



*The rugged remoteness of Great Barrier makes it difficult to connect to the rest of New Zealand
(Photo: Mark Russell)*

The challenge to connect the remote corners of New Zealand

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Russell Brown goes off the grid on Great Barrier Island to see out what it takes to get the local community online and connected.

In the lead-up to Christmas on Aotea Great Barrier Island, locals were bracing for the deluge.

Every holiday season, the island's permanent population of around 900 multiplies and this summer, with foreign travel off the agenda, it was predicted it could increase by tenfold. Visitors' spending will flow into the bank accounts of Great Barrier's public-facing businesses, but their owners might not always be in a position to log in and check their balances. Because the summer rush will, without a doubt, bring down the off-the-grid island's fragile internet. And the mobile phone network. And, critically, the eftpos machines that are supposed to take the money.

Challenges are not unique to the Barrier. Connecting remote communities to the rest of New Zealand is a hard, but essential task. The isolation and intimacy of these communities are what makes these places unique and special, but it also makes building digital infrastructure incredibly challenging.

From towns on the West Coast, to farms in the Far North, and communities hidden in dense native bush, there's a demand and need for the internet. But our rugged landscape means connections can be temperamental or sometimes non-existent.

The continual investment in digital infrastructure is a huge commitment. It often requires creating a partnership between Crown and private communication companies to try and reach into the far corners of New Zealand to keep these communities connected and functioning.

People on Great Barrier need connectivity more than the rest of us on the mainland
(Photo: Mark Russell)



I was invited on a visit to Great Barrier by Vodafone to explore the island's communications infrastructure. We arrived on a half-hour flight from North Shore aerodrome, passing over the backlog of container ships idling while they awaited their turn at Auckland's port. From the air, Aotea seems both distant – it marks the far edge of the Hauraki Gulf – and closer than you think. Geographically, it's an extension of the Coromandel peninsula, with its steep, craggy slopes jutting from the sea. From an infrastructure perspective, the island is fully off-the-grid, with residents needing solar panels and water tanks, and non-perishable groceries are bought over by the car ferry or air from the mainland.

Residents have had some form of communication with the mainland since 1897, when the Pigeon Post service was established in the wake of the wreck of the SS Wairarapa, which cost 121 lives when the steamer struck Miners Head, the north-west point of Great Barrier Island, and is still regarded as one of New Zealand's worst maritime disasters. A telegraph cable was laid across the Colville channel from the Coromandel in 1908. But now all the links are

wireless, and getting 21st century internet and mobile phone access to the remote community of Great Barrier is a real challenge.

We'd barely touched down at the aerodrome in Claris when we discovered that in the 2020s, Barrier people think a lot about connectivity and how to get it.

The manager of the airport's information centre has become used to visitors' questions about internet and mobile connectivity (her standard answer is "log off, you're on holiday"). At home, on Medland Road on the way to Tryphena, she doesn't have any herself.

"We've got nothing," she said, while acknowledging she didn't move to Great Barrier Island to spend her days streaming videos. "We had the option of getting satellite installed, but considering it was a rental, we felt it wasn't really worth it. Tryphena itself has really good connectivity, but we're up further in a valley, which is a bit of a black spot. It's not a major for me, but my partner is self-employed and he needs connectivity."

Residents need solar panels and water tanks, and non-perishable groceries are bought over by the car ferry or air from the mainland. (Photo: Mark Russell)

Indeed, people on Great Barrier need connectivity more than the rest of us on the mainland. While the isolation and disconnection is part of the appeal of life on Aotea, connection to the rest of the world is also essential to survival.

"We can't just walk down the road and grab stuff. Everyone has to order in bulk groceries, building supplies, anything to do with freight. If you want a test pot of paint, you have to order it online or call someone."

Still, she shrugged, it wasn't the end of the world.

"The island keeps you busy. If you're watching Netflix you're doing something wrong."

Thaigan Govender, the Vodafone engineer along on the trip, listened and suggested that a long rooftop pole might help her and her husband catch the signal she said was available a few hundred metres from their house.

Before we left the airport, Govender did a speed test on his phone. The result looked great: better than 50mbit/s, the kind of speed you'd be happy with in, say, Point Chevalier. But there's a catch, and it's at the Okupu tower that overlooks the Claris settlement.

Vodafone built the tower in 2013 with funding from the government's Rural Broadband Initiative (RBI). It was the most expensive cell tower of the programme and it relies on a microwave backhaul to the mainland that is operated by Chorus. The backhaul link – also used by other mobile operators and a cluster of small wireless internet providers using public spectrum – is only 100Mbit/s and on parts of the island that enjoy 4G mobile service, it's this inbound link that limits the speed customers get.

Govender opened Vodafone's cabinet at the foot of the tower to show the racks where the boxes that handle Vodafone's 3G and 4G services. There's spare room there and Vodafone could at some point slot in a 5G box, which would shorten the range but improve the speed and reliability of fixed wireless and mobile services on the island. But that's not really an option until there's a much faster connection to the mainland.



Thaigan Govender explaining what's in the Claris cabinet
(Photo: Nicky Preston)

Another challenge is evident up on the hill. Like many remote areas, Great Barrier Island has no electricity grid. The 3000 watts the site needs to run comes from two big batteries backed up by solar panels, a wind turbine and, when necessary, a generator.

Back down in Claris, the Great Barrier local board office does have power. Thanks to a council grant, it's fully solar and forms a "micro-grid" with the island's medical centre. There's even an EV charging station, and board chair Izzy Fordham arrived to meet us on an e-bike. She was worried about how Great Barrier's businesses were going to handle the influx of summer visitors.

Unlike, say, Whangamata, which faces similar summer challenges yet has seen public objections to cell towers and even the intervention of the local council, it seems there are few if any objections to more infrastructure on Great Barrier.

"People are hungry and have an appetite for better internet and cell coverage," said Fordham. "It's intermittent and it collapses and as we're coming into the busy time now for us, this is when it's under the greatest pressure. Every pub, shop, gas station – everyone's got eftpos now. We're becoming more cashless, which makes it quite difficult in summer."

Our next visit was to Ray Twomey, whose firm Great Barrier Cartage hauled the parts up the hill for the Okupu tower in 2013. He retains an interest in the company but is retired now. He still has a pretty good view of the tower from his home in Kaitoke and is happy with the service he's getting via Farmside, the Timaru-based RBI provider acquired by Vodafone in 2017.

He switched to terrestrial wireless from Farmside's satellite product a couple of years ago and his connection is good and largely reliable.

"I don't have any complaints about Farmside; it works most of the time," he said. "We watch Netflix. Sometimes it slows down a bit if you get a long weekend."



Not much service here (Photo: Mark Russell)

He did, however, have a problem configuring the call diversion on his new modem. Govender disappeared indoors to sort it out.

Our last customer to be visited, Steve Jenkins, runs a furniture business in Vietnam from their house on the beachfront at Medlands when he and his wife Anne aren't at their apartment at the Viaduct.

They're also happy Farmside customers ("The service has been Triple-A. They know where Great Barrier is, for a start.") but Vodafone mobile coverage can be spotty. They have some signal out on the road and in the master bedroom at the back of the house, but nowhere in the long, elegant living area and bedrooms in between due to the position of the cell tower on the hill and the island's undulating landscape. Govender followed Steve around the property and eventually recommended a \$1200 device that should sort out the mobile issue.

Determining a broader fix for all residents is complicated and the economics of building costly digital infrastructure in rural or remote areas doesn't often stack up, either for the mobile operators or the individual users. This is where government-funded programs like the RBI step in. Geography and history mean islanders are served by a hotchpotch of different services, all of them available in some places and not others. There are six different microwave connections to the island, half of them operated by Chorus, and six cell towers. Claris is one of two spots on Great Barrier with a small copper network. It's said to be the system built for the 1990 Commonwealth Games village, shipped over to the island after the event, but that has its own issues. When it's all going well, customers can expect the kind of DSL speeds the rest of us had in the year 2005. But the Chorus radio link carrying DSL and voice calling to and from the mainland is limited and Aotea is a rugged place to maintain lines, which sometimes fail when it rains.



Local community board chair, Izzy Fordham with Thaigan Govender
(Photo: Nicky Preston)

When the network fails, the board cops it. But Fordham does have one ace. Sometimes local resident Rohan MacMahon – now a consultant – formerly worked for Crown Infrastructure Partners, the state-owned company that manages the government's \$1.7 billion investment in broadband fibre. His wife's family have been visiting Okiwi on Great Barrier since the 1930s and he has his own family connection to the place. He's Australian, but his great grandfather washed up on the island after the SS Wairarapa shipwreck in 1894, not far from where his family stays now, tying him not just to the place but its communications history.

"I feel for Vodafone and the others", said MacMahon. "I've got a mobile phone that I take with me to the Barrier and I'm paying Vodafone the same amount of money whether that service works on Barrier or not. So they don't get any extra revenue from me just because I

go to the Barrier. It's not like they sell any more phones or bigger plans just because they extend the coverage. It can be hard to make a business case.

In 2018, he wrote a report for the board outlining the island's connectivity problems. "There's a real impact on business productivity," MacMahon said. "Every small business on the Barrier is impacted by lousy connectivity. And it's non-trivial. With Netflix and YouTube, you can argue that people come to the Barrier to get away from all that, but if you're a tourism operator and you can't take orders or do your accounts, then you have a pretty fundamental problem."



You don't come here to watch Netflix (Photo: Mark Russell)

Although its situation is particularly acute, Great Barrier isn't the only place facing these problems. The same things that attract visitors – isolation and dramatic landscapes – can also make mobile delivery difficult. Residents and business owners on the West Coast of the South Island recently complained about yawning black spots in their mobile coverage.

But it's more than just the business community that the internet provides a vital connection for. "With the population skewing older you're also looking at more health conditions," said MacMahon. "The health centre in Claris probably has one of the better set-ups on the island, but I've got a friend who lives in our valley who, as far we know, is the only person who's been on dialysis while not being connected to the electricity grid, let alone the internet."

A survey MacMahon conducted found, unsurprisingly, that nearly everyone on Great Barrier has a mobile phone but nearly a quarter of people reported having no mobile service at home. Half of the residents surveyed described mobile service on the island as "poor" and a further 20% said it was "very poor".

He did identify a few quick wins, including Vodafone upgrading two repeater stations: one in Medlands and the other in Okiwi in the north of the island which is a particular problem area. Vodafone has plans to upgrade the Medlands repeater to 4G in the first half of 2021 and is already in the process of upgrading its site on Motu Kaikoura where site rentals from both it and Spark fund the small island's nature reserve. But this all costs money, the consents take a long time and the investment might not necessarily be returned.



The Claris cell site and electricity generator on the right (Photo: Nicky Preston)

Even when Vodafone upgrades its Medlands repeater to 4G, service will still be subject to the backhaul capacity of the Okupu tower it relays from. Chorus, which could upgrade the link to the tower, has not responded favourably to the local board's entreaties to do so. Might the government come to the party again?

The government has said that further funding could be available. Just over a hundred million is available nationally as part of RBI2, the second tranche of the Rural Broadband initiative launched by the last National government, plus a further \$40 million from the Provincial Growth Fund. Funding was approved in late 2018 and included Great Barrier in its scope. More recently, during the election campaign, the Labour Party pledged a further \$60 million towards improving internet connectivity in rural areas, including on Auckland's fringes.

But no further details on specific upgrades or coverage areas for Aotea have been announced since. Budgeting is not the same as building, and at this stage only half of the towers promised by the previous government to fill in black spots are built. Furthermore, the RBI2 and Mobile

Black Spots Fund (MBSF) programmes require five years to achieve the volume of new sites required.

The last big investment on Great Barrier was the Okupu/Claris tower in 2013, with cell sites added at Medlands and Okiwi in 2014 and 2016, via a partnership between the Great Barrier local board, Auckland Council, Vodafone and the Department of Conservation. Each was justifiably claimed as a win by then Auckland Central MP Nikki Kaye, but it's hard to escape the fact that Great Barrier is falling behind not just the rest of the electorate – Waiheke Island now has two fibre connections to the mainland – but the rest of the country. Auckland Central's new MP Chloe Swarbrick visited Great Barrier a few days before we did and you can guess what she heard about.

Great Barrier isn't the only area where services installed as part of the first RBI rollouts nearly a decade ago are hitting capacity limits. The Wairarapa doesn't have a stretch of water between itself and the rest of the country, but it's essentially in the same boat with demand for connectivity far outstripping supply.

"You see this all over Aotearoa," said Govender. "A lot of Kiwis are facing similar challenges to what we see on Great Barrier Island, from towns on the West Coast to farms in Northland and houses located behind dense native bush. Internet connections can be temperamental or in some cases non-existent. Our isolation and sparse population offer many benefits, but it also makes building digital infrastructure challenging.

"We invest hundreds of millions of dollars each year into new or existing connectivity, both in our cities and all over regional New Zealand, but the business case needs to stack up, meaning remote areas can pose a challenge, especially because remote areas are more costly to build in."

The upshot is a country on two different tracks for connectivity. Waiheke has its two fibre links to the mainland, but you only need to look at the Chorus broadband map to see that there are swathes of the land without even the minimum of rural service. Labour's 2018 funding announcement identified 1400km of state highways, 80,000 households and 159 tourist areas that needed mobile coverage.

In a column last year Vodafone CEO Jason Paris wrote optimistically of the potential benefits of 5G mobile service in urban areas but cautioned that even with "sensible infrastructure sharing" by the three mobile service providers, continued public investment will be required to make digital services available to all New Zealanders and close the urban-rural digital divide.

There are upsides: the Rural Connectivity Group, which brings together the mobile providers and Crown Infrastructure Partners, which manages the public's investment, is a good model that demonstrates how industry collaboration on deploying infrastructure can deliver results. And, Paris wrote, the accessibility and relative affordability of digital services compares well to the "dire infrastructure situations across the country – be it roads, rail or water."



The local store in Claris pays tribute to the Pigeon Post established in 1897
(Photo: Mark Russell)

On the other hand, you can't move for headlines about broken sewers in Wellington. The voices of New Zealanders further from the seat of power, who want services the rest of us take for granted, can be harder to hear.

Aside from the island's more obvious charms, a day on Great Barrier has provided an insight into the challenges those New Zealanders face. We had a little time before we needed to fly home, so we took a look at the community art gallery in Claris. Alongside the art, there's a striking range of locally-made natural products for sale.

I chose a little pot of the Aotea Company's kawakawa balm and handed over my card. The wireless eftpos transaction went through quickly and smoothly. This time.

This story was created in paid partnership with Vodafone.