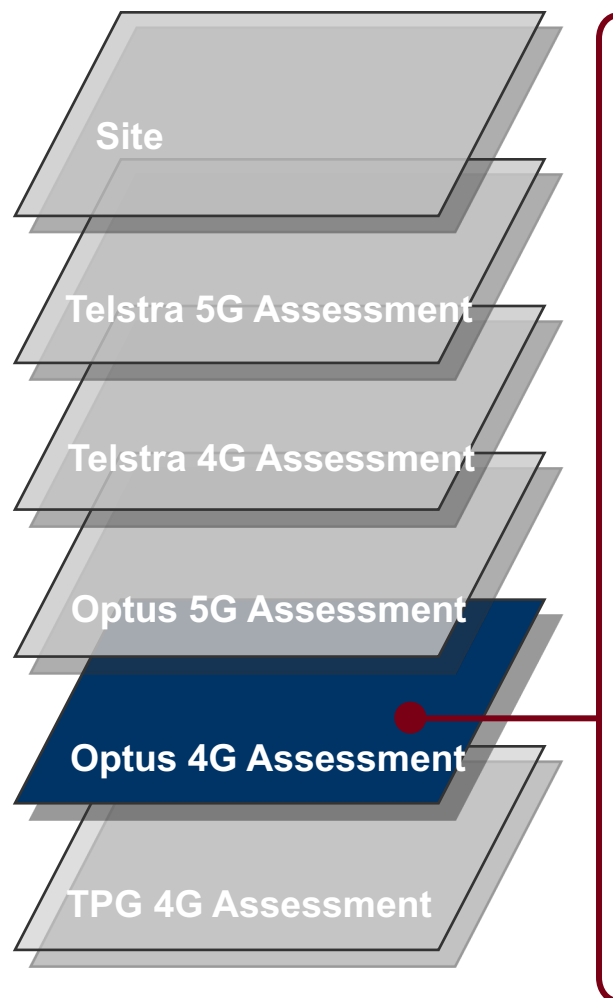
Action – Optus - Upgrade 1 x Site to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites



Ballina Shire Analysis

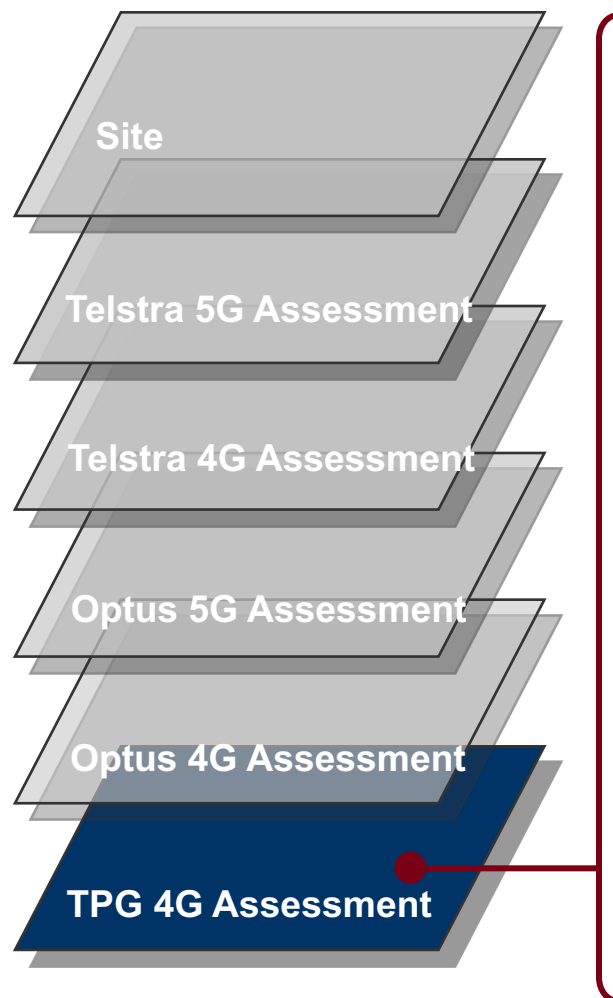
Blackwall Drive

Assessment – Good 4G coverage



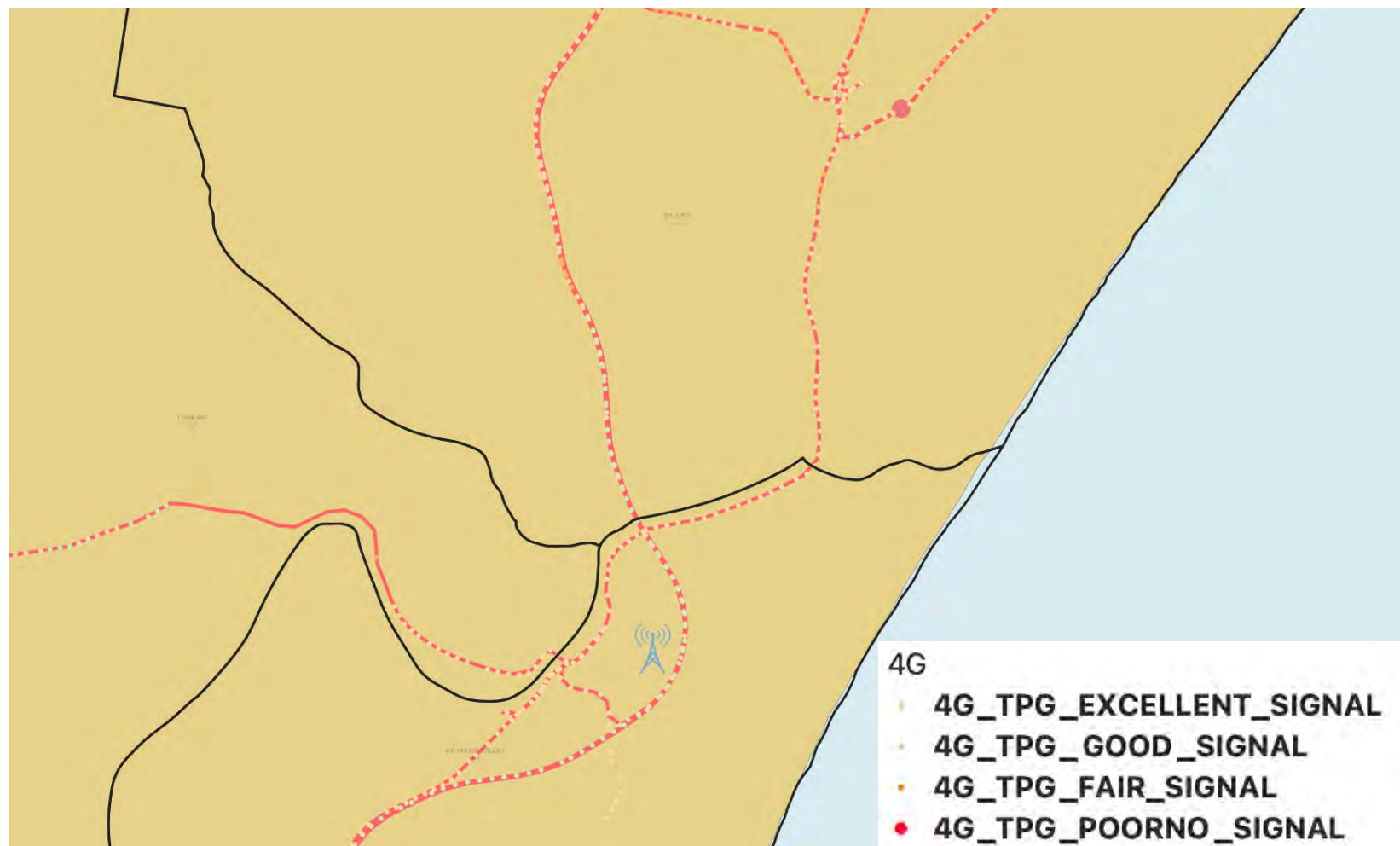
Ballina Shire Analysis

Blackwall Drive



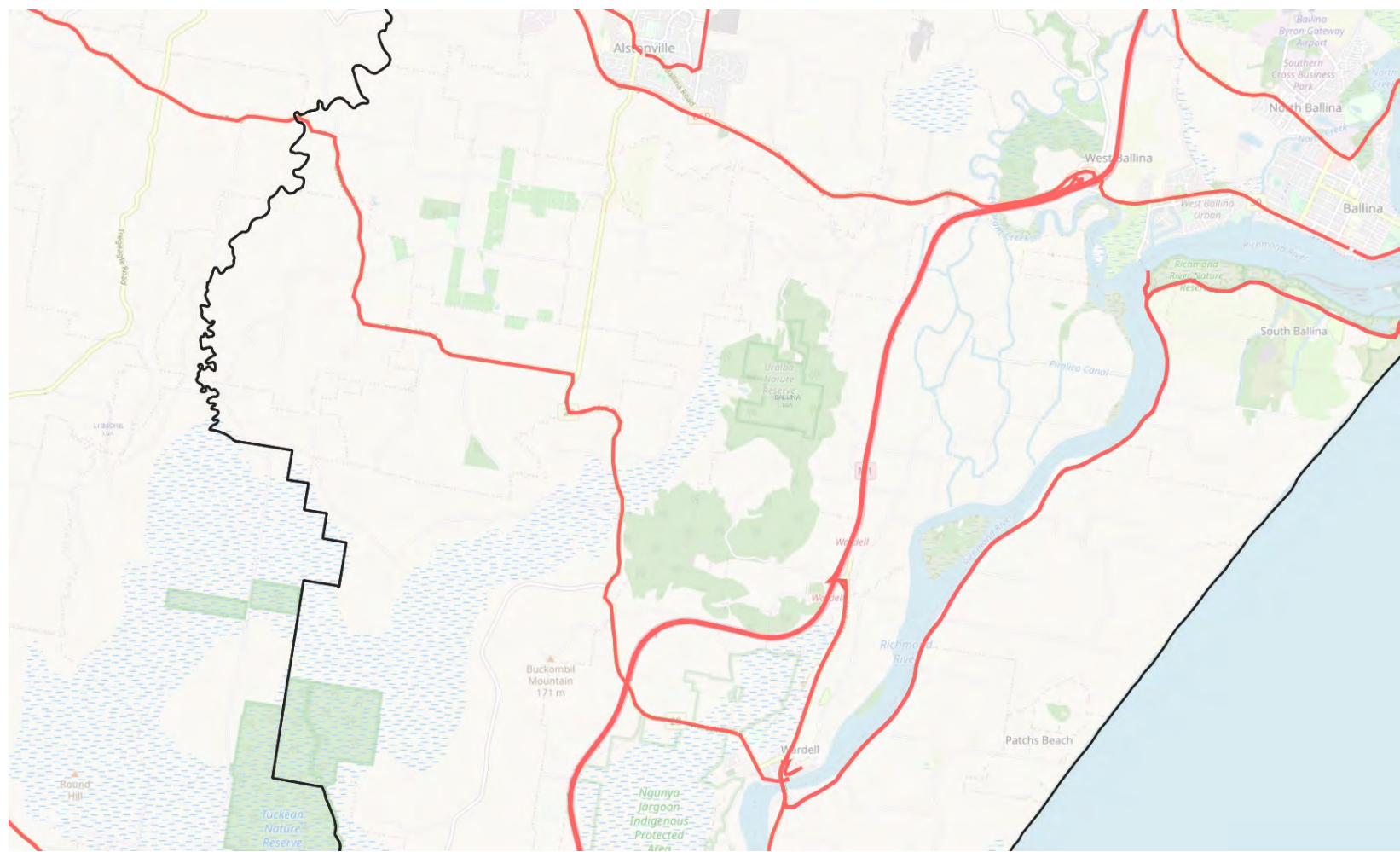
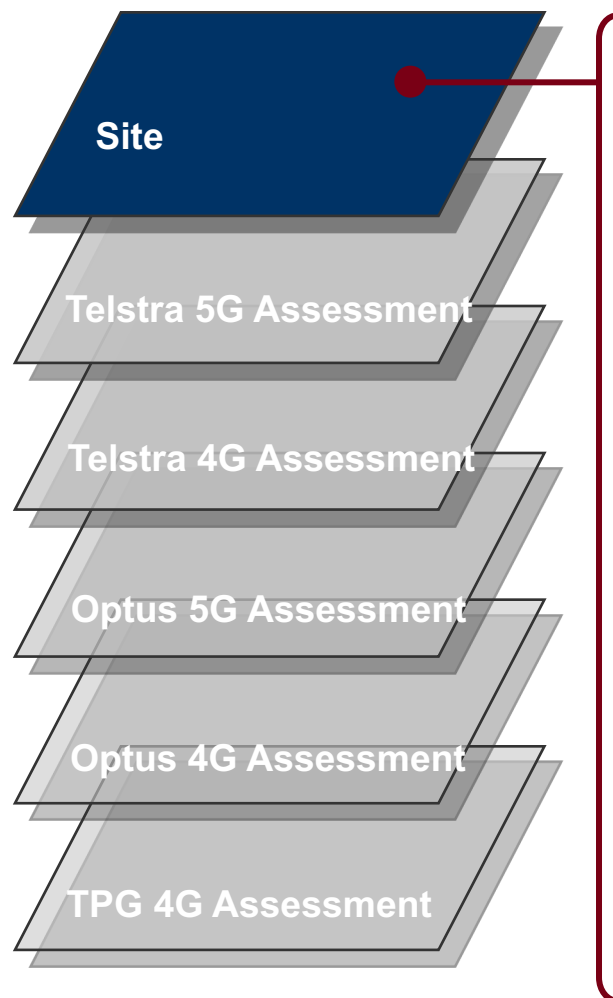
Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites



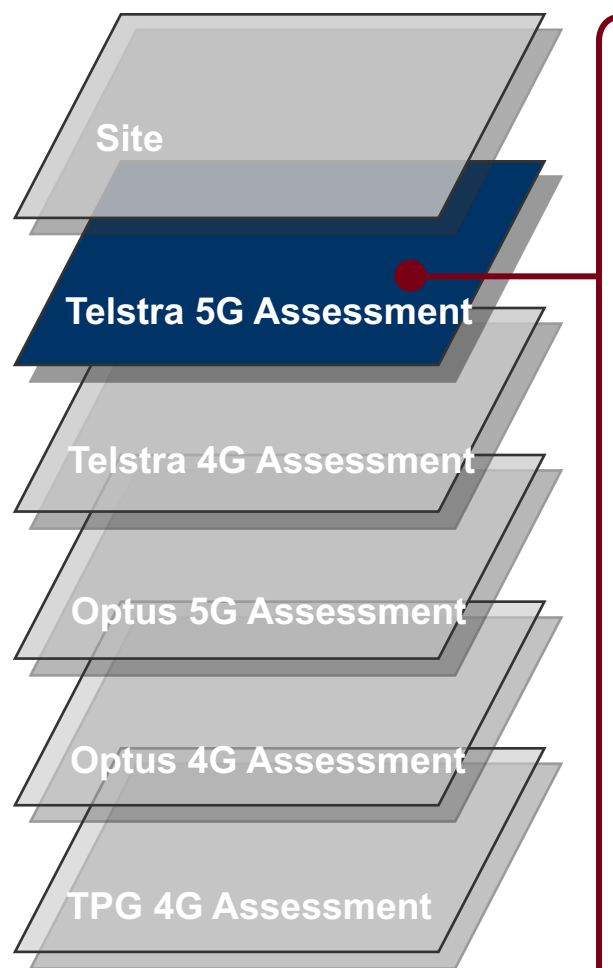
Ballina Shire Analysis

Wardell Road



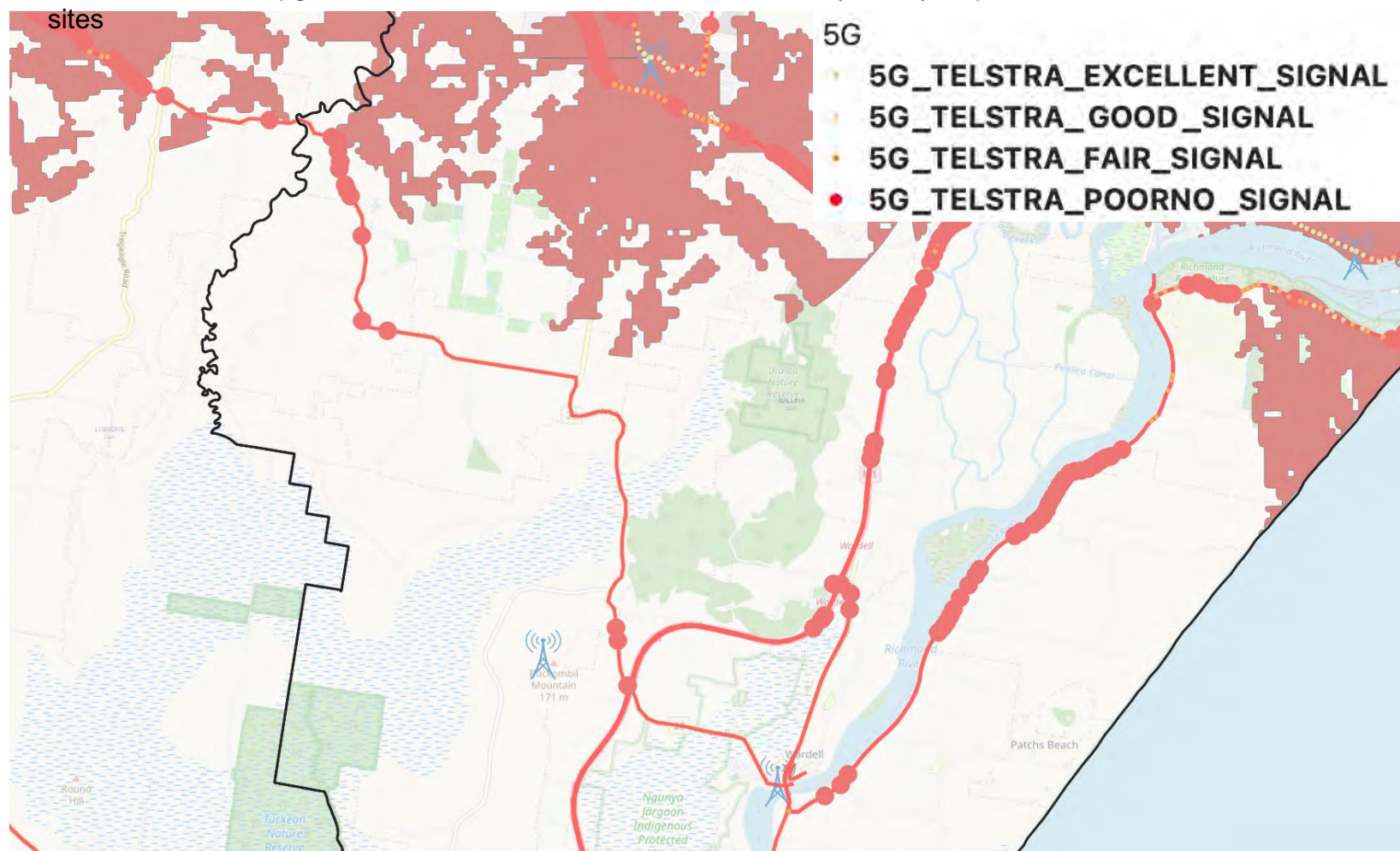
Ballina Shire Analysis

Wardell Road



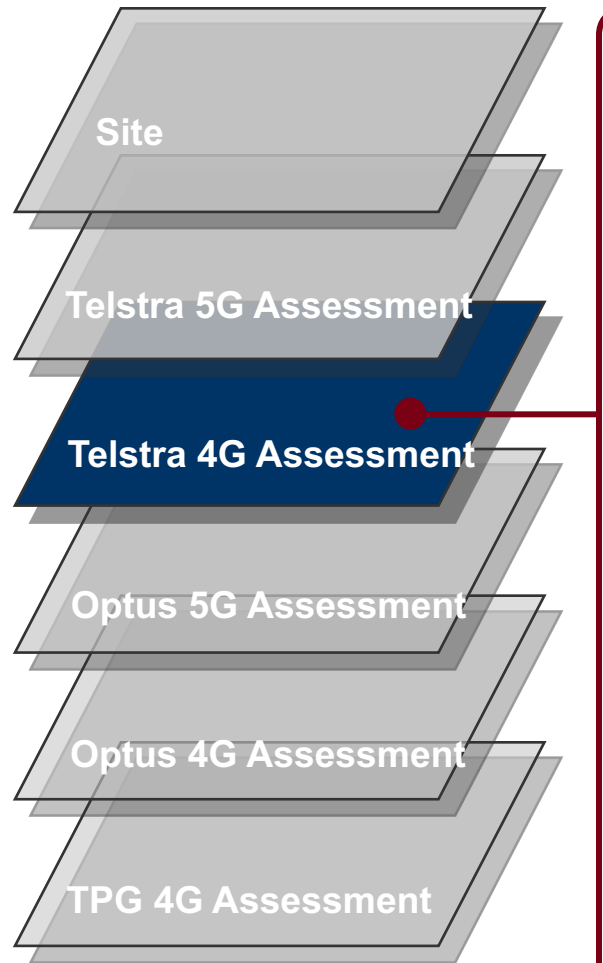
Assessment – No current 5G coverage.

Action – Telstra - Upgrade 2 x Sites with 5G & Telstra / Fed Govt (MBSP) – up to 2 new 5G sites



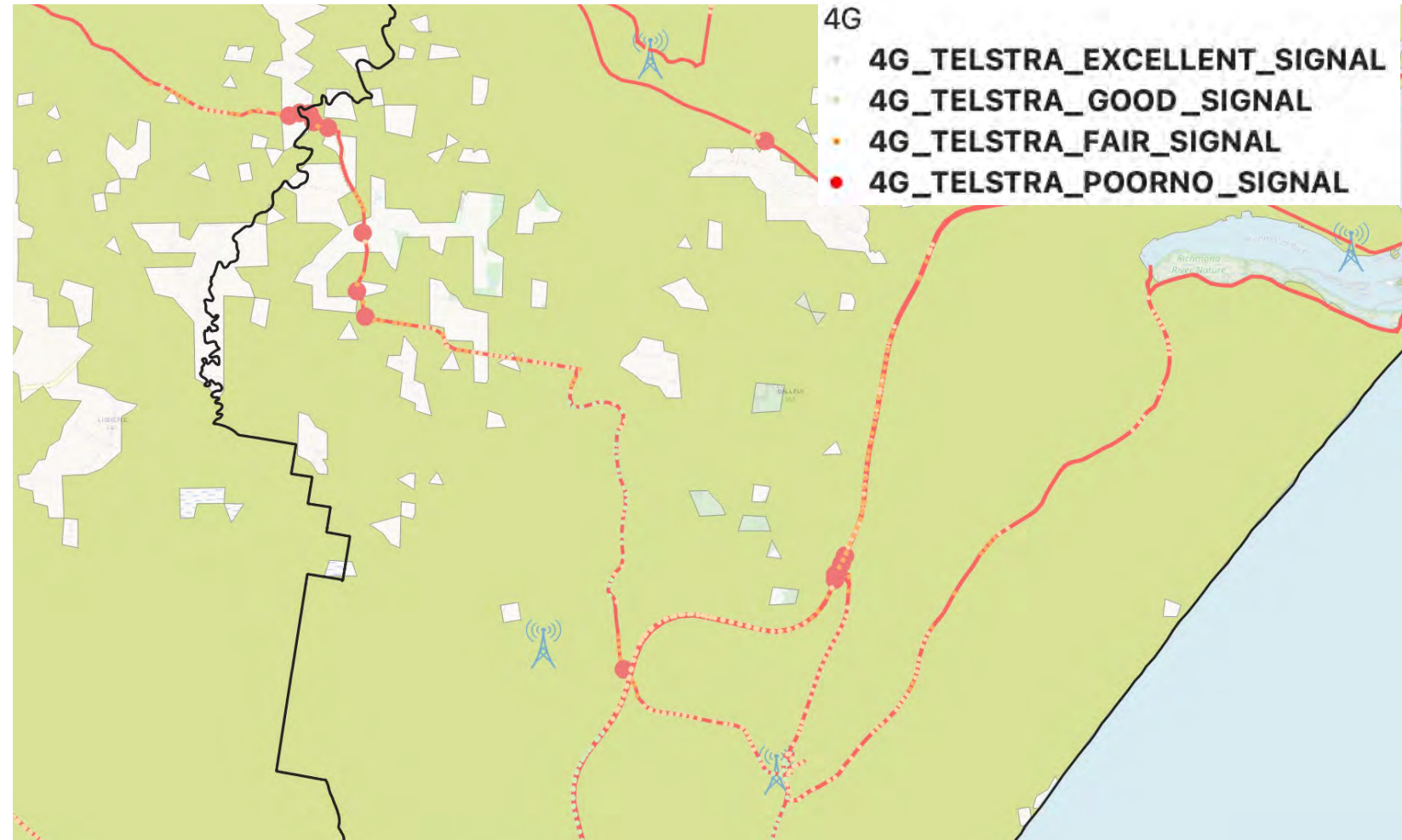
Ballina Shire Analysis

Wardell Road



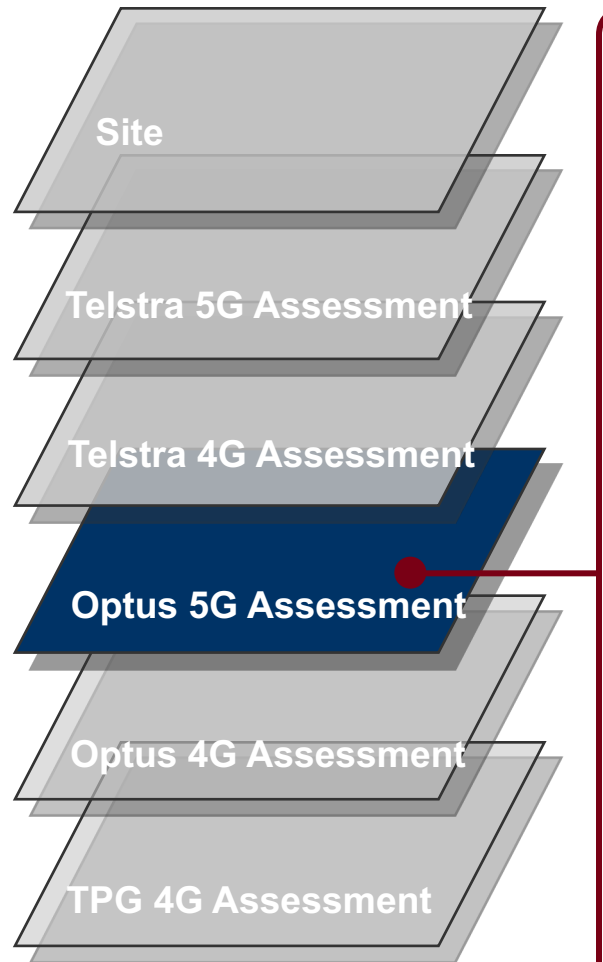
Assessment - Good and Poor / Fair 4G coverage with some 4G blackspots

Action – Telstra / Fed Govt (MBSP) – 1 new 4G Tower sites



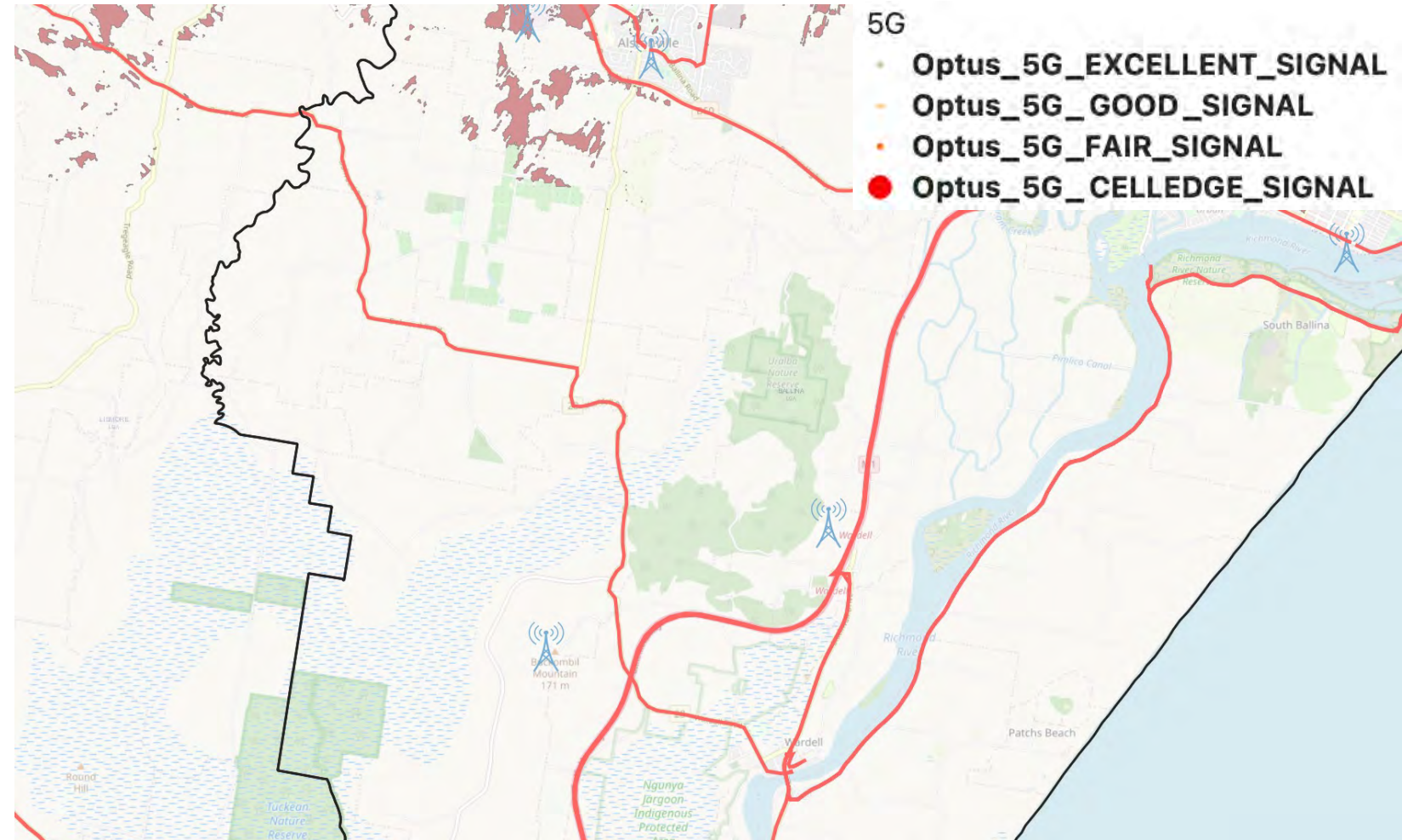
Ballina Shire Analysis

Wardell Road



Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 2 x Sites to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites

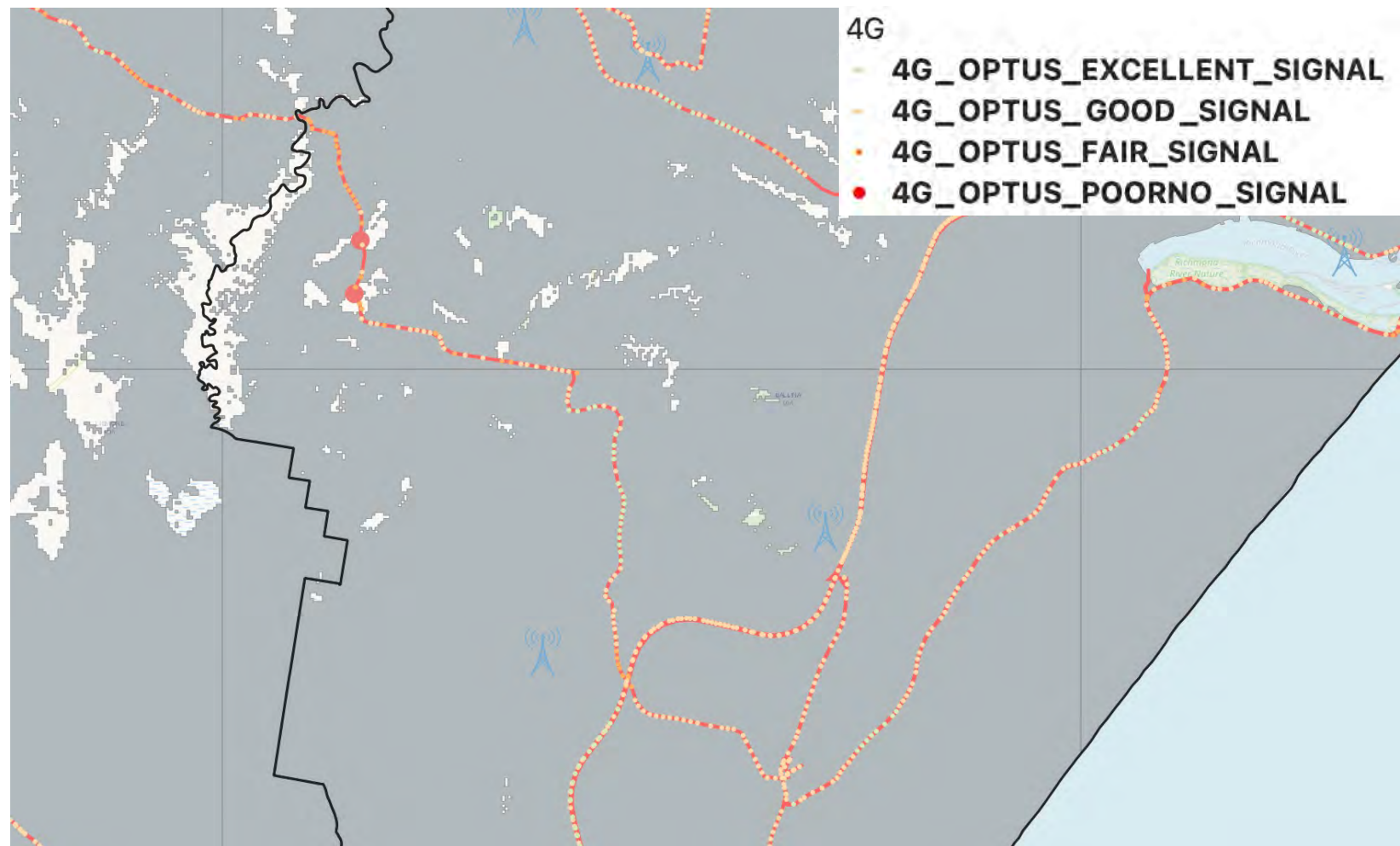
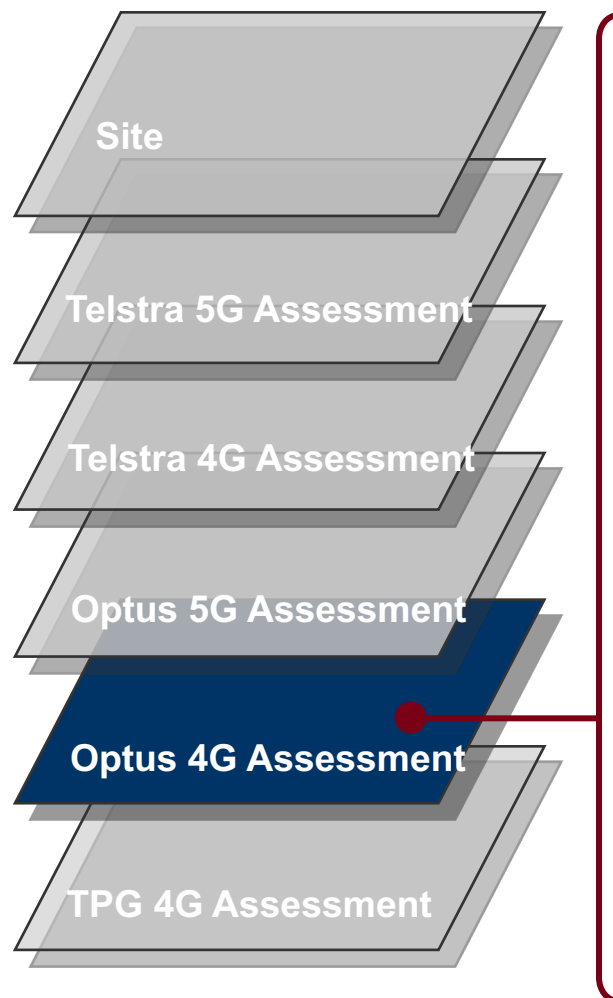


Ballina Shire Analysis

Wardell Road

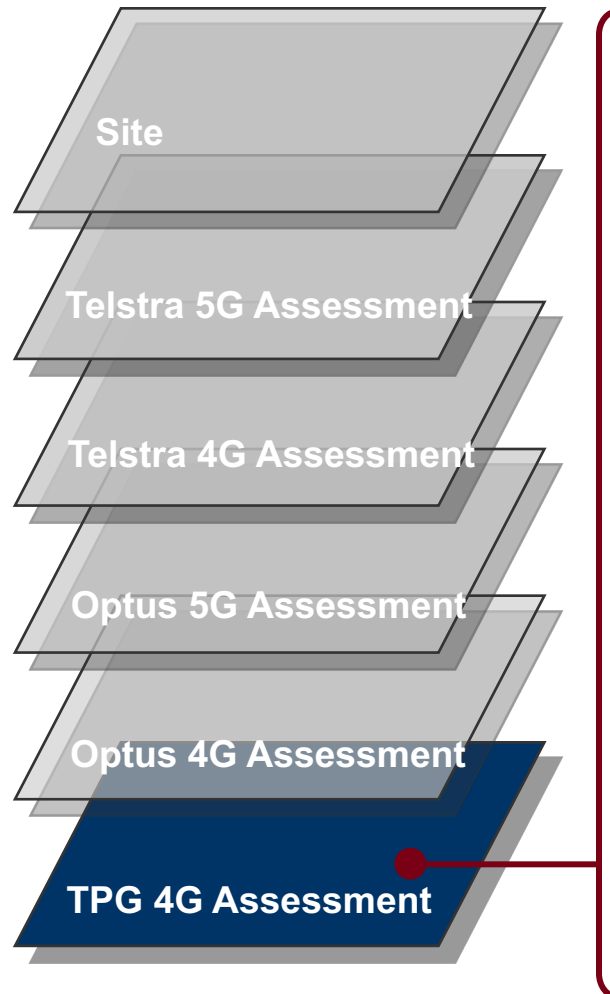
Assessment - Good 4G coverage with some 4G blackspots

Action – Optus / Fed Govt – 1 new 4G Tower sites



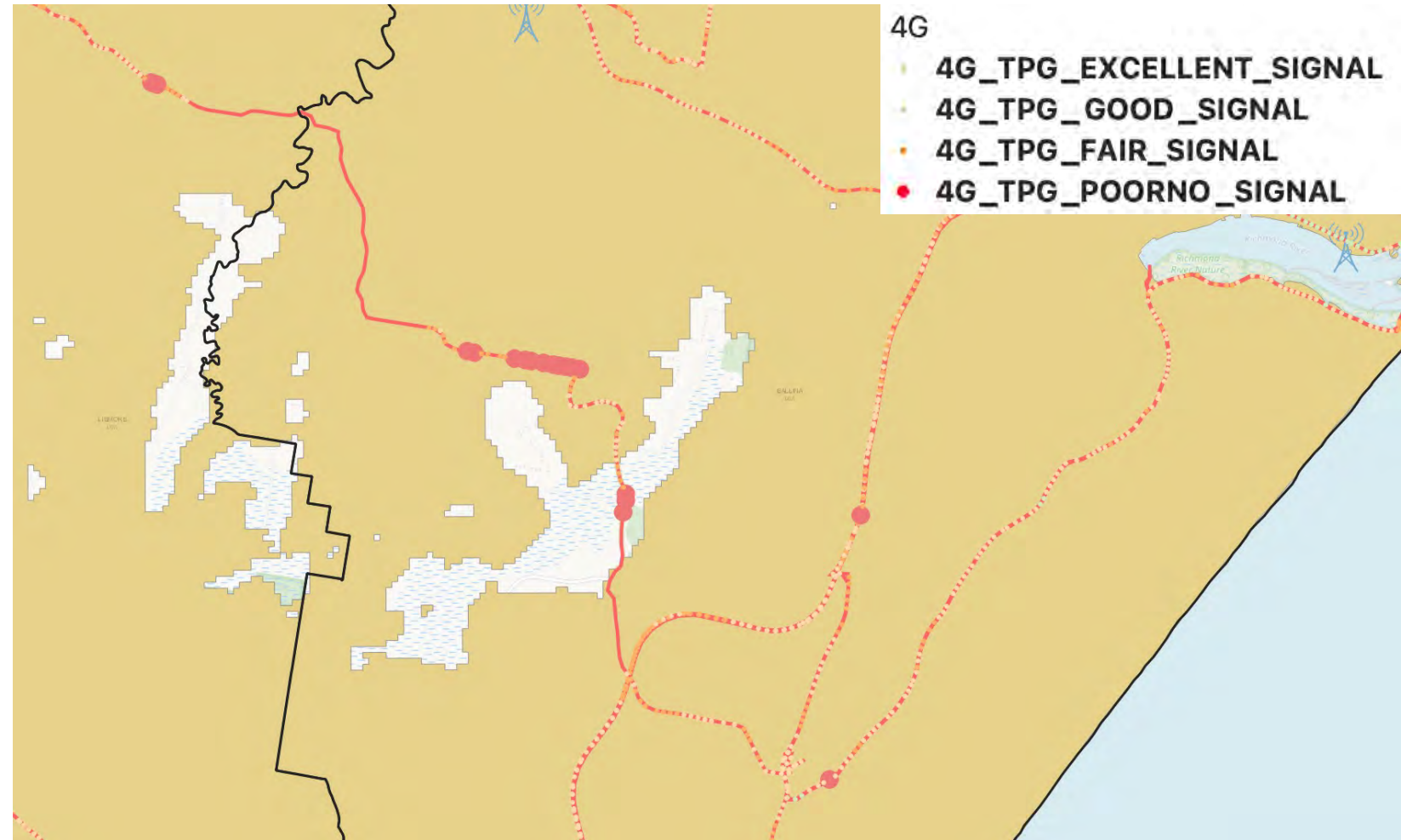
Ballina Shire Analysis

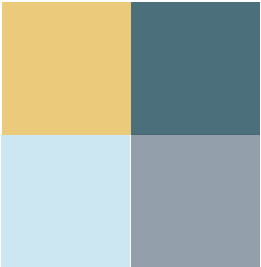
Wardell Road



Assessment - Mixture of Good and Poor / Fair 4G coverage with many 4G blackspots

Action –TPG / Fed Govt (MBSP) – up to 2 new 4G sites





1. Richmond Valley Shire Analysis

Richmond Valley Shire Analysis

Signal Testing:

Road name	From	To	Approx Distance
Pacific Highway	Broadwater	Southern shire boundary	40km
Bruxner Highway	Western shire boundary	Eastern shire boundary	25km
Summerland Way	Northern shire boundary	Southern shire boundary	70km
Casino – Coraki Rd / Woodburn – Coraki Rd	Casino	Woodburn	48km
Woodburn – Evans Head Rd	Woodburn	Evans Head	10km
Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd	Bruxner Highway	Summerland Way	25km
Edenville Rd	McDonalds Bridge Rd	Summerland Way	10km

Mongogarrie Rd	Summerland Way	Shire boundary	15km
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Network Bandwidth Point Tests:

- Casino
- Broadwater
- Woodburn
- Evans Head
- Coraki

This section provides an analysis of the change in Mobile Network Operator sites in the Richmond Valley Shire from 2018 to 2022.

Total Number of Sites by MNO

Kyogle Shire	2018	2022
Optus	7	11
Telstra	6	9
TPG	3	5

Total Number of 3G Sites by MNO & radiofrequency spectrum deployed

Richmond Valley Shire	2018	2022
Optus		
900 MHz	7	10
2100 MHz	3	3

Telstra 850 MHz 2100 MHz	5 1	7
TPG 900 MHz 2100 MHz	3 3	5 3

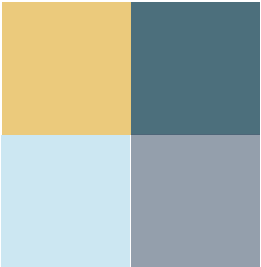
Note – A single site may host multiple spectrum bands.

Total Number of 4G Sites by MNO & radiofrequency spectrum deployed

Richmond Valley Shire	2018	2022
Optus		
700 MHz	7	11
900 MHz		1
1800 MHz	1	5
2100 MHz	1	4
2300 MHz		
2600 MHz	4	5
3500 MHz		
Telstra		
700 MHz	6	9
900 MHz		
1800 MHz	1	2
2100 MHz		2
2600 MHz		1
TPG		
700 MHz		
850 MHz	3	5
1800 MHz		
2100 MHz		1
2600 MHz		

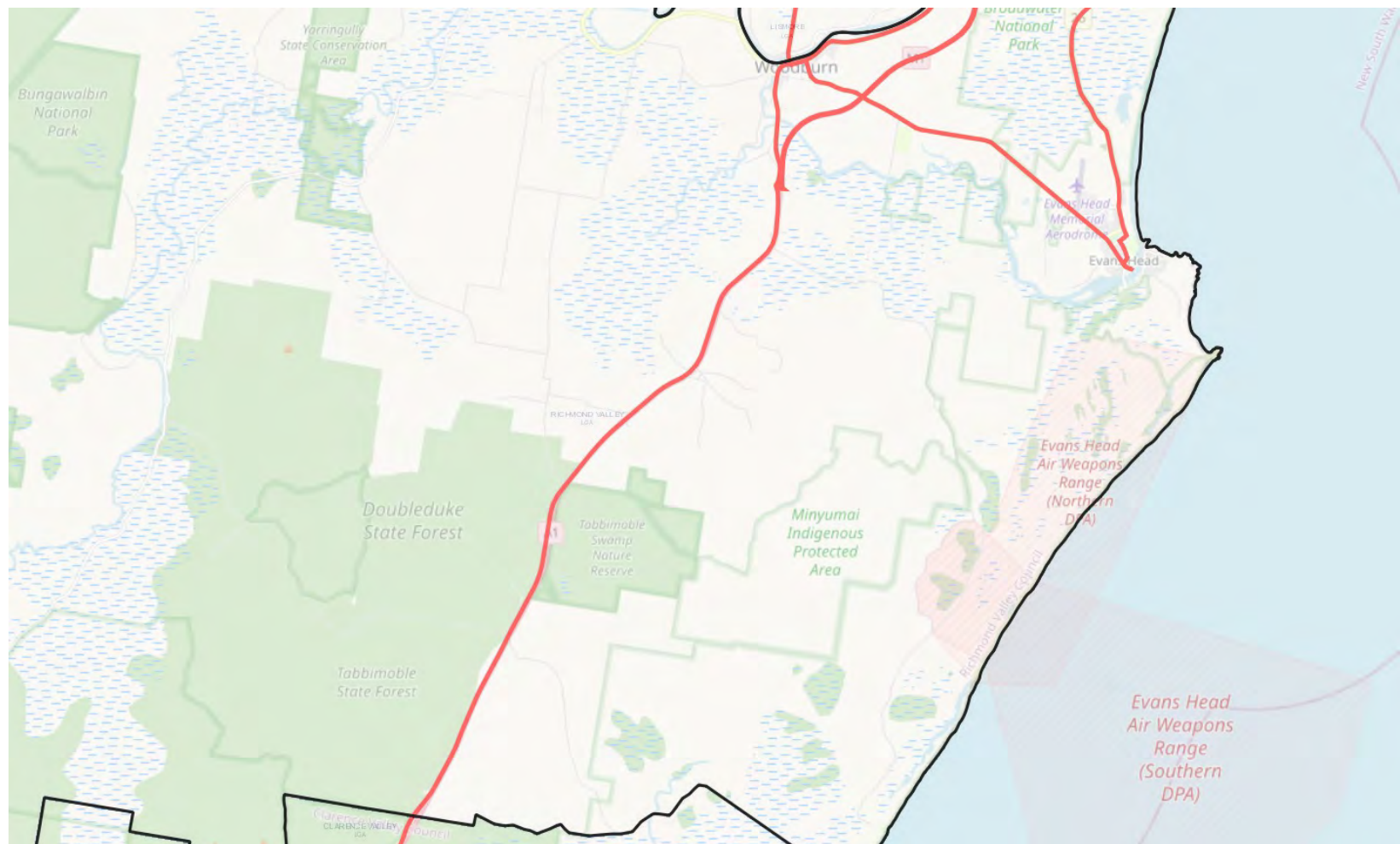
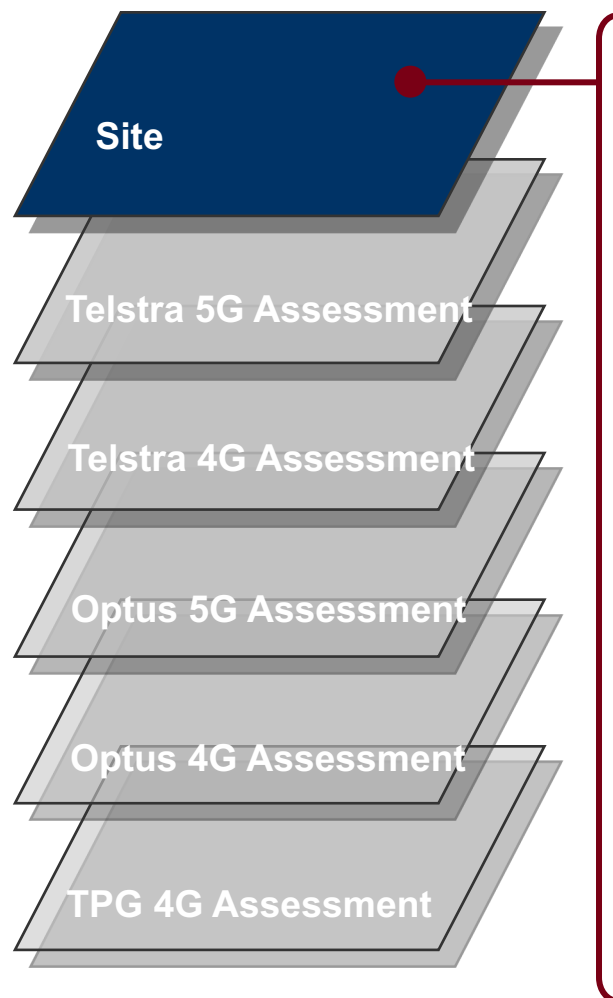
Total Number of 5G Sites by MNO

Richmond Valley Shire	2018	2022
Optus		
2100 MHz	-	1
2300 MHz	-	
3500 MHz	-	
26000 MHz	-	
Telstra		
850 MHz	-	1
2600 MHz	-	
3600 MHz	-	2
TPG		
700 MHz	-	
3600 MHz	-	



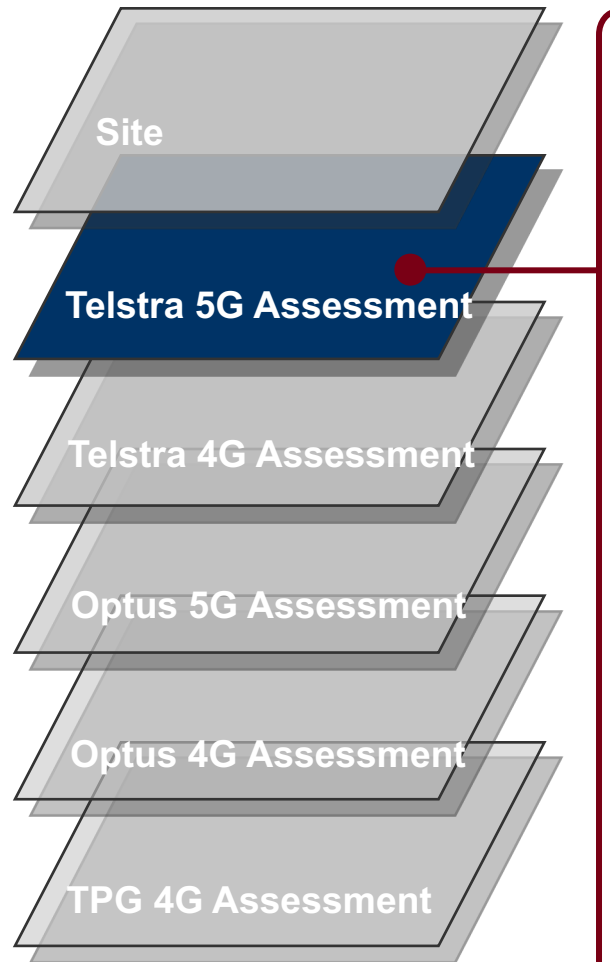
Richmond Valley Shire Analysis

Pacific Highway



Richmond Valley Shire Analysis

Pacific Highway

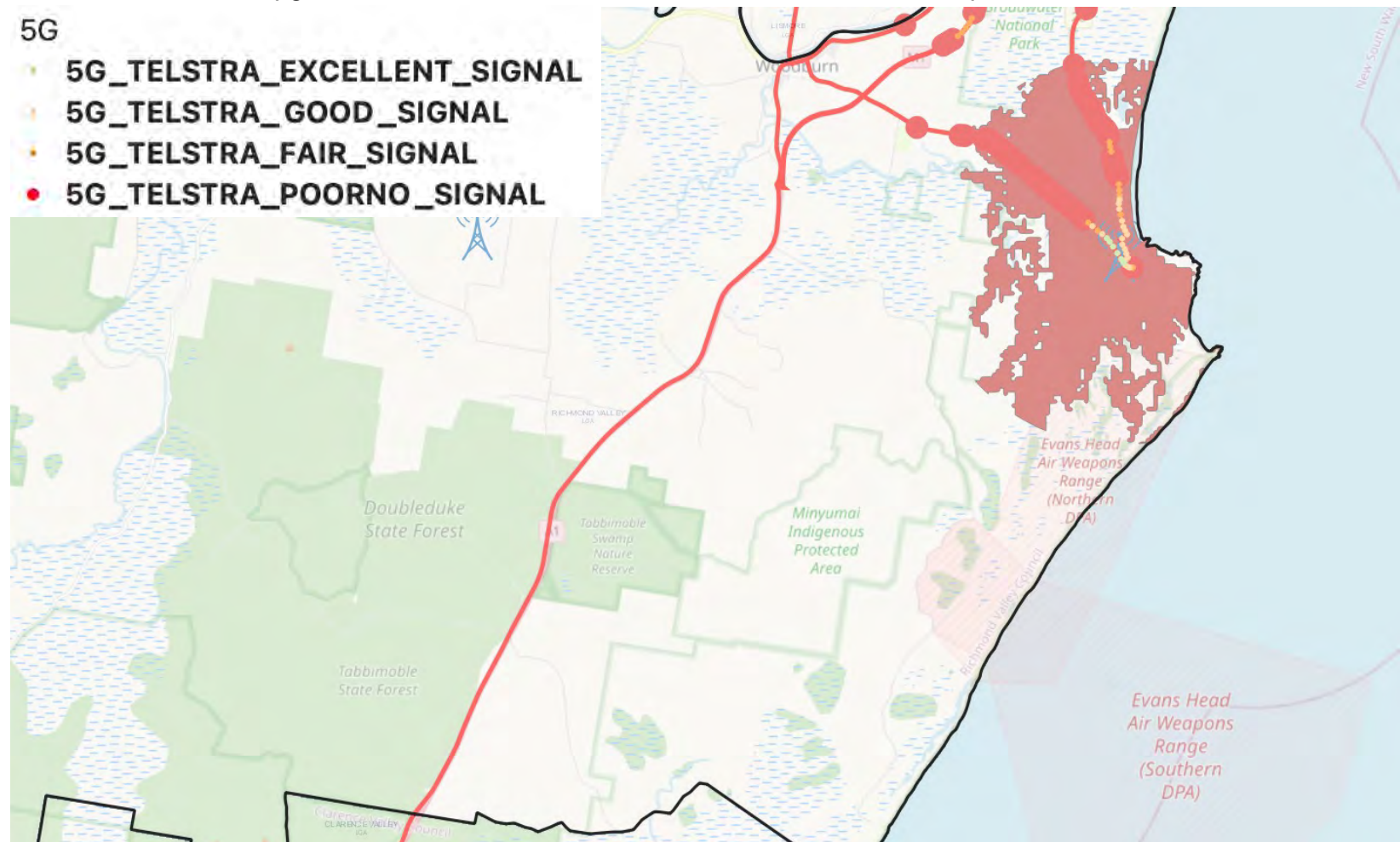


Assessment – Initial 5G coverage near Evans Head. Broad 5G blackspot areas

Action – Telstra - Upgrade 1 x Tower Sites with 5G & Telstra / Fed Govt – up to 2 new 5G Tower sites

5G

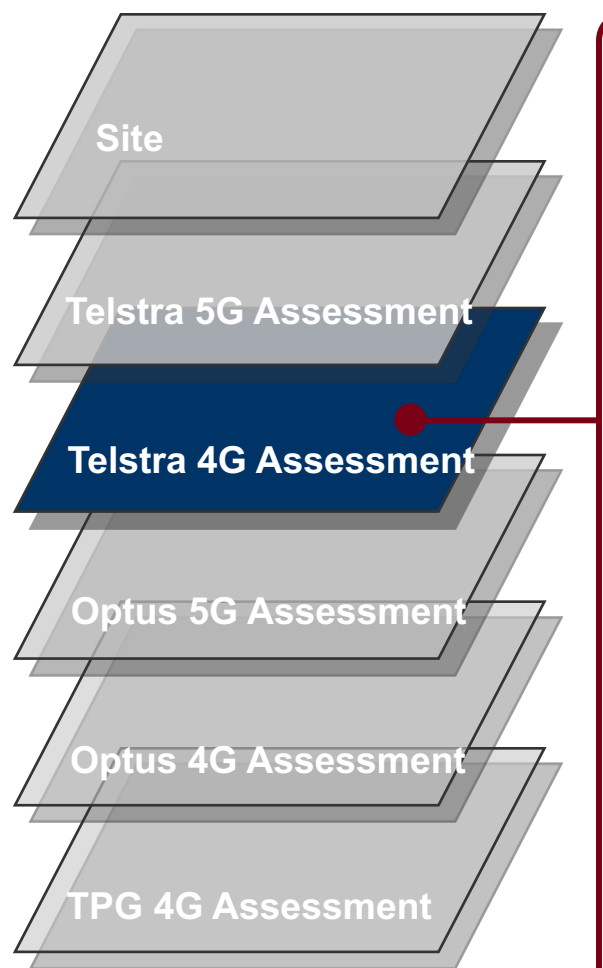
- 5G_TELSTRA_EXCELLENT_SIGNAL
- 5G_TELSTRA_GOOD_SIGNAL
- 5G_TELSTRA_FAIR_SIGNAL
- 5G_TELSTRA_POORNO_SIGNAL



Richmond Valley Shire Analysis

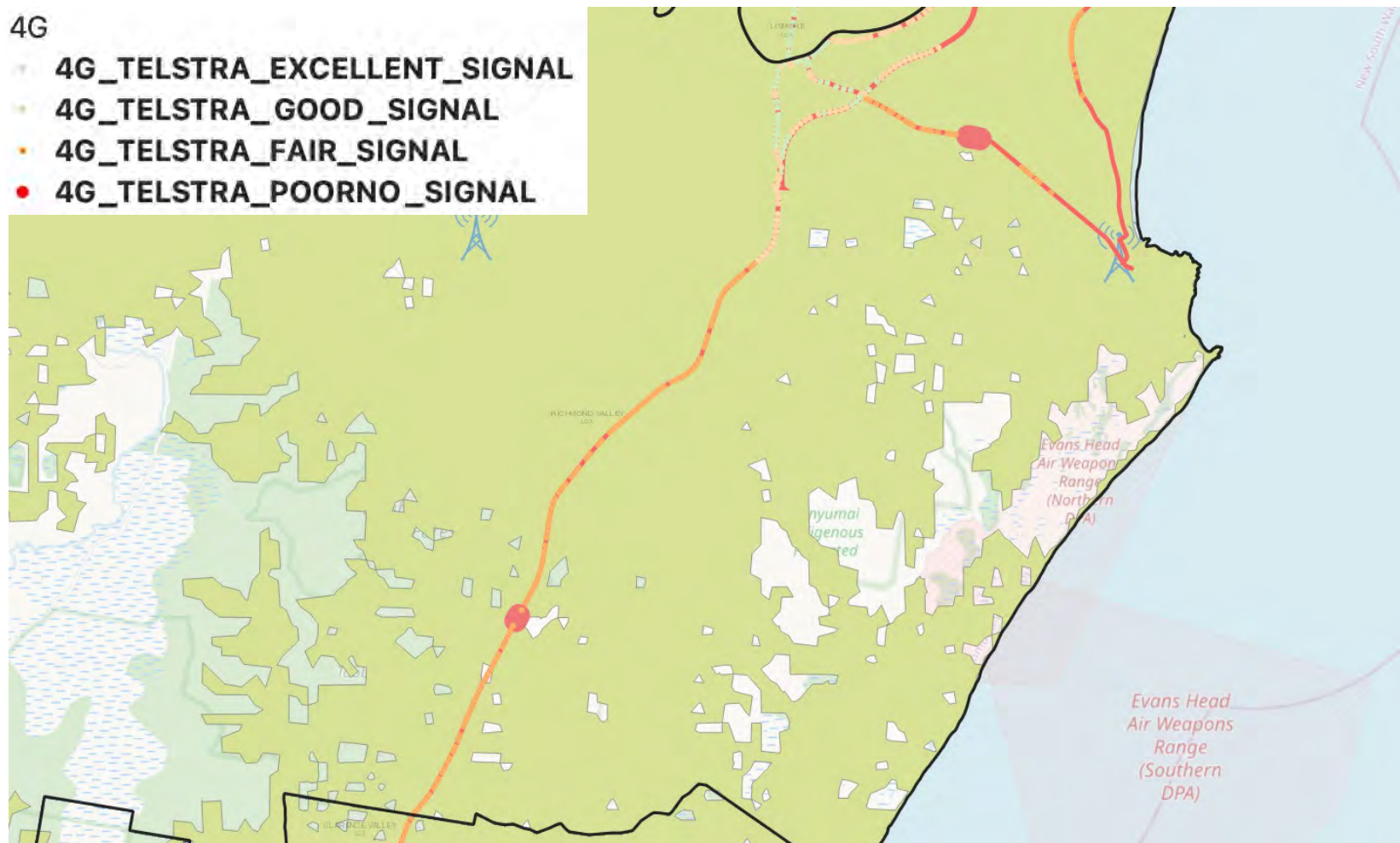
Pacific Highway

Assessment – Good 4G coverage



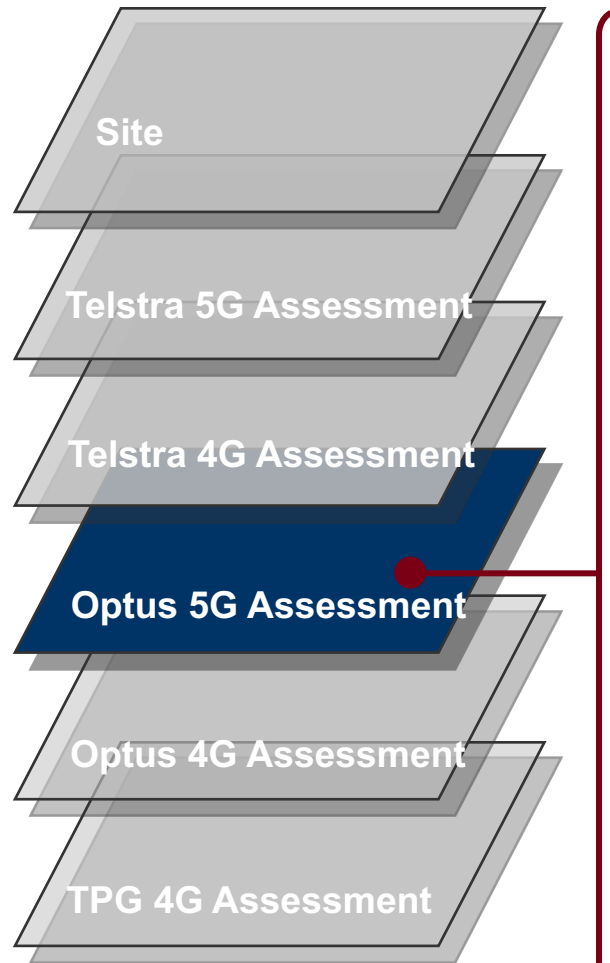
4G

- 4G_TELSTRA_EXCELLENT_SIGNAL
- 4G_TELSTRA_GOOD_SIGNAL
- 4G_TELSTRA_FAIR_SIGNAL
- 4G_TELSTRA_POORNO_SIGNAL



Richmond Valley Shire Analysis

Pacific Highway

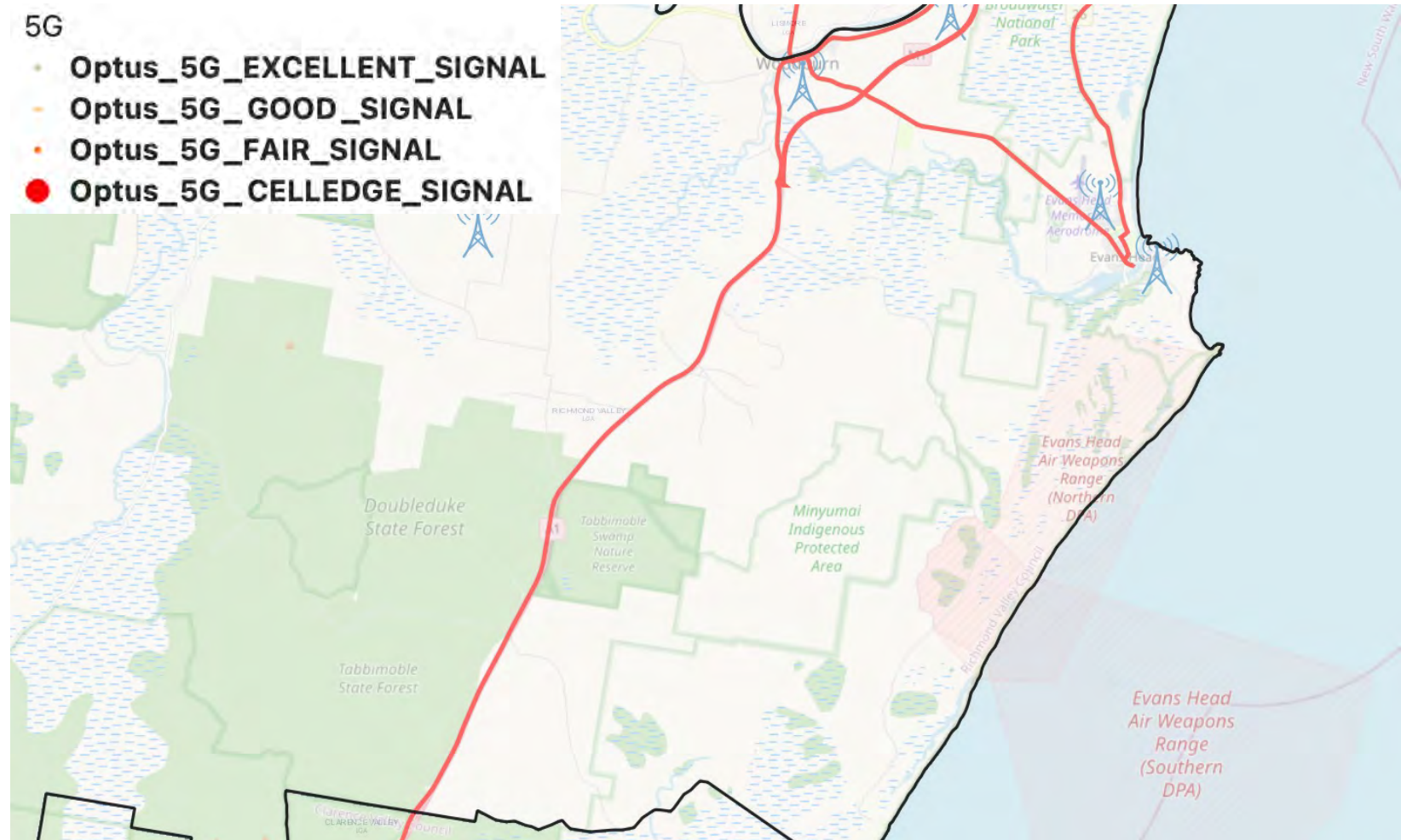


Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 3 x Sites to 5G & Optus / Fed Govt – 1 new 5G Tower sites

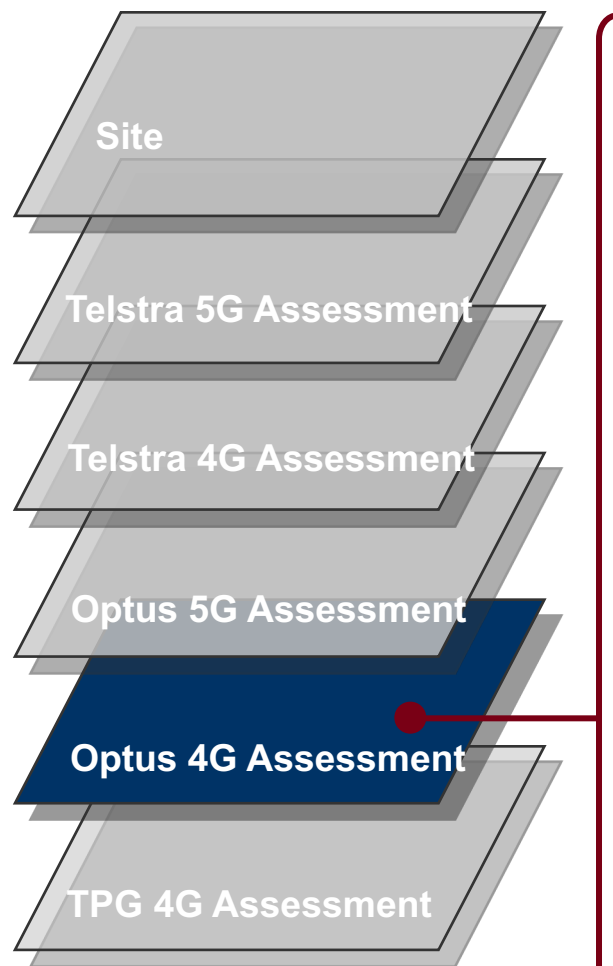
5G

- **Optus_5G_EXCELLENT_SIGNAL**
- **Optus_5G_GOOD_SIGNAL**
- **Optus_5G_FAIR_SIGNAL**
- **Optus_5G_CELLEDGE_SIGNAL**



Richmond Valley Shire Analysis

Pacific Highway

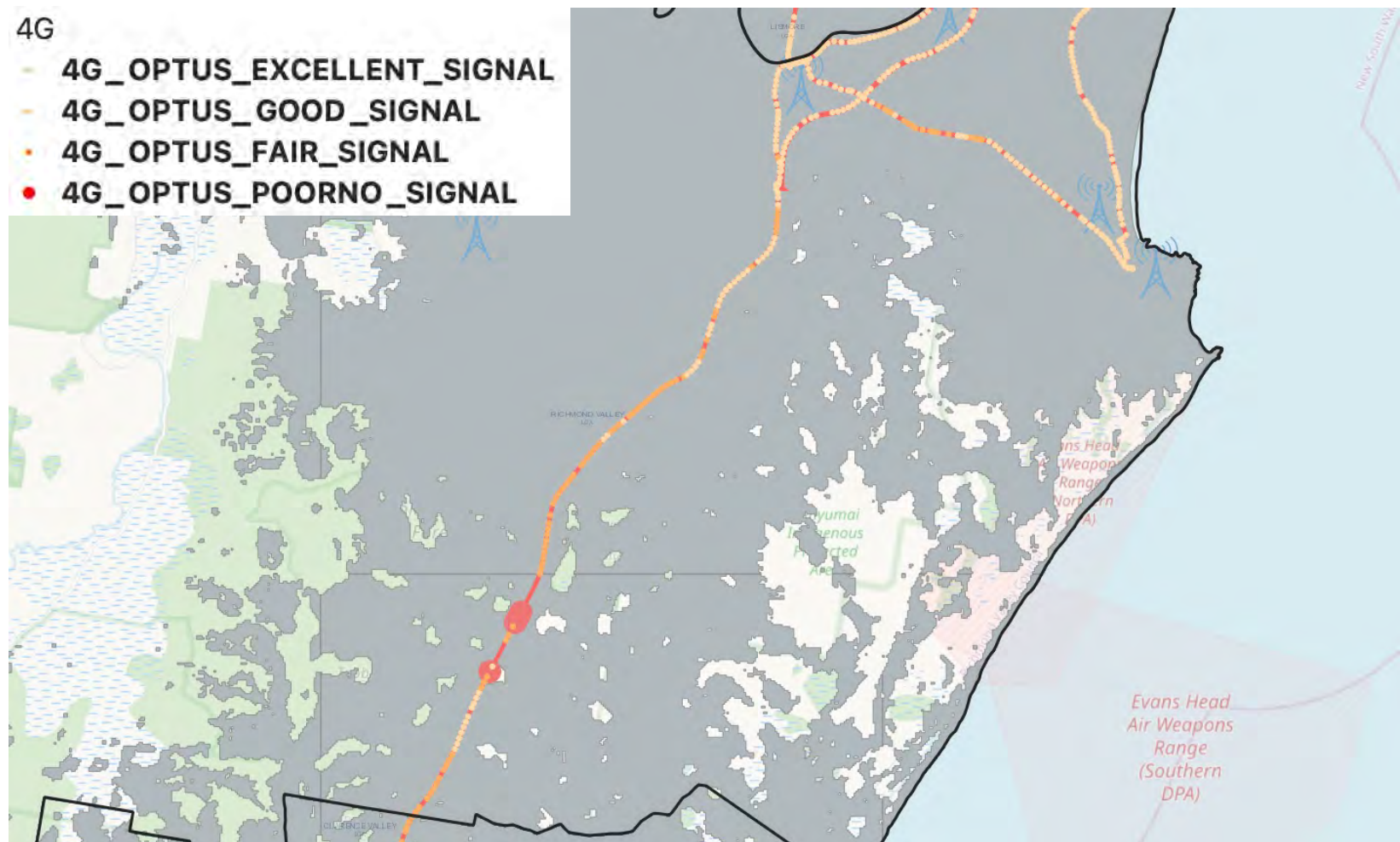


Assessment – Good 4G coverage with smnall blackspot area

Action – Optus / Fed Govt – up to 4 new 4G Tower sites

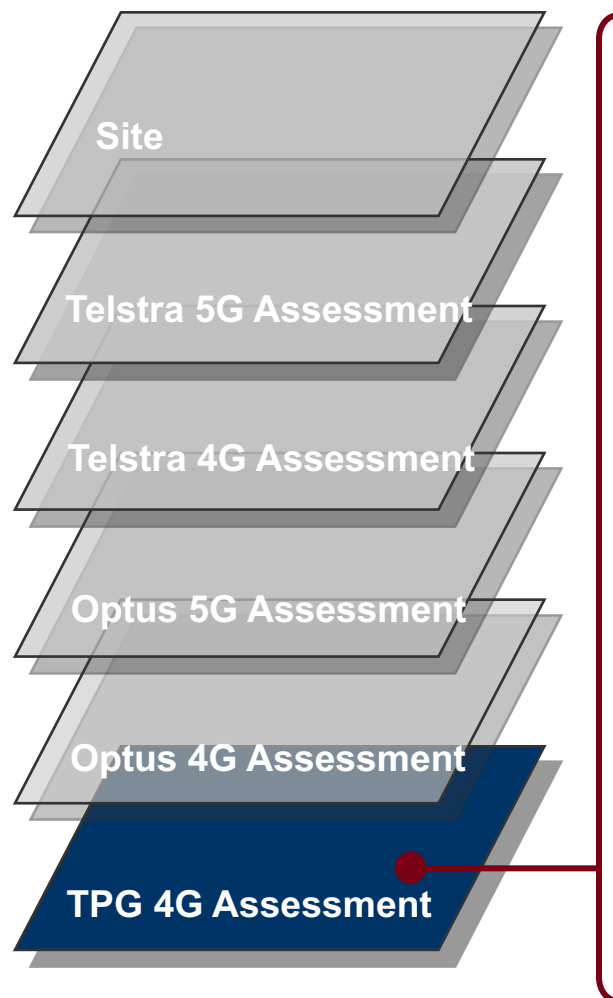
4G

- 4G_OPTUS_EXCELLENT_SIGNAL
- 4G_OPTUS_GOOD_SIGNAL
- 4G_OPTUS_FAIR_SIGNAL
- 4G_OPTUS_POORNO_SIGNAL



Richmond Valley Shire Analysis

Pacific Highway



Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – TPG – upgrade existing Site with 4G midband

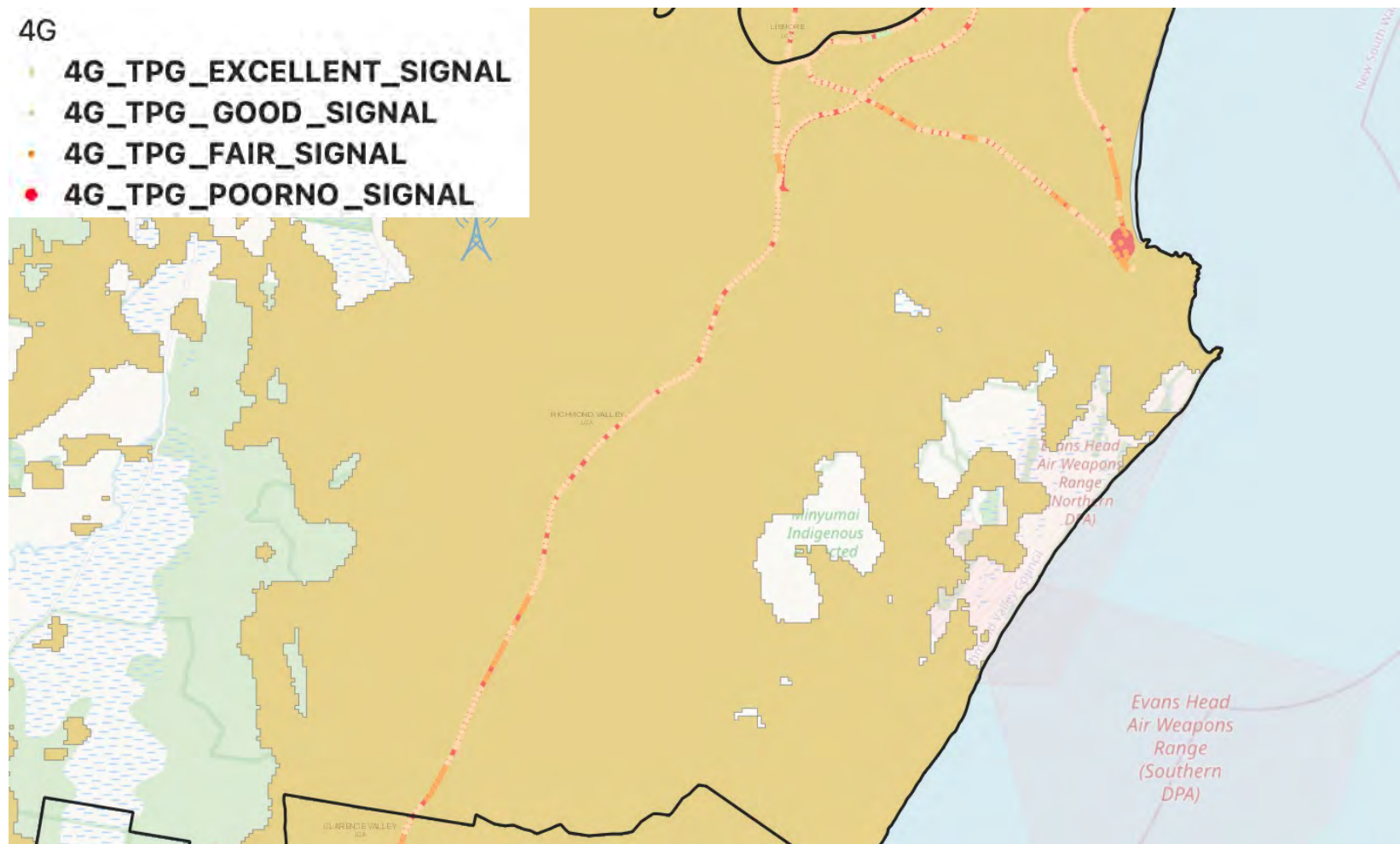
4G

4G_TPG_EXCELLENT_SIGNAL

4G_TPG_GOOD_SIGNAL

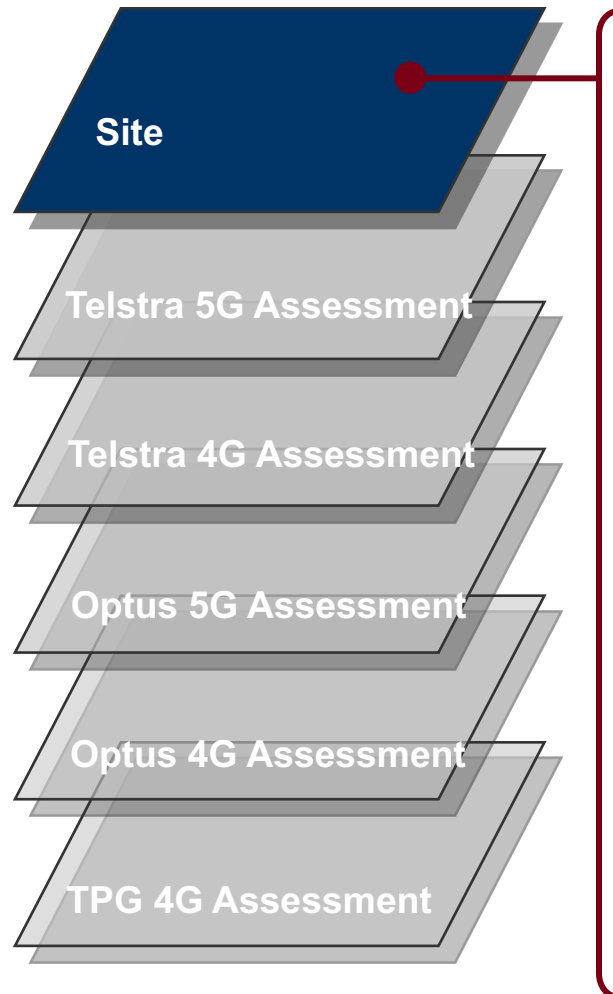
4G_TPG_FAIR_SIGNAL

4G_TPG_POORNO_SIGNAL



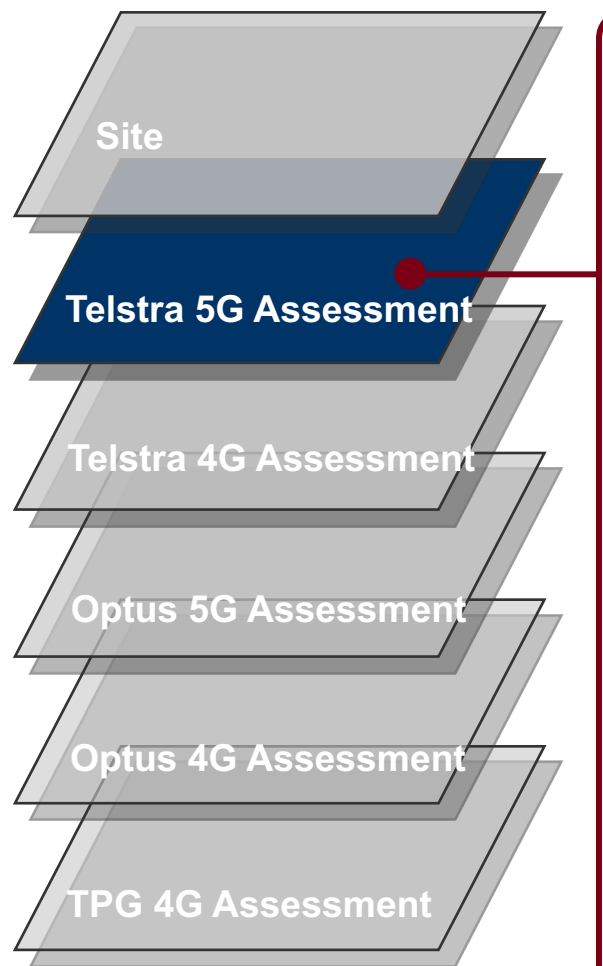
Richmond Valley Shire Analysis

Bruxner Highway



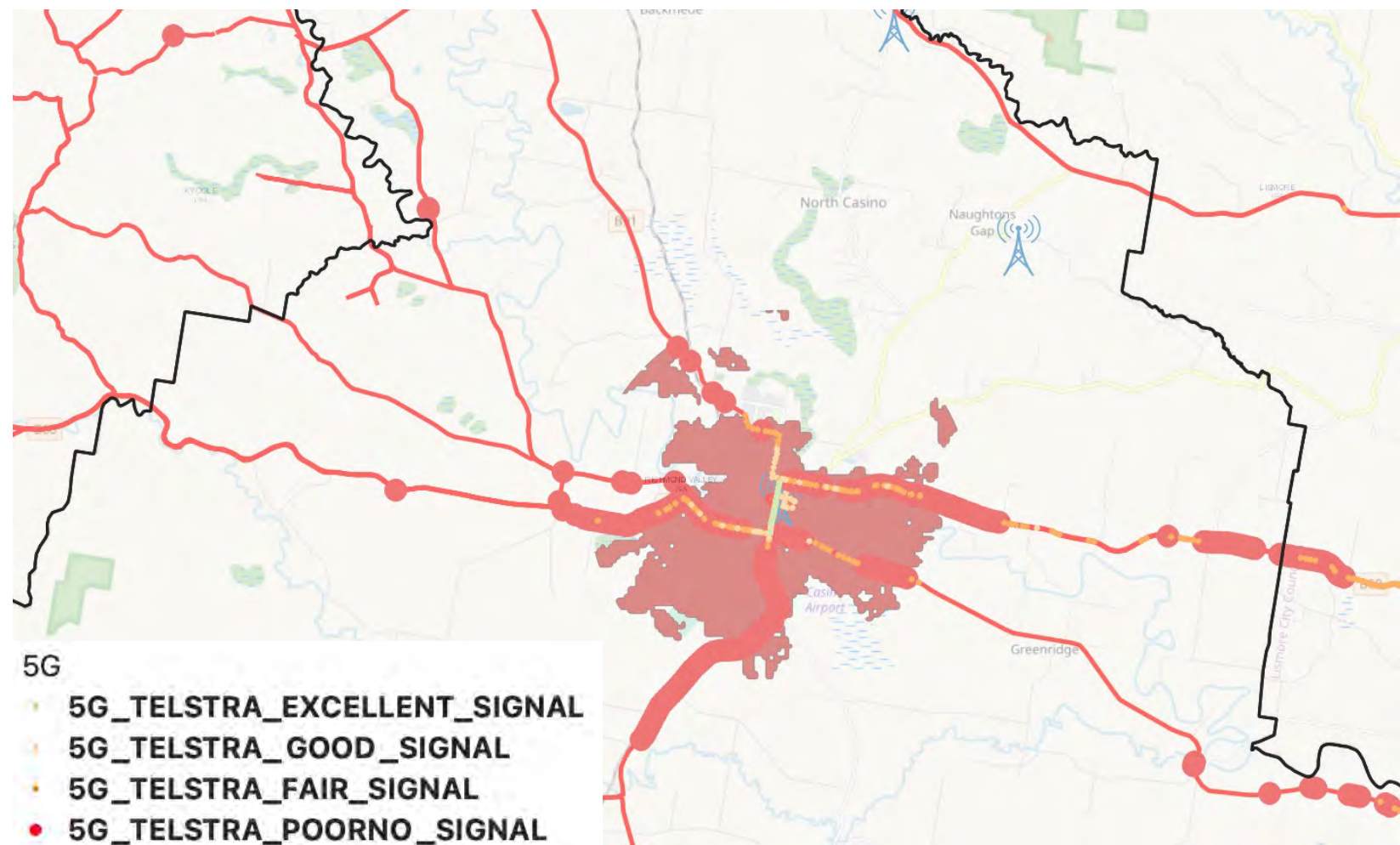
Richmond Valley Shire Analysis

Bruxner Highway



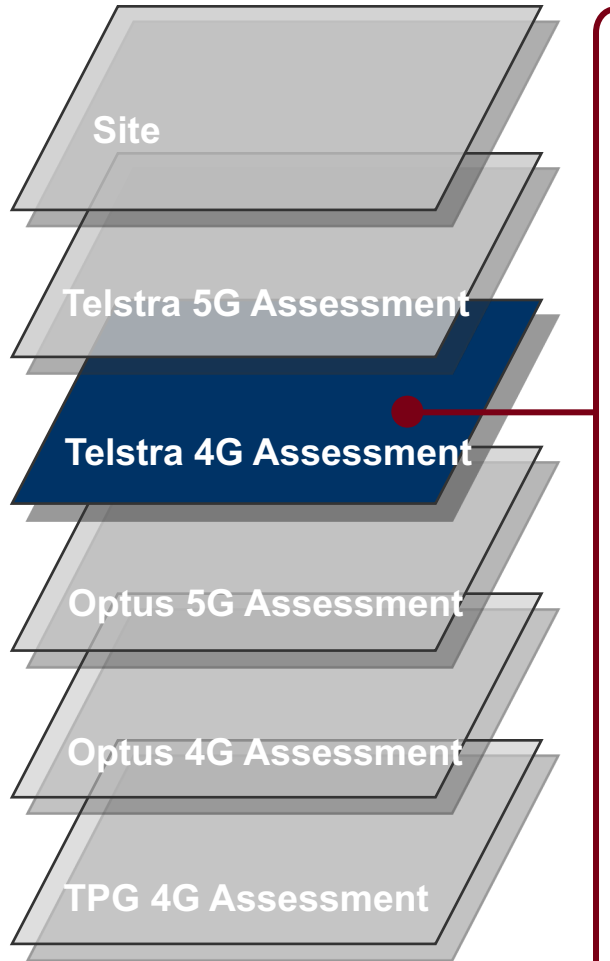
Assessment – Areas of 5G coverage within and east of Casino with broad 5G Blackspot areas to the west

Action –Telstra / Fed Govt – up to 3 new 5G Tower sites



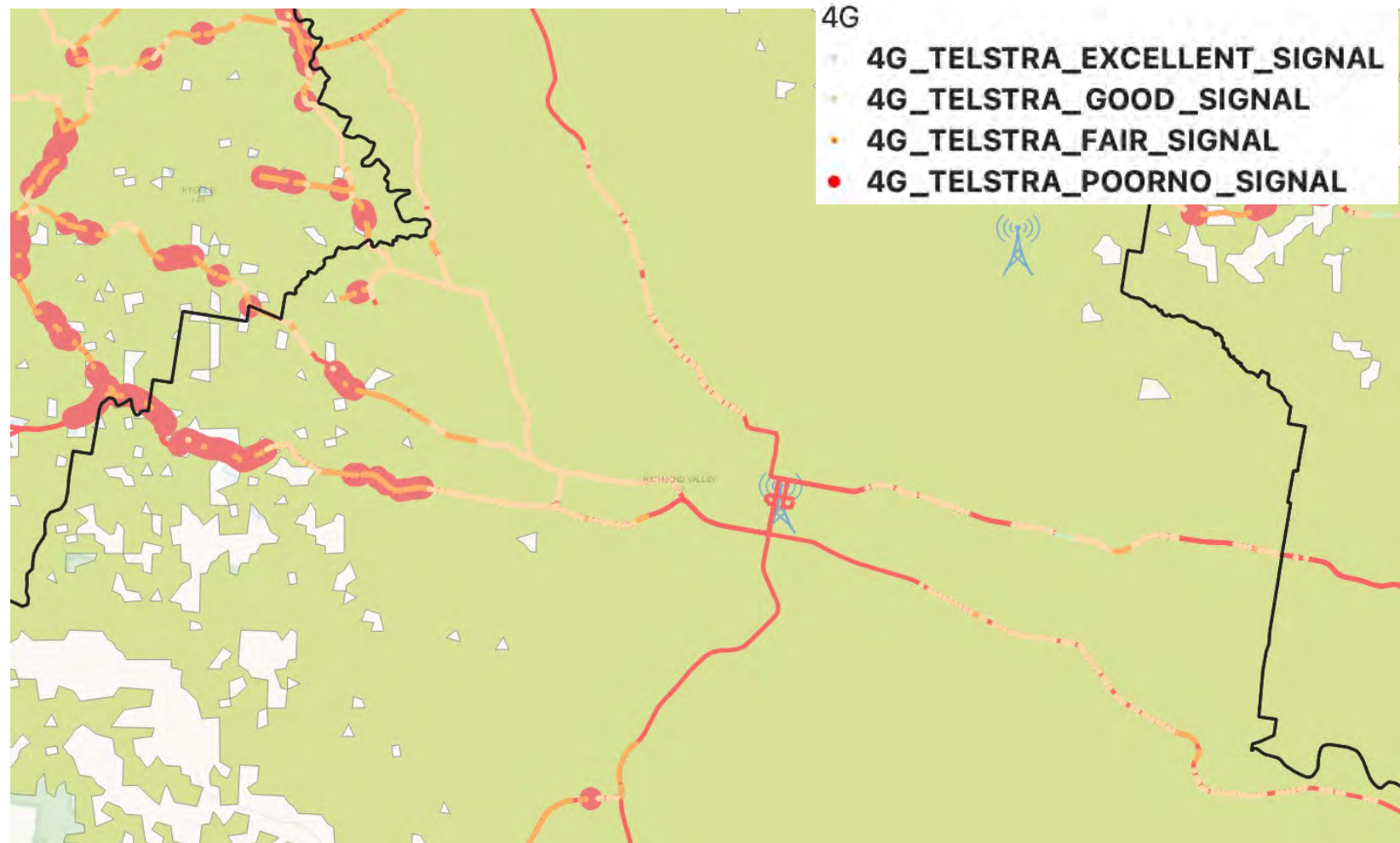
Richmond Valley Shire Analysis

Bruxner Highway



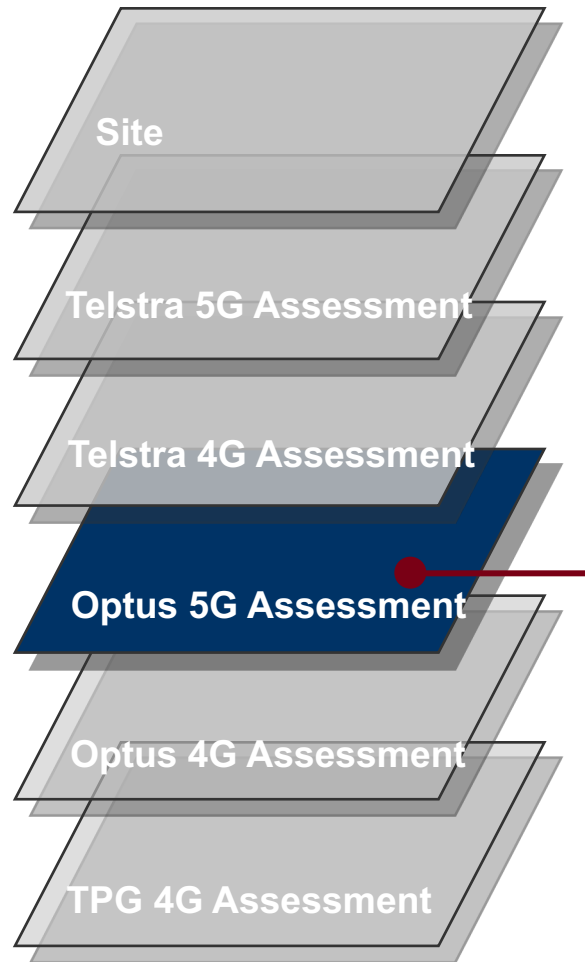
Assessment – Good 4G coverage with broad 4G blackspots at western shire boundary

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



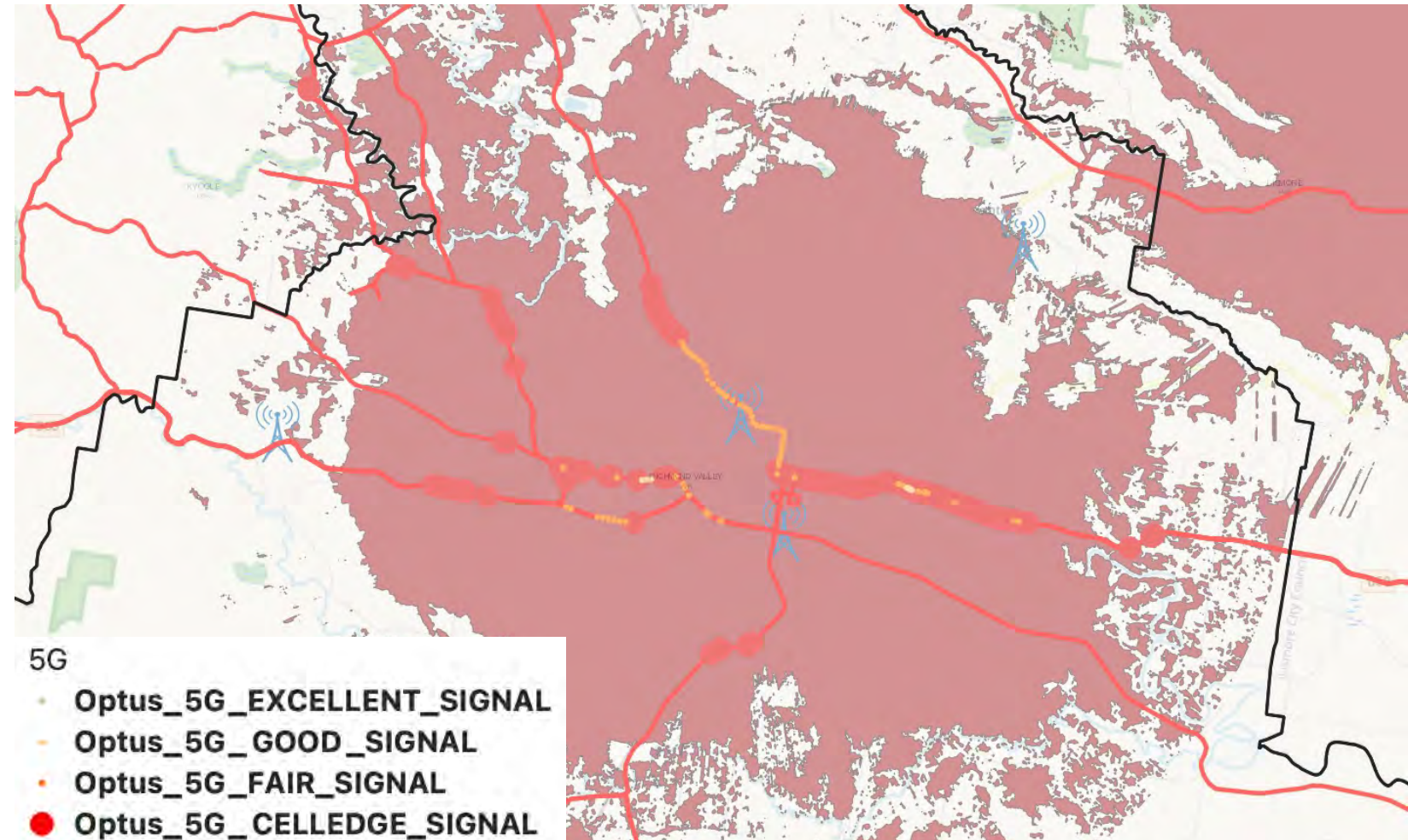
Richmond Valley Shire Analysis

Bruxner Highway



Assessment – Areas of 5G coverage within and near Casino along with broad 5G Blackspot areas

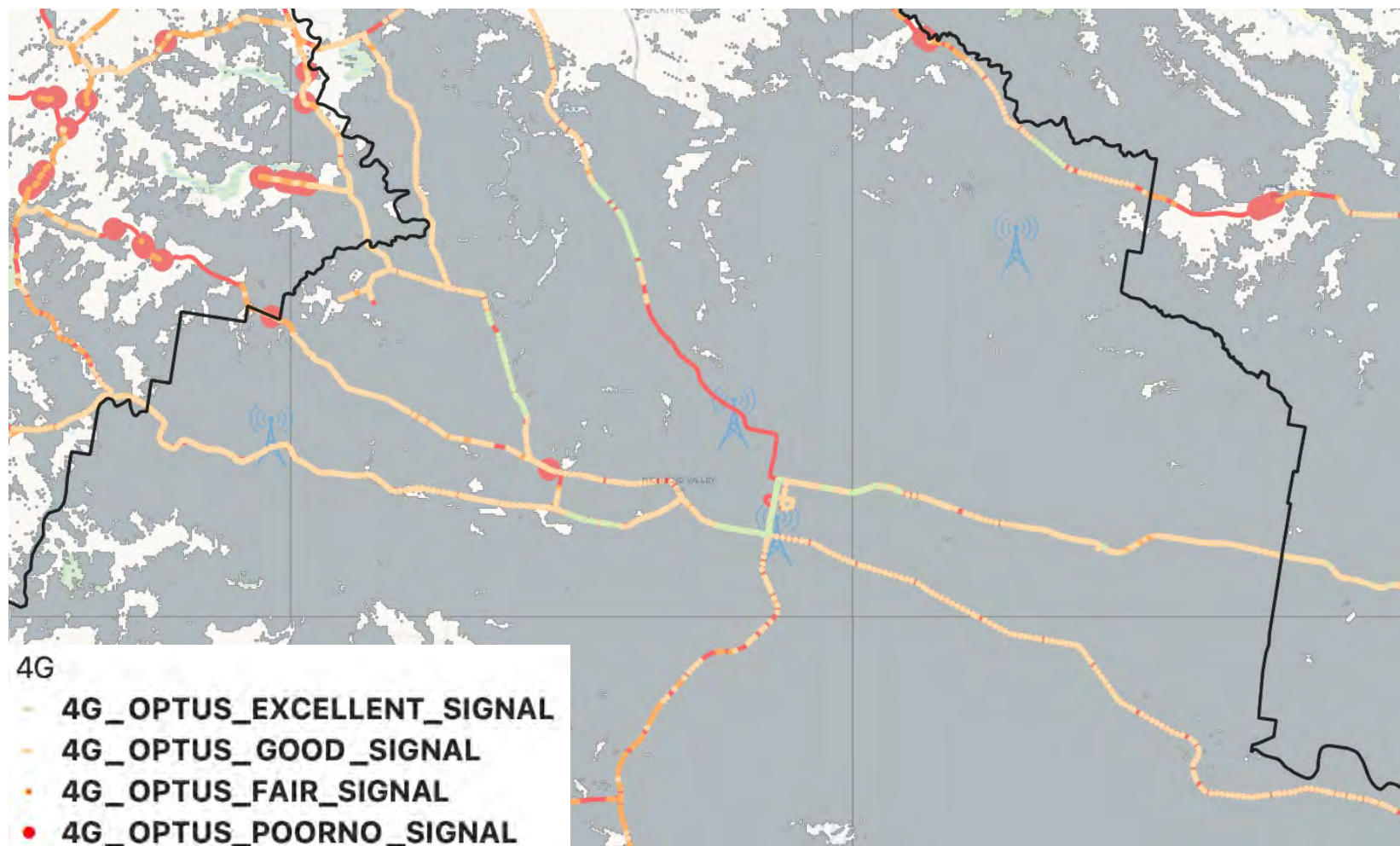
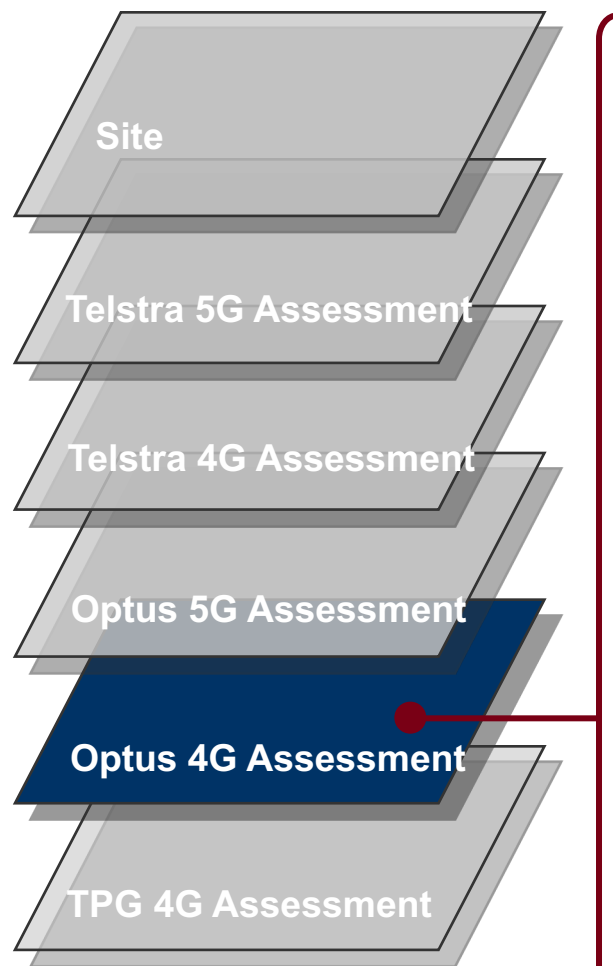
Action – Optus - Upgrade 1 x Tower Sites with 5G & Optus / Fed Govt – 1 new 5G Tower sites



Richmond Valley Shire Analysis

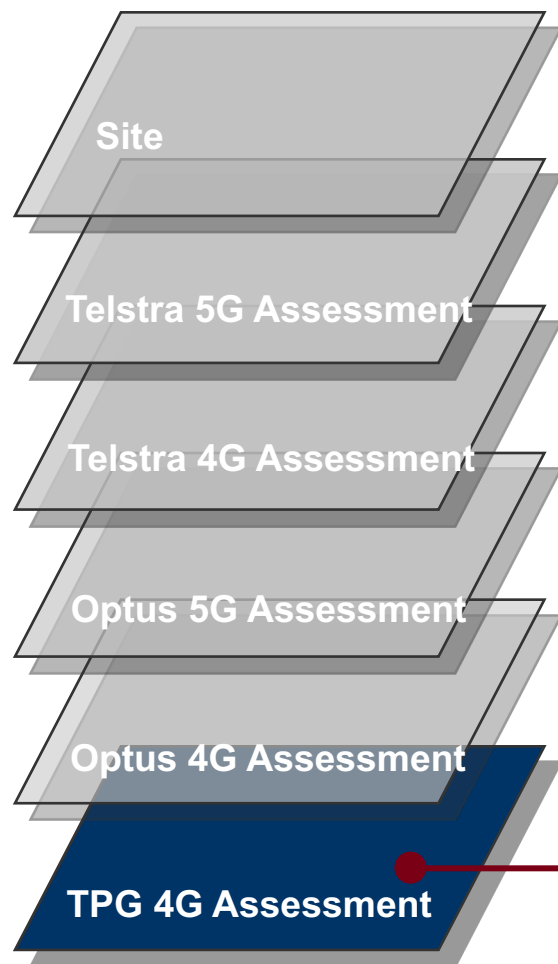
Bruxner Highway

Assessment – Good 4G coverage



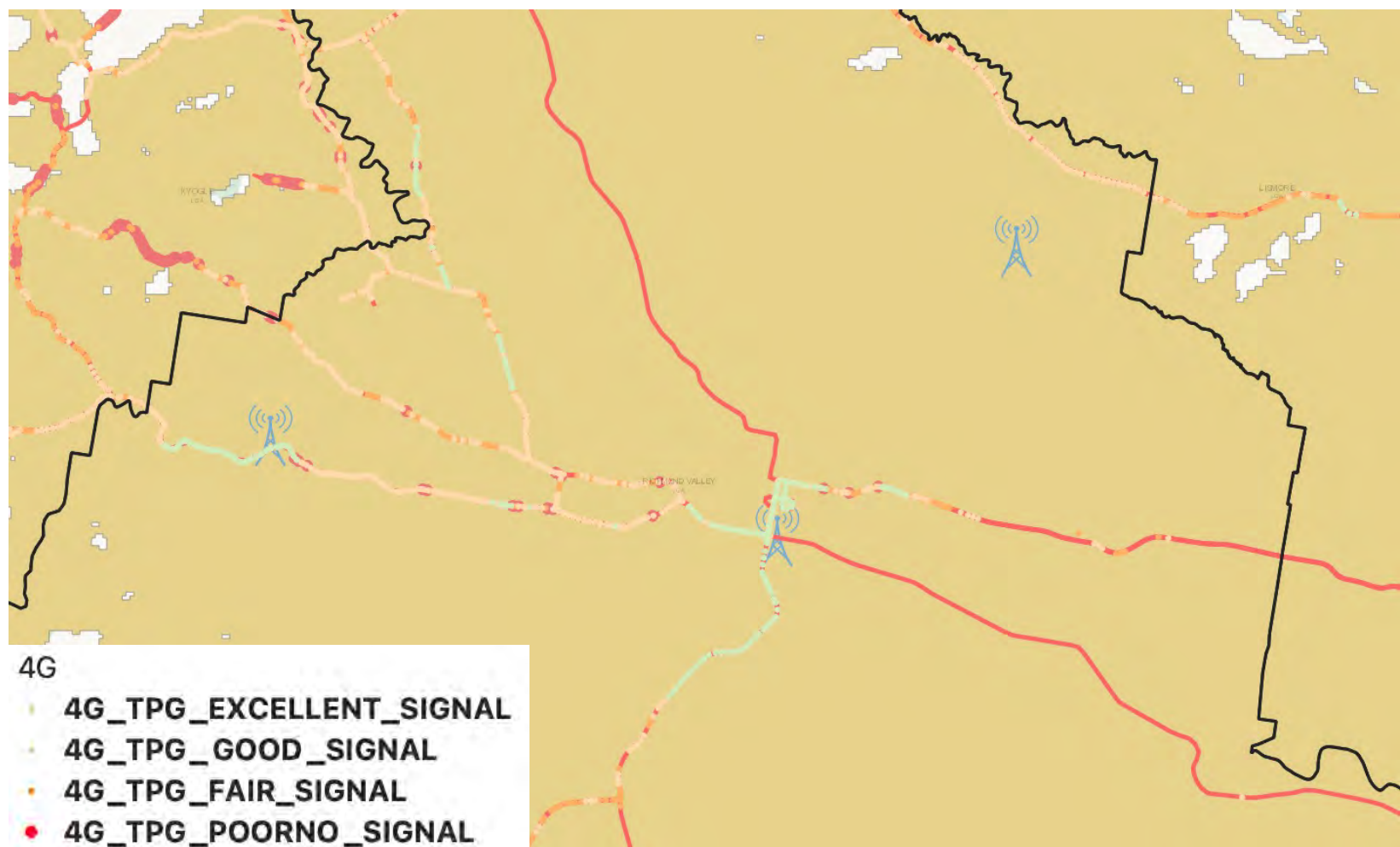
Richmond Valley Shire Analysis

Bruxner Highway



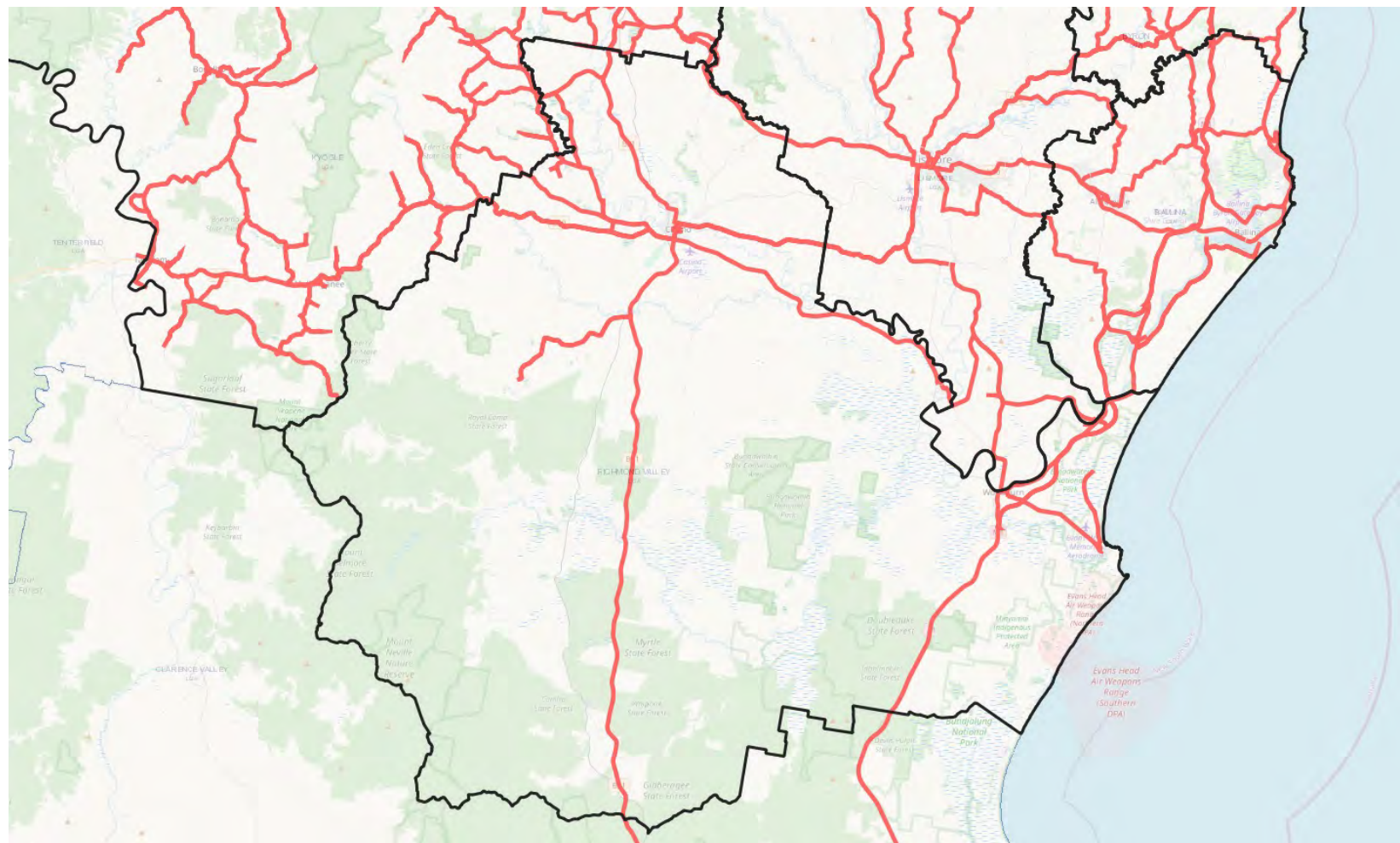
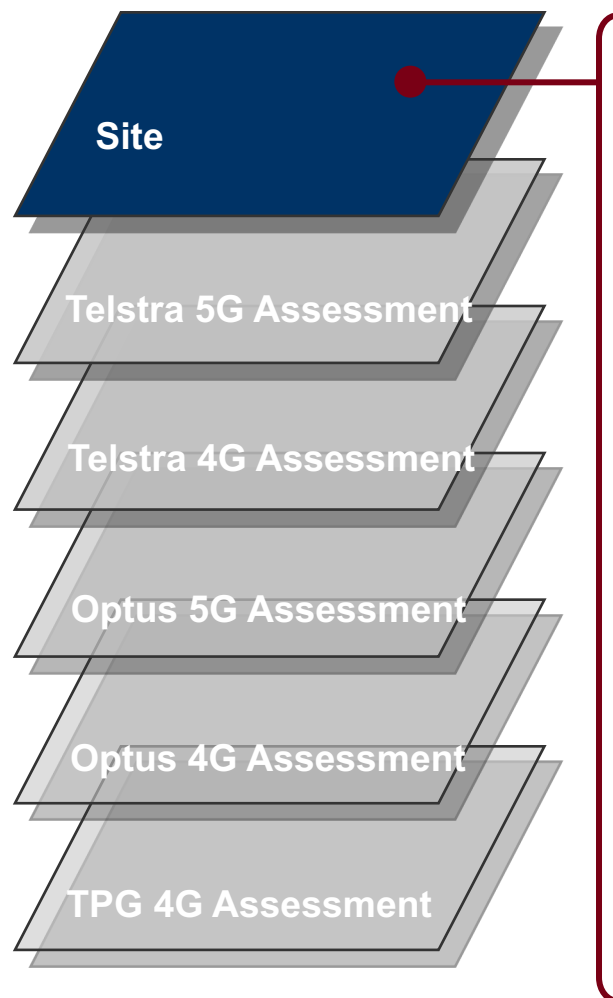
Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – TPG / Fed Govt (MBSP) – 1 new 4G Tower sites



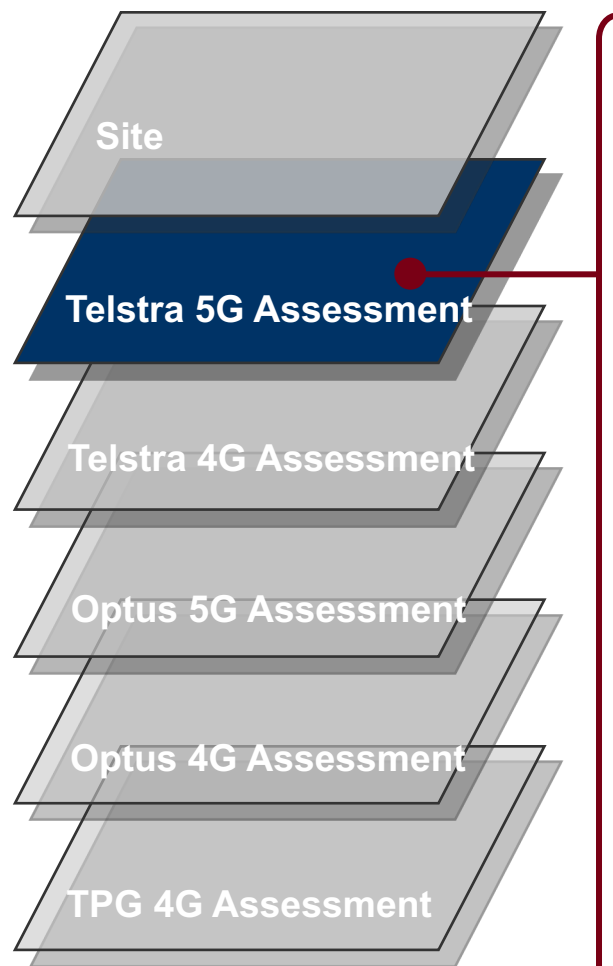
Richmond Valley Shire Analysis

Summerland Way



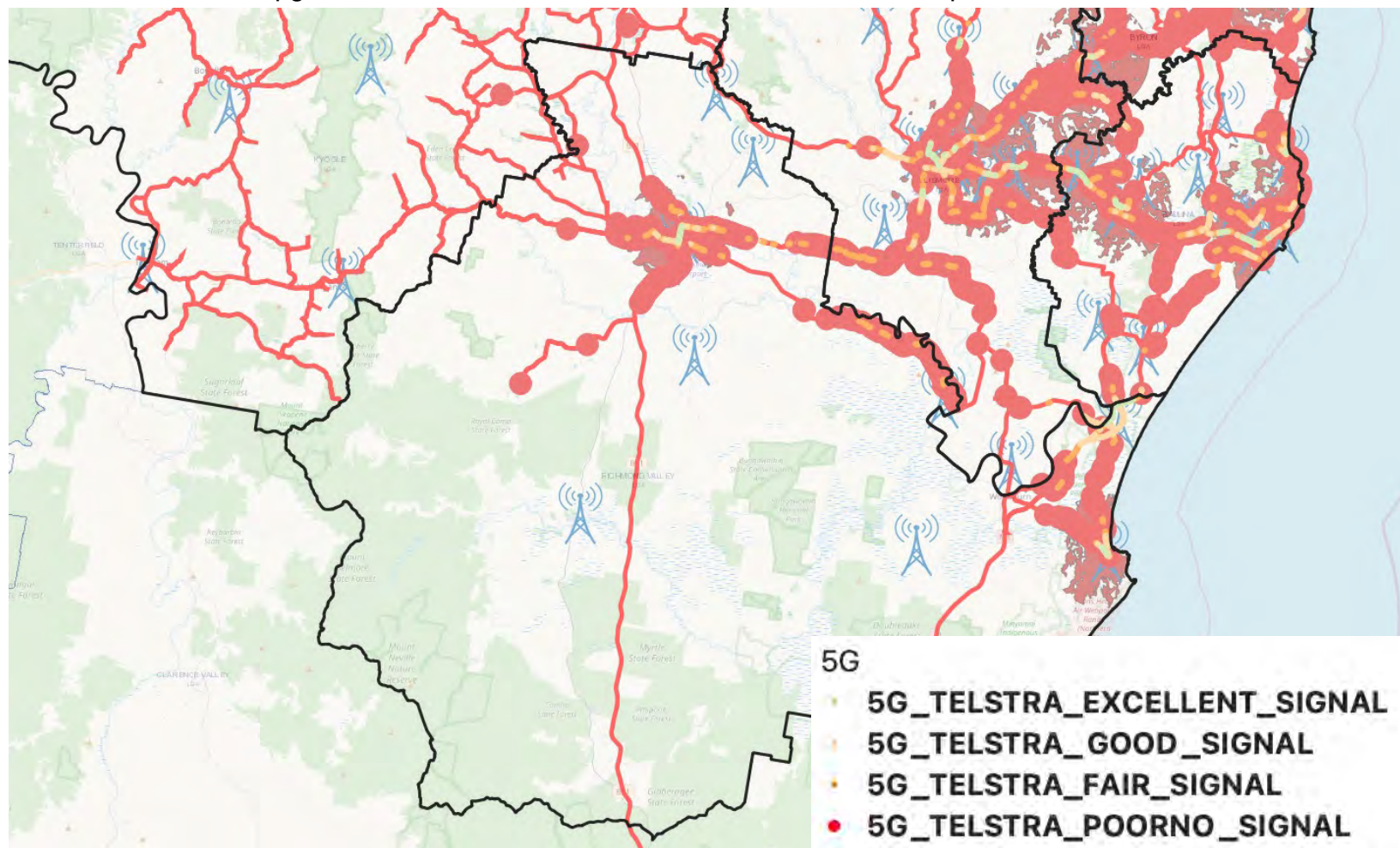
Richmond Valley Shire Analysis

Summerland Way



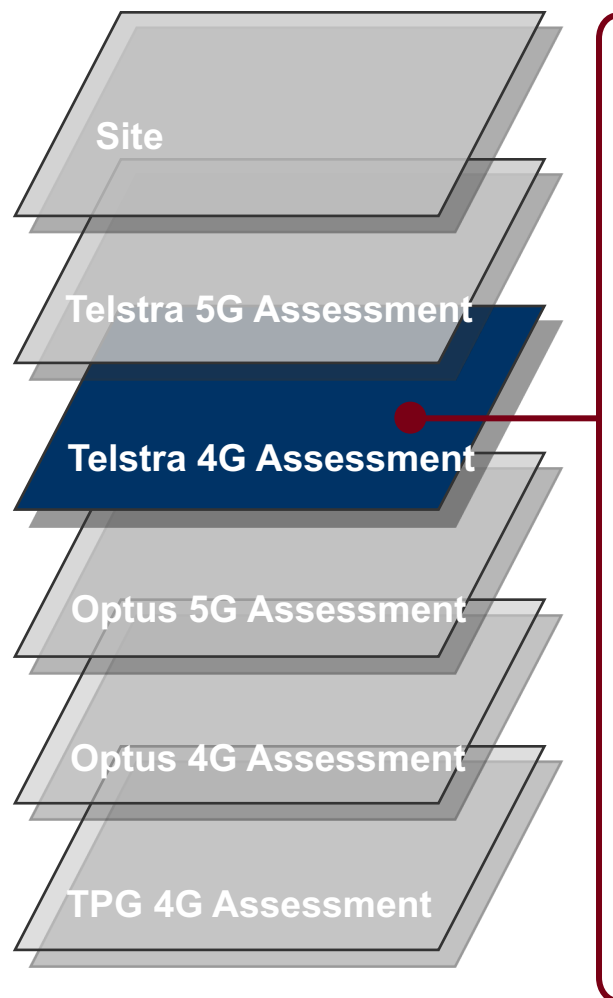
Assessment – Initial 5G coverage limited to Casino township and outskirts. Large 5G blackspot areas

Action – Telstra - Upgrade 2 x Tower Sites with 5G & Telstra / Fed Govt – up to 3 new 5G Tower sites



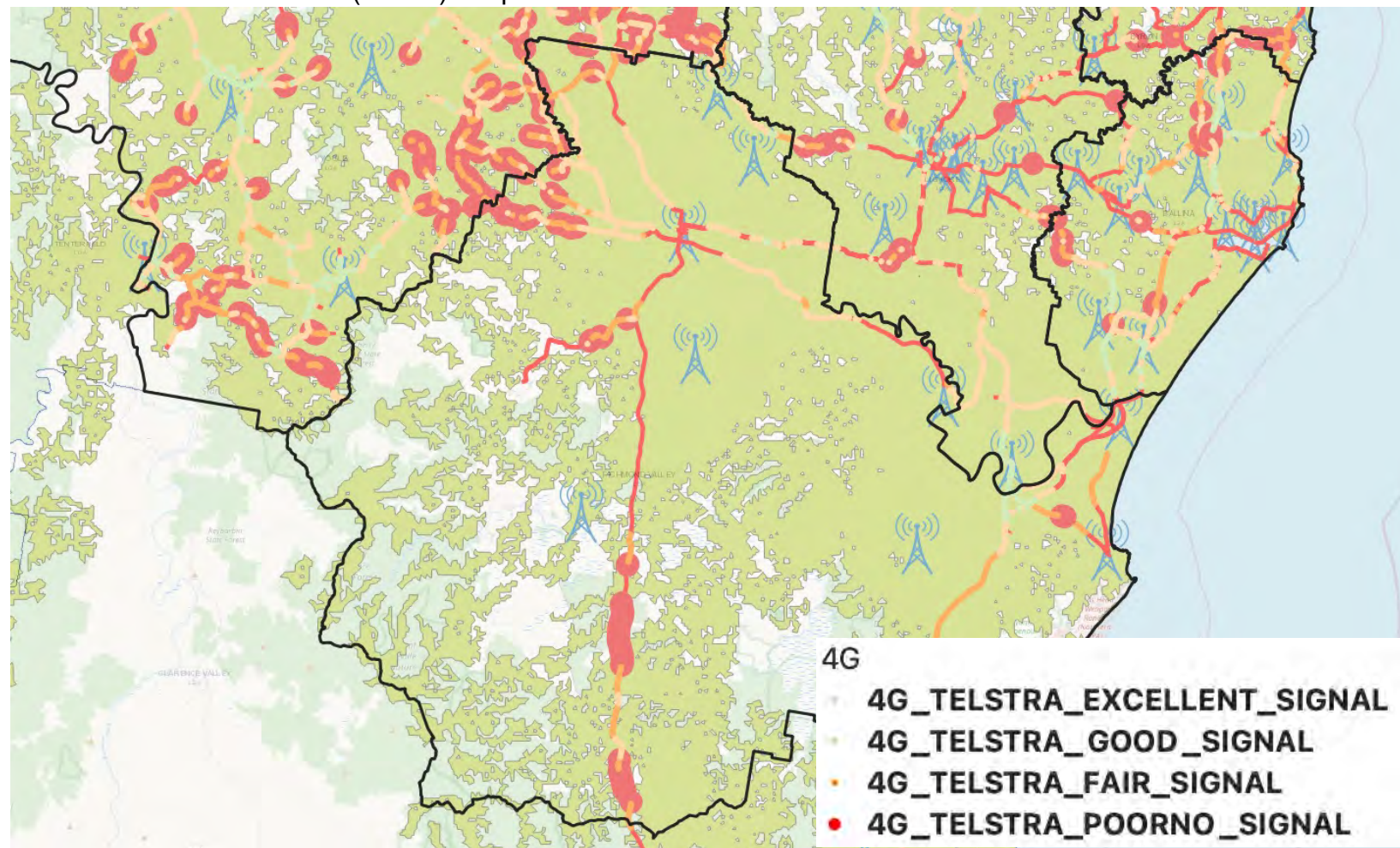
Richmond Valley Shire Analysis

Summerland Way



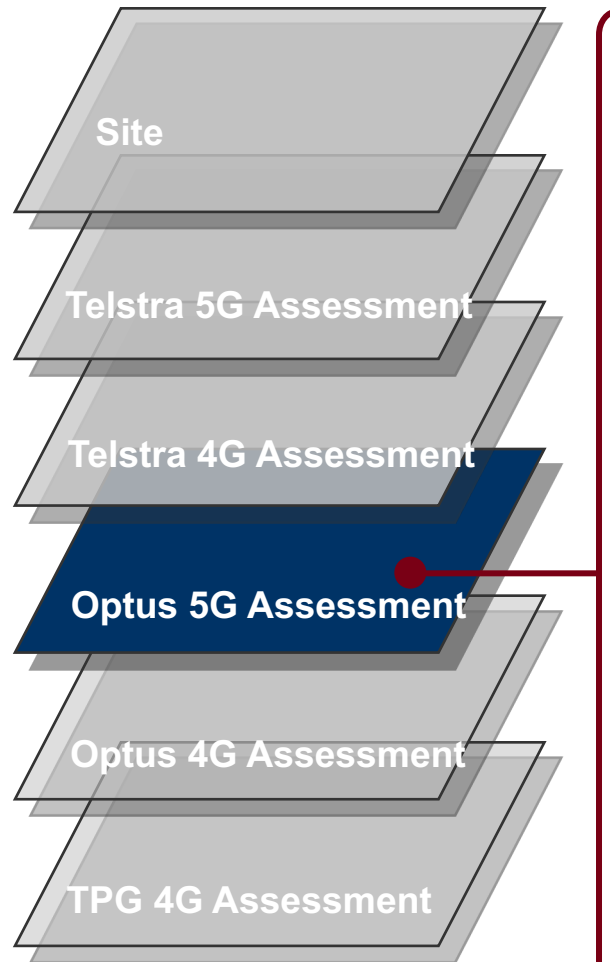
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – Telstra / Fed Govt (MBSP) – up to 3 new 4G Tower sites



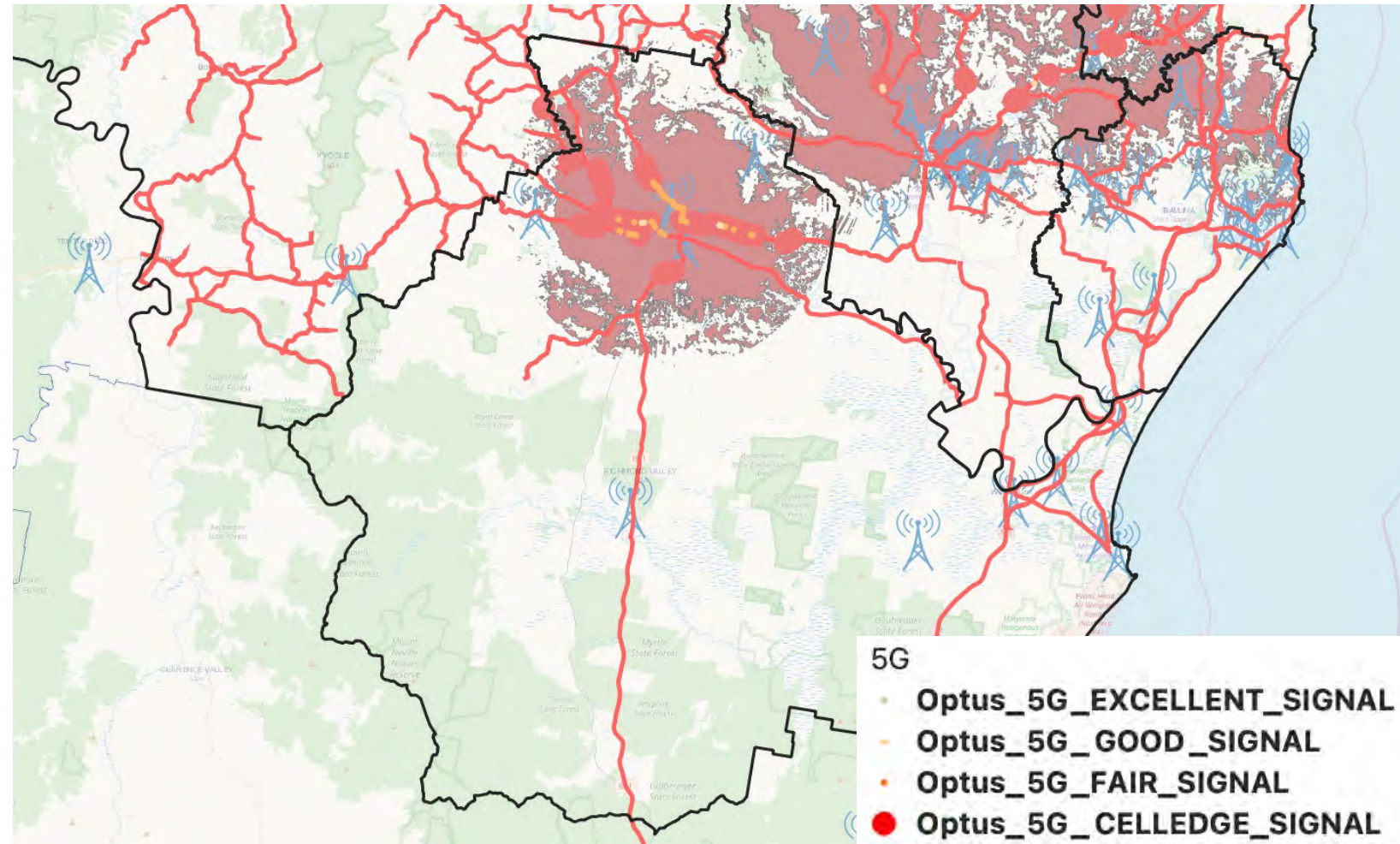
Richmond Valley Shire Analysis

Summerland Way



Assessment - Initial 5G coverage limited to Casino township and outskirts. Large 5G blackspot areas

Action – Optus - Upgrade 1 x Tower Sites with 5G & Optus / Fed Govt – up to 3 new 5G Tower sites

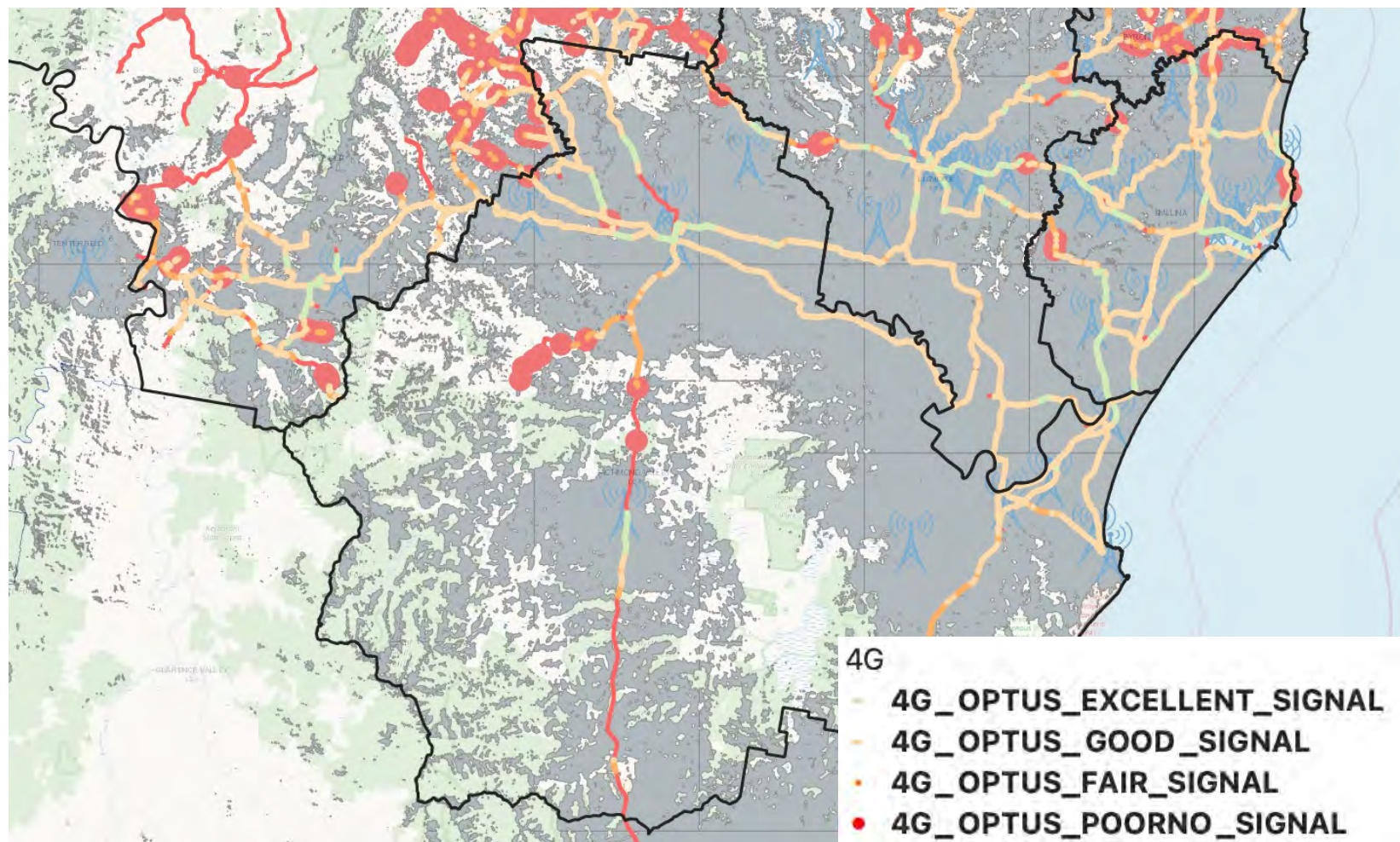
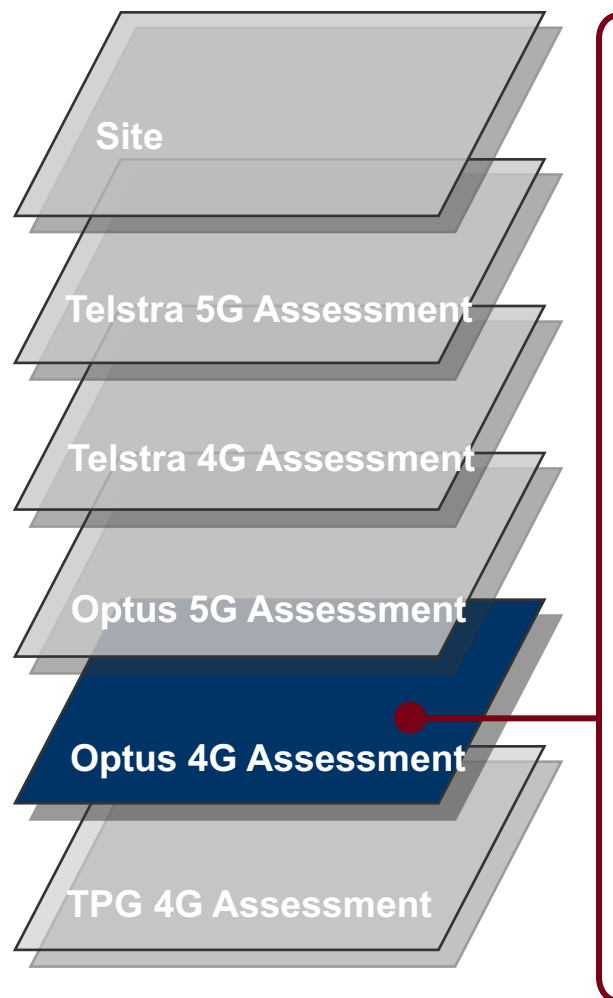


Richmond Valley Shire Analysis

Summerland Way

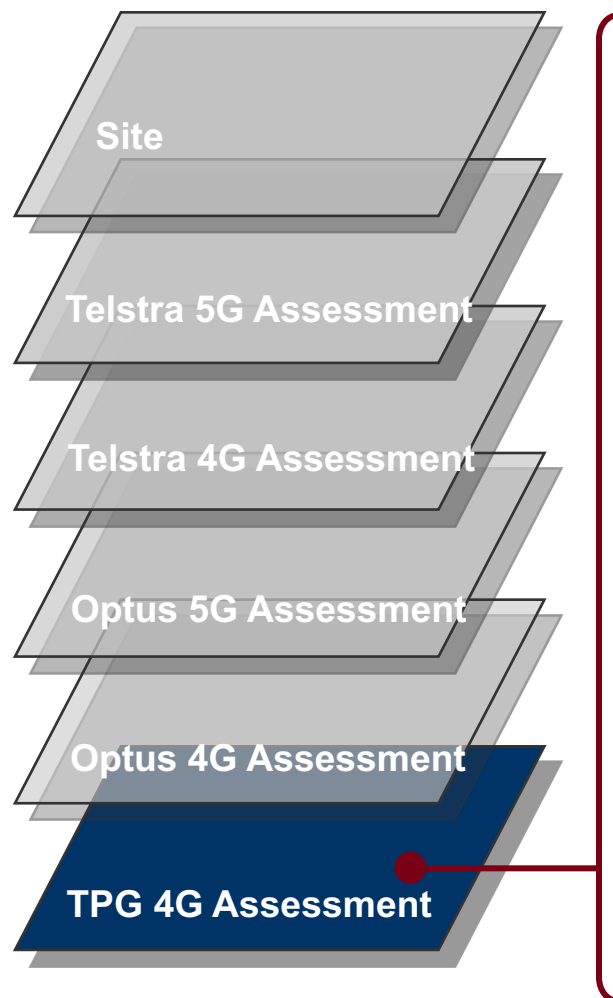
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – Optus / Fed Govt – up to 3 new 4G Tower sites



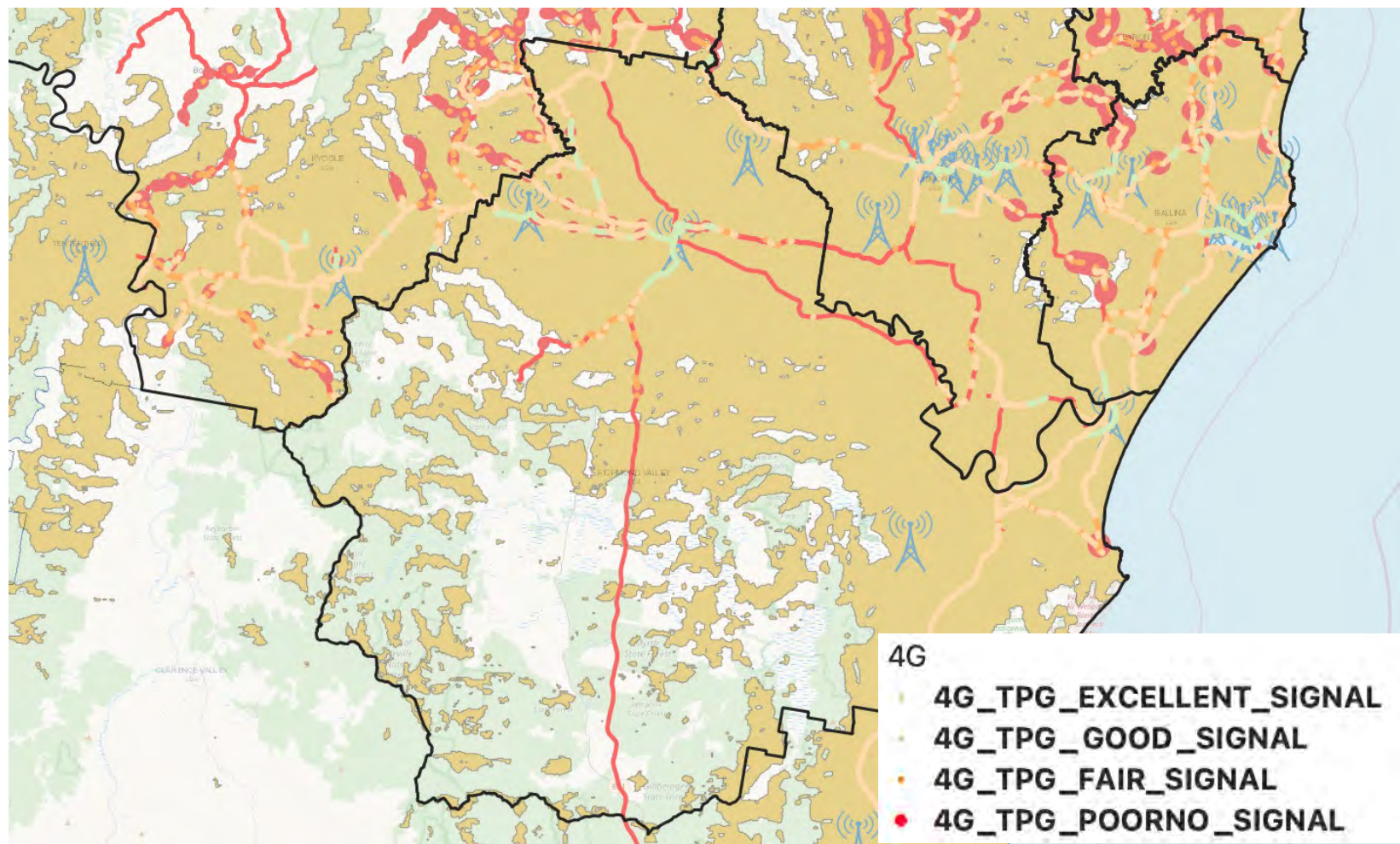
Richmond Valley Shire Analysis

Summerland Way



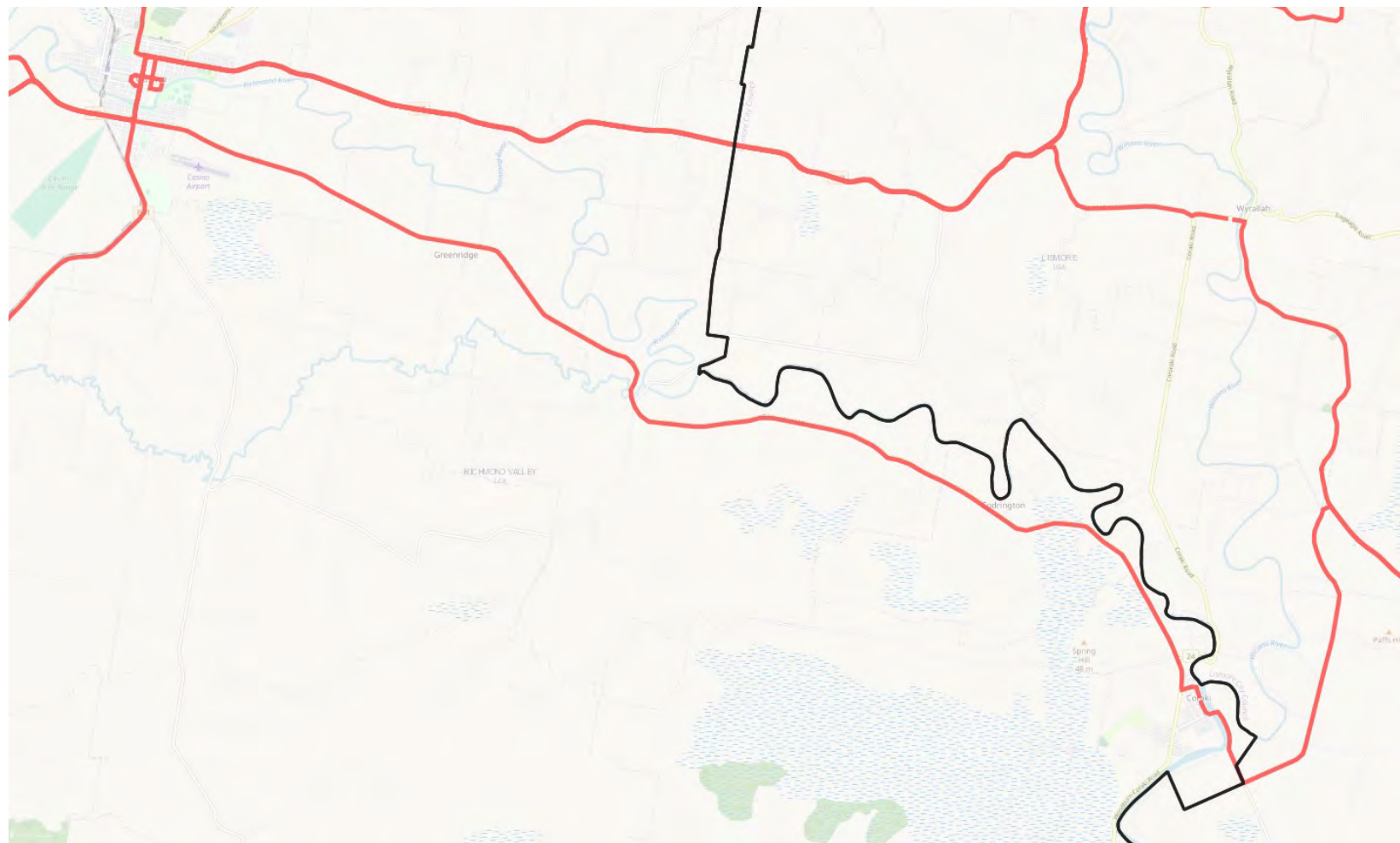
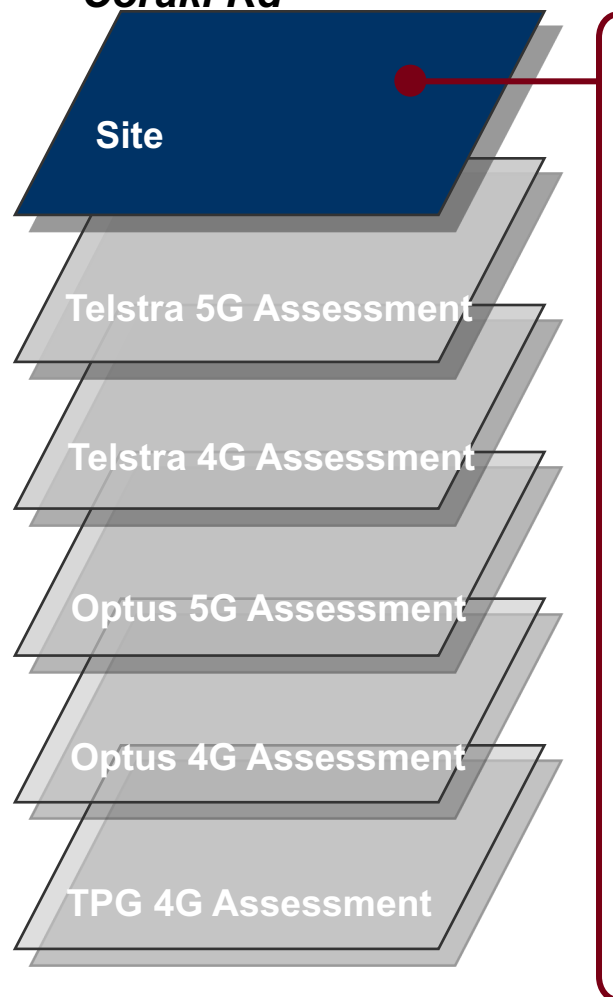
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – TPG / Fed Govt (MBSP) – up to 3 new 4G Tower sites



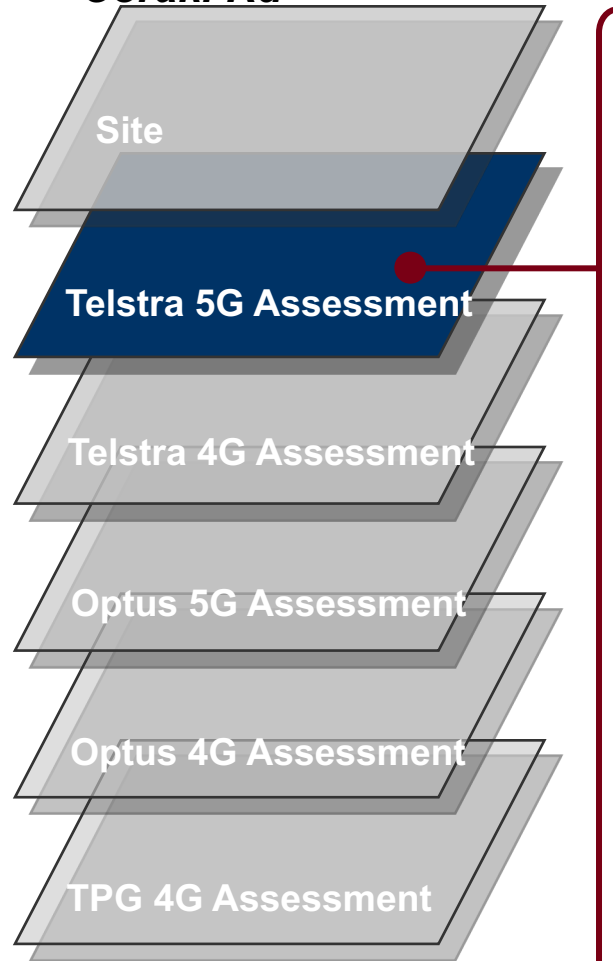
Richmond Valley Shire Analysis

Casino – Coraki Rd / Woodburn – Coraki Rd



Richmond Valley Shire Analysis

Casino – Coraki Rd / Woodburn – Coraki Rd



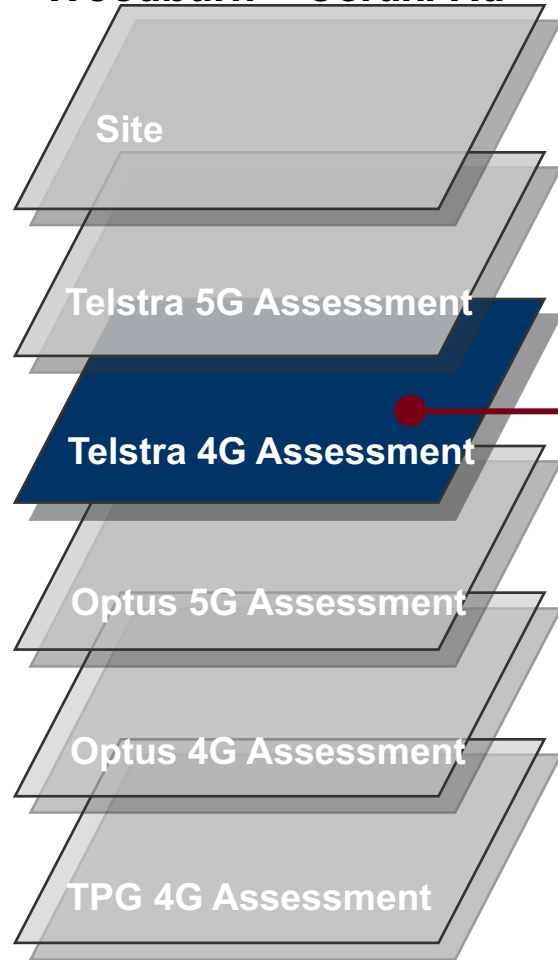
Assessment – Initial 5G coverage limited to Casino township and outskirts. Large 5G blackspot areas

Action – Telstra - Upgrade 1 x Tower Sites with 5G & Telstra / Fed Govt – 1 new 5G Tower sites



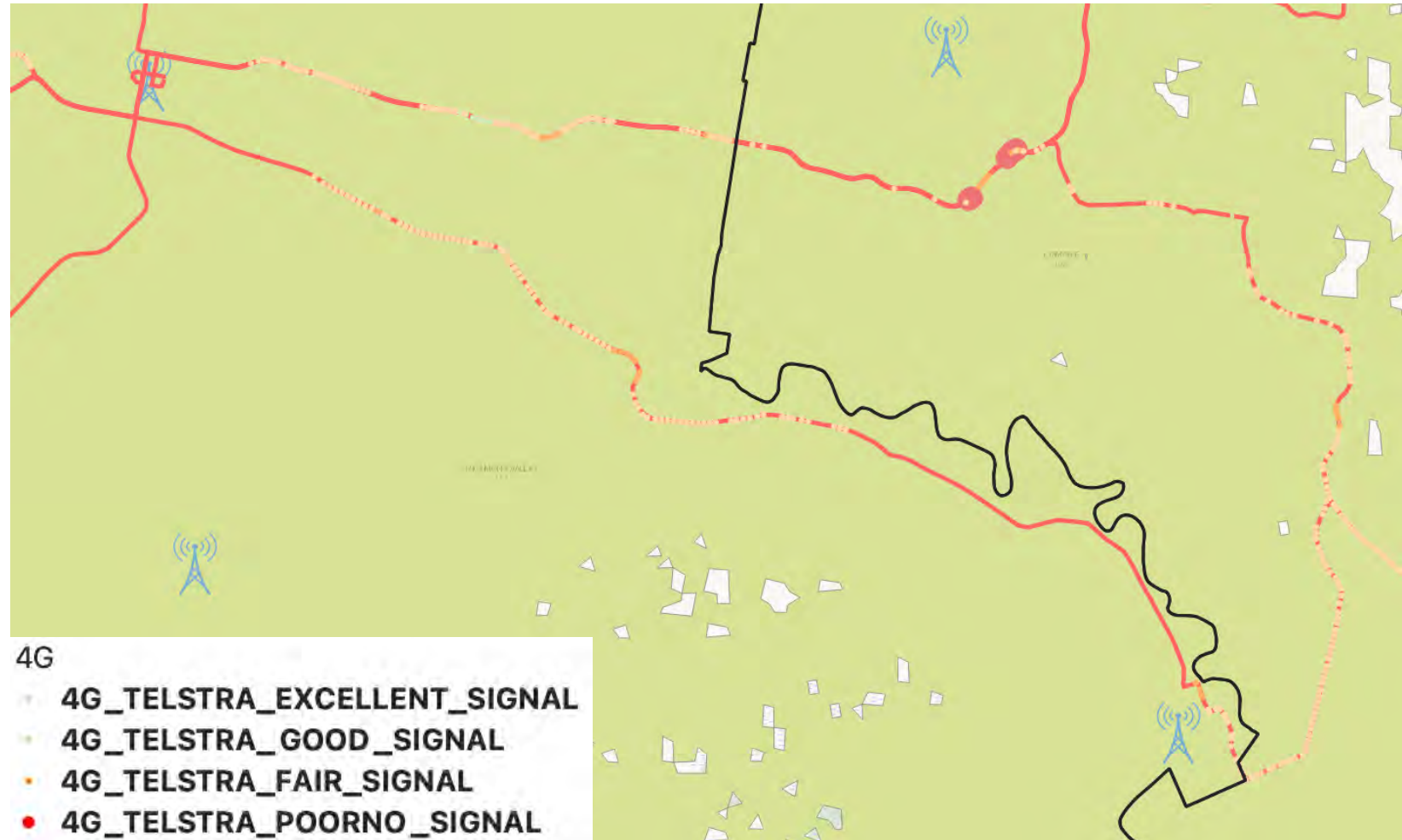
Richmond Valley Shire Analysis

Casino – Coraki Rd / Woodburn – Coraki Rd



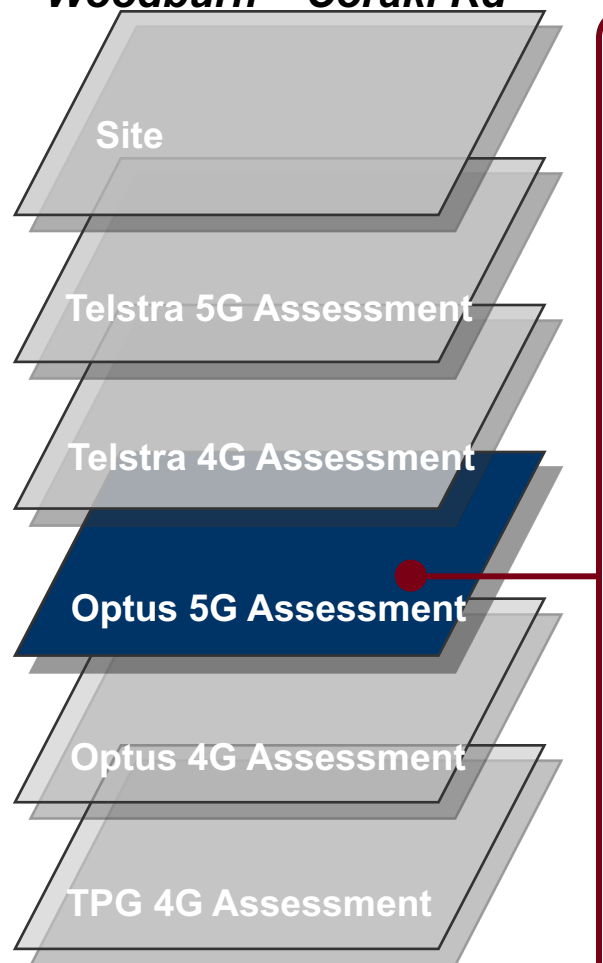
Assessment - Mixture of Good 4G coverage with some 4G blackspots

Action – Telstra – Upgrade 1 x Sites to 4G midband



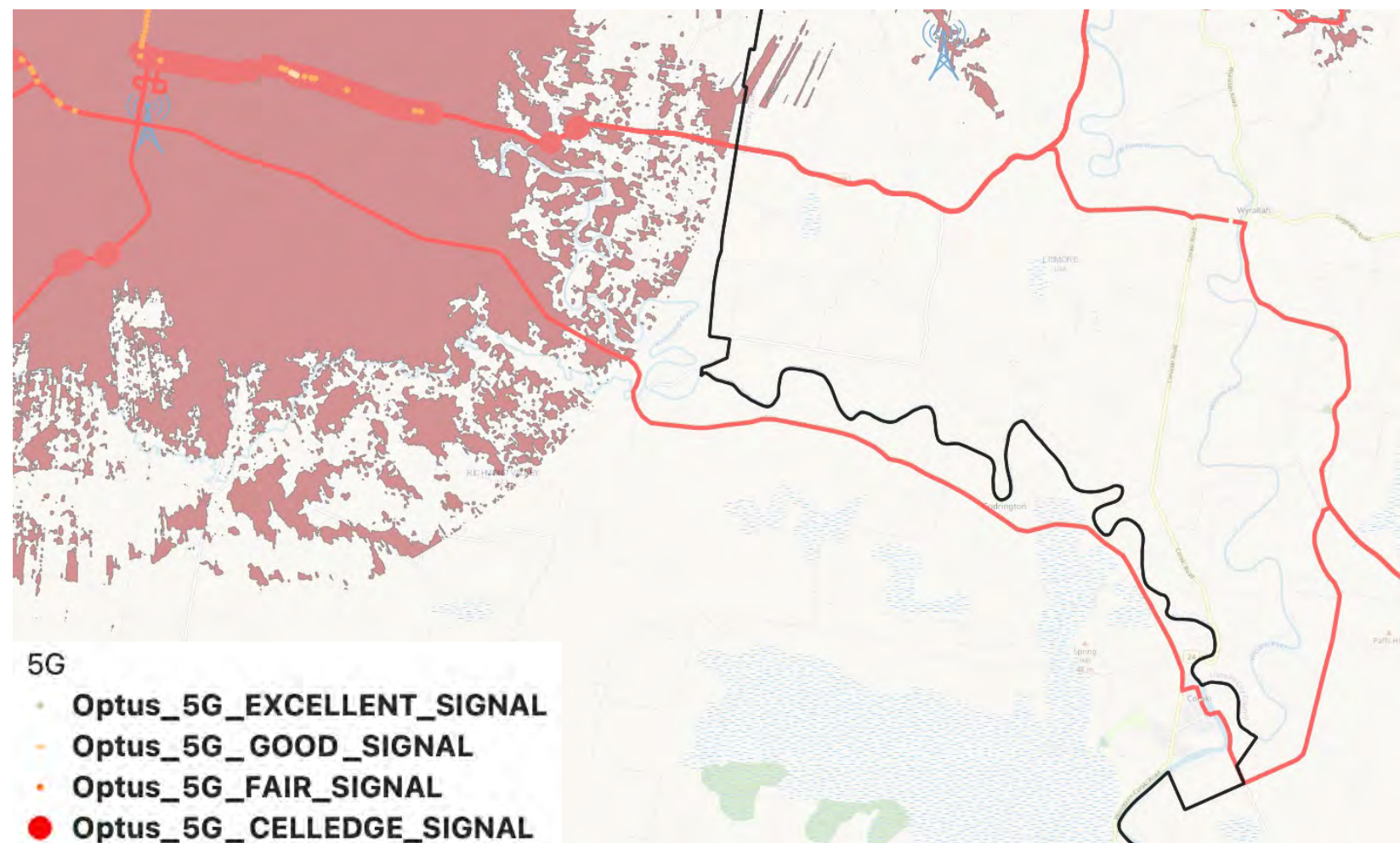
Richmond Valley Shire Analysis

**Casino – Coraki Rd /
Woodburn – Coraki Rd**



Assessment - No current Optus 5G coverage

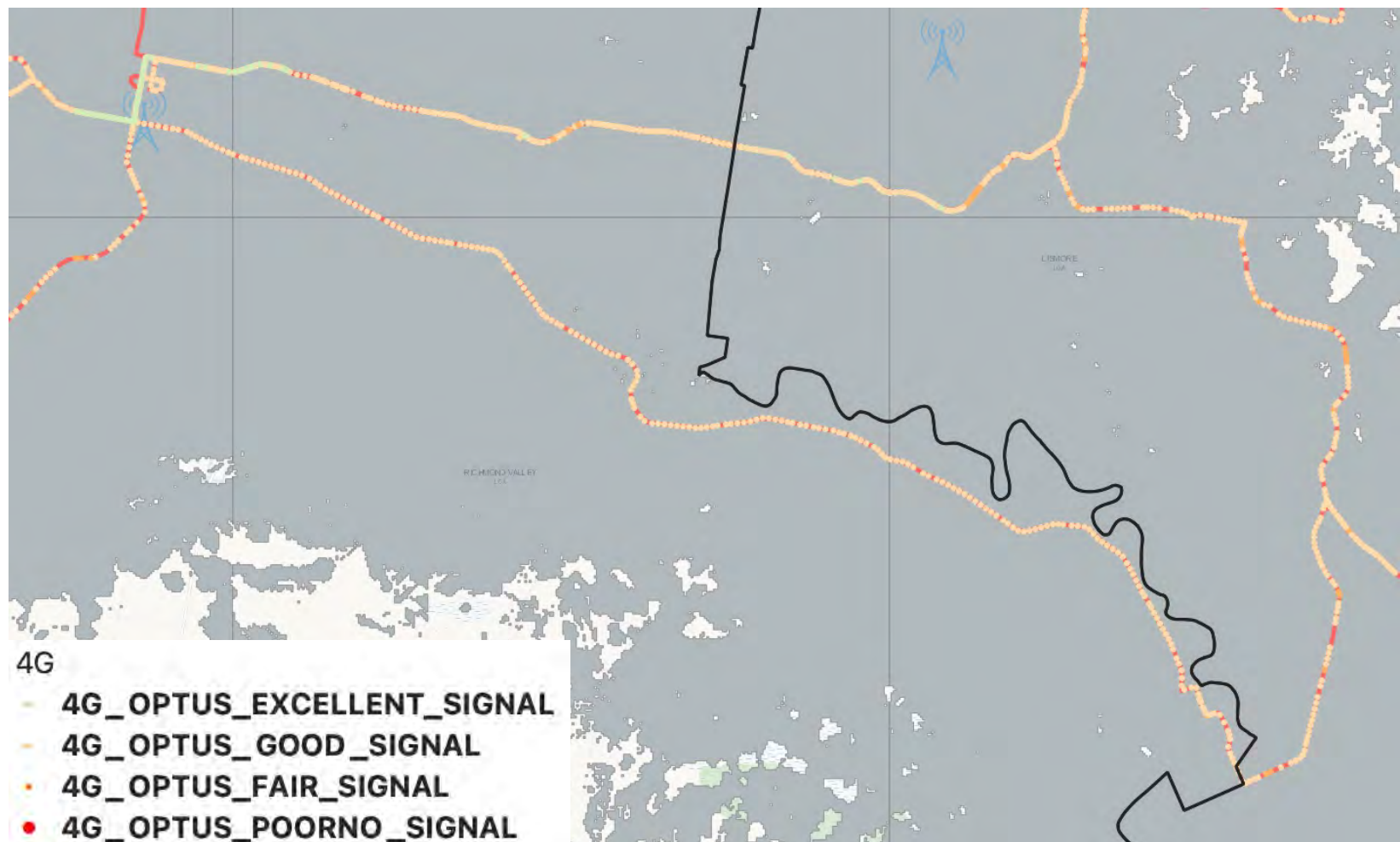
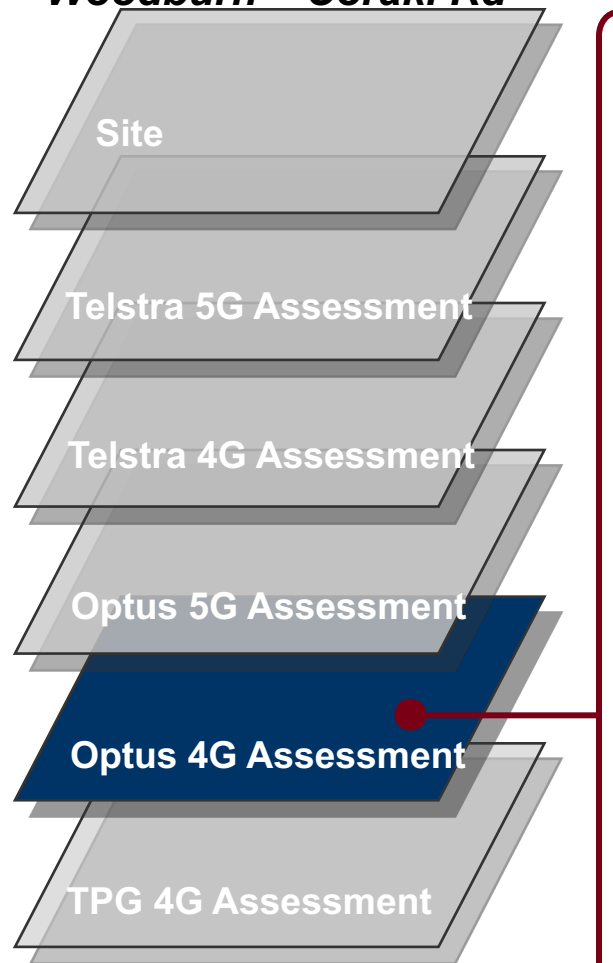
Action – Optus - Upgrade 1 x Optus Site to 5G & Optus / Fed Govt – 1 new 5G Tower sites



Richmond Valley Shire Analysis

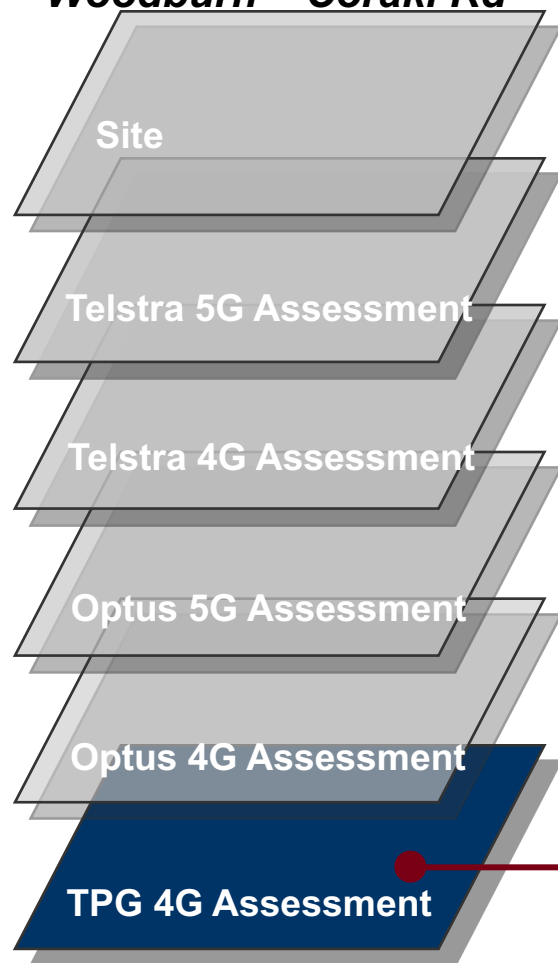
**Casino – Coraki Rd /
Woodburn – Coraki Rd**

Assessment – Good 4G coverage



Richmond Valley Shire Analysis

**Casino – Coraki Rd /
Woodburn – Coraki Rd**



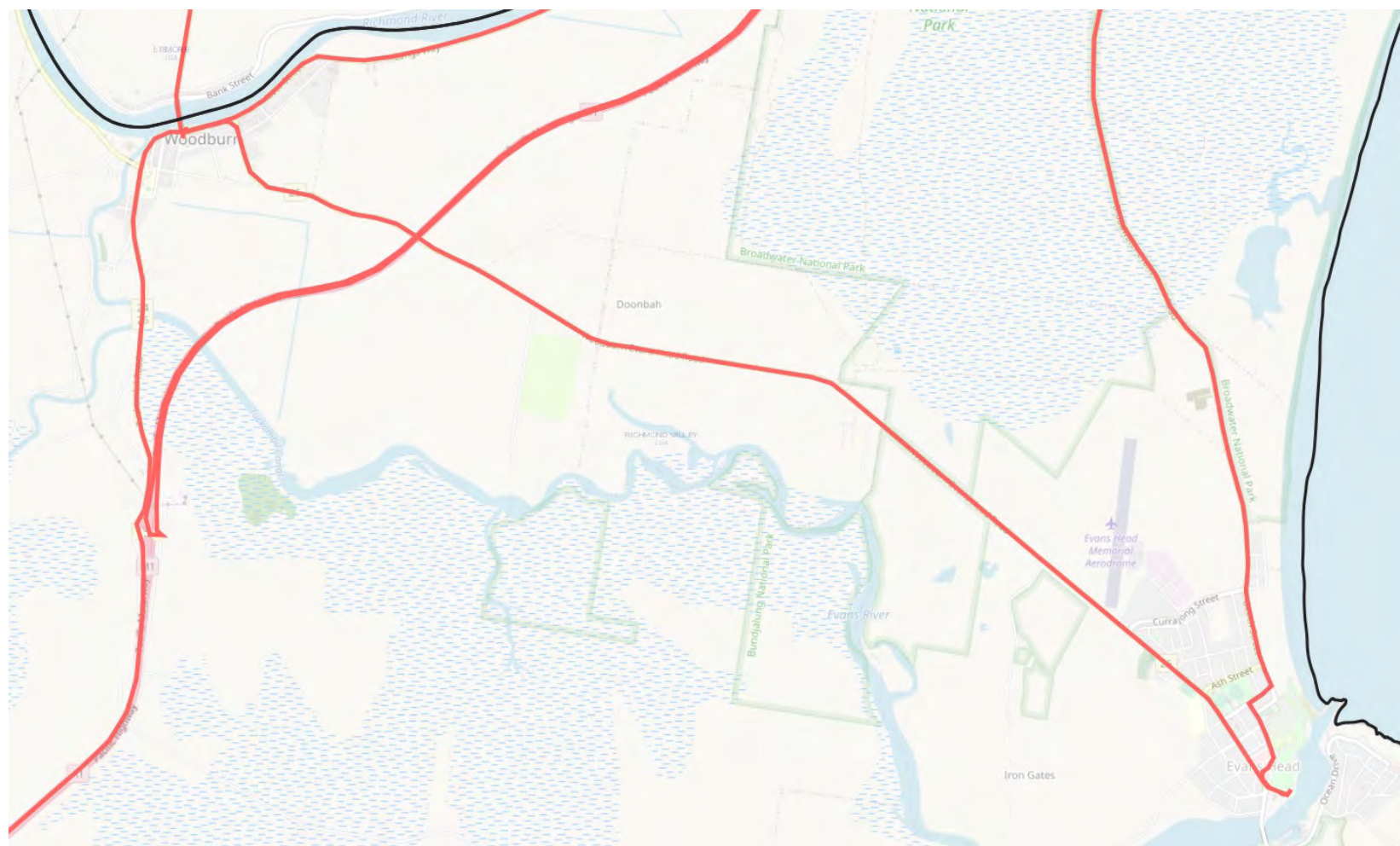
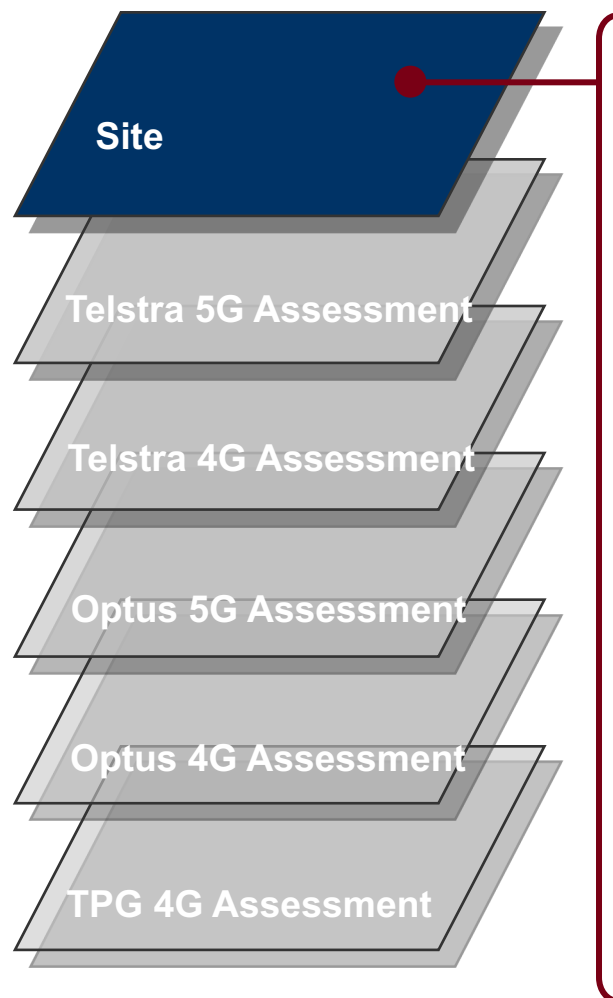
Assessment - Broad 4G blackspots

Action – TPG – Upgrade 1 x Site to 4G midband and TPG / Fed Govt (MBSP) – 1 new 4G Tower sites



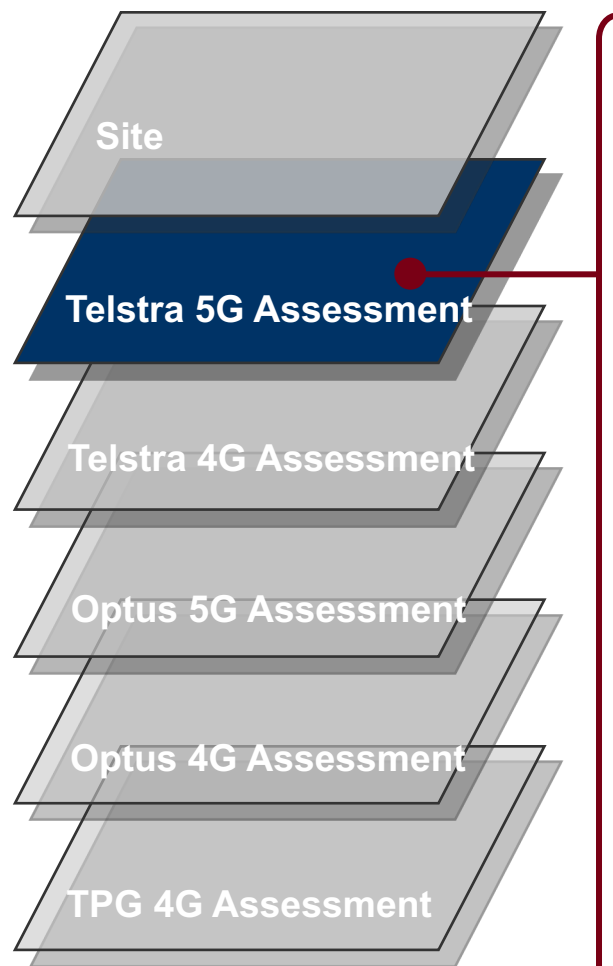
Richmond Valley Shire Analysis

Woodburn – Evans Head Rd



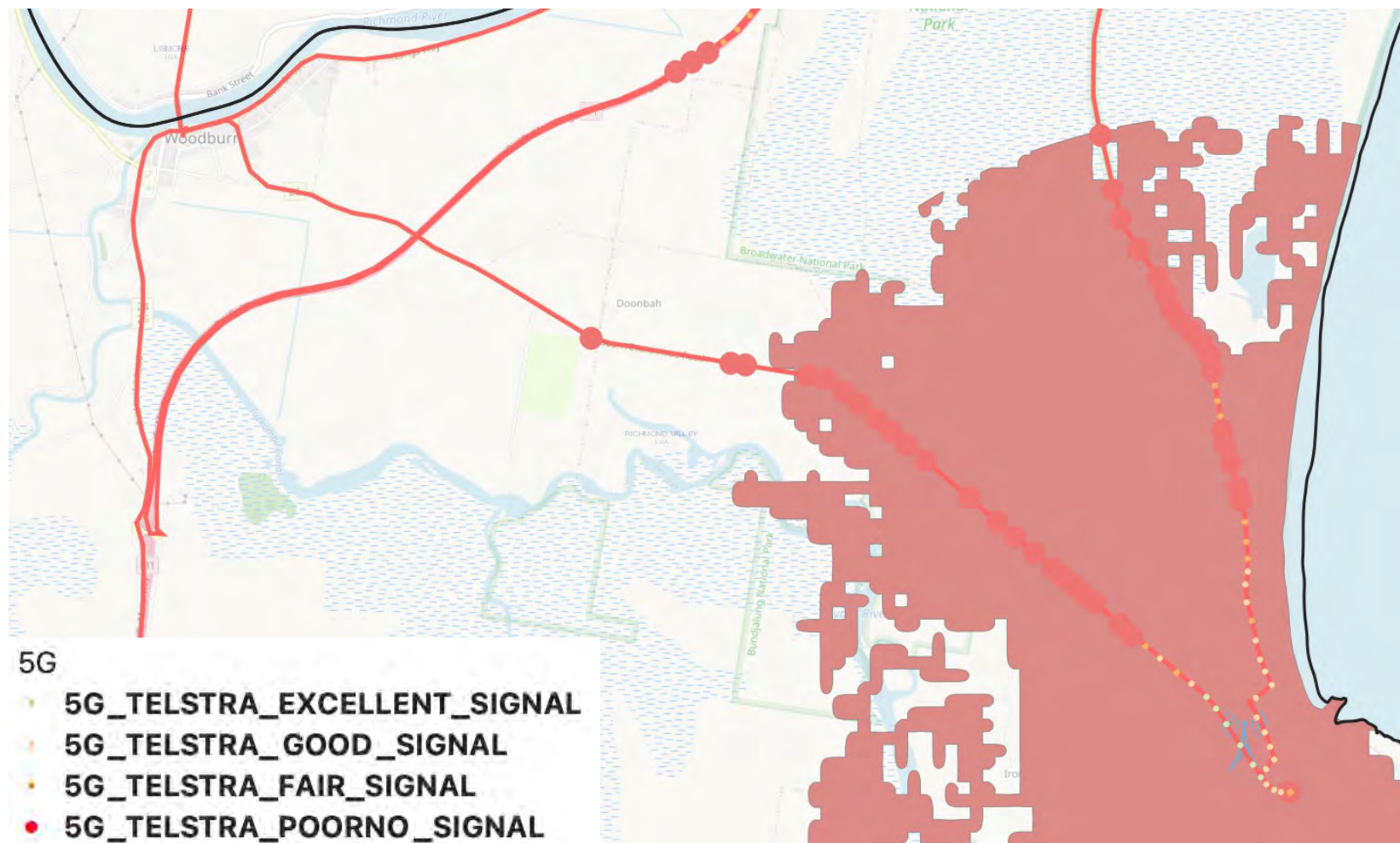
Richmond Valley Shire Analysis

Woodburn – Evans Head Rd



Assessment – Initial 5G coverage limited to Evans Head township and outskirts. Large 5G blackspot areas

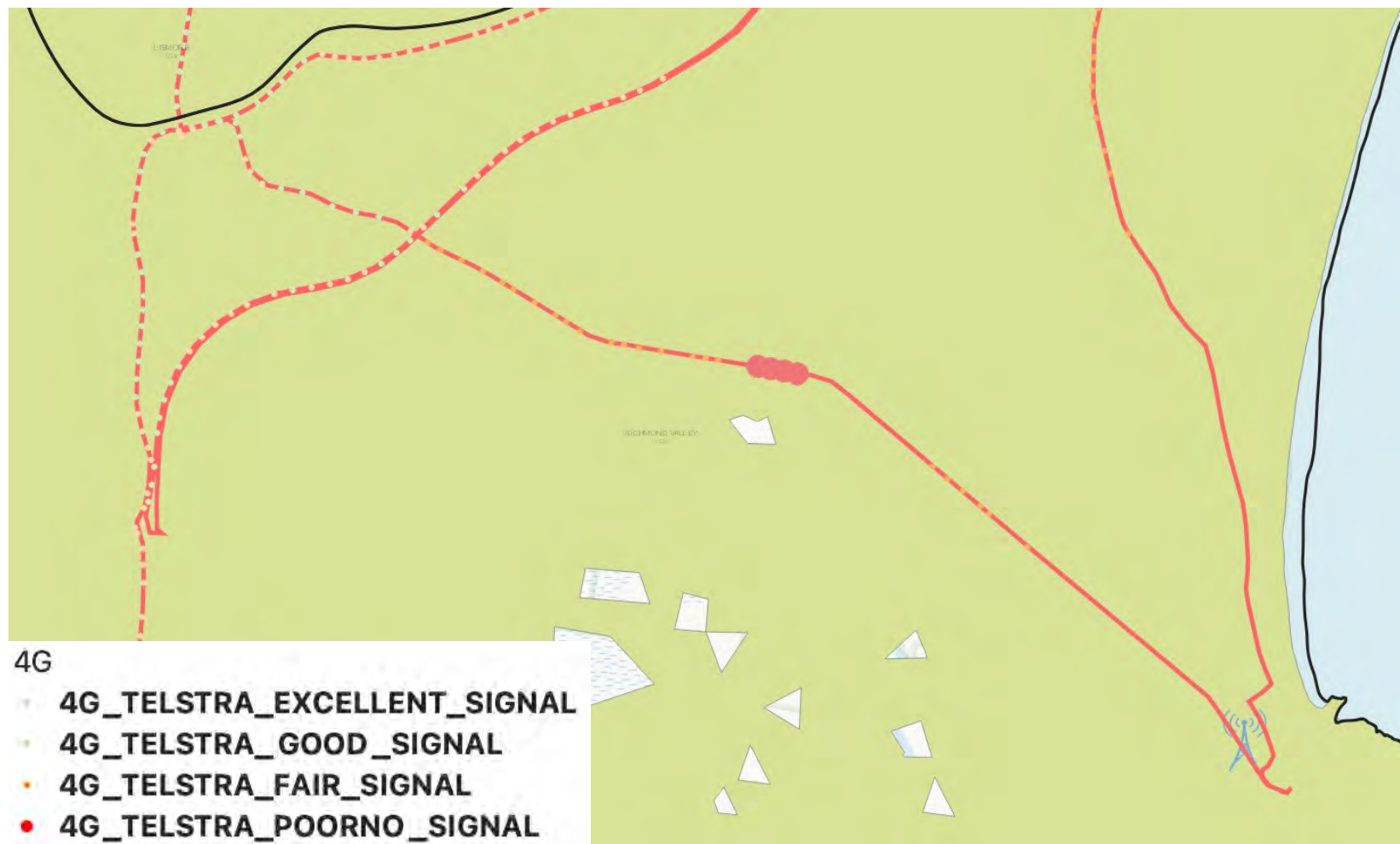
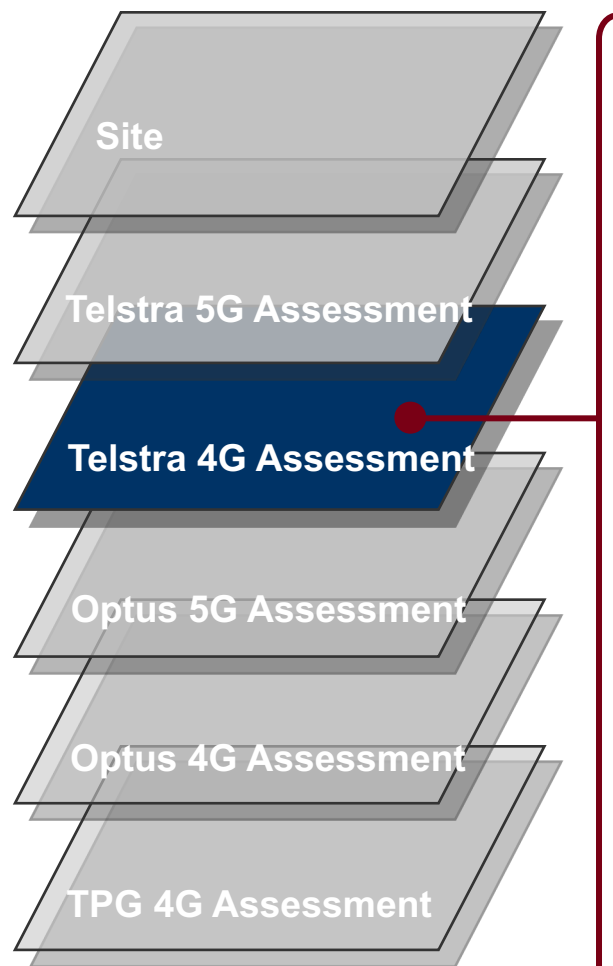
Action – Telstra - Upgrade 2 x Tower Sites with 5G



Richmond Valley Shire Analysis

Woodburn – Evans Head Rd

Assessment – Good 4G coverage

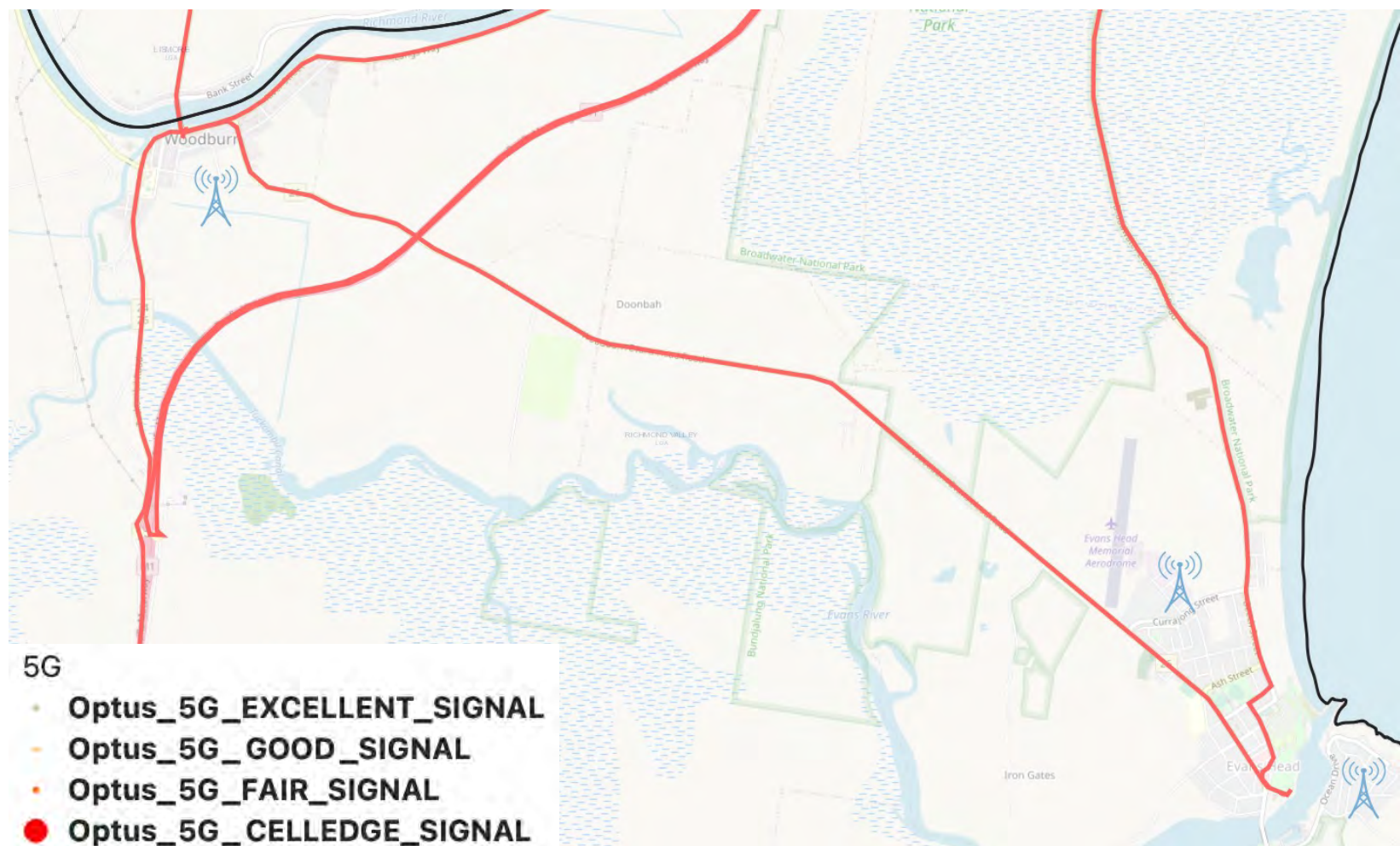
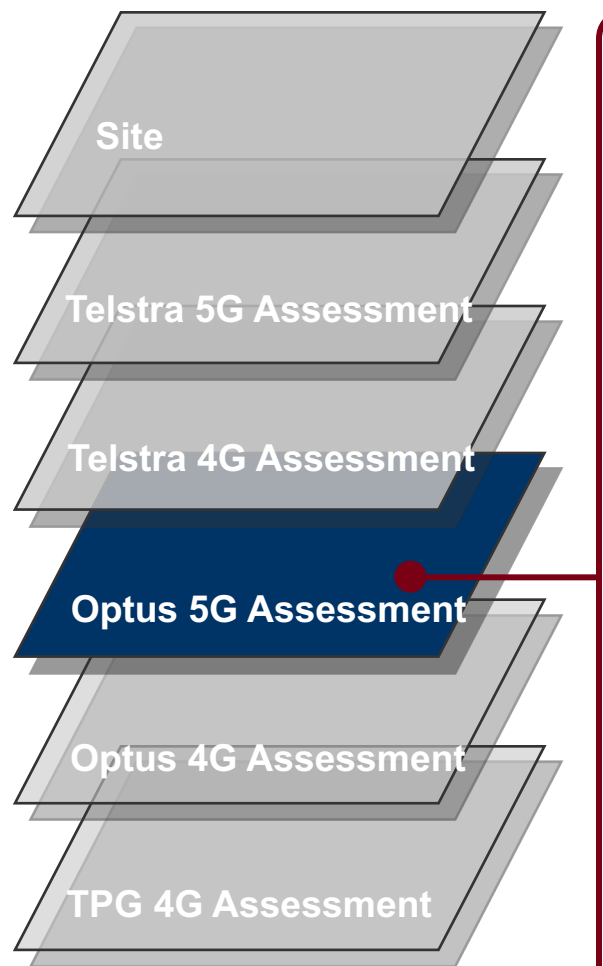


Richmond Valley Shire Analysis

Woodburn – Evans Head Rd

Assessment - No current Optus 5G coverage

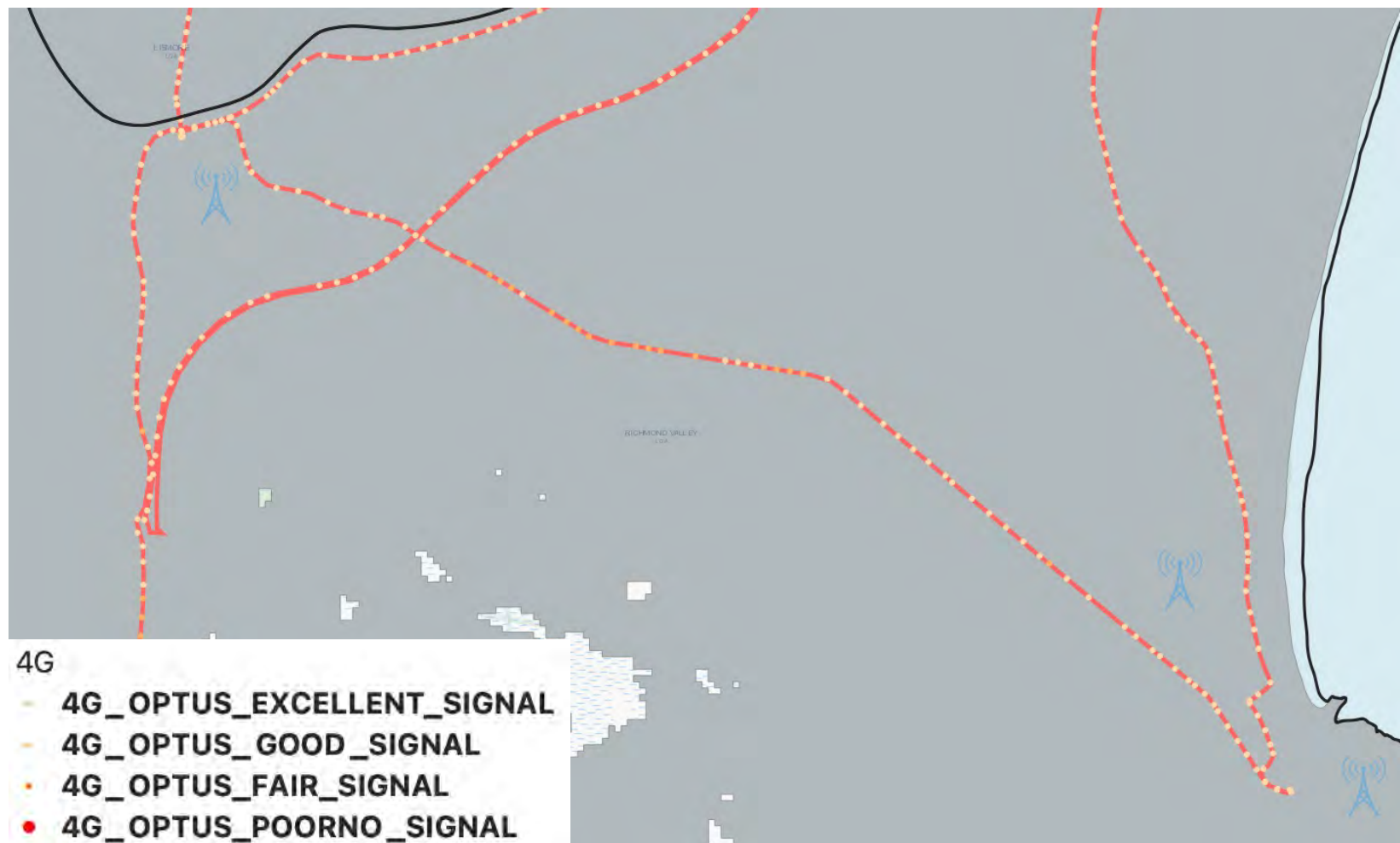
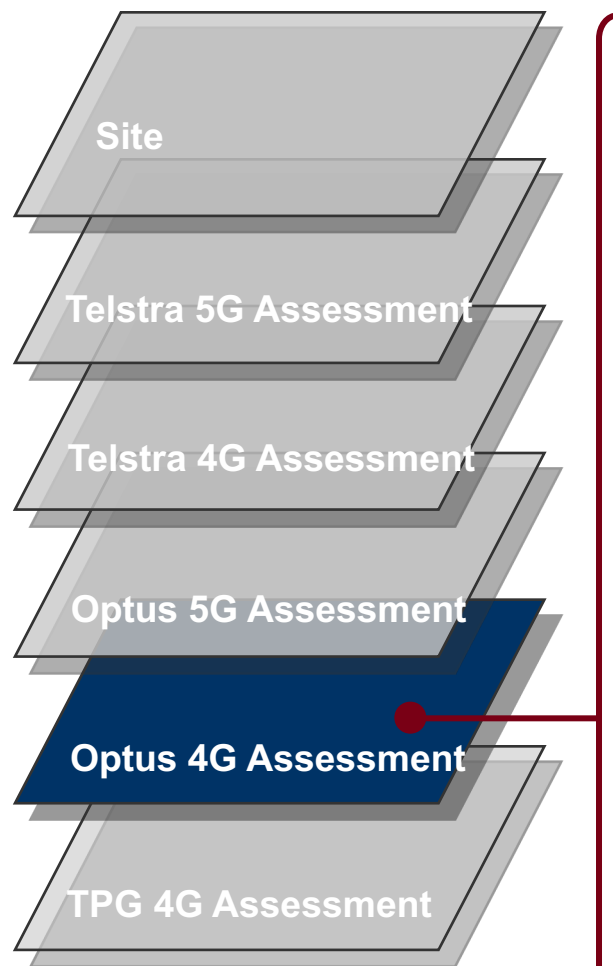
Action – Optus - Upgrade 3 x Optus Sites to 5G



Richmond Valley Shire Analysis

Woodburn – Evans Head Rd

Assessment – Good 4G coverage

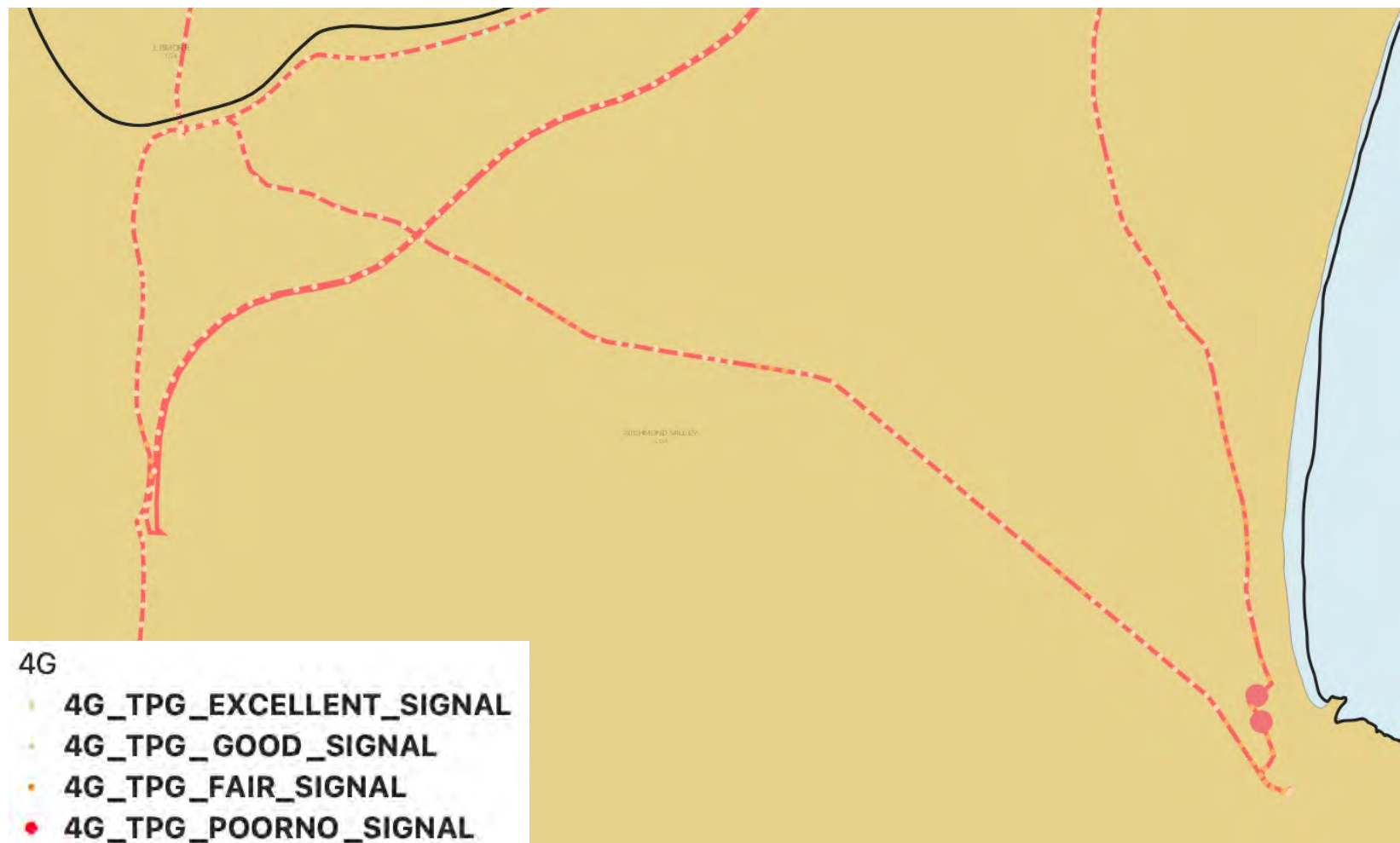
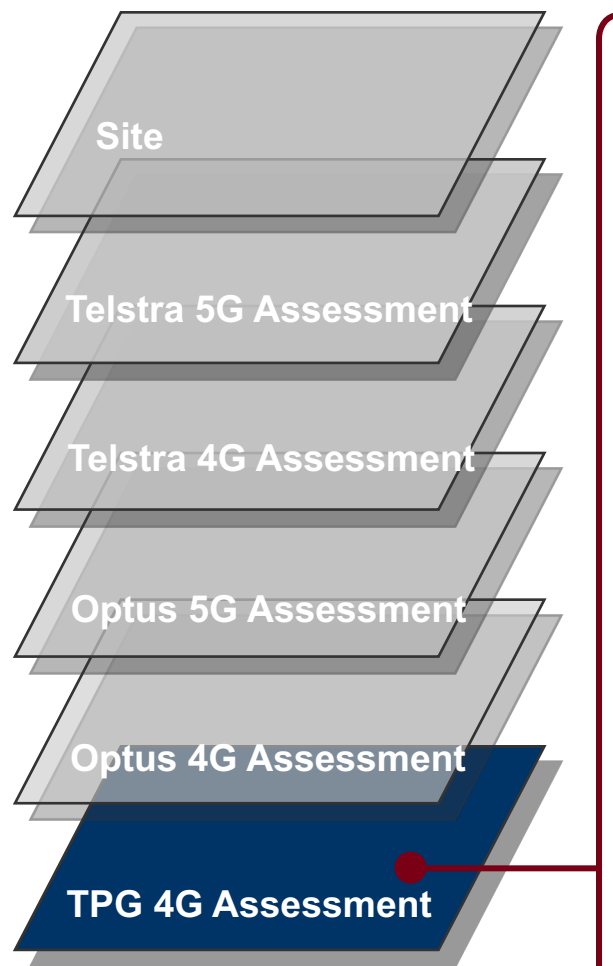


Richmond Valley Shire Analysis

Woodburn – Evans Head Rd

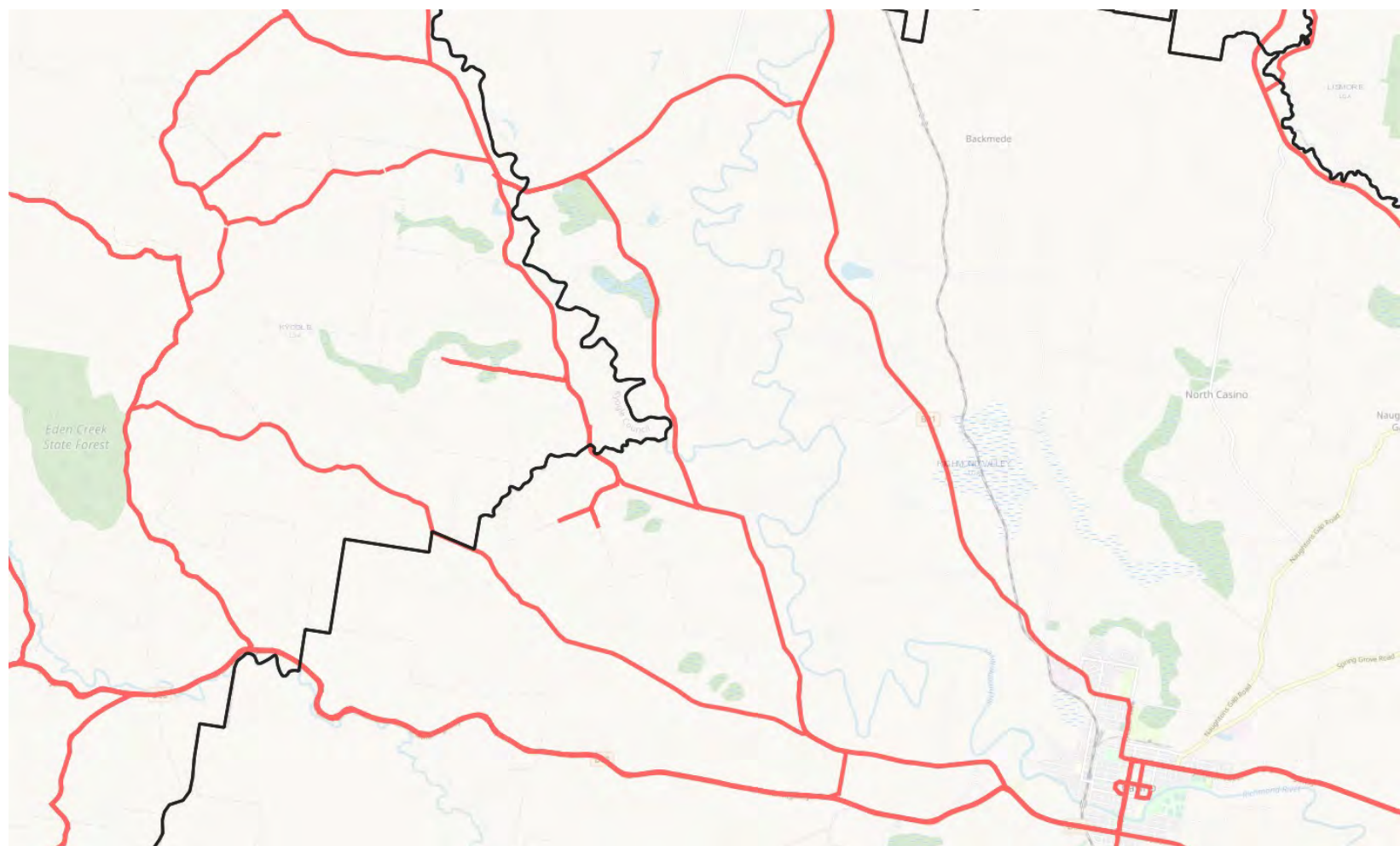
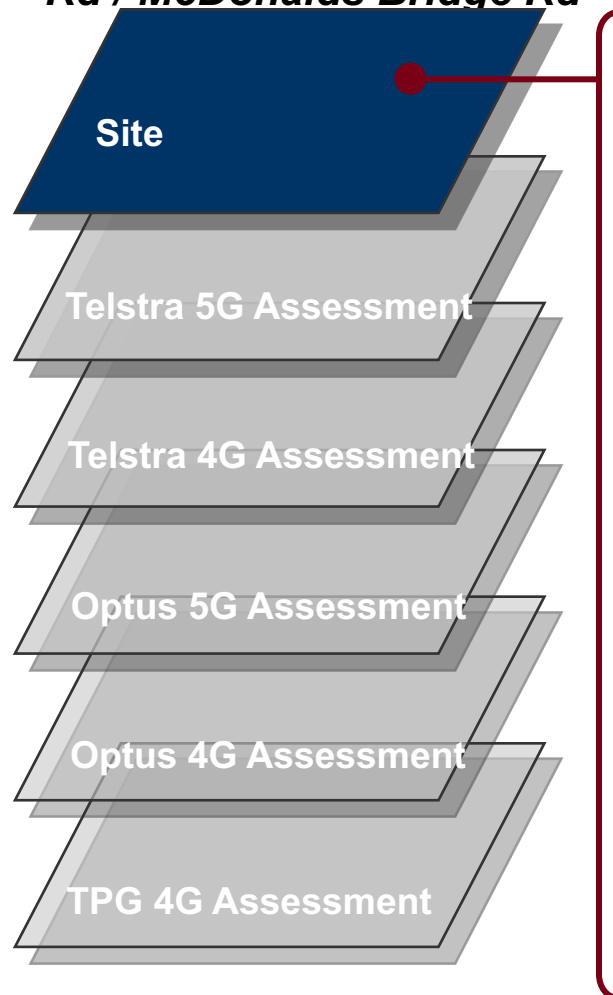
Assessment - Mixture of Good and Poor / Fair 4G coverage

Action – TPG - Upgrade 3 x TPG Sites to 5G



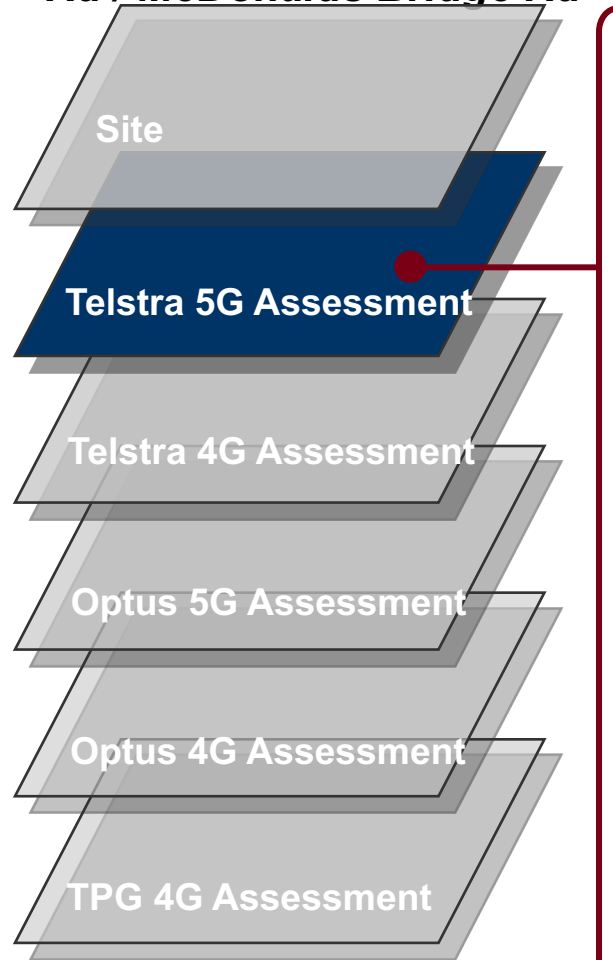
Richmond Valley Shire Analysis

**Sextonville Rd / Stratheden
Rd / McDonalds Bridge Rd**



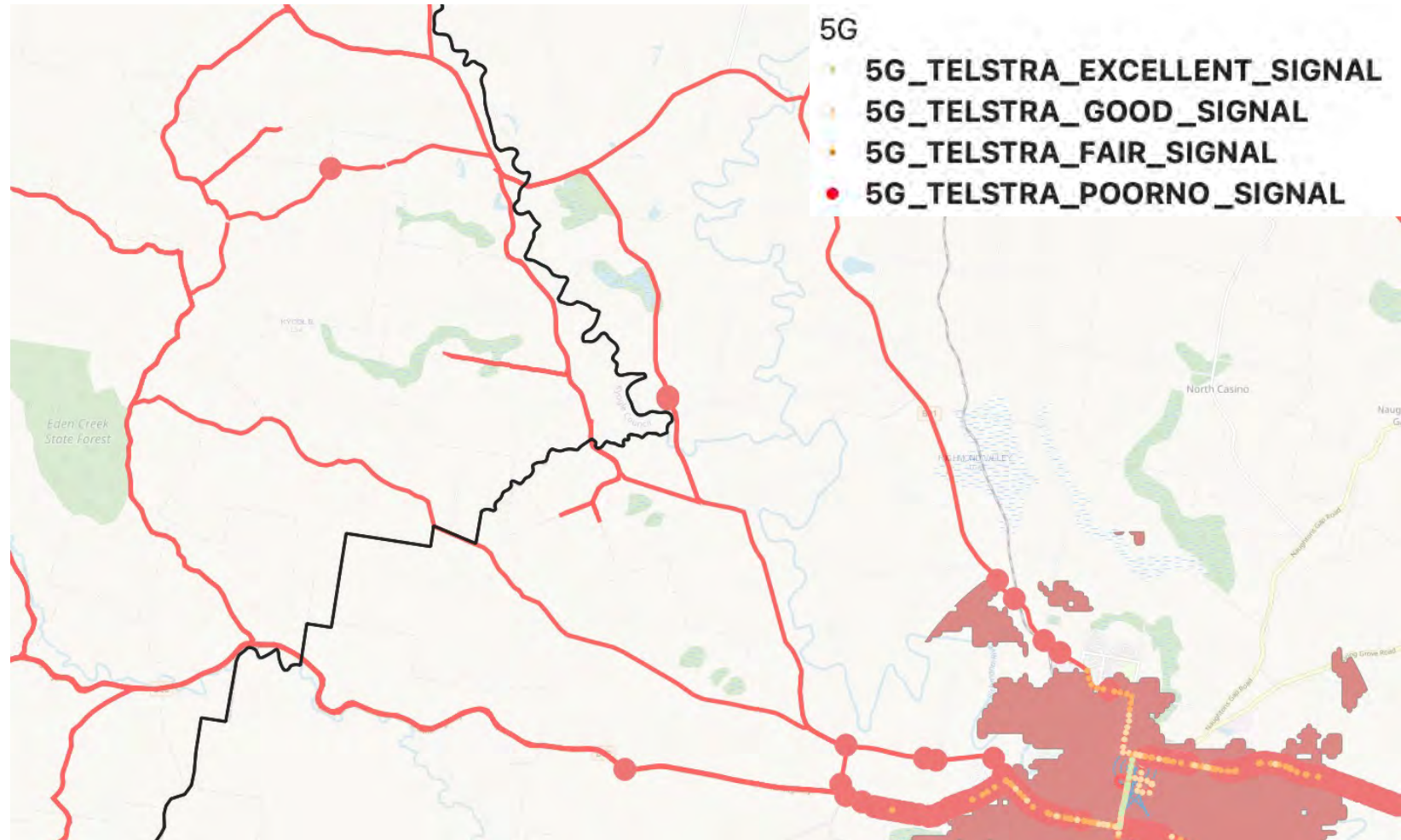
Richmond Valley Shire Analysis

Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd



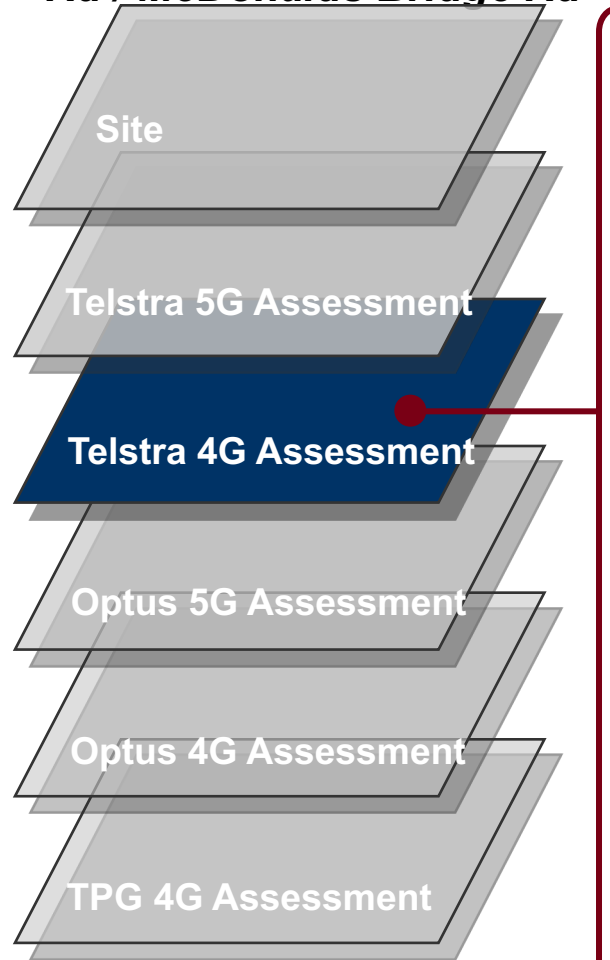
Assessment – No 5G coverage.

Action – Telstra - Upgrade 2 x Tower Sites with 5G & Telstra / Fed Govt – 1 new 5G Tower sites



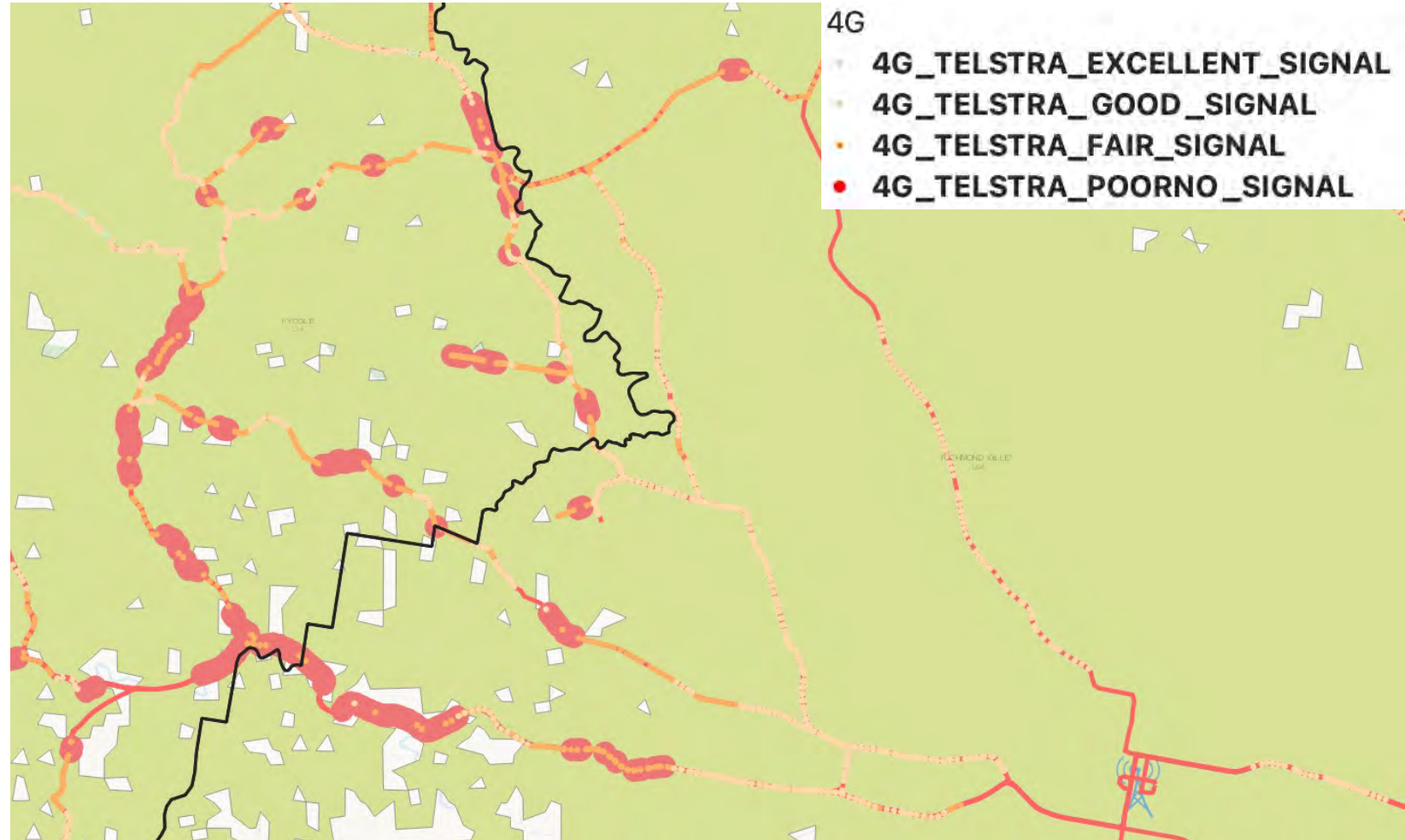
Richmond Valley Shire Analysis

Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd



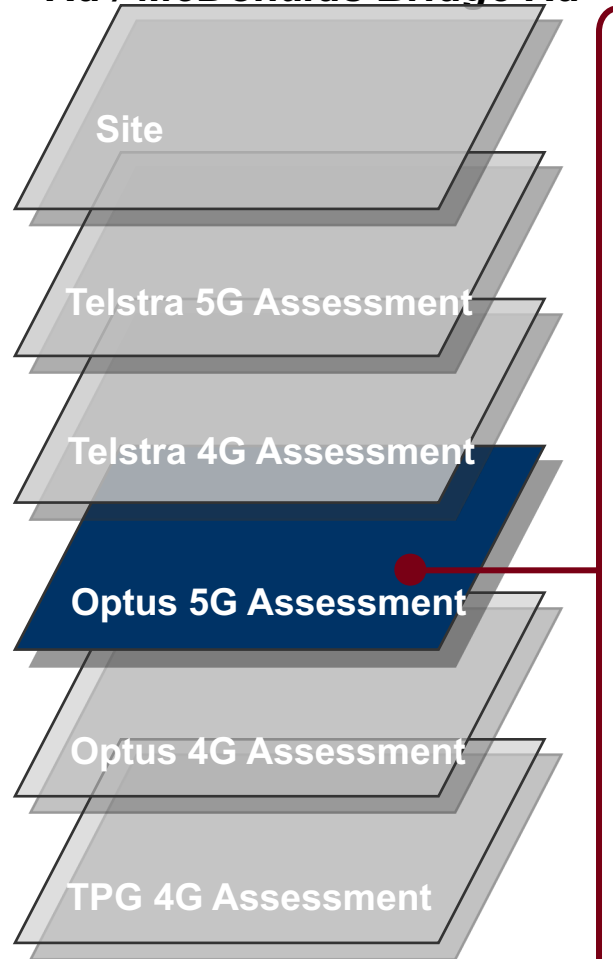
Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – Telstra / Fed Govt (MBSP) – up to 2 new 4G Tower sites



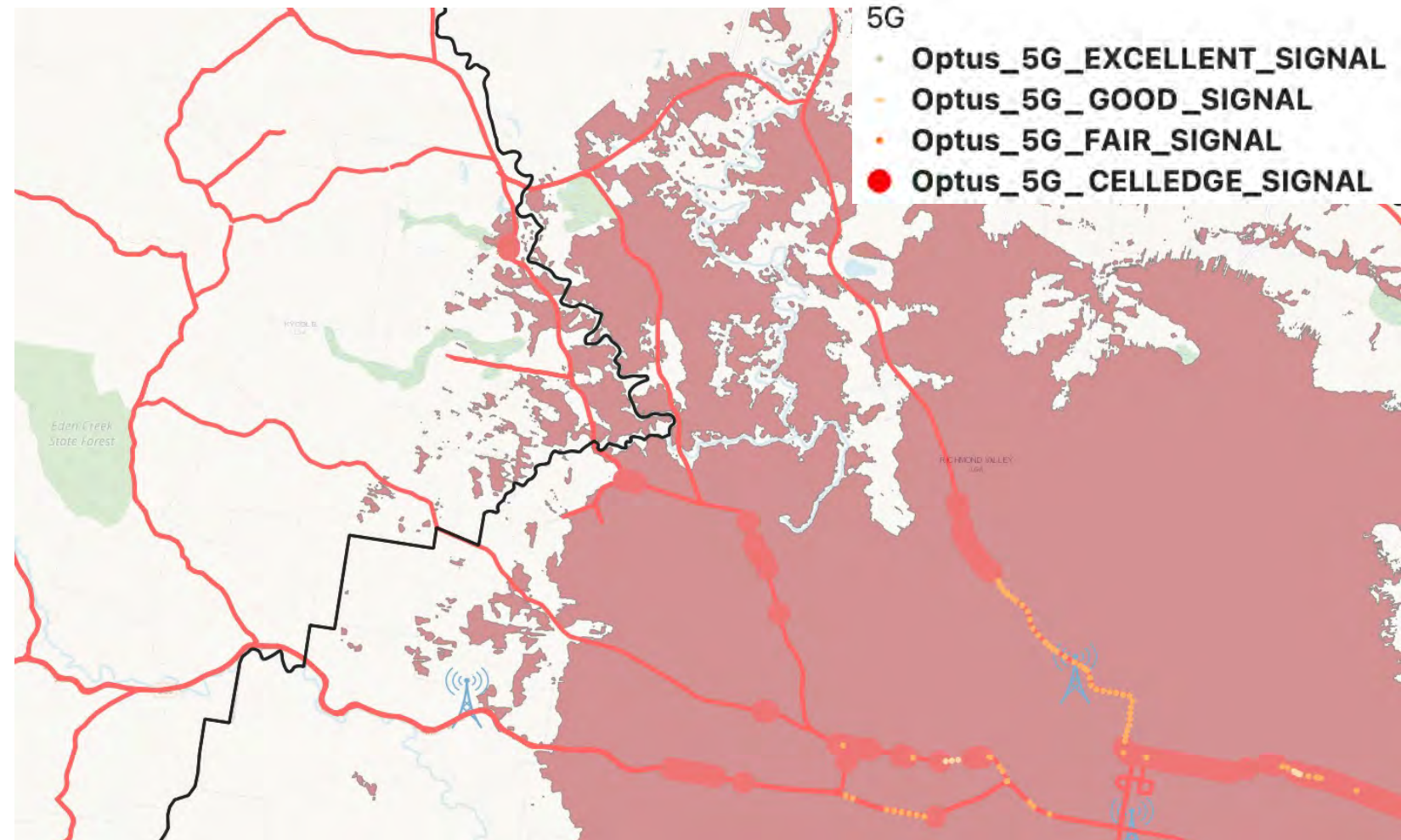
Richmond Valley Shire Analysis

Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd



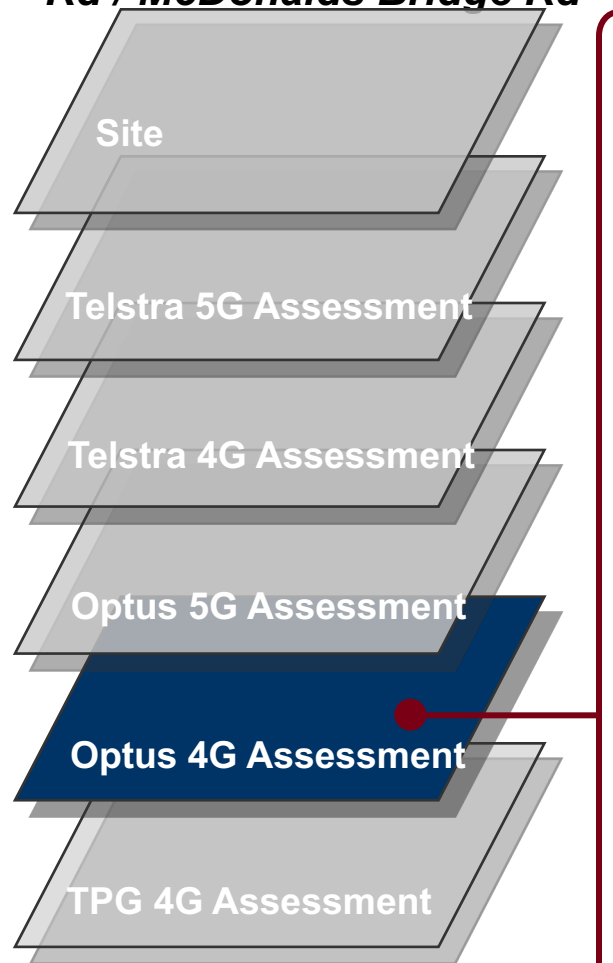
Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 1 x Site to 5G & Optus / Fed Govt – up to 2 new 5G Tower sites



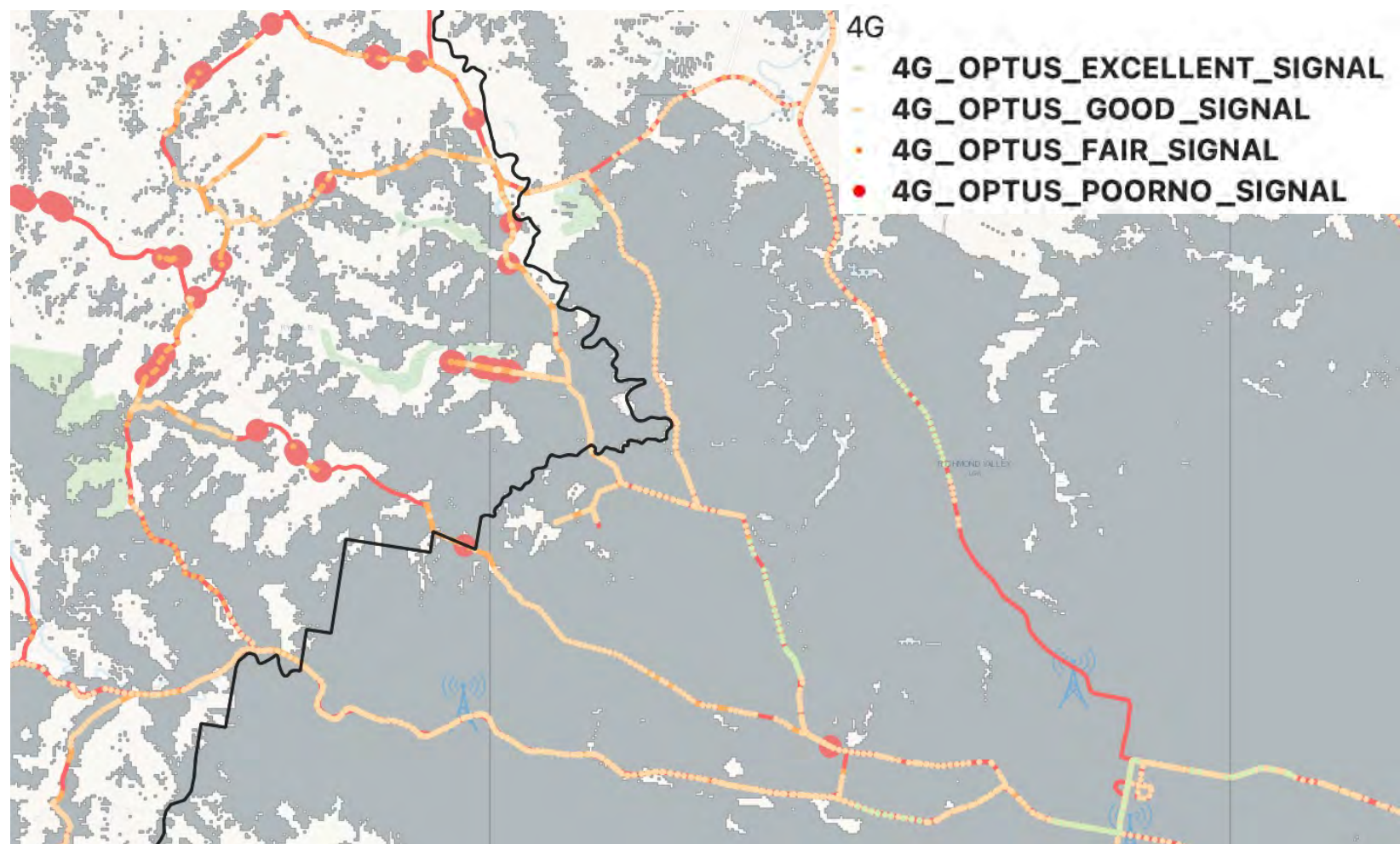
Richmond Valley Shire Analysis

Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd



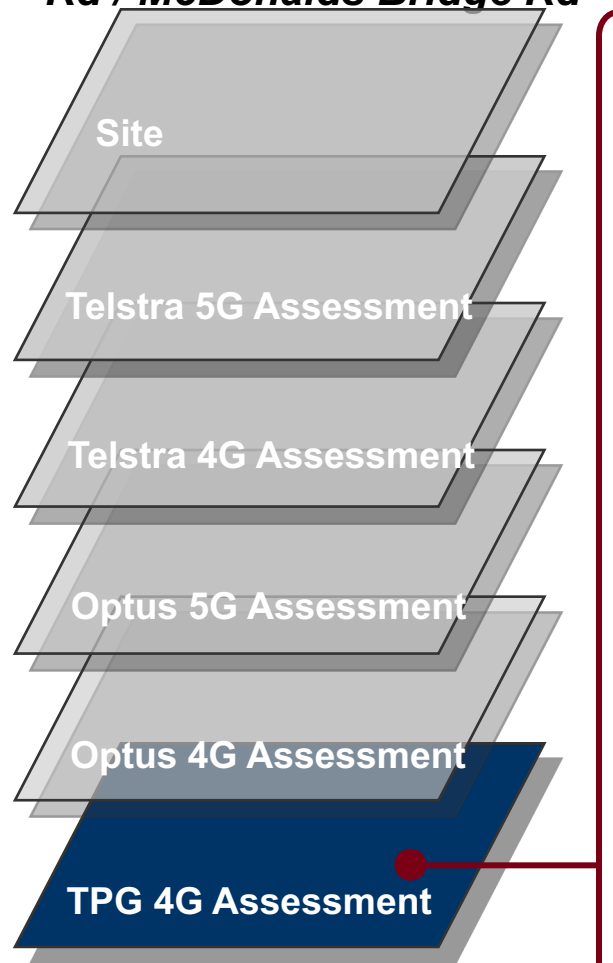
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – Optus / Fed Govt – up to 2 new 4G Tower sites



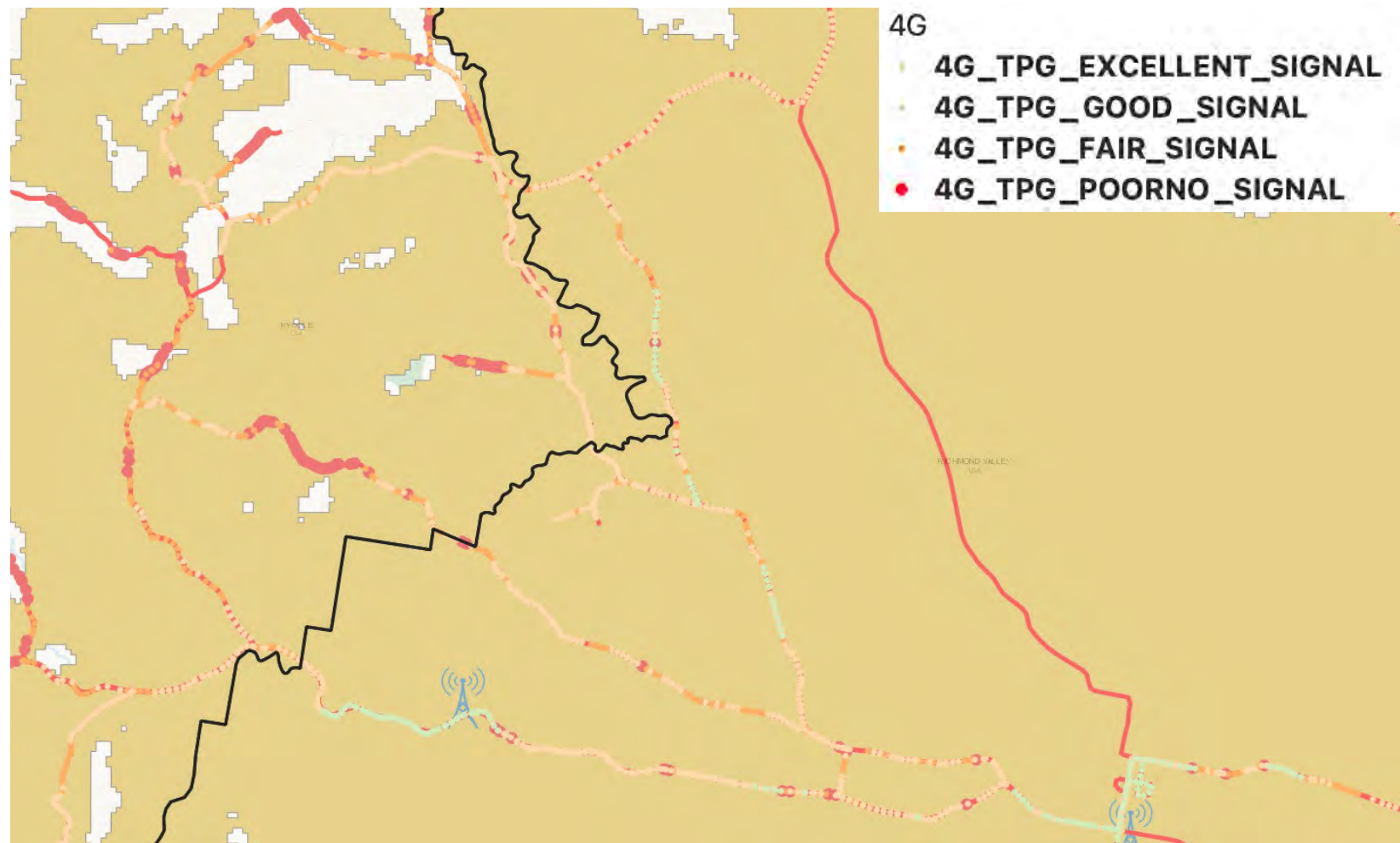
Richmond Valley Shire Analysis

Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd



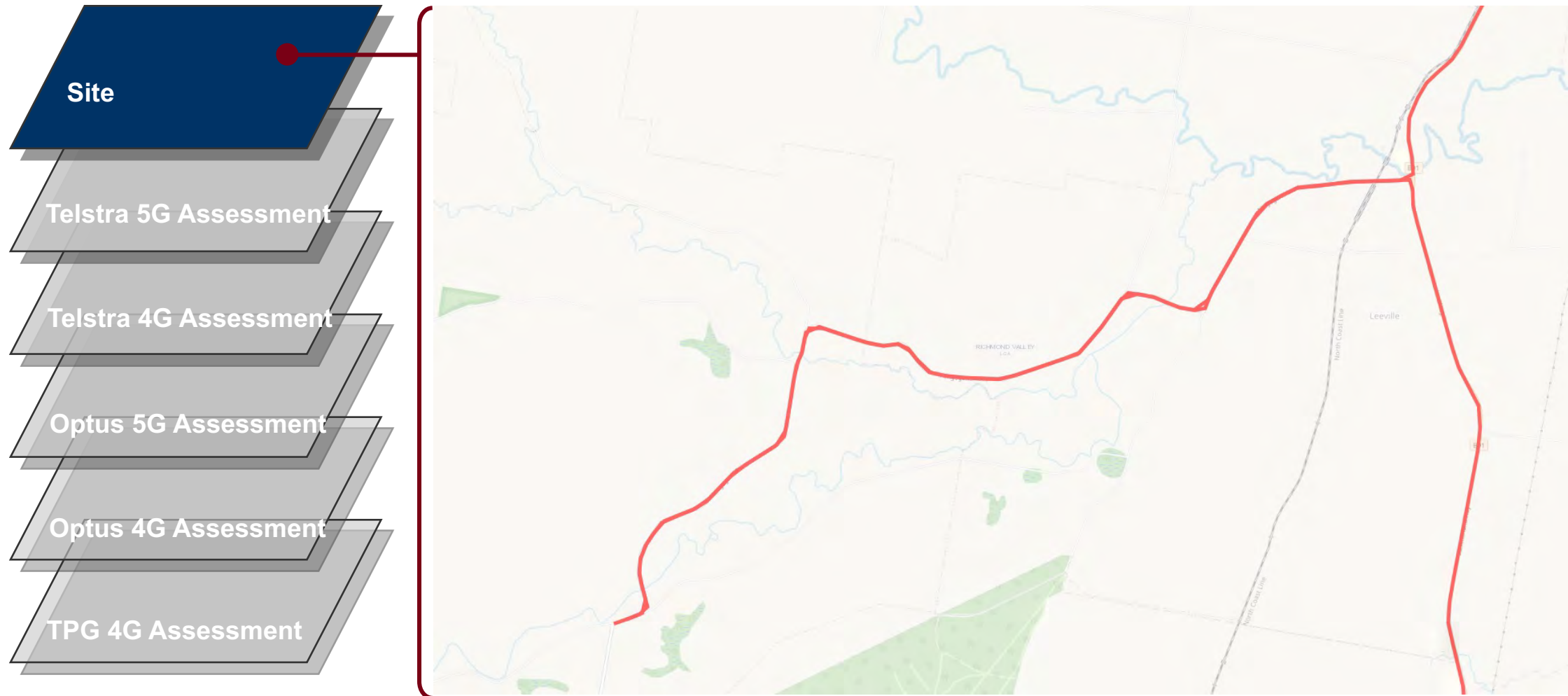
Assessment - Mixture of Good and Poor / Fair 4G coverage with some 4G blackspots

Action – TPG / Fed Govt – up to 2 new 4G Tower sites



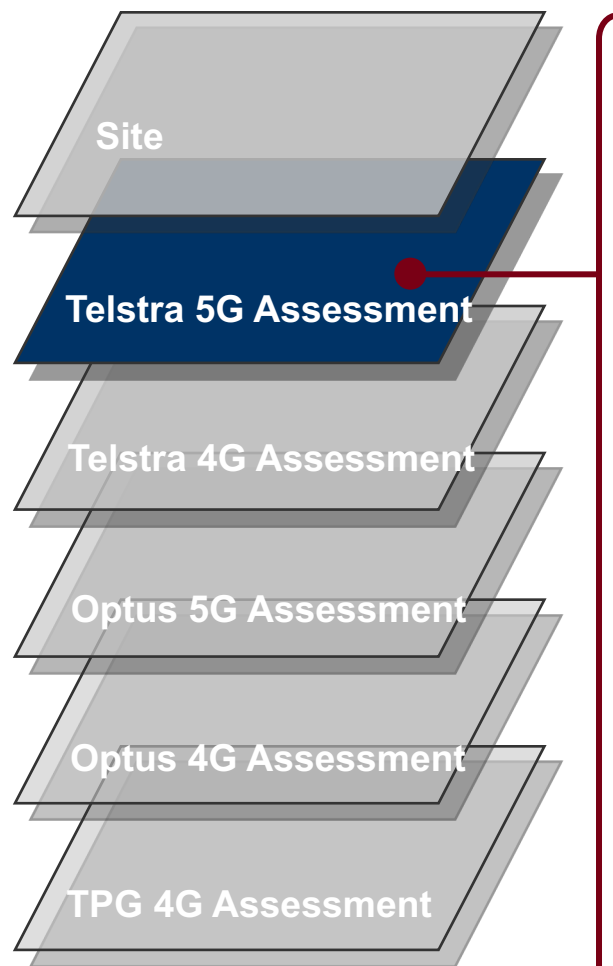
Richmond Valley Shire Analysis

Mongogarrie Rd



Richmond Valley Shire Analysis

Mongogarrie Rd

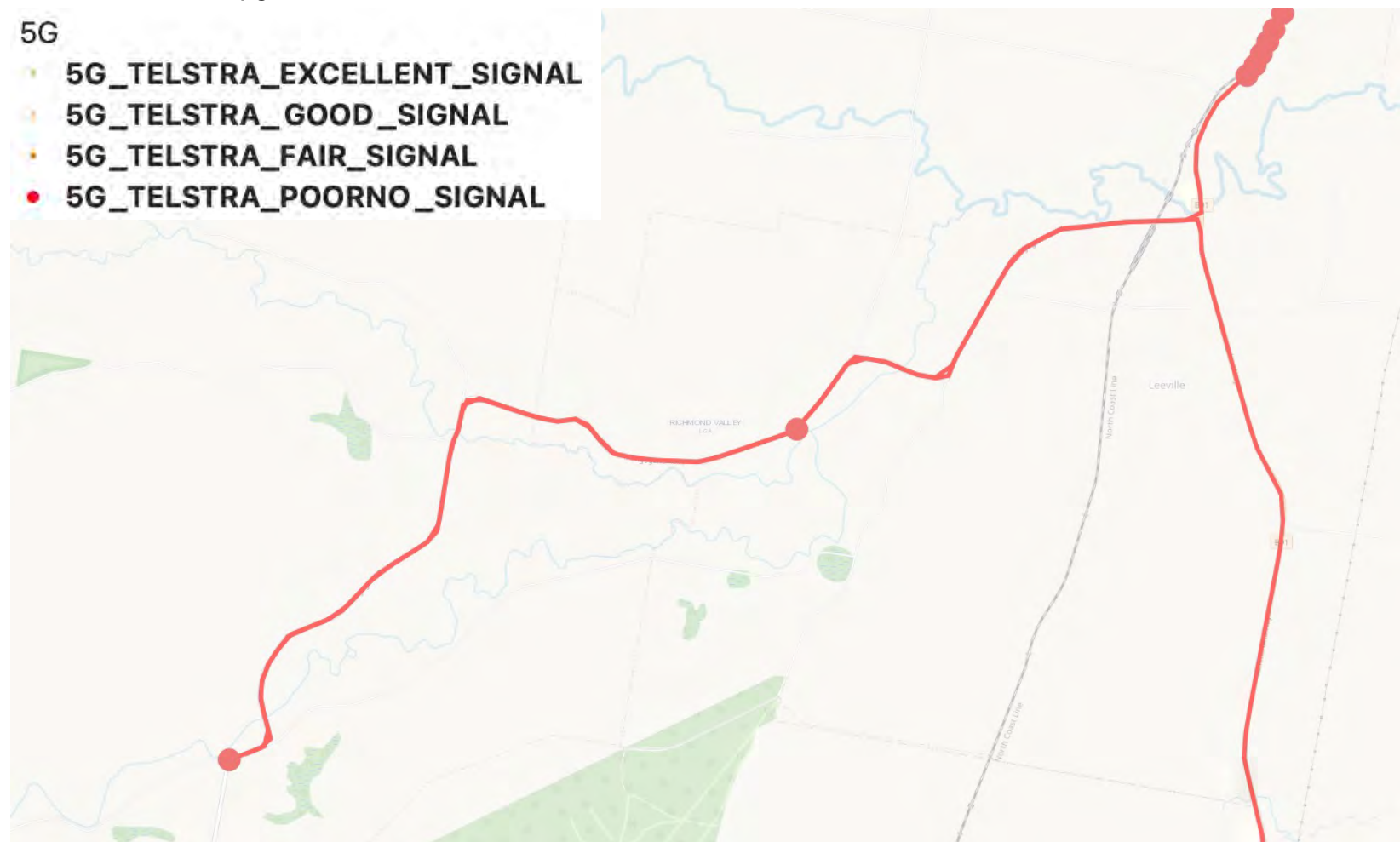


Assessment – No 5G coverage.

Action – Telstra - Upgrade 1 x Tower Sites with 5G & Telstra / Fed Govt – 1 new 5G Tower sites

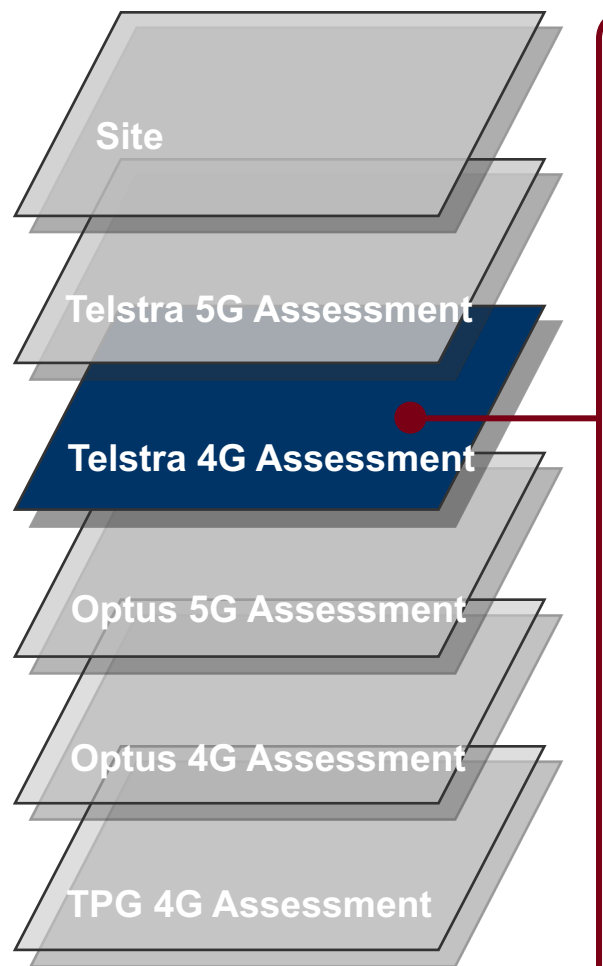
5G

- 5G_TELSTRA_EXCELLENT_SIGNAL
- 5G_TELSTRA_GOOD_SIGNAL
- 5G_TELSTRA_FAIR_SIGNAL
- 5G_TELSTRA_POORNO_SIGNAL



Richmond Valley Shire Analysis

Mongogarrie Rd



Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – Telstra / Fed Govt (MBSP) – 1 new 4G Tower sites

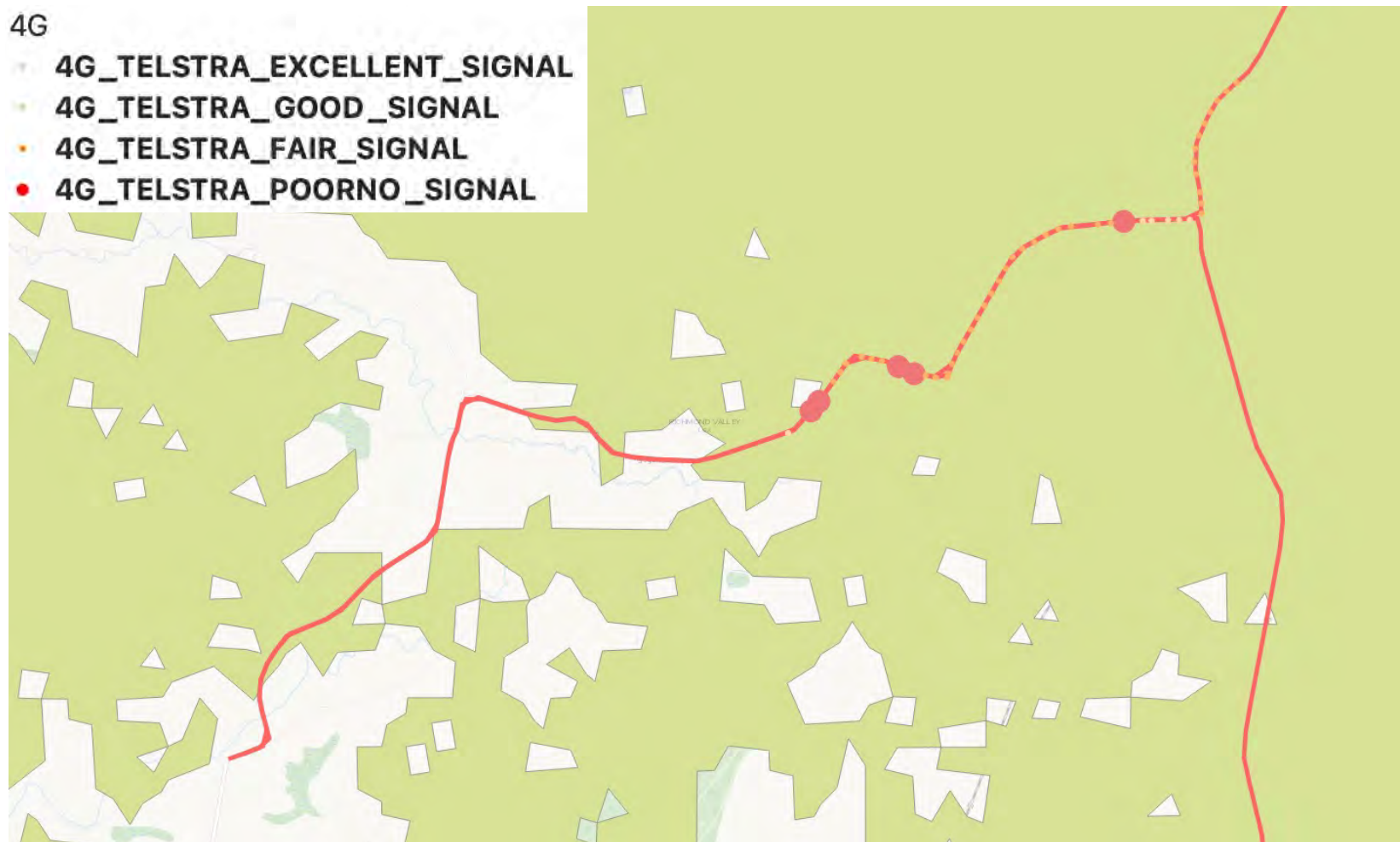
4G

4G_TELSTRA_EXCELLENT_SIGNAL

4G_TELSTRA_GOOD_SIGNAL

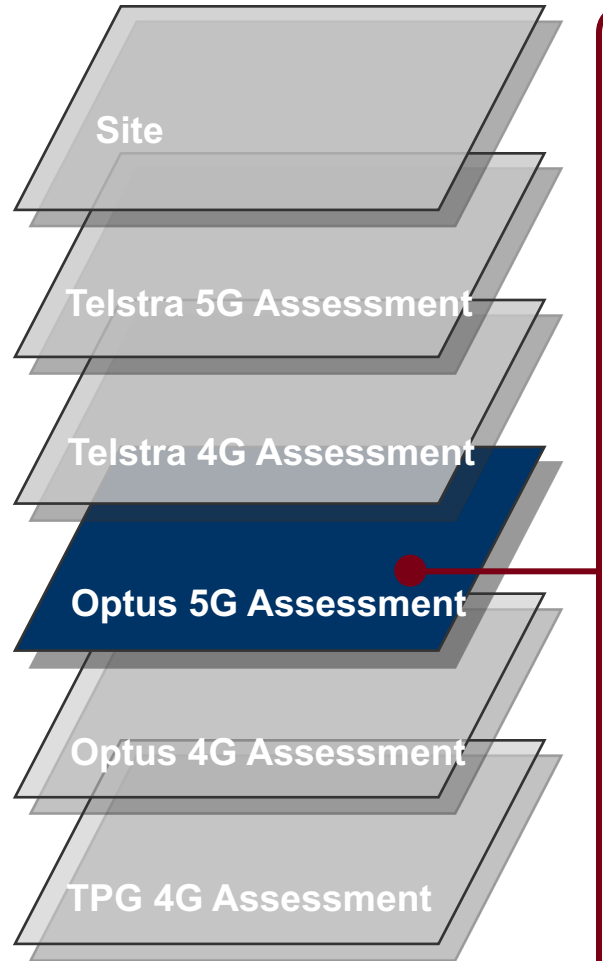
4G_TELSTRA_FAIR_SIGNAL

4G_TELSTRA_POORNO_SIGNAL



Richmond Valley Shire Analysis

Mongogarrie Rd

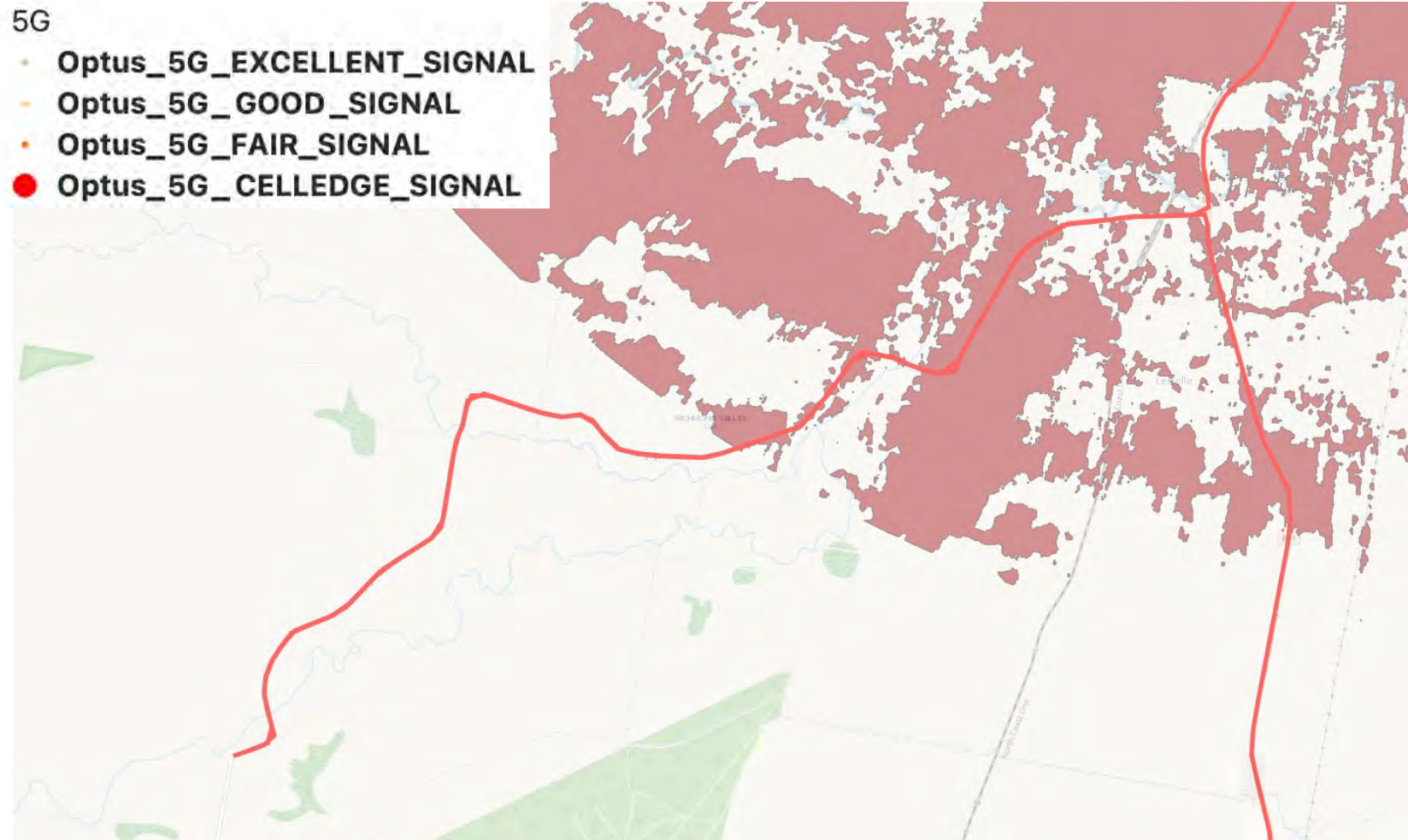


Assessment - No current Optus 5G coverage

Action – Optus - Upgrade 1 x Site to 5G lowband & Optus / Fed Govt – 1 new 5G Tower sites

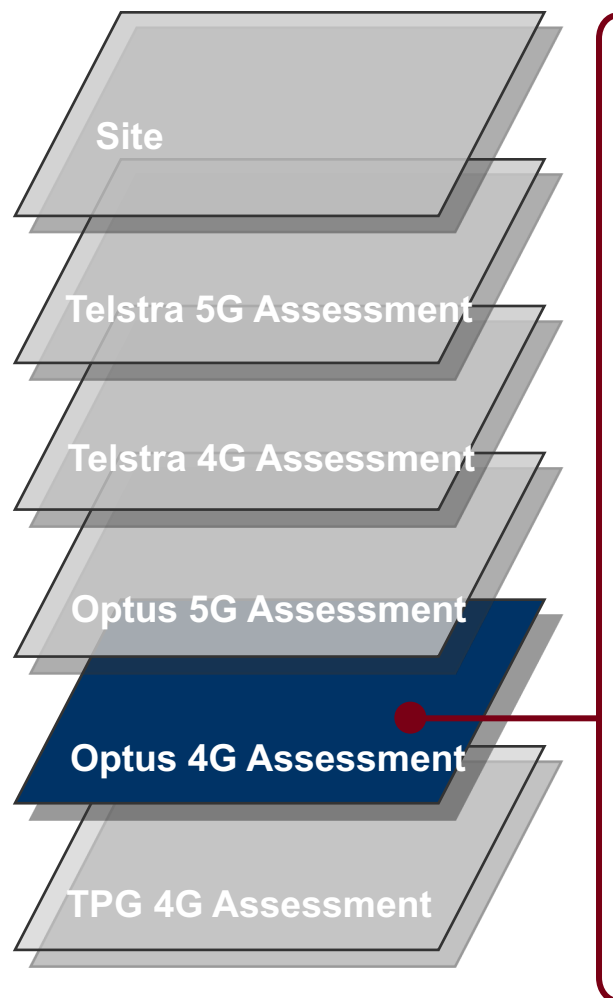
5G

- Optus_5G_EXCELLENT_SIGNAL
- Optus_5G_GOOD_SIGNAL
- Optus_5G_FAIR_SIGNAL
- Optus_5G_CELLEDGE_SIGNAL



Richmond Valley Shire Analysis

Mongogarrie Rd



Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – Optus / Fed Govt – 1 new 4G Tower sites

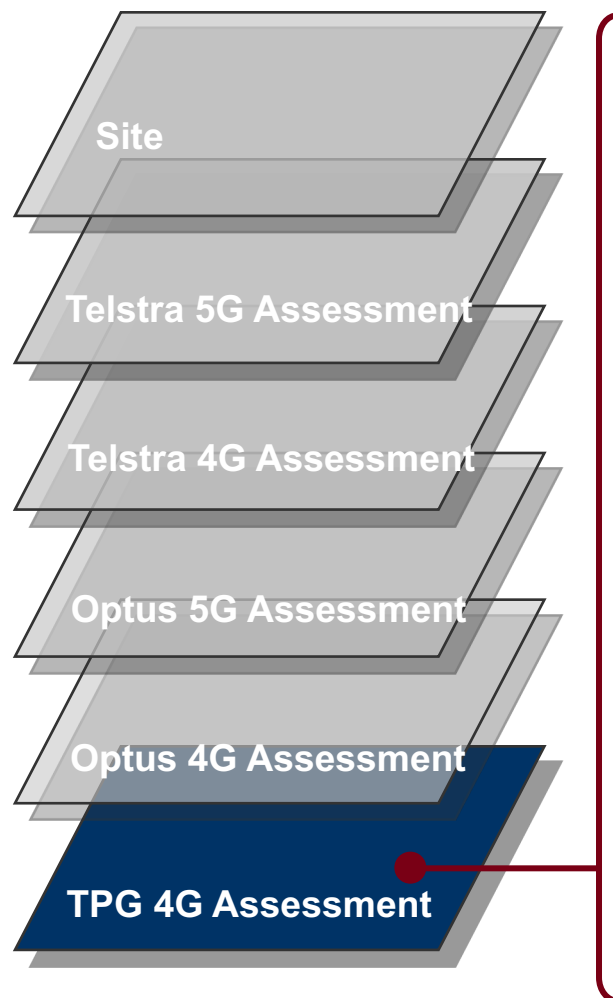


Richmond Valley Shire Analysis

Mongogarrie Rd

Assessment - Mixture of Good and Poor / Fair 4G coverage with broad 4G blackspots

Action – TPG / Fed Govt – 1 new 4G Tower sites



1. Advocacy Priorities

Priority Actions

Based on our analysis, the following priority actions for advocacy for the Northern Rivers JO region is presented below



5G

- Site upgrades and new sites in each Council area as per the tables below:

Tweed Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	2	3
Tweed Coast Road	1	2
Tweed Valley Way	4	1
Tomewin Road		1
Numinbah Road	1	2
Limpinwood Road / Brays Creek Road	2	2
Kyogle Road	2	2
Kyogle Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Summerland Way	4	
Clarence Way	5	5
Bruxner Highway	2	2
Afterlee Road / Peacock Creek Road	1	4
Kyogle Road	1	3
Bentley Road		1

Fawcetts Plain Road		_*
Collins Creek Road		1*
Gradys Creek Road		3
Cawongla Road	1	
Byron Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	2	3
The Pocket Road / Main Arm Road	2	2
Coolamon Scenic Road	3	2
Myocum Road		1
Ewingdale Road	3	
Broken Head Road	2	2
Lismore Road	1	1
Eureka Road		2
Federal Drive		2
Binna Burra Road		1
Friday Hut Road		3
Bangalow Road		3
Lismore City	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Bruxner Highway	1	2
Bangalow Road		1
Kyogle Road		1
Nimbin Road / Blue Knob Road	1	1
Wyrallah Road	3	2

Dunoon Road	3	
The Channon / Pinchin Road	1	
Rous Rd	1	
Ballina Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	3	2
Bruxner Highway	1	1
The Coast Road / Byron Bay Road	1	
Tintenbar Road	2	
Teven Road	1	1
River Drive	1	1
Blackwall Drive	1	
Wardell Road	2	2
Richmond Valley Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	1	2
Bruxner Highway		3
Summerland Way	2	3
Casino – Coraki Rd / Woodburn – Coraki Rd	1	1
Woodburn – Evans Head Rd	2	
Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd	2	1
Mongogarrie Rd	1	1



4G

- Site upgrades and new sites in each Council area as per the tables below:

Tweed Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		1
Tweed Coast Road		2
Tweed Valley Way	2	1
Tomewin Road		
Numinbah Road	1	2
Limpinwood Road / Brays Creek Road		3
Kyogle Road		2

Kyogle Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Summerland Way	4	2
Clarence Way	4	3
Bruxner Highway	2	2
Afterlee Road / Peacock Creek Road	2	4
Kyogle Road	1	2
Bentley Road	1	1
Fawcetts Plain Road		
Collins Creek Road		1
Gradys Creek Road	2	
Cawongla Road		

Byron Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		1
The Pocket Road / Main Arm Road	1	
Coolamon Scenic Road		
Myocum Road		1
Ewingdale Road		
Broken Head Road		
Lismore Road		1
Eureka Road		
Federal Drive		2
Binna Burra Road	1	1
Friday Hut Road	2	1
Bangalow Road	1	2
Lismore City	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Bruxner Highway	1	
Bangalow Road		
Kyogle Road	1	
Nimbin Road / Blue Knob Road	4	3
Wyrallah Road		
Dunoon Road		
The Channon / Pinchin Road	2	1
Rous Rd		

Ballina Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		
Bruxner Highway		
The Coast Road / Byron Bay Road		
Tintenbar Road	1	
Teven Road		
River Drive		
Blackwall Drive		
Wardell Road	1	
Richmond Valley Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		
Bruxner Highway		2
Summerland Way		3
Casino – Coraki Rd / Woodburn – Coraki Rd	1	
Woodburn – Evans Head Rd		
Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd		2
Mongogarrie Rd		1



5G

- Site upgrades and new sites in each Council area as per the tables below:

Tweed Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	6	3
Tweed Coast Road	4	2
Tweed Valley Way	3	3
Tomewin Road	1	1
Numinbah Road	1	3
Limpinwood Road / Brays Creek Road		4
Kyogle Road	3	4

Kyogle Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
North West Kyogle Shire		6
North East Kyogle Shire	2	6
South Kyogle Shire	1	5
Summerland Way	1	4
Clarence Way		5
Bruxner Highway	1	3
Afterlee Road / Peacock Creek Road		4
Kyogle Road	1	3

Bentley Road		1
Fawcetts Plain Road	1	
Collins Creek Road		1*
Gradys Creek Road		3
Cawongla Road		1
Byron Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	6	2
The Pocket Road / Main Arm Road	2	1
Coolamon Scenic Road	2	1
Myocum Road		1
Ewingdale Road	3	
Broken Head Road	3	2
Lismore Road	1	1
Eureka Road	2	1
Federal Drive	1	1
Binna Burra Road		4
Friday Hut Road	2	3
Bangalow Road	4	3
Lismore City	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Bruxner Highway	3	4
Bangalow Road	2	2
Kyogle Road	2	1
Nimbin Road / Blue Knob Road	2	4

Wyrallah Road	2	3
Dunoon Road	2	1
The Channon / Pinchin Road	2	
Rous Rd	2	
Ballina Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	3	3
Bruxner Highway	2	2
The Coast Road / Byron Bay Road	2	
Tintenbar Road	2	
Teven Road	2	2
River Drive	2	1
Blackwall Drive	1	2
Wardell Road	2	2
Richmond Valley Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	3	1
Bruxner Highway	1	1
Summerland Way	1	3
Casino – Coraki Rd / Woodburn – Coraki Rd	1	1
Woodburn – Evans Head Rd		3
Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd	1	2
Mongogarrie Rd	1	1

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4G

- Site upgrades and new sites in each Council area as per the tables below:

Tweed Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	1	
Tweed Coast Road		
Tweed Valley Way		1
Tomewin Road		
Numinbah Road		2
Limpinwood Road / Brays Creek Road		4
Kyogle Road		3

Site	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Summerland Way	1	4
Clarence Way		5
Bruxner Highway	1	3
Afterlee Road / Peacock Creek Road		4
Kyogle Road	1	3
Bentley Road		1
Fawcetts Plain Road	1	
Collins Creek Road		1*
Gradys Creek Road		3
Cawongla Road		1

Byron Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	1	
The Pocket Road / Main Arm Road	1	
Coolamon Scenic Road		
Myocum Road		1
Ewingdale Road		
Broken Head Road		
Lismore Road		1
Eureka Road		
Federal Drive		
Binna Burra Road	1	1
Friday Hut Road	2	2
Bangalow Road		3

Lismore City	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Bruxner Highway		
Bangalow Road		
Kyogle Road	1	
Nimbin Road / Blue Knob Road	2	3
Wyrallah Road		
Dunoon Road		
The Channon / Pinchin Road	1	
Rous Rd	1	

Ballina Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		
Bruxner Highway		
The Coast Road / Byron Bay Road		
Tintenbar Road		
Teven Road		
River Drive	2	
Blackwall Drive		
Wardell Road	1	
Richmond Valley Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		
Bruxner Highway		
Summerland Way		
Casino – Coraki Rd / Woodburn – Coraki Rd		
Woodburn – Evans Head Rd		
Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd		
Edenville Rd		
Mongogarrie Rd		



4G

- Site upgrades and new sites in each Council area as per the tables below:

Tweed Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	3	3
Tweed Coast Road		2
Tweed Valley Way	2	4
Tomewin Road	1	1
Numinbah Road	1	3
Limpinwood Road / Brays Creek Road		4
Kyogle Road		6

Site	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Summerland Way	1	4
Clarence Way		5
Bruxner Highway	1	3
Afterlee Road / Peacock Creek Road		4
Kyogle Road	1	3
Bentley Road		1
Fawcetts Plain Road	1	
Collins Creek Road		1*
Gradys Creek Road		3
Cawongla Road		1

Byron Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	2	2
The Pocket Road / Main Arm Road		1
Coolamon Scenic Road		2
Myocum Road		1
Ewingdale Road	3	
Broken Head Road	3	2
Lismore Road		1
Eureka Road	1	
Federal Drive	3	2
Binna Burra Road	1	1
Friday Hut Road	2	2
Bangalow Road		3

Lismore City	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Bruxner Highway	3	
Bangalow Road	2	
Kyogle Road	1	
Nimbin Road / Blue Knob Road	1	4
Wyrallah Road	1	3
Dunoon Road	1	3
The Channon / Pinchin Road	1	
Rous Rd	1	

Ballina Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway		2
Bruxner Highway		2
The Coast Road		2
Byron Bay Road		1
Tintenbar Road		1
Teven Road		
River Drive	1	
Blackwall Drive		1
Wardell Road		2

Richmond Valley Shire	Estimated existing site upgrades to support full coverage	Estimated new sites to support full coverage
Pacific Highway	1	
Bruxner Highway		1
Summerland Way		3
Casino – Coraki Rd / Woodburn – Coraki Rd	1	1
Woodburn – Evans Head Rd	3	
Sextonville Rd / Stratheden Rd / McDonalds Bridge Rd		2
Mongogarrie Rd		1

2. Next Steps

Based on the results of the Independent Mobile Network Testing and an assessment of other aspects of the digital infrastructure in the Northern Rivers region, the following recommended next steps have been developed for consideration.

1. Work directly with Optus, Vodafone, and Telstra to prioritize investments in new sites and network upgrades. This will help reduce the digital divide in the area and promote more equitable access to critical digital infrastructure for the local community.
2. Collaborate with NSW State Government and the Australian Government to advance Northern Rivers, in federal and state funding programs, including but not limited to the Mobile Black Spot Program.

Our test results aggregate user experience information and can demonstrate a service gap between the coverage maps of a carrier and the real end user experience. The most effective way to achieve carrier investment is for the results not to be generally released.

A process of meetings with the three national mobile broadband carriers and working through priority locations builds a working relationship based on both parties having knowledge of network strengths and weaknesses.

The release of individual site tests and comparative results can be beneficial, however a caveat should be provided reminding the recipient that the test were completed in one location at a point in time.

Where transmission signals are available but weak, aerial augmentation can assist greatly. All carrier retailers can, if asked, provide information and options in this regard.

3. Glossary

Glossary of Terms	
Backhaul	Backhaul typically refers to the mid to long-distance transport of data from a series of disparate locations back to a more centralised location. The backhaul portion of the network comprises the intermediate links between the core, or backbone, of the network and the small sub-networks at the 'edge' of the entire hierarchical network. In the context of the NBN, backhaul services are the data carriage services provided over highspeed, high-capacity fibre lines, which carry aggregated network traffic between a Point of Interconnect (PoI) and a centralised or 'core' part of the network, for example an Internet Service Provider's data centre.
Bandwidth	Refers to the capacity and rate of data transfer over a network, usually measured in kilobits, megabits or gigabits per second.
Blackspot	An under-served premises, or area, usually in remote or rural locations and sometimes on the edges of cities, which is unable to obtain adequate, metro-comparable broadband or other communications services. Reasons for blackspots are normally related to the limitations of technologies, geography or a lack of investment.
Broadband	Broadband is a term used to refer to 'always on' high speed Internet or other network access. In the past, broadband services and technologies were defined in terms of a capability to transfer information at higher rates than traditional dial-up services.
Cloud Computing	Cloud computing is an Internet-based technology which stores information in servers and provides that information as an on demand service. Under cloud computing consumers can access all of their documents and data from any device with internet access such as a home or work PC, a mobile phone or other mobile internet enabled device.
Dark Fibre	It is the equipment at either end that dictates what capacity can be delivered over an optical fibre— ranging upwards from about 100 Mbit/s (at the low end). The term 'dark fibre' simply refers to optical fibre that is available for use and is provided without any equipment at either end. The term was originally used when talking about the potential network capacity of telecommunication infrastructure, but now also refers to the increasingly common practice of leasing fibre optic cables from a network service provider.
Digital Divide	The gap between people with effective access to digital and information technology and services, and those with very limited or no access at all. It refers both to a person's physical access to technology and the resources and skills available to effectively use the technology. Often used in Australia to describe the different levels of communications service available between metropolitan and regional areas.

Fibre Optic	Also known as optical fibre, fibre-optic cable is made up of thin threads of glass that carry beams of light. In telecommunications, data is translated into pulses of laser light that can be transmitted along the fibre cables. Fibre-optic technology is less susceptible to 'noise' and 'interference' than other data-transfer mediums such as standard copper telephone lines and can be used more reliably over longer distances without loss of speed or quality. Fibre is used extensively in backbone and international submarine networks, and to connect the base stations of mobile and wireless networks. It is increasingly being used for the last mile connection to home and business premises in FTTX networks.
Fibre to the Curb (FttC)	Refers to networks in which fibre connections are provided to a kerb-side equipment cabinet, in which the fibre's optical signal is converted to an electrical signal and delivered to premises over copper wires— typically over a maximum distance of 100 metres or less.
Fibre to the Node (FttN)	Similar to FTTC but using a neighbourhood node that serves more premises rather than a kerb-side node. Copper distances are typically up to around 1 km.
Fibre to the Premise (FtTP)	Similar to Fibre to the Home, but a more neutral term that includes non-residential premises, such as schools, hospitals, and workplaces, as well as households. Fibre connections are provided all the way to premises, including individual units in multi-dwelling buildings
Fixed Line	Fixed line refers to technologies that use physical infrastructure, such as copper wires, rather than wireless infrastructure to deliver data connections. Traditional voice services, dial-up internet, xDSL, HFC cable and FTTP are all forms of fixed line services
Fixed Wireless Broadband	A family of wireless technologies that, as opposed to mobile wireless, delivers broadband services to a particular premises or fixed location. These services are sometimes called 'point-to point' or 'point-to-multi-point' and require an antenna that is generally permanently attached to the user's building. Fixed wireless can be used for backhauling in certain cases but also as an access technology, particularly in rugged or remote terrain and areas with low population densities that may make a fixed line alternative impossible or uneconomic. Wireless technologies are limited by the availability of wireless spectrum, the number of concurrent users, distance from the cell antenna and physical impediments such as hills and valleys interrupting signals.
Gigabit per second (Gbit/s)	A measure of communications speed equal to 1 000 000 000 bits per second. Also expressed as Gbps and Gb/s.

Greenfield	A term used to describe a piece of undeveloped land, either currently used for agriculture or completely unused.
Internet	A worldwide, publicly accessible series of interconnected computer networks that transmit data using the standard Internet Protocol (IP). It is a 'network of networks' that consists of millions of smaller domestic, academic, business, and government networks, which together carry various information and services, such as electronic mail, online chat, file transfer, and the interlinked web pages and other resources of the World Wide Web (www).
Internet Service Provider (ISP)	Also known as a Retail Service Provider (RSP), an organisation that offers access to the Internet to its customers. ISPs generally also provide other services such as electronic mail accounts, data storage and web hosting to their customers. ISPs may employ a combination of their own and third party infrastructure, or simply resell services provided by a wholesale carrier.
Last mile infrastructure	Infrastructure used to provide the link from a customer's premises to the provider's nearest point of aggregation. For example, a provider offering a wireless broadband service to the customer would be providing last-mile infrastructure using wireless broadband technology. The "digital divide" is attributed to the lack of suitable "Last mile infrastructure" in lower population density areas.
Latency	The delay in data transmission caused by the time it takes for data to get from one designated point to another.
Megabits per second (Mbit/s)	A measure of communications speed equal to 1 000 000 bits per second. Also expressed as Mbps, mbps, Mb/s and mb/s.
Mobile Wireless and Mobile Broadband	Broadband services supported by mobile networks, such as '3G' and '4G' networks, offering mobility and flexibility for users of handheld and laptop devices. Wireless technologies are limited by the availability of wireless spectrum, the number of concurrent users, distance from the cell antenna and physical impediments such as hills and valleys interrupting signals.
Point of Interconnect	The connection point that allows Retail Service Providers (RSPs) and Wholesale Service Providers (WSPs) to connect to NBN Co network infrastructure.

(Pol)	
Quality of Service (QoS)	The use of a range of networking technologies and techniques to provide guarantees on the ability of a network to deliver predictable results. Network performance within the scope of QoS can include availability, bandwidth, latency and error rate.
Satellite Broadband	Satellite broadband uses a radio dish to bounce a signal off a satellite and down to an earth station. It is common in rural and remote areas with low population densities, where fixed line alternatives are uneconomic. One-way satellite connections utilise a satellite link to download data to the broadband user and a standard telephone connection for uploading data back to the Internet. Two-way satellite connections use the satellite link to both upload and download information. The suitability of satellite broadband for some applications is impacted by the large physical distances between satellites and the earth's surface, which results in latency (delay) in the sending and receipt of data. Quality may also be affected by the number of simultaneous users and adverse weather conditions.
Smart Infrastructure	The application of communications technologies to infrastructure to make better, more efficient use of resources. Smart infrastructure can be used within the transport, energy, communications and water sectors.
Wholesale Service Provider (WSP)	A provider of infrastructure and services that deals only with other providers and does not have a commercial relationship with end-users or consumers. In telecommunications, a wholesale service provider allows other companies to lease access to equipment and services and avoid the expense of building their own infrastructure.
Wireless Broadband	Wireless broadband uses radio frequencies to transmit and receive data between customers and a local transmission point. Normally, this requires a number of base stations, similar to mobile phone towers, which transmit to customers who have a small transmitter/receiver connected to their computers or other digital devices. Wireless technologies are limited by the availability of wireless spectrum, the number of concurrent users, distance from the cell antenna and physical impediments such as hills and valleys interrupting signals.
Wireless Spectrum	Often referred to as the Radio-Frequency Spectrum, this is the array of electromagnetic radio frequencies used for communications, including mobile broadband, television, AM and FM radio, defence and any other service employing a wireless technology. The spectrum is divided into many frequency ranges, or bands, and usually allocated for a specific technology, device, use or service. Wireless Spectrum is a finite and regulated public asset, and in Australia is administered by the Australian Communications and Media Authority (ACMA), often through a licensing regime.

4. Appendices – Network Speed Tests

Telstra

4G+ (LTE-A)	Telstra / Telstra Billinudgel, AU	12/19/22 9:49:05 am	47.06 Mb/s 3.60 Mb/s	78 ms
Server:	[AU] Melbourne - 1 Gb/s - Summit Internet			
ISP:	Telstra (505:1)	Download bitrate (max):	47.06 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	26.35 Mb/s	
Techno.:	4G+ (LTE-A)	Upload bitrate (max):	3.60 Mb/s	
Signal:	-69 dBm > -71 dBm	Upload bitrate (average):	1.13 Mb/s	
Coord.:	-28.50421408, 153.52527624 (GPS)	Latency (min):	78 ms	
Address:	Billilids Long Day Care Centre, O'Donn Billinudgel, Byron Shire Council, New Sou 2483,	Latency (average):	381 ms	
		Latency (jitter):	16 ms	
		Data used:	17.15 MiB	
4G+ (LTE-A)	Telstra / Telstra Kingscliff, AU	11/17/22 9:33:31 am	118.70 Mb/s 20.50 Mb/s	54 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Telstra (505:1)	Download bitrate (max):	118.70 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	66.66 Mb/s	
Techno.:	4G+ (LTE-A)	Upload bitrate (max):	20.50 Mb/s	
Signal:	-65 dBm > -65 dBm	Upload bitrate (average):	17.04 Mb/s	
Coord.:	-28.25690692, 153.57811824 (GPS)	Latency (min):	54 ms	
Address:	Mockingbird, Hungerford Lane, Kingscl Shire Council, New South Wales, 2487,	Latency (average):	61 ms	
		Latency (jitter):	24 ms	
		Data used:	54.47 MiB	
4G (LTE)	Telstra / Telstra Murwillumbah, AU	11/17/22 1:17:44 pm	0.76 Mb/s 29.33 Mb/s	63 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Telstra (505:1)	Download bitrate (max):	0.76 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	0.45 Mb/s	
Techno.:	4G (LTE)	Upload bitrate (max):	29.33 Mb/s	
Signal:	-51 dBm > -51 dBm	Upload bitrate (average):	21.26 Mb/s	
Coord.:	-28.32801589, 153.39825754 (GPS)	Latency (min):	63 ms	
Address:	10, Wollumbin Street, Murwillumbah, Tw Council, New South Wales, 2484,	Latency (average):	73 ms	
		Latency (jitter):	12 ms	
		Data used:	17.17 MiB	
4G+ (LTE-A)	Telstra / Telstra Ocean Shores, AU	12/19/22 9:40:12 am	21.06 Mb/s 3.53 Mb/s	83 ms
Server:	[AU] Melbourne - 1 Gb/s - Summit Internet			
ISP:	Telstra (505:1)	Download bitrate (max):	21.06 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	17.36 Mb/s	
Techno.:	4G+ (LTE-A)	Upload bitrate (max):	3.53 Mb/s	
Signal:	-81 dBm > -79 dBm	Upload bitrate (average):	1.96 Mb/s	
Coord.:	-28.52356151, 153.54553872 (GPS)	Latency (min):	83 ms	
Address:	K Hub, Rajah Road, Ocean Shores, By Council, New South Wales, 2483,	Latency (average):	94 ms	
		Latency (jitter):	29 ms	
		Data used:	12.28 MiB	
4G+ (LTE-A)	Telstra / Telstra Pottsville, AU	11/17/22 9:57:30 am	19.44 Mb/s 4.82 Mb/s	64 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Telstra (505:1)	Download bitrate (max):	19.44 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	13.34 Mb/s	
Techno.:	4G+ (LTE-A)	Upload bitrate (max):	4.82 Mb/s	
Signal:	-71 dBm > -71 dBm	Upload bitrate (average):	2.17 Mb/s	
Coord.:	-28.38997057, 153.56232494 (GPS)	Latency (min):	64 ms	
Address:	Coronation Avenue, Pottsville, Tweed Shire New South Wales, 2489,	Latency (average):	98 ms	
		Latency (jitter):	203 ms	
		Data used:	10.42 MiB	
4G+ (LTE-A)	Telstra / Telstra Chinderah, AU	11/17/22 9:25:31 am	9.74 Mb/s 46.86 Mb/s	37 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Telstra (505:1)	Download bitrate (max):	9.74 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	6.32 Mb/s	
Techno.:	4G+ (LTE-A)	Upload bitrate (max):	46.86 Mb/s	
Signal:	-53 dBm > -53 dBm	Upload bitrate (average):	41.03 Mb/s	
Coord.:	-28.23584225, 153.55509456 (GPS)	Latency (min):	37 ms	
Address:	Chinderah Village, Chinderah Bay Drive, C Tweed Shire Council, New South Wa	Latency (average):	42 ms	
		Latency (jitter):	10 ms	
		Data used:	36.62 MiB	
5G (NSA)	Telstra / Telstra Tweed Heads, AU	11/17/22 8:55:44 am	466.76 Mb/s 58.87 Mb/s	38 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Telstra (505:1)	Download bitrate (max):	466.76 Mb/s	
Network:	Telstra (505:1)	Download bitrate (average):	244.72 Mb/s	
Techno.:	5G (NSA)	Upload bitrate (max):	58.87 Mb/s	
Signal:	-51 dBm > -51 dBm	Upload bitrate (average):	50.06 Mb/s	
Coord.:	-28.17021270, 153.54365760 (Fused)	Latency (min):	38 ms	
Address:	Tweed Heads Visitor Information Cent Street, Tweed Heads, Tweed Shire Cou South Wales, 2485,	Latency (average):	51 ms	
		Latency (jitter):	23 ms	
		Data used:	186.07 MiB	

4G+ (LTE-A)	Telstra / Telstra Kyogle, AU	12/16/22 10:14:03 am	92.31 Mb/s 0.55 Mb/s	79 ms
Server: [AU] Melbourne - 1 Gb/s - Summit Internet	Download bitrate (max):	92.31 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	59.13 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	0.55 Mb/s		
Techno.: 4G+ (LTE-A)	Upload bitrate (average):	0.17 Mb/s		
Signal: -51 dBm > -51 dBm	Latency (min):	79 ms		
Coord.: -28.62165740, 153.00376180 (Network)	Latency (average):	82 ms		
Address: Box & Dice Cafe, Stratheden Street, Kyog Council, New South Wales, 2474,	Latency (jitter):	13 ms		
	Data used:	36.18 MiB		

4G (LTE)	Telstra / Telstra Tabulam, AU	12/15/22 11:03:36 am	19.17 Mb/s 18.18 Mb/s	45 ms
Server: [AU] Melbourne - 1 Gb/s - Summit Internet	Download bitrate (max):	19.17 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	15.46 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	18.18 Mb/s		
Techno.: 4G (LTE)	Upload bitrate (average):	14.36 Mb/s		
Signal: -51 dBm > -51 dBm	Latency (min):	45 ms		
Coord.: -28.88708010, 152.56761690 (Network)	Latency (average):	142 ms		
Address: Bruxner Highway, Tabulam, Kyogle Cou South Wales, 2469,	Latency (jitter):	229 ms		
	Data used:	22.05 MiB		

4G (LTE)	Telstra / Telstra Woodenbong, AU	11/25/22 12:56:13 pm	74.89 Mb/s 3.67 Mb/s	48 ms
Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max):	74.89 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	65.59 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	3.67 Mb/s		
Techno.: 4G (LTE)	Upload bitrate (average):	1.73 Mb/s		
Signal: -55 dBm > -55 dBm	Latency (min):	48 ms		
Coord.: -28.38891440, 152.61231990 (Network)	Latency (average):	347 ms		
Address: Lynda's Pitstop, 34 Unungar Street, Woo Kyogle Council, New South Wales, 2476,	Latency (jitter):	8 ms		
	Data used:	40.71 MiB		

4G (LTE)	Telstra / Telstra Bonalbo, AU	12/15/22 2:05:24 pm	13.65 Mb/s 42.65 Mb/s	45 ms
Server: [AU] Melbourne - 1 Gb/s - Summit Internet	Download bitrate (max):	13.65 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	7.96 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	42.65 Mb/s		
Techno.: 4G (LTE)	Upload bitrate (average):	37.38 Mb/s		
Signal: -57 dBm > -55 dBm	Latency (min):	45 ms		
Coord.: -28.73745266, 152.62303818 (GPS)	Latency (average):	57 ms		
Address: Post Office Lane, Bonalbo, Kyogle Cou South Wales, 2469,	Latency (jitter):	26 ms		
	Data used:	33.34 MiB		

4G+ (LTE-A)	Telstra / Telstra Byron Bay, AU	12/20/22 2:31:00 pm	39.56 Mb/s 0.55 Mb/s	39 ms
Server: [AU] Melbourne - 1 Gb/s - Summit Internet	Download bitrate (max):	39.56 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	36.13 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	0.55 Mb/s		
Techno.: 4G+ (LTE-A)	Upload bitrate (average):	0.17 Mb/s		
Signal: -69 dBm > -59 dBm	Latency (min):	39 ms		
Coord.: -28.64000644, 153.63601493 (GPS)	Latency (average):	46 ms		
Address: Cape Byron State Conservation Area, LI Road, Byron Bay, Byron Shire Council, N Wales, 2481,	Latency (jitter):	11 ms		
	Data used:	22.41 MiB		


5G (NSA)	Telstra / Telstra Bangalow, AU	12/20/22 10:59:58 am	302.65 Mb/s 12.20 Mb/s	60 ms
Server: [AU] Melbourne - 1 Gb/s - Summit Internet	Download bitrate (max):	302.65 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	196.40 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	12.20 Mb/s		
Techno.: 5G (NSA)	Upload bitrate (average):	9.87 Mb/s		
Signal: -87 dBm > -77 dBm	Latency (min):	60 ms		
Coord.: -28.68671680, 153.52522761 (GPS)	Latency (average):	68 ms		
Address: Deacon Street, Bangalow, Byron Shire Cou South Wales, 2479,	Latency (jitter):	24 ms		
	Data used:	124.93 MiB		


5G (NSA)	Telstra / Telstra Byron Bay, AU	12/19/22 3:59:58 pm	193.79 Mb/s 42.06 Mb/s	44 ms
Server: [AU] Melbourne - 1 Gb/s - Summit Internet	Download bitrate (max):	193.79 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	169.40 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	42.06 Mb/s		
Techno.: 5G (NSA)	Upload bitrate (average):	31.51 Mb/s		
Signal: -57 dBm > -57 dBm	Latency (min):	44 ms		
Coord.: -28.64134595, 153.60938458 (GPS)	Latency (average):	406 ms		
Address: Shirley Street, Byron Bay, Byron Shire Cou South Wales, 2481,	Latency (jitter):	497 ms		
	Data used:	123.96 MiB		

4G+ (LTE-A)	Telstra / Telstra Brunswick Heads, AU	11/18/22 10:24:21 am	93.32 Mb/s 16.78 Mb/s	55 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	93.32 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	61.67 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	16.78 Mb/s		
Techno.: 4G+ (LTE-A)	Upload bitrate (average):	12.64 Mb/s		
Signal: -71 dBm > -71 dBm	Latency (min):	55 ms		
Coord.: -28.54076320, 153.55148062 (GPS)	Latency (average):	66 ms		
Address: Brunswick Heads Police Station, Fin Brunswick Heads, Byron Shire Council, N Wales, 2483,	Latency (jitter):	27 ms		
	Data used:	47.01 MiB		


5G (NSA)	Telstra / Telstra Mullumbimby, AU	11/18/22 10:46:51 am	157.20 Mb/s 82.08 Mb/s	57 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	157.20 Mb/s		
ISP: Telstra (505:1)	Download bitrate (average):	95.40 Mb/s		
Network: Telstra (505:1)	Upload bitrate (max):	82.08 Mb/s		
Techno.: 5G (NSA)	Upload bitrate (average):	61.37 Mb/s		
Signal: -51 dBm > -51 dBm	Latency (min):	57 ms		
Coord.: -28.55609960, 153.49922841 (GPS)	Latency (average):	64 ms		
Address: Dalley Street, Mullumbimby, Byron Shire New South Wales, 2482,	Latency (jitter):	17 ms		
	Data used:	107.26 MiB		

<div> <div>4G (LTE)</div> <div>Telstra / Telstra</div> <div>Clunes, AU</div> <div>12/20/22</div> <div>33.36 Mb/s</div> <div>46 ms</div> </div> <div> <div>12:35:32 pm</div> <div>0.80 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 4G (LTE)</div> <div>Signal: -65 dBm > -65 dBm</div> <div>Coord.: -28.73131179, 153.40574253 (GPS)</div> <div>Address: Main Street, Clunes, Lismore City Cou</div> <div>South Wales, 2480,</div> </div> <div> <div>Download bitrate (max): 33.36 Mb/s</div> <div>Download bitrate (average): 27.38 Mb/s</div> <div>Upload bitrate (max): 0.80 Mb/s</div> <div>Upload bitrate (average): 0.25 Mb/s</div> <div>Latency (min): 46 ms</div> <div>Latency (average): 50 ms</div> <div>Latency (jitter): 9 ms</div> <div>Data used: 17.23 MiB</div> </div>	<div> <div>4G+ (LTE-A)</div> <div>Telstra / Telstra</div> <div>Wollongbar, AU</div> <div>12/20/22</div> <div>30.61 Mb/s</div> <div>41 ms</div> </div> <div> <div>12:08:08 pm</div> <div>0.55 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 4G+ (LTE-A)</div> <div>Signal: -61 dBm > -63 dBm</div> <div>Coord.: -28.82053810, 153.42301042 (GPS)</div> <div>Address: Rifle Range Road, Wollongbar, Ballina Shire</div> <div>New South Wales, 2477,</div> </div> <div> <div>Download bitrate (max): 30.61 Mb/s</div> <div>Download bitrate (average): 25.69 Mb/s</div> <div>Upload bitrate (max): 0.55 Mb/s</div> <div>Upload bitrate (average): 0.17 Mb/s</div> <div>Latency (min): 41 ms</div> <div>Latency (average): 48 ms</div> <div>Latency (jitter): 14 ms</div> <div>Data used: 16.17 MiB</div> </div>	<div> <div>5G (NSA)</div> <div>Telstra / Telstra</div> <div>Lismore, AU</div> <div>12/19/22</div> <div>540.20 Mb/s</div> <div>43 ms</div> </div> <div> <div>1:35:18 pm</div> <div>90.41 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 5G (NSA)</div> <div>Signal: -51 dBm > -51 dBm</div> <div>Coord.: -28.80638428, 153.27763843 (GPS)</div> <div>Address: Molesworth Street, Lismore, Lismore City</div> <div>New South Wales, 2480,</div> </div> <div> <div>Download bitrate (max): 540.20 Mb/s</div> <div>Download bitrate (average): 454.40 Mb/s</div> <div>Upload bitrate (max): 90.41 Mb/s</div> <div>Upload bitrate (average): 77.76 Mb/s</div> <div>Latency (min): 43 ms</div> <div>Latency (average): 57 ms</div> <div>Latency (jitter): 27 ms</div> <div>Data used: 330.45 MiB</div> </div>
<div> <div>4G (LTE)</div> <div>Telstra / Telstra</div> <div>Newrybar, AU</div> <div>12/20/22</div> <div>0.36 Mb/s</div> <div>49 ms</div> </div> <div> <div>1:18:17 pm</div> <div>0.00 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 4G (LTE)</div> <div>Signal: -75 dBm > -75 dBm</div> <div>Coord.: -28.71674121, 153.53304386 (GPS)</div> <div>Address: Newrybar Public School, Broken H</div> <div>Newrybar, Ballina Shire Council, New Sou</div> <div>2479,</div> </div> <div> <div>Download bitrate (max): 0.36 Mb/s</div> <div>Download bitrate (average): 0.25 Mb/s</div> <div>Upload bitrate (max): 0.00 Mb/s</div> <div>Upload bitrate (average): 0.00 Mb/s</div> <div>Latency (min): 49 ms</div> <div>Latency (average): 1244 ms</div> <div>Latency (jitter): 10 ms</div> <div>Data used: 864.31 KiB</div> </div>	<div> <div>5G (NSA)</div> <div>Telstra / Telstra</div> <div>Alstonville, AU</div> <div>12/20/22</div> <div>407.10 Mb/s</div> <div>46 ms</div> </div> <div> <div>11:52:51 am</div> <div>58.11 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 5G (NSA)</div> <div>Signal: -51 dBm > -51 dBm</div> <div>Coord.: -28.84172603, 153.44003101 (GPS)</div> <div>Address: Alstonville (Southbound), Main Street, Al</div> <div>Ballina Shire Council, New South Wal</div> </div> <div> <div>Download bitrate (max): 407.10 Mb/s</div> <div>Download bitrate (average): 353.78 Mb/s</div> <div>Upload bitrate (max): 58.11 Mb/s</div> <div>Upload bitrate (average): 52.98 Mb/s</div> <div>Latency (min): 46 ms</div> <div>Latency (average): 48 ms</div> <div>Latency (jitter): 5 ms</div> <div>Data used: 249.52 MiB</div> </div>	<div> <div>4G+ (LTE-A)</div> <div>Telstra / Telstra</div> <div>Lennox Head, AU</div> <div>12/19/22</div> <div>90.77 Mb/s</div> <div>44 ms</div> </div> <div> <div>3:33:31 pm</div> <div>35.66 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 4G+ (LTE-A)</div> <div>Signal: -59 dBm > -61 dBm</div> <div>Coord.: -28.79279678, 153.59395199 (GPS)</div> <div>Address: Super Cellars, Pacific Parade, Lennox He</div> <div>Area, Lennox Head, Ballina Shire Council, N</div> <div>Wales, 2478,</div> </div> <div> <div>Download bitrate (max): 90.77 Mb/s</div> <div>Download bitrate (average): 83.94 Mb/s</div> <div>Upload bitrate (max): 35.66 Mb/s</div> <div>Upload bitrate (average): 29.04 Mb/s</div> <div>Latency (min): 44 ms</div> <div>Latency (average): 47 ms</div> <div>Latency (jitter): 8 ms</div> <div>Data used: 72.28 MiB</div> </div>
<div> <div>5G (NSA)</div> <div>Telstra / Telstra</div> <div>Ballina, AU</div> <div>12/19/22</div> <div>328.66 Mb/s</div> <div>39 ms</div> </div> <div> <div>3:18:43 pm</div> <div>90.92 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 5G (NSA)</div> <div>Signal: -51 dBm > -51 dBm</div> <div>Coord.: -28.87175852, 153.56373115 (GPS)</div> <div>Address: Ballina Courthouse, 18, River Street, Ball</div> <div>Area, Ballina, Ballina Shire Council, N</div> <div>Wales, 2478,</div> </div> <div> <div>Download bitrate (max): 328.66 Mb/s</div> <div>Download bitrate (average): 253.23 Mb/s</div> <div>Upload bitrate (max): 90.92 Mb/s</div> <div>Upload bitrate (average): 82.75 Mb/s</div> <div>Latency (min): 39 ms</div> <div>Latency (average): 50 ms</div> <div>Latency (jitter): 12 ms</div> <div>Data used: 213.80 MiB</div> </div>	<div> <div>4G+ (LTE-A)</div> <div>Telstra / Telstra</div> <div>Broadwater, AU</div> <div>12/19/22</div> <div>46.15 Mb/s</div> <div>64 ms</div> </div> <div> <div>11:55:07 am</div> <div>0.55 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 4G+ (LTE-A)</div> <div>Signal: -61 dBm > -55 dBm</div> <div>Coord.: -29.01021516, 153.43579349 (GPS)</div> <div>Address: Melbo's Verandah, Parlinga Drive, Br</div> <div>Richmond Valley Council, New South Wal</div> </div> <div> <div>Download bitrate (max): 46.15 Mb/s</div> <div>Download bitrate (average): 40.82 Mb/s</div> <div>Upload bitrate (max): 0.55 Mb/s</div> <div>Upload bitrate (average): 0.17 Mb/s</div> <div>Latency (min): 64 ms</div> <div>Latency (average): 71 ms</div> <div>Latency (jitter): 17 ms</div> <div>Data used: 25.21 MiB</div> </div>	<div> <div>4G (LTE)</div> <div>Telstra / Telstra</div> <div>Woodburn, AU</div> <div>12/19/22</div> <div>9.71 Mb/s</div> <div>70 ms</div> </div> <div> <div>10:04:11 am</div> <div>23.75 Mb/s</div> </div> <div> <div>Server: [AU] Melbourne - 1 Gb/s - Summit Internet</div> <div>ISP: Telstra (505:1)</div> <div>Network: Telstra (505:1)</div> <div>Techno.: 4G (LTE)</div> <div>Signal: -61 dBm > -59 dBm</div> <div>Coord.: -29.07226006, 153.34196267 (GPS)</div> <div>Address: Cedar Street, Woodburn, Richmond Valle</div> <div>New South Wales, 2472,</div> </div> <div> <div>Download bitrate (max): 9.71 Mb/s</div> <div>Download bitrate (average): 5.94 Mb/s</div> <div>Upload bitrate (max): 23.75 Mb/s</div> <div>Upload bitrate (average): 19.27 Mb/s</div> <div>Latency (min): 70 ms</div> <div>Latency (average): 75 ms</div> <div>Latency (jitter): 14 ms</div> <div>Data used: 18.59 MiB</div> </div>

4G (LTE)	Telstra / Telstra	12/19/22	38.00 Mb/s	48 ms
	Wardell, AU	2:15:14 pm	34.92 Mb/s	
Server: [AU] Melbourne - 1 Gb/s - Summit Internet Download bitrate (max): 38.00 Mb/s				
ISP: Telstra (505:1) Download bitrate (average): 28.28 Mb/s				
Network: Telstra (505:1) Upload bitrate (max): 34.92 Mb/s				
Techno.: 4G (LTE) Upload bitrate (average): 31.32 Mb/s				
Signal: -67 dBm > -67 dBm Latency (min): 48 ms				
Coord.: -28.95254590, 153.46548555 (GPS) Latency (average): 52 ms				
Address: Sinclair Street, Wardell, Ballina Shire Cou South Wales, 2477, Latency (jitter): 9 ms				
Data used: 40.41 MiB				

5G (NSA)	Telstra / Telstra	12/18/22	202.92 Mb/s	72 ms
	Evans Head, AU	9:36:25 am	39.26 Mb/s	
Server: [AU] Melbourne - 1 Gb/s - Summit Internet Download bitrate (max): 202.92 Mb/s				
ISP: Telstra (505:1) Download bitrate (average): 170.55 Mb/s				
Network: Telstra (505:1) Upload bitrate (max): 39.26 Mb/s				
Techno.: 5G (NSA) Upload bitrate (average): 32.51 Mb/s				
Signal: -65 dBm > -59 dBm Latency (min): 72 ms				
Coord.: -29.11942630, 153.43336060 (Fused) Latency (average): 76 ms				
Address: Evans Head Surf Shack, McDonald Pla Head, Richmond Valley Council, New Sou 2473, Latency (jitter): 12 ms				
Data used: 126.05 MiB				

4G+ (LTE-A)	Telstra / Telstra	12/19/22	110.54 Mb/s	73 ms
	Casino, AU	11:01:02 am	0.55 Mb/s	
Server: [AU] Melbourne - 1 Gb/s - Summit Internet Download bitrate (max): 110.54 Mb/s				
ISP: Telstra (505:1) Download bitrate (average): 89.41 Mb/s				
Network: Telstra (505:1) Upload bitrate (max): 0.55 Mb/s				
Techno.: 4G+ (LTE-A) Upload bitrate (average): 0.17 Mb/s				
Signal: -51 dBm > -51 dBm Latency (min): 73 ms				
Coord.: -28.86375603, 153.05072822 (GPS) Latency (average): 78 ms				
Address: Hickey Street, Casino, Richmond Valley Cou South Wales, 2470, Latency (jitter): 19 ms				
Data used: 54.28 MiB				

4G (LTE)	Telstra / Telstra	12/19/22	3.02 Mb/s	65 ms
	Coraki, AU	10:35:25 am	10.13 Mb/s	
Server: [AU] Melbourne - 1 Gb/s - Summit Internet Download bitrate (max): 3.02 Mb/s				
ISP: Telstra (505:1) Download bitrate (average): 1.66 Mb/s				
Network: Telstra (505:1) Upload bitrate (max): 10.13 Mb/s				
Techno.: 4G (LTE) Upload bitrate (average): 8.08 Mb/s				
Signal: -69 dBm > -71 dBm Latency (min): 65 ms				
Coord.: -28.98676435, 153.28760769 (GPS) Latency (average): 71 ms				
Address: Club Hotel, 95, Richmond Terrace, Coraki Coraki, Richmond Valley Council, New Sou 2471, Latency (jitter): 13 ms				
Data used: 7.28 MiB				

Optus

4G+ (LTE-A)	YES OPTUS / Optus Byron Bay, AU	12/20/22 2:31:14 pm	11.86 Mb/s 2.04 Mb/s	28 ms	4G+ (LTE-A)	YES OPTUS / Optus Newrybar, AU	12/20/22 1:18:24 pm	72.36 Mb/s 9.96 Mb/s	34 ms	4G+ (LTE-A)	YES OPTUS / Optus Clunes, AU	12/20/22 12:35:41 pm	46.60 Mb/s 2.18 Mb/s	35 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 11.86 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 72.36 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 46.60 Mb/s									
ISP: YES OPTUS (505:2)	Download bitrate (average): 9.15 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 66.85 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 40.91 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 2.04 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 9.96 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 2.18 Mb/s									
Techno.: 4G+ (LTE-A)	Upload bitrate (average): 0.93 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 7.63 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 1.20 Mb/s									
Signal: -79 dBm > -63 dBm	Latency (min): 28 ms	Signal: -77 dBm > -79 dBm	Latency (min): 34 ms	Signal: -71 dBm > -73 dBm	Latency (min): 35 ms									
Coord.: -28.64000377, 153.63604976 (GPS)	Latency (average): 333 ms	Coord.: -28.71670701, 153.53307690 (GPS)	Latency (average): 43 ms	Coord.: -28.73126160, 153.40571110 (Network)	Latency (average): 45 ms									
Address: Cape Byron State Conservation Area, Li Road, Byron Bay, Byron Shire Council, N Wales, 2481,	Latency (jitter): 20 ms	Address: Newrybar Public School, Broken H Newrybar, Ballina Shire Council, New Sou 2479,	Latency (jitter): 20 ms	Address: Main Street, Clunes, Lismore City Cou South Wales, 2480,	Latency (jitter): 12 ms									
	Data used: 6.48 MiB		Data used: 46.65 MiB		Data used: 25.67 MiB									

4G+ (LTE-A)	Optus / Optus Wollongbar, AU	12/20/22 12:08:24 pm	25.71 Mb/s 2.37 Mb/s	39 ms	4G+ (LTE-A)	Optus / Optus Alstonville, AU	12/20/22 11:52:58 am	149.17 Mb/s 72.63 Mb/s	33 ms	4G+ (LTE-A)	YES OPTUS / Optus Bangalow, AU	12/20/22 11:00:14 am	91.91 Mb/s 4.11 Mb/s	35 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 25.71 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 149.17 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 91.91 Mb/s									
ISP: Optus (505:2)	Download bitrate (average): 21.49 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 98.69 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 72.95 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 2.37 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 72.63 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 4.11 Mb/s									
Techno.: 4G+ (LTE-A)	Upload bitrate (average): 1.50 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 64.45 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 2.64 Mb/s									
Signal: -63 dBm > -65 dBm	Latency (min): 39 ms	Signal: -51 dBm > -51 dBm	Latency (min): 33 ms	Signal: -85 dBm > -77 dBm	Latency (min): 35 ms									
Coord.: -28.82054607, 153.42308949 (GPS)	Latency (average): 43 ms	Coord.: -28.84157180, 153.44001150 (Network)	Latency (average): 44 ms	Coord.: -28.68669851, 153.52528467 (GPS)	Latency (average): 341 ms									
Address: Rifle Range Road, Wollongbar, Ballina Shire New South Wales, 2477,	Latency (jitter): 8 ms	Address: Alstonville (northbound), Main Street, Al Ballina Shire Council, New South Wai	Latency (jitter): 21 ms	Address: Deacon Street, Bangalow, Byron Shire Cou South Wales, 2479,	Latency (jitter): 17 ms									
	Data used: 14.22 MiB		Data used: 109.47 MiB		Data used: 46.04 MiB									

4G+ (LTE-A)	YES OPTUS / Optus Bangalow, AU	12/20/22 10:42:03 am	67.59 Mb/s 2.08 Mb/s	38 ms	4G+ (LTE-A)	Optus / Optus Billinudgel, AU	12/19/22 9:49:11 am	81.83 Mb/s 6.88 Mb/s	33 ms	4G+ (LTE-A)	Optus / Optus Ocean Shores, AU	12/19/22 9:40:28 am	40.53 Mb/s 3.77 Mb/s	29 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 67.59 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 81.83 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 40.53 Mb/s									
ISP: YES OPTUS (505:2)	Download bitrate (average): 50.26 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 66.08 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 29.73 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 2.08 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 6.88 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 3.77 Mb/s									
Techno.: 4G+ (LTE-A)	Upload bitrate (average): 0.94 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 4.95 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 1.97 Mb/s									
Signal: -75 dBm > -75 dBm	Latency (min): 38 ms	Signal: -77 dBm > -79 dBm	Latency (min): 33 ms	Signal: -85 dBm > -83 dBm	Latency (min): 29 ms									
Coord.: -28.68725083, 153.52483286 (GPS)	Latency (average): 45 ms	Coord.: -28.50420607, 153.52524285 (GPS)	Latency (average): 41 ms	Coord.: -28.52349714, 153.54553505 (GPS)	Latency (average): 36 ms									
Address: Station Street, Bangalow, Byron Shire Cou South Wales, 2479,	Latency (jitter): 17 ms	Address: Billilids Long Day Care Centre, O'Donn Billinudgel, Byron Shire Council, New Sou 2483,	Latency (jitter): 12 ms	Address: Ocean Village Shopping Centre, Yalla K Ocean Shores, Byron Shire Council, N Wales, 2483,	Latency (jitter): 11 ms									
	Data used: 31.11 MiB		Data used: 43.88 MiB		Data used: 19.77 MiB									

4G+ (LTE-A)	YES OPTUS / Optus Byron Bay, AU	12/19/22 4:00:20 pm	275.25 Mb/s 83.66 Mb/s	31 ms	4G+ (LTE-A)	YES OPTUS / Optus Lennox Head, AU	12/19/22 3:33:37 pm	205.56 Mb/s 62.69 Mb/s	37 ms	4G+ (LTE-A)	YES OPTUS / Optus Ballina, AU	12/19/22 3:18:48 pm	60.74 Mb/s 51.53 Mb/s	34 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 275.25 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 205.56 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 60.74 Mb/s									
ISP: YES OPTUS (505:2)	Download bitrate (average): 184.66 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 98.46 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 46.00 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 83.66 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 62.69 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 51.53 Mb/s									
Techno.: 4G+ (LTE-A)	Upload bitrate (average): 65.10 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 53.53 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average): 46.49 Mb/s									
Signal: -55 dBm > -55 dBm	Latency (min): 31 ms	Signal: -53 dBm > -67 dBm	Latency (min): 37 ms	Signal: -65 dBm > -63 dBm	Latency (min): 34 ms									
Coord.: -28.64135333, 153.60939518 (GPS)	Latency (average): 38 ms	Coord.: -28.79278734, 153.59396183 (GPS)	Latency (average): 48 ms	Coord.: -28.87178361, 153.56371889 (GPS)	Latency (average): 37 ms									
Address: Shirley Street, Byron Bay, Byron Shire Cou South Wales, 2481,	Latency (jitter): 14 ms	Address: Super Cellars, Pacific Parade, Lennox He Area, Lennox Head, Ballina Shire Council, N Wales, 2478,	Latency (jitter): 23 ms	Address: Ballina Courthouse, 18, River Street, Balli Area, Ballina, Ballina Shire Council, N Wales, 2478,	Latency (jitter): 6 ms									
	Data used: 160.62 MiB		Data used: 100.98 MiB		Data used: 62.56 MiB									

4G+ (LTE-A)	Optus / Optus Wardell, AU	12/19/22 2:15:19 pm	14.19 Mb/s 6.17 Mb/s	38 ms	4G+ (LTE-A)	Optus / Optus Lismore, AU	12/19/22 1:35:28 pm	233.81 Mb/s 51.13 Mb/s	30 ms	4G+ (LTE-A)	YES OPTUS / Optus Pearces Corner, AU	12/19/22 1:21:58 pm	34.65 Mb/s 75.42 Mb/s	38 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 14.19 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 233.81 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 34.65 Mb/s									
ISP: Optus (505:2)	Download bitrate (average): 11.88 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 169.94 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 29.00 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 6.17 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 51.13 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 75.42 Mb/s									
Techno: 4G+ (LTE-A)	Upload bitrate (average): 5.23 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 45.81 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 65.19 Mb/s									
Signal: -75 dBm > -73 dBm	Latency (min): 38 ms	Signal: -53 dBm > -51 dBm	Latency (min): 30 ms	Signal: -51 dBm > -51 dBm	Latency (min): 38 ms									
Coord: -28.95252329, 153.46550054 (GPS)	Latency (average): 44 ms	Coord: -28.80640149, 153.27766885 (GPS)	Latency (average): 38 ms	Coord: -28.81182318, 153.34521626 (GPS)	Latency (average): 41 ms									
Address: Sinclair Street, Wardell, Ballina Shire Cou South Wales, 2477,	Latency (jitter): 11 ms	Address: Molesworth Street, Lismore, Lismore City New South Wales, 2480,	Latency (jitter): 17 ms	Address: WIN Television, 2LM Triple Z, Northern Star Ballina Road, Pearces Corner, Goonellabah City Council, New South Wales, 2480,	Latency (jitter): 10 ms									
	Data used: 11.73 MiB		Data used: 137.46 MiB		Data used: 68.27 MiB									

4G+ (LTE-A)	YES OPTUS / Optus Broadwater, AU	12/19/22 11:55:14 am	106.77 Mb/s 33.00 Mb/s	64 ms	4G+ (LTE-A)	Optus / Optus Casino, AU	12/19/22 11:01:09 am	86.64 Mb/s 37.23 Mb/s	59 ms	4G+ (LTE-A)	YES OPTUS / Optus Coraki, AU	12/19/22 10:35:18 am	3.75 Mb/s 1.73 Mb/s	59 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 106.77 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 86.64 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 3.75 Mb/s									
ISP: YES OPTUS (505:2)	Download bitrate (average): 67.73 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 60.00 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 2.07 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 33.00 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 37.23 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 1.73 Mb/s									
Techno: 4G+ (LTE-A)	Upload bitrate (average): 29.75 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 31.01 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 0.81 Mb/s									
Signal: -75 dBm > -71 dBm	Latency (min): 64 ms	Signal: -63 dBm > -63 dBm	Latency (min): 59 ms	Signal: -73 dBm > -69 dBm	Latency (min): 59 ms									
Coord: -29.01016317, 153.43576071 (GPS)	Latency (average): 68 ms	Coord: -28.86371366, 153.05076941 (GPS)	Latency (average): 68 ms	Coord: -28.98797660, 153.28826740 (Network)	Latency (average): 67 ms									
Address: Melba's Verandah, Paringa Drive, Br Richmond Valley Council, New South Wal	Latency (jitter): 12 ms	Address: Hickey Street, Casino, Richmond Valley Cou South Wales, 2470,	Latency (jitter): 16 ms	Address: Coraki Riverside Caravan Park & Carr 43, Richmond Terrace, Coraki Junctio Richmond Valley Council, New South Wal	Latency (jitter): 14 ms									
	Data used: 63.05 MiB		Data used: 59.69 MiB		Data used: 2.18 MiB									

4G+ (LTE-A)	Optus / Optus Woodburn, AU	12/19/22 10:04:18 am	29.94 Mb/s 7.79 Mb/s	62 ms	4G+ (LTE-A)	Optus / Optus Evans Head, AU	12/18/22 9:36:39 am	19.11 Mb/s 1.98 Mb/s	60 ms	4G+ (LTE-A)	Optus / Optus Lismore, AU	11/18/22 1:25:14 pm	7.75 Mb/s 21.84 Mb/s	101 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 29.94 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 19.11 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max): 7.75 Mb/s									
ISP: Optus (505:2)	Download bitrate (average): 22.67 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 13.80 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 3.94 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 7.79 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 1.98 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 21.84 Mb/s									
Techno: 4G+ (LTE-A)	Upload bitrate (average): 5.83 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 0.95 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 17.23 Mb/s									
Signal: -71 dBm > -71 dBm	Latency (min): 62 ms	Signal: -51 dBm > -51 dBm	Latency (min): 60 ms	Signal: -71 dBm > -67 dBm	Latency (min): 101 ms									
Coord: -29.07228155, 153.34198321 (GPS)	Latency (average): 74 ms	Coord: -29.11941054, 153.43346613 (GPS)	Latency (average): 101 ms	Coord: -28.81377745, 153.27952967 (GPS)	Latency (average): 123 ms									
Address: Cedar Street, Woodburn, Richmond Valley New South Wales, 2472,	Latency (jitter): 27 ms	Address: Evans Head Surf Shack, McDonald Pla Head, Richmond Valley Council, New Sou 2473,	Latency (jitter): 318 ms	Address: Hungry Jacks, 48, Ballina Road, Lismore City Council, New South Wales, 2480,	Latency (jitter): 59 ms									
	Data used: 16.72 MiB		Data used: 9.28 MiB		Data used: 16.33 MiB									

4G+ (LTE-A)	YES OPTUS / Optus Mullumbimby, AU	11/18/22 10:47:00 am	99.45 Mb/s 39.56 Mb/s	50 ms	4G+ (LTE-A)	Optus / Optus Brunswick Heads, AU	11/18/22 10:24:30 am	151.04 Mb/s 3.49 Mb/s	74 ms	4G+ (LTE-A)	YES OPTUS / Optus Pottsville, AU	11/17/22 9:57:36 am	36.97 Mb/s 5.83 Mb/s	29 ms
Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max): 99.45 Mb/s	Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max): 151.04 Mb/s	Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max): 36.97 Mb/s									
ISP: YES OPTUS (505:2)	Download bitrate (average): 63.48 Mb/s	ISP: Optus (505:2)	Download bitrate (average): 112.67 Mb/s	ISP: YES OPTUS (505:2)	Download bitrate (average): 24.12 Mb/s									
Network: Optus (505:2)	Upload bitrate (max): 39.56 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 3.49 Mb/s	Network: Optus (505:2)	Upload bitrate (max): 5.83 Mb/s									
Techno: 4G+ (LTE-A)	Upload bitrate (average): 32.18 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 1.14 Mb/s	Techno: 4G+ (LTE-A)	Upload bitrate (average): 2.80 Mb/s									
Signal: -75 dBm > -73 dBm	Latency (min): 50 ms	Signal: -63 dBm > -65 dBm	Latency (min): 74 ms	Signal: -73 dBm > -75 dBm	Latency (min): 29 ms									
Coord: -28.55620823, 153.49917405 (GPS)	Latency (average): 56 ms	Coord: -28.54081880, 153.35163560 (GPS)	Latency (average): 118 ms	Coord: -28.39005668, 153.56230118 (GPS)	Latency (average): 42 ms									
Address: Dalley Street, Mullumbimby, Byron Shire New South Wales, 2482,	Latency (jitter): 11 ms	Address: Fire and Rescue NSW Station 240 Brunswi 4, Fingal Street, Brunswick Heads, By Council, New South Wales, 2483,	Latency (jitter): 321 ms	Address: Coronation Avenue, Pottsville, Tweed Shire New South Wales, 2489,	Latency (jitter): 21 ms									
	Data used: 62.84 MiB		Data used: 68.86 MiB		Data used: 17.13 MiB									

4G+ (LTE-A)	Optus / Optus Chinderah, AU	11/17/22 9:25:37 am	192.41 Mb/s 23.42 Mb/s	21 ms	4G+ (LTE-A)	Optus / Optus Chinderah, AU	11/17/22 9:25:37 am	192.41 Mb/s 23.42 Mb/s	21 ms	5G (NSA)	YES OPTUS / Optus Tweed Heads, AU	11/17/22 8:55:57 am	35.70 Mb/s 14.36 Mb/s	25 ms
Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max) :	192.41 Mb/s	ISP: Optus (505.2)	Download bitrate (average) :	115.85 Mb/s	Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max) :	35.70 Mb/s	ISP: YES OPTUS (505.2)	Download bitrate (average) :	18.54 Mb/s	Network: Optus (505.2)	Upload bitrate (max) :	14.36 Mb/s
Network: Optus (505.2)	Upload bitrate (max) :	23.42 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average) :	22.18 Mb/s	Network: Optus (505.2)	Upload bitrate (max) :	23.42 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average) :	22.18 Mb/s	Signal: -51 dBm > -51 dBm	Latency (min) :	21 ms
Coord.: -28.23584969, 153.55512221 (GPS)	Latency (average) :	27 ms	Address: Chinderah Village, Chinderah Bay Drive, C Tweed Shire Council, New South Wa	Latency (jitter) :	14 ms	Coord.: -28.23584969, 153.55512221 (GPS)	Latency (average) :	27 ms	Address: Chinderah Village, Chinderah Bay Drive, C Tweed Shire Council, New South Wa	Latency (jitter) :	14 ms	Signal: -51 dBm > -55 dBm	Latency (min) :	25 ms
Data used :	87.41 MiB					Data used :	87.41 MiB					Coord.: -28.17022300, 153.54360420 (GPS)	Latency (average) :	35 ms
												Address: Tweed Heads Visitor Information Cent Street, Tweed Heads, Tweed Shire Cou South Wales, 2485,	Latency (jitter) :	38 ms
												Data used :	18.58 MiB	

4G+ (LTE-A)	Optus / Optus Murwillumbah, AU	11/17/22 1:17:25 pm	74.15 Mb/s 29.54 Mb/s	48 ms	4G+ (LTE-A)	Optus / Optus Kyogle, AU	12/16/22 10:14:33 am	66.43 Mb/s 2.49 Mb/s	39 ms	4G (LTE)	Optus / Optus Tabulam, AU	12/15/22 11:03:41 am	8.13 Mb/s 3.65 Mb/s	64 ms
Server: [AU] Brisbane - 1 Gb/s - VMVault	Download bitrate (max) :	74.15 Mb/s	ISP: Optus (505.2)	Download bitrate (average) :	44.95 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	66.43 Mb/s	ISP: Optus (505.2)	Download bitrate (average) :	57.33 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	8.13 Mb/s
Network: Optus (505.2)	Upload bitrate (max) :	29.54 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average) :	23.14 Mb/s	Network: Optus (505.2)	Upload bitrate (max) :	2.49 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average) :	1.14 Mb/s	Network: Optus (505.2)	Upload bitrate (max) :	3.65 Mb/s
Signal: -67 dBm > -55 dBm	Latency (min) :	48 ms	Coord.: -28.32817750, 153.39833170 (Network)	Latency (average) :	57 ms	Signal: -75 dBm > -71 dBm	Latency (min) :	39 ms	Coord.: -28.62179503, 153.00454325 (GPS)	Latency (average) :	42 ms	Signal: -85 dBm > -85 dBm	Latency (min) :	64 ms
Address: 10, Wollumbin Street, Murwillumbah, Tw Council, New South Wales, 2484,	Latency (jitter) :	18 ms	Data used :	45.18 MiB		Address: Box & Dice Cafe, Stratheden Street, Kyog Council, New South Wales, 2474,	Latency (jitter) :	7 ms	Address: Bruzner Highway, Tabulam, Kyogle Cou South Wales, 2469,	Latency (jitter) :	25 ms	Data used :	5.86 MiB	

Vodafone

4G (LTE)	Vodafone / Vodafone Byron Bay, AU	12/20/22 2:30:49 pm	22.99 Mb/s 21.69 Mb/s	40 ms	4G+ (LTE-A)	Vodafone / Vodafone Newrybar, AU	12/20/22 1:18:09 pm	15.26 Mb/s 7.13 Mb/s	39 ms	4G (LTE)	Vodafone / Vodafone Clunes, AU	12/20/22 12:35:25 pm	2.58 Mb/s 2.55 Mb/s	42 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	22.99 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	15.26 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	2.58 Mb/s			
ISP:	Vodafone (505:3)	Download bitrate (average):	19.41 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	9.87 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	1.73 Mb/s			
Network:	Vodafone (505:3)	Upload bitrate (max):	21.69 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	7.13 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	2.55 Mb/s			
Techno.:	4G (LTE)	Upload bitrate (average):	15.71 Mb/s	Techno.:	4G+ (LTE-A)	Upload bitrate (average):	4.77 Mb/s	Techno.:	4G (LTE)	Upload bitrate (average):	1.67 Mb/s			
Signal:	-65 dBm > -63 dBm	Latency (min):	40 ms	Signal:	-79 dBm > -81 dBm	Latency (min):	39 ms	Signal:	-77 dBm > -79 dBm	Latency (min):	42 ms			
Coord.:	-28.64003148, 153.63599809 (GPS)	Latency (average):	47 ms	Coord.:	-28.71674203, 153.53297614 (GPS)	Latency (average):	347 ms	Coord.:	-28.73129121, 153.40574618 (GPS)	Latency (average):	78 ms			
Address:	Cape Byron State Conservation Area, L Road, Byron Bay, Byron Shire Council, N Wales, 2481,	Latency (jitter):	14 ms	Address:	Newrybar Public School, Broken Hill, Newrybar, Ballina Shire Council, New South Wales, 2479,	Latency (jitter):	23 ms	Address:	Main Street, Clunes, Lismore City Council, South Wales, 2480,	Latency (jitter):	24 ms			
	Data used:	26.05 MiB			Data used:	10.35 MiB			Data used:	2.44 MiB				

4G+ (LTE-A)	Vodafone / Vodafone Bexhill, AU	12/20/22 12:24:23 pm	5.11 Mb/s 1.98 Mb/s	30 ms	4G (LTE)	Vodafone / Vodafone Alstonville, AU	12/20/22 11:52:44 am	15.27 Mb/s 4.59 Mb/s	35 ms	4G+ (LTE-A)	Vodafone / Vodafone Billinudgel, AU	12/19/22 9:49:00 am	37.36 Mb/s 15.16 Mb/s	34 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	5.11 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	15.27 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	37.36 Mb/s			
ISP:	Vodafone (505:3)	Download bitrate (average):	4.40 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	14.10 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	35.04 Mb/s			
Network:	Vodafone (505:3)	Upload bitrate (max):	1.98 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	4.59 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	15.16 Mb/s			
Techno.:	4G+ (LTE-A)	Upload bitrate (average):	0.81 Mb/s	Techno.:	4G (LTE)	Upload bitrate (average):	1.89 Mb/s	Techno.:	4G+ (LTE-A)	Upload bitrate (average):	11.82 Mb/s			
Signal:	-81 dBm > -81 dBm	Latency (min):	30 ms	Signal:	-77 dBm > -79 dBm	Latency (min):	35 ms	Signal:	-87 dBm > -87 dBm	Latency (min):	34 ms			
Coord.:	-28.75609366, 153.39352564 (GPS)	Latency (average):	342 ms	Coord.:	-28.84166354, 153.44002326 (GPS)	Latency (average):	338 ms	Coord.:	-28.50421800, 153.52521705 (GPS)	Latency (average):	44 ms			
Address:	Eltham Hotel, 441, Eltham Road, Eltham Lismore City Council, New South Wales, 2478,	Latency (jitter):	25 ms	Address:	Alstonville (Southbound), Main Street, Alstonville, Ballina Shire Council, New South Wales, 2478,	Latency (jitter):	17 ms	Address:	Billinudgel Long Day Care Centre, O'Donnell Street, Billinudgel, Byron Shire Council, New South Wales, 2483,	Latency (jitter):	13 ms			
	Data used:	3.51 MiB			Data used:	9.97 MiB			Data used:	31.20 MiB				

4G+ (LTE-A)	Vodafone / Vodafone Ocean Shores, AU	12/19/22 9:39:52 am	42.35 Mb/s 4.35 Mb/s	35 ms	4G (LTE)	Vodafone / Vodafone Byron Bay, AU	12/19/22 4:00:10 pm	18.82 Mb/s 23.69 Mb/s	37 ms	4G (LTE)	Vodafone / Vodafone Lennox Head, AU	12/19/22 3:33:25 pm	31.46 Mb/s 8.09 Mb/s	35 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	42.35 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	18.82 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	31.46 Mb/s			
ISP:	Vodafone (505:3)	Download bitrate (average):	39.16 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	14.47 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	26.25 Mb/s			
Network:	Vodafone (505:3)	Upload bitrate (max):	4.35 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	23.69 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	8.09 Mb/s			
Techno.:	4G+ (LTE-A)	Upload bitrate (average):	2.36 Mb/s	Techno.:	4G (LTE)	Upload bitrate (average):	18.96 Mb/s	Techno.:	4G (LTE)	Upload bitrate (average):	5.52 Mb/s			
Signal:	-81 dBm > -77 dBm	Latency (min):	35 ms	Signal:	-53 dBm > -51 dBm	Latency (min):	37 ms	Signal:	-87 dBm > -87 dBm	Latency (min):	35 ms			
Coord.:	-28.52349544, 153.54551952 (GPS)	Latency (average):	46 ms	Coord.:	-28.64132146, 153.60936396 (GPS)	Latency (average):	44 ms	Coord.:	-28.79280529, 153.59396337 (GPS)	Latency (average):	79 ms			
Address:	K Hub, Rajah Road, Ocean Shores, Byron Shire Council, New South Wales, 2483,	Latency (jitter):	19 ms	Address:	Shirley Street, Byron Bay, Byron Shire Council, New South Wales, 2481,	Latency (jitter):	15 ms	Address:	Super Cellars, Pacific Parade, Lennox Head, Ballina Shire Council, New South Wales, 2478,	Latency (jitter):	339 ms			
	Data used:	25.34 MiB			Data used:	23.47 MiB			Data used:	20.60 MiB				

4G (LTE)	Vodafone / Vodafone Ballina, AU	12/19/22 3:18:35 pm	84.43 Mb/s 29.91 Mb/s	35 ms	4G+ (LTE-A)	Vodafone / Vodafone Lismore, AU	12/19/22 1:35:09 pm	69.55 Mb/s 36.38 Mb/s	27 ms	4G (LTE)	Vodafone / Vodafone Wardell, AU	12/19/22 2:15:09 pm	1.54 Mb/s 4.07 Mb/s	35 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	84.43 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	69.55 Mb/s	Server:	[AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max):	1.54 Mb/s			
ISP:	Vodafone (505:3)	Download bitrate (average):	65.92 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	66.87 Mb/s	ISP:	Vodafone (505:3)	Download bitrate (average):	1.13 Mb/s			
Network:	Vodafone (505:3)	Upload bitrate (max):	29.91 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	36.38 Mb/s	Network:	Vodafone (505:3)	Upload bitrate (max):	4.07 Mb/s			
Techno.:	4G (LTE)	Upload bitrate (average):	23.86 Mb/s	Techno.:	4G+ (LTE-A)	Upload bitrate (average):	28.49 Mb/s	Techno.:	4G (LTE)	Upload bitrate (average):	1.45 Mb/s			
Signal:	-51 dBm > -51 dBm	Latency (min):	35 ms	Signal:	-51 dBm > -51 dBm	Latency (min):	27 ms	Signal:	-81 dBm > -81 dBm	Latency (min):	35 ms			
Coord.:	-28.87178837, 153.56375291 (GPS)	Latency (average):	44 ms	Coord.:	-28.80640128, 153.27769702 (GPS)	Latency (average):	37 ms	Coord.:	-28.95251710, 153.46554313 (GPS)	Latency (average):	1227 ms			
Address:	Ballina Courthouse, 18, River Street, Ballina, Ballina Shire Council, N Wales, 2478,	Latency (jitter):	12 ms	Address:	Molesworth Street, Lismore, Lismore City Council, New South Wales, 2480,	Latency (jitter):	16 ms	Address:	Sinclair Street, Wardell, Ballina Shire Council, South Wales, 2477,	Latency (jitter):	18 ms			
	Data used:	59.38 MiB			Data used:	62.64 MiB			Data used:	1.76 MiB				

4G+ (LTE-A)	Vodafone / Vodafone Lismore, AU	12/19/22 1:35:09 pm	69.55 Mb/s 36.38 Mb/s	27 ms	4G (LTE)	Vodafone / Vodafone Pearces Corner, AU	12/19/22 1:21:17 pm	68.46 Mb/s 38.31 Mb/s	29 ms	4G (LTE)	Vodafone / Vodafone Broadwater, AU	12/19/22 11:55:00 am	7.79 Mb/s 4.75 Mb/s	33 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	69.55 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	68.46 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	7.79 Mb/s	ISP: Vodafone (505:3)	Download bitrate (average) :	7.18 Mb/s	ISP: Vodafone (505:3)	Download bitrate (average) :	4.75 Mb/s
Network : Vodafone (505:3)	Upload bitrate (max) :	36.38 Mb/s	Network : Vodafone (505:3)	Upload bitrate (max) :	38.31 Mb/s	Network : Vodafone (505:3)	Upload bitrate (max) :	2.03 Mb/s	Techno.: 4G (LTE-A)	Upload bitrate (average) :	2.03 Mb/s	Techno.: 4G (LTE)	Upload bitrate (average) :	16 ms
Signal: -51 dBm > -51 dBm	Latency (min) :	27 ms	Signal: -51 dBm > -51 dBm	Latency (min) :	29 ms	Signal: -65 dBm > -63 dBm	Latency (min) :	33 ms	Coord.: -28.80640128, 153.27769702 (GPS)	Latency (average) :	336 ms	Coord.: -29.01015466, 153.43580923 (GPS)	Latency (average) :	16 ms
Address: Molesworth Street, Lismore, Lismore City Council, New South Wales, 2480,	Latency (jitter) :	16 ms	Address: WIN Television, 2LM Triple Z, Northern Star Ballina Road, Pearces Corner, Goonellabah City Council, New South Wales, 2480,	Latency (jitter) :	21 ms	Address: Melba's Verandah, Paringa Drive, Br Richmond Valley Council, New South Wal	Latency (jitter) :	16 ms	Data used :	Data used :	5.92 MiB	Data used :	Data used :	5.92 MiB
Data used :	62.64 MiB		Data used :	59.37 MiB		Data used :	59.37 MiB							
4G (LTE)	Vodafone / Vodafone Woodburn, AU	12/19/22 10:04:02 am	1.87 Mb/s 4.65 Mb/s	38 ms	4G (LTE)	Vodafone / Vodafone Evans Head, AU	12/18/22 9:36:21 am	3.34 Mb/s 1.53 Mb/s	33 ms	4G+ (LTE-A)	Vodafone / Vodafone Lismore, AU	11/18/22 1:25:02 pm	35.81 Mb/s 23.10 Mb/s	35 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	1.87 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	3.34 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	35.81 Mb/s	ISP: Vodafone (505:3)	Download bitrate (average) :	28.83 Mb/s	ISP: Vodafone (505:3)	Download bitrate (average) :	23.10 Mb/s
Network : Vodafone (505:3)	Upload bitrate (max) :	4.65 Mb/s	Network : Vodafone (505:3)	Upload bitrate (max) :	1.53 Mb/s	Network : Vodafone (505:3)	Upload bitrate (max) :	19.65 Mb/s	Techno.: 4G (LTE)	Upload bitrate (average) :	19.65 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average) :	35 ms
Signal: -77 dBm > -75 dBm	Latency (min) :	38 ms	Signal: -83 dBm > -81 dBm	Latency (min) :	33 ms	Signal: -61 dBm > -63 dBm	Latency (min) :	35 ms	Coord.: -29.07227512, 153.34199819 (GPS)	Latency (average) :	43 ms	Coord.: -28.81389139, 153.27951253 (GPS)	Latency (average) :	21 ms
Address: Cedar Street, Woodburn, Richmond Valley New South Wales, 2472,	Latency (jitter) :	19 ms	Address: Evans Head Surf Shack, McDonald Pla Head, Richmond Valley Council, New Sou 2473,	Latency (jitter) :	24 ms	Address: Hungry Jacks, 48, Ballina Road, Lismore City Council, New South Wales, 2480,	Latency (jitter) :	21 ms	Data used :	Data used :	32.40 MiB	Data used :	Data used :	32.40 MiB
Data used :	2.91 MiB		Data used :	2.58 MiB		Data used :	2.58 MiB							
4G+ (LTE-A)	Vodafone / Vodafone Mullumbimby, AU	11/18/22 10:46:42 am	55.96 Mb/s 17.82 Mb/s	45 ms	4G+ (LTE-A)	Vodafone / Vodafone Brunswick Heads, AU	11/18/22 10:24:08 am	54.73 Mb/s 4.80 Mb/s	44 ms	4G (LTE)	Vodafone / Vodafone Pottsville, AU	11/17/22 9:57:24 am	10.16 Mb/s 3.53 Mb/s	39 ms
Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	55.96 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	54.73 Mb/s	Server: [AU] Sydney - 1 Gb/s - OVH.com	Download bitrate (max) :	10.16 Mb/s	ISP: Vodafone (505:3)	Download bitrate (average) :	9.11 Mb/s	ISP: Vodafone (505:3)	Download bitrate (average) :	3.53 Mb/s
Network : Vodafone (505:3)	Upload bitrate (max) :	17.82 Mb/s	Network : Vodafone (505:3)	Upload bitrate (max) :	4.80 Mb/s	Network : Vodafone (505:3)	Upload bitrate (max) :	1.99 Mb/s	Techno.: 4G+ (LTE-A)	Upload bitrate (average) :	1.99 Mb/s	Techno.: 4G (LTE)	Upload bitrate (average) :	39 ms
Signal: -65 dBm > -69 dBm	Latency (min) :	45 ms	Signal: -73 dBm > -71 dBm	Latency (min) :	44 ms	Signal: -81 dBm > -79 dBm	Latency (min) :	638 ms	Coord.: -28.55619415, 153.49919539 (GPS)	Latency (average) :	638 ms	Coord.: -28.38999690, 153.56228190 (GPS)	Latency (average) :	19 ms
Address: Dalley Street, Mullumbimby, Byron Shire New South Wales, 2482,	Latency (jitter) :	5 ms	Address: Fire and Rescue NSW Station 240 Brunswick 4, Fingal Street, Brunswick Heads, By Council, New South Wales, 2483,	Latency (jitter) :	15 ms	Address: Coronation Avenue, Pottsville, Tweed Shire New South Wales, 2489,	Latency (jitter) :	7.34 MiB	Data used :	Data used :	7.34 MiB	Data used :	Data used :	7.34 MiB
Data used :	36.68 MiB		Data used :	29.03 MiB		Data used :	29.03 MiB							

4G (LTE)	Vodafone / Vodafone Kingscliff, AU	11/17/22 9:33:19 am	37.40 Mb/s 21.11 Mb/s	34 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Vodafone (505.3)			
Network:	Vodafone (505.3)			
Techno:	4G (LTE)			
Signal:	-77 dBm > -75 dBm			
Coord:	-28.25693449, 153.57810240 (GPS)			
Address:	Seaview Street, Kingscliff, Tweed Shire Cou South Wales, 2487,			
				32.44 MiB
4G (LTE)	Vodafone / Vodafone Chinderah, AU	11/17/22 9:25:25 am	100.68 Mb/s 5.41 Mb/s	31 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Vodafone (505.3)			
Network:	Vodafone (505.3)			
Techno:	4G (LTE)			
Signal:	-59 dBm > -63 dBm			
Coord:	-28.23584515, 153.55504769 (GPS)			
Address:	Chinderah Village, Chinderah Bay Drive, C Tweed Shire Council, New South Wa			
				50.83 MiB
4G+ (LTE-A)	Vodafone / Vodafone Tweed Heads, AU	11/17/22 8:55:30 am	62.76 Mb/s 35.54 Mb/s	46 ms
Server:	[AU] Brisbane - 1 Gb/s - VMVault			
ISP:	Vodafone (505.3)			
Network:	Vodafone (505.3)			
Techno:	4G+ (LTE-A)			
Signal:	-51 dBm > -55 dBm			
Coord:	-28.17012820, 153.54359910 (Fused)			
Address:	Tweed Heads Visitor Information Cent Street, Tweed Heads, Tweed Shire Cou South Wales, 2485,			
				48.13 MiB
5G (NSA)	Vodafone / Vodafone Murwillumbah, AU	11/17/22 1:17:19 pm	103.85 Mb/s 50.65 Mb/s	48 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Vodafone (505.3)			
Network:	Vodafone (505.3)			
Techno:	5G (NSA)			
Signal:	-73 dBm > -71 dBm			
Coord:	-28.32807820, 153.39824720 (Fused)			
Address:	10, Wollumbin Street, Murwillumbah, Tw Council, New South Wales, 2484,			
				80.38 MiB
4G (LTE)	Vodafone / Vodafone Kyogle, AU	12/16/22 10:13:55 am	6.18 Mb/s 3.82 Mb/s	37 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Vodafone (505.3)			
Network:	Vodafone (505.3)			
Techno:	4G (LTE)			
Signal:	-57 dBm > -57 dBm			
Coord:	-28.62165730, 153.00378190 (Network)			
Address:	Box & Dice Cafe, Stratheden Street, Kyog Council, New South Wales, 2474,			
				3.82 MiB
4G (LTE)	Vodafone / Vodafone Tabulam, AU	12/15/22 11:03:20 am	6.14 Mb/s 0.45 Mb/s	55 ms
Server:	[AU] Sydney - 1 Gb/s - OVH.com			
ISP:	Vodafone (505.3)			
Network:	Vodafone (505.3)			
Techno:	4G (LTE)			
Signal:	-85 dBm > -85 dBm			
Coord:	-28.88708060, 152.56762300 (Network)			
Address:	Bruxner Highway, Tabulam, Kyogle Cou South Wales, 2469,			
				4.00 MiB