WHITEPAPER

Testing Tech in Paradise

Unleashing next generation digital services:
Sunshine Coast's urban testbed

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ACKNOWLEDGEMENT OF TRADITIONAL CUSTODIANS

Sunshine Coast Council acknowledges the traditional Country of the Kabi Kabi peoples and the Jinibara peoples of the coastal plains and hinterlands of the Sunshine Coast and recognises that these have always been and continue to be places of cultural, spiritual, social and economic significance. We wish to pay respect to their Elders – past, present and emerging – and acknowledge the important role Aboriginal and Torres Strait Islander people continue to play within the Sunshine Coast community.

ACKNOWLEDGEMENTS

Council wishes to thank all contributors and stakeholders involved in the development of this document.

This document has been printed on environmentally responsible paper.

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EXECUTIVE SUMMARY

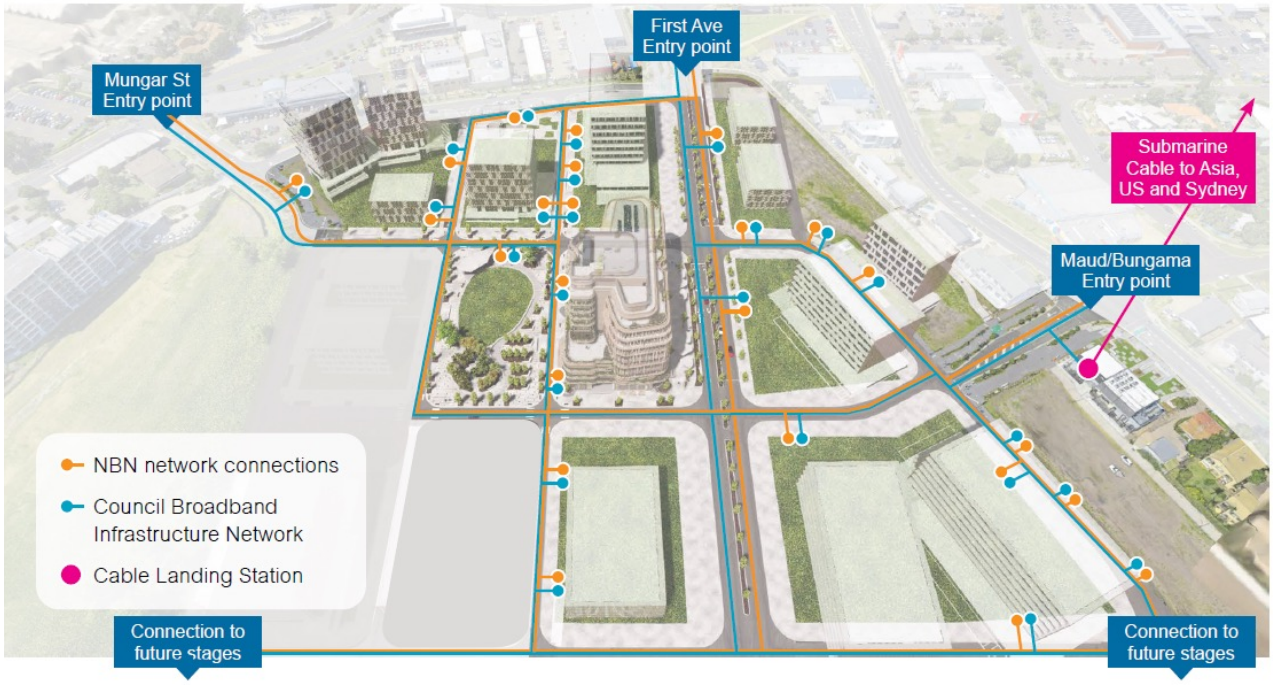
The digital services of tomorrow will demand bandwidth, response times and accuracy that are beyond the capabilities of today's data networks.

The newly developed Maroochydore City Centre has been purposely designed to incorporate the latest in data networking technology, including a city-wide deployment of fibre broadband, with Wi-Fi 6 and LoRaWAN wireless network access points, and pole infrastructure.

This infrastructure presents a glimpse into the future of smart city environments around the world and provides a unique urban testbed environment for new digital services. This makes the Sunshine Coast the ideal location for testing and trialling next generation digital services.

One specific industry well positioned to take advantage of these capabilities is sports, where the combination of high speed wireless and geospatial services present opportunities for services relating to the management of people and services, monitoring of athlete's performance, and for enhanced communications and fan engagement.

"The growth of Queensland's sportstech economy has seen the development and commercialisation of new concepts which are transforming the world of sports in our State." Treasurer and Minister for Trade and Investment, Cameron Dick



INTRODUCTION

The combination of high speed wireless networks, geolocation services and powerful portable digital devices is enabling service providers to communicate with businesses or consumers in innovative new ways. These services are using high definition audio and video streams and location-based services to revolutionise industries and consumer behaviour and creating meaningful new business opportunities and consumer experiences.

The impact of these new services is being felt across a broad range of industries, including transport and logistics, sports, tourism and leisure, health and aged care, utilities and infrastructure plus many more.

Although technology has made remarkable progress, limitations in existing data network technologies have restricted the development and uptake of many leading-edge services. For example, cellular wireless networks have been prone to congestion during periods of high demand and create small delays between sending and receiving information (often referred to as latency) which can prove significant for some applications.

Geolocation services utilising satellite or mobile network base stations can fall short in providing the required accuracy for certain applications. This is particularly prevalent in dense urban areas or when a mobile device is in motion. This can be problematic for operators of autonomous vehicles, where the vehicle might need a very precise understanding of its location when operating autonomously, or when the vehicle's operator wants to operate the vehicle by remote control.

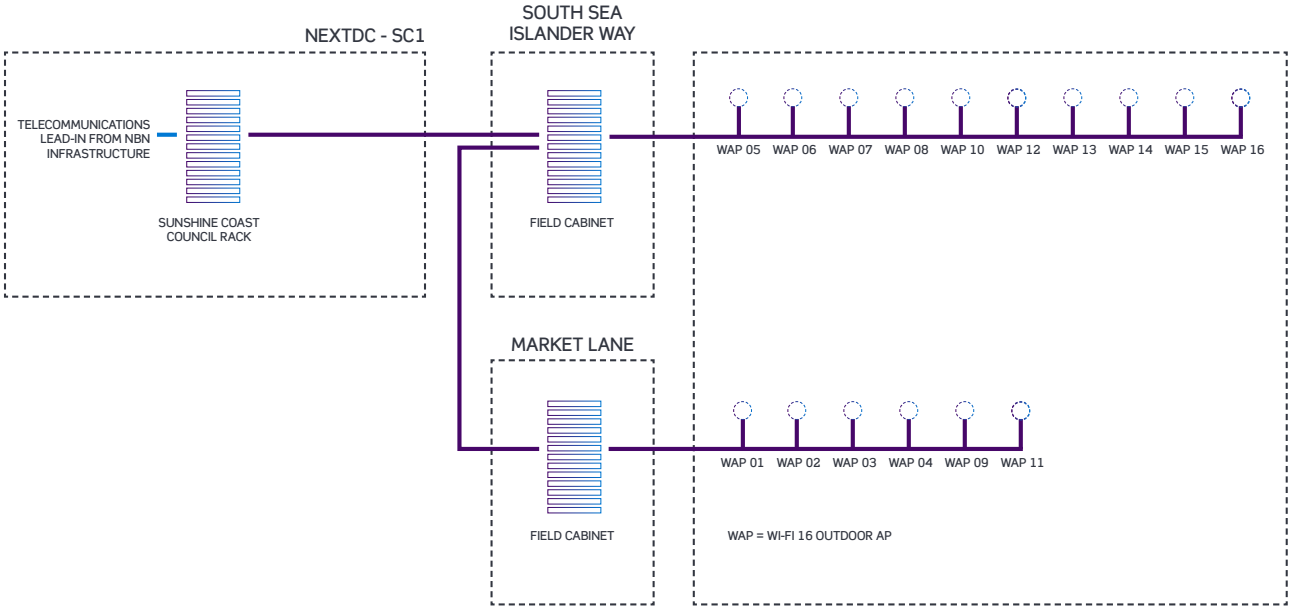
Inevitably, business and consumer customers will demand services that are faster, more responsive, and more precise. That means new data network technologies are needed.

Thankfully, the story of technology is one of constant progress and in many instances, technology has been developed that helps overcome these limitations. For example, the latest generation of Wi-Fi network technology, known as Wi-Fi 6, solves many of the challenges of existing wireless networks when it comes to latency and network congestions.

However, in Australia we are yet to see significant deployment of this technology, especially in large scale urban environments. For digital service creators, who often succeed through being first to market with new ideas, this limited rollout has restricted their ability to test out the possibilities of Wi-Fi 6 and related technologies in real world environments.

Sunshine Coast Council's Smart City Framework has identified the benefits that can flow from being early adopters of these new network technologies and the opportunities they create for local businesses to be cutting-edge creators and users of technology. That's why the new Maroochydore City Centre was designed with next gen digital connectivity at its core. The city-wide deployment of cutting-edge digital infrastructure, including fibre broadband, Wi-Fi 6, LoRaWAN wireless network access points and multi-function pole infrastructure, makes the Sunshine Coast the perfect location for testing next gen technology.

Maroochydore City Centre stage one digital infrastructure



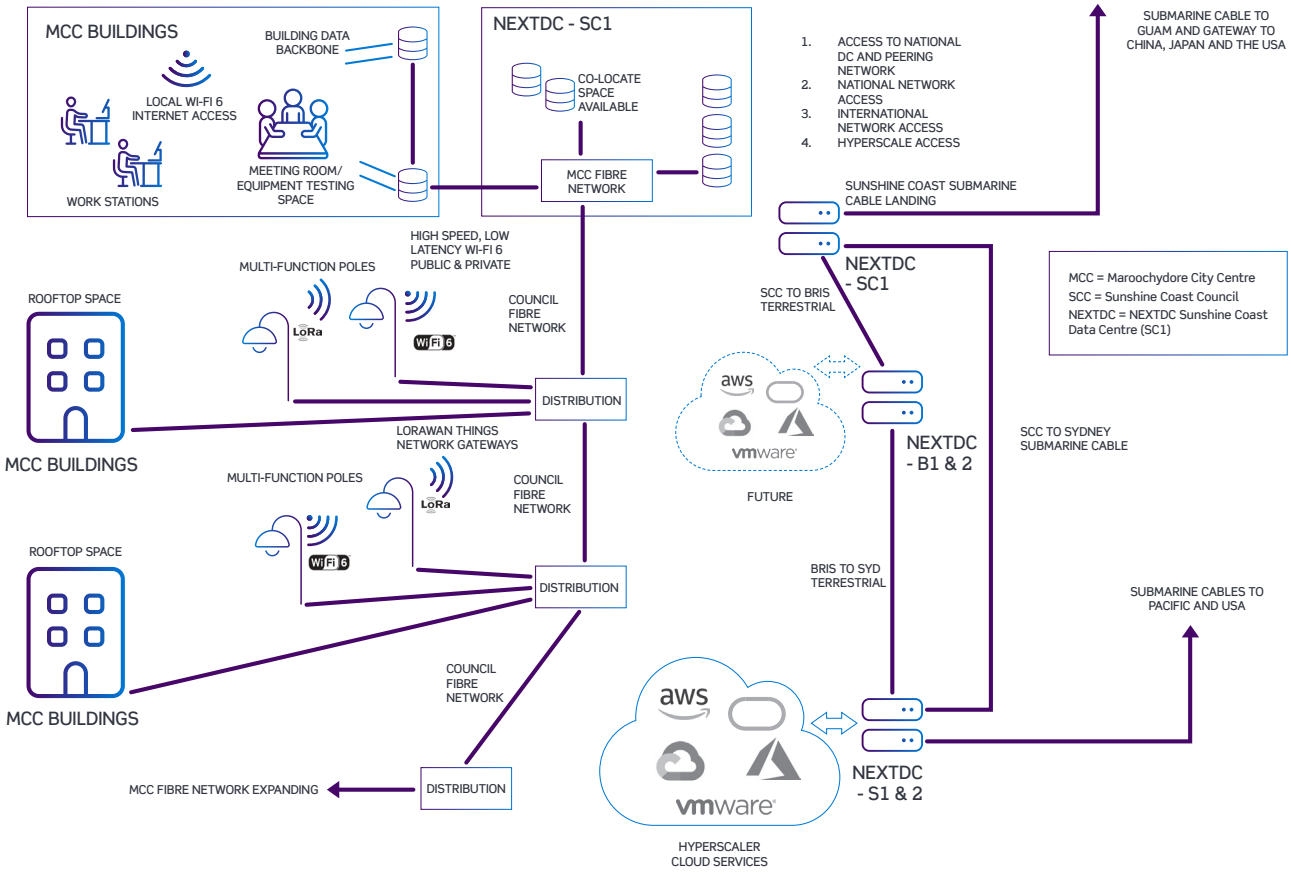
Maroochydore City Centre has next generation digital connectivity at its core.

The Maroochydore City Centre digital network consists of:

- A city-wide deployment of Wi-Fi 6 networking technology offering speeds of up to 50Mbps with 5 to 10 millisecond latency, which is ideal for streaming high demand audio and video content and enabling precise location services. This network is deployed across 18 access points covering 80% of the road reserve in the current development area and provides both public and private network services.
- A LoRaWAN network providing low power data network connectivity covers almost 100% of the development area. This network is ideal for the deployment of internet-of-things applications such as sensors.
- 54 multi-function poles, each with 6 fibre connections, with each able to host a range of additional network devices.
- A fibre network throughout the entire city centre, including connections to all smart poles in addition to commercial and government buildings.
- Direct connection to NEXTDC's Sunshine Coast Data Centre (SC1), with onwards connections to the NEXTDC peering services and the international subsea broadband data submarine cable.
- Access to newly constructed Sunshine Coast Council City Hall, including hot desk and meeting room facilities as well as access to high speed network services.

This combination of technologies and infrastructure provides the ideal environment for testing next generation digital services in an urban environment. The proximity of the city centre to the Sunshine Coast International Broadband Network (SCIBN) cable landing station and NEXTDC's SC1 data centre provides unparalleled options for low latency connectivity between city-based services and destinations in Asia and North America.

Note that usage of infrastructure and services is subject to a commercial agreement.



The combination of technologies and infrastructure in Maroochydore City Centre (MCC) provides international, national and local service and support to test next-gen digital services in an urban environment.

USE CASES

The Maroochydore City Centre offers opportunities to trial next generation digital services across a wide range of industry sectors. The possibilities are limitless, but early examination has identified a number of possible use cases that could benefit from the network's infrastructure. Examples include:

Sporting events

- *Crowd management:* There is a significant opportunity to better understand and manage the movements of large crowds within and between events using the signals generated by mobile devices. Combined with the presence of a Wi-Fi 6 network, this provides options for testing new modes of communication which are less likely to experience the congestion effects generated by crowds of people when using cellular network technologies. This presents new options for managing crowd movement in real time using location-specific communication, including the ability to alert people to the movements of emergency services, while also creating new options for entertainment services to alleviate boredom and frustration for people who are waiting for venue access or transport services.

Transport management

- *Real-time asset tracking:* The combination of Wi-Fi 6 and LoRaWAN networks offers a unique opportunity to collect vehicle telemetry data at different levels of detail. With real-time access to this data, network managers can create a full digital twin of an entire urban environment. This model can then be used for managing the transport network, while the ability to model the network with high accuracy in software also creates the opportunity to safely test different scenarios based on real world data.

Utilities infrastructure maintenance

- *Augmented reality and on-demand learning:* The complexity and variations of equipment used by modern utilities businesses can make life difficult for repair technicians. Training people to work on every variation of equipment can be expensive, time consuming and ultimately unwarranted in those instances where specific equipment is rarely used. One alternative is to employ on-demand learning, using a technology concept called augmented reality and smart glasses to overlay information into a technician's field of vision. The combination of image recognition technology with high speed, low latency bandwidth enables the development of very precise augmented reality services that present highly detailed information to the field technician. Alternately, they can use the smart glasses to relay what they are seeing to a remote location where it can be viewed by a more experienced technician. The use of precision location services also ensures technicians can more easily find the equipment they have been asked to service.

Logistics and deliveries

- *Autonomous vehicles:* One of the most expensive and complicated aspects of any logistics network is the so-called 'last mile' of pick up or delivery. Unmanned autonomous vehicles (UAVs) hold great promise to revolutionise this last mile by enabling low cost solutions. While numerous solutions have been trialled, none have achieved mainstream uptake, in part due to the problems that urban environments present when it comes to navigation and the need for reliable communication between the UAV and its operator. The combination of high bandwidth communications and precise location service using Wi-Fi 6 presents an opportunity to test new ways of operating UAVs in a controlled environment.

Urban transport

- *Geofencing and pedestrian safety:* Micro mobility services such as escooters and electric bikes present new options for sustainable urban mobility. However, these devices are often used in areas of high pedestrian and vehicular traffic, and the need to keep both riders and pedestrians safe has led service providers to place limitations on the speed of their devices. This speed can be controlled automatically based on the device's location using a technology known as geofencing. This works by determining the device's specific location, such as whether it is on a road or a shared pathway and setting its speed according to predetermined rules. Geofencing requires highly accurate positioning data, which can be hard to achieve in urban environments using satellite GPS services or signals from mobile phone towers. Testing geofencing services using the Wi-Fi 6 network in the Maroochydore City Centre provides a unique opportunity to understand the possibilities of this technology, while also providing a high speed communication channel to the riders.

Travel and tourism

- *Digital wayfinding:* Exploring new locations can be exciting but can also be challenging for people with disability or culturally and linguistically diverse people. The combination of high speed bandwidth and accurate location services creates the opportunity to provide very accurate wayfinding services directly to people's mobile devices, such as augmented reality solutions which can provide information about a person's immediate environment using symbols or their preferred language. Another option is to combine location services with a device's haptic capabilities. This can provide an additional layer of communication, such as causing the device to vibrate when its user takes a wrong turn or alerting someone with low vision or blindness when they have arrived at a pedestrian crossing.

Crowd management

- *Ubiquitous broadband communication in congested environments:* Major events such as concerts and sporting events often involve the movement of large groups of people. With real-time monitoring of mobile devices, it's now easier to track crowd movement and identify pinch points or blockages in busy areas. By leveraging this data and using mobile messaging, it's possible to redirect people to less congested areas and ease overcrowding. This will be critical for major sporting events such as the 2032 Olympic and Paralympic Games, which will create unprecedented need for the management of large volumes of people for a short duration event, including the requirement to provide rapid access for emergency services. In all instances such needs will be well served using reliable and location-specific communications technologies.

Remote collaboration

- *High definition virtual reality:* Recent years have seen many Australians become accustomed to holding meetings using network-based videoconferencing. However, these systems rarely match the experience of being there in person. One solution is to utilise virtual reality solutions which place all participants in a shared virtual environment. These services require high bandwidth to create a visually appealing experience and demand low latency to eliminate lag in the video and audio signals. While many services are currently being tested and trialled in indoor scenarios, the Maroochydore City Centre provides options for testing these outdoors.

Aged care

- *Remote health monitoring:* The quality of life of older Australians can often by enhanced by enabling them to retain their autonomy outside of a care facility. However, cognitive and physical impairments can increase the risks they face when moving through urban environments. By creating services that combine body-worn sensors with the Maroochydore City Centre's high speed wireless network and precision location services aged care service providers gain the opportunity to better monitor the movement of customers in a city environment. For example, by monitoring data from body-worn sensors a service provider might quickly identify patterns of movement that indicate a wearer is at risk, such as if they are detected as being on a roadway or having suffered a fall, or if their health data being streamed from their device indicates they are experiencing a medical emergency. This information may be used to trigger an audio or video call over the wireless network, or to dispatch a responder to the customer's location with a high degree of accuracy.

Sports and entertainment

- *Fan engagement:* The availability of high speed wireless data services creates new opportunities for capturing sound and vision from sporting events, through the use of portable cameras including drones and other mobile systems. Enhanced opportunities for attendees to both record and stream their personal experience, or directly tap into different perspectives being streamed from events, can be created. Traditionally one of the side effects of large numbers of people using mobile services in a small area is the tendency to overwhelm the available bandwidth. Using Wi-Fi 6 in an urban environment enables the simulation of mass events and subsequent testing of new services, such as providing attendees with different views of the event streamed directly their devices, or enabling them to stream their own experiences live to friends, families and followers. The ability to test different services in a high bandwidth location will be important in the lead up to the 2032 Olympic and Paralympic Games, given the likelihood that higher resolution video formats will be in use by that time, including the recording and streaming of virtual reality experiences as well as possible use of holographic technologies.

These use cases are just a sample of what might be made possible using the infrastructure deployed at Maroochydore City Centre.

Testing Tech in Paradise: The Connected Worker pilot program.

Some of these concepts have already been tested on the Sunshine Coast in the 'Testing Tech in Paradise: The Connected Worker' pilot program. This pilot program set out to test new techniques for conducting field equipment audits – a task which traditionally required up to three people on site to conduct manual inspections and log the results. The trial equipped field technicians with augmented reality headsets connected to the Maroochydore City Centre Wi-Fi 6 network. The trial proved successful in terms of using the equipment deployed to accurately identify underground infrastructure within the city centre and then automatically logging these activities in a remotely hosted asset management system. This reduced the number of technicians and the time taken to perform the same actions using conventional processes.

The opportunities for new digital services are endless, but success in this highly competitive field often depends on getting new services to market quickly. The combination of the next generation digital infrastructure of the Maroochydore City Centre and the high speed broadband cable presents a unique opportunity to test new services using a highly responsive, and precise network deployed in a wide scale urban environment.

As part of the trial, The AVR Lab produced a comprehensive report. The results suggest an ROI of 254% over 1 year and payback in approx. 5 months.

In addition, The AVR Lab propose the following benefits including: improved training and education, increased efficiency and productivity, increased safety and competitive business advantages.

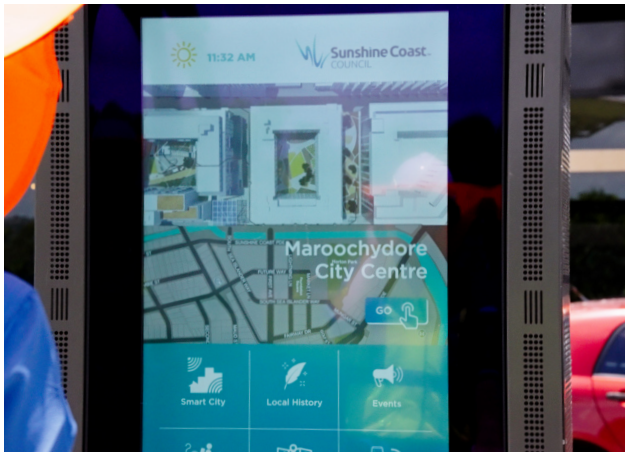
TESTING TECH IN PARADISE

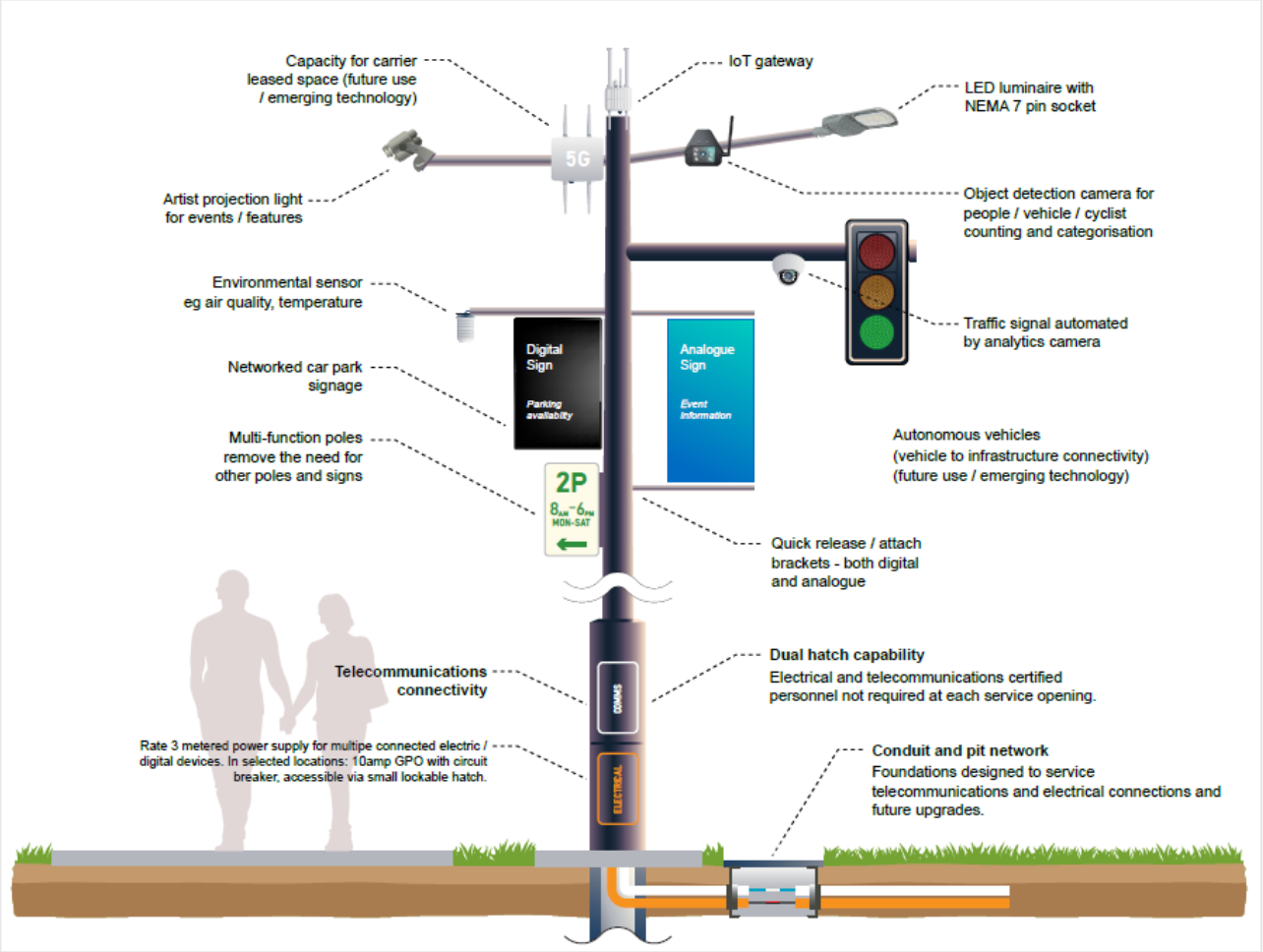
Testing Tech in Paradise is an opportunity for companies to test and trial new technology in a real world environment.

The Sunshine Coast is uniquely positioned to facilitate this, presenting a unique urban testbed environment for new digital services.

SCIBN, including the new Maroochydore City Centre digital assets, provides an opportunity for research organisations, government and business to accelerate the development of new technology software, hardware equipment and devices.

- International Broadband Submarine Cable
- Cable Landing Station
- NEXTDC's Sunshine Coast Data Centre (SC1)
- Cyber Security Node
- Multi-path telecommunications conduits
- Multi-carrier optic fibre networks
- 5G mobile broadband
- Wi-Fi 6 free public Wi-Fi
- LoRaWAN IoT Network
- Multi-function poles
- Digital kiosks
- Landing pad





Multi-function poles in Maroochydore City Centre support a range of smart technologies that can be tested in a real world environment. Illustration is an excerpt from the Smart Infrastructure Manual.

Are you interested in testing and trialling your technology on the Sunshine Coast? Reach out to Wendy Macdonald, Investment Lead, Sunshine Coast Council. Call **0408 731 999**, email **wendy.macdonald@sunshinecoast.qld.gov.au** or click the link below!

TALK TO WENDY