Transport for NSW

Smart Central River City

Blueprint for seizing the opportunity

December 2022

Image 1 Parramatta CBD seen from above, from the river

NSW GOVERNMENT

dpie.nsw.gov.au/smartplaces

Acknowledgement of Country

The NSW Government acknowledges that we work on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging. In delivering Smart Places, we will be thoughtful and collaborative, and show our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically and where their strong connections to country are celebrated and embraced.

Contents

Acknowledgement of Country **2**

Executive summary **4**

A beating heart for Greater Sydney **7**

The people of the Central River City 8

Growth and change 9

Digital inclusion and connectivity **10**

A digitally connected Central River City 11

Smart-Central River City vision **14**

Smart Central River City outcomes 14

Seven smart opportunities **15**

Delivering a Smart Central River City **17**

Glossary **21**

References **22**

Executive summary

Enabled by digital technologies and data, Central River City will be the region's **true, connected, unifying centre** and a **future-focused, liveable** and **sustainable economic corridor** with access to jobs and housing.

By 2056, Sydney will become a global city, similar in size to London or New York. Spanning over 130,000 hectares through the heart of the Greater Sydney and across the traditional lands of seven groups of First Nations' people, Central River City is as dynamic as it is diverse.

It is home to one of Sydney's fastest-growing and strategically important economic corridors – running through Greater Parramatta and the Olympic Peninsula – and is changing rapidly to accommodate more jobs and business opportunities, rebalancing Greater Sydney's population.

It is a city steeped in history, with cultural connections to the land tracing back over 65,000 years and hosting one of the earliest European settlements in Australia.

The Smart Central River City Blueprint lays out the opportunity for connected technologies and data solutions to celebrate the culture and history of Central River City and support its growth and transformation into a thriving, economic powerhouse.

A Smart Central River City will provide digital connectivity and use connected technologies and data to create a place that is:

- **collaborative**: generating and supporting **collaboration** between governments and with industry
- **liveable**: improving **liveability, and sustainability** by creating places with great amenity for people to visit, live, work and play
- **productive**: attracting and sustaining a **skilled workforc**e and investment in **knowledge-intensive industries**, from start-ups, scale-ups to large multi-national corporations; and a workforce
- **sustainable**: improving the **resilience** of communities and infrastructure.

Central River City today

130,556 ha
Total area

774,038
Number of jobs

1,834,311
Population

642,424
Number of dwellings

A Smart Central River City will leverage the technologies available today while setting up for investment in future solutions to support:

- a 30-minute city, leveraging catalytic investments by the NSW Government in Parramatta Light Rail and Sydney Metro West
- an additional 487,849 people by 2041 (DPE, 2021a)
- up to 731,182 dwellings (DPE, 2021b)
- up to 194,000 new jobs by 2041 (TfNSW, 2022)

A future smart city

Smart Central River City will:

- provide smart places for all people to 'work/study anywhere' and access 'on-demand' services
- use best in class connectivity to create globally competitive economic precincts which attract and retain knowledge-intensive industries, including Westmead Health and Innovation District and Parramatta Central Business District.
- support experimentation and innovation with key precincts leveraging open data and entertainment, creative, cultural and research assets
- nurture a responsive city using data insights to enhance liveability
- promote full participation in society, digital economy, and democratic processes through meaningful access to digital services.

Striving for a 1 Terabit City

Digital connectivity is critical to achieving sustainable growth, economic competitiveness and productivity outcomes in the Central River City.

Growing demand for digital connectivity is being driven by a massive increase in connected devices in our cities, as we rollout smart places, and the greater use of high-bandwidth applications.

We need to be ambitious and set the city up for a future: and with this blueprint, we are striving for a 1 Terabit City. This is a city where our residents have access to 100-gigabit networks and businesses can exploit 1 terabit (125+gigabit) networks, supporting full and rich digital experiences.

Seven smart opportunities

This Blueprint will help use technology and data solutions to support the growth ambitions of the Greater Parramatta and Olympic Peninsula economic corridor and the aspirations of the future, residents, visitors, workers, investors and students in the broader Central River City. Seven key opportunities are outlined below.

CUSTOMER EXPERIENCE
Applying the Smart Places Customer Charter, placing our customers at the heart of the Smart Central River City, so we deliver customers better places and services.

DIGITAL CONNECTIVITY
Providing fit-for-purpose, seamless and reliable internet connectivity across the Central River City to spark new ideas, support growth and development and attract talent and new industries.

DATA MANAGEMENT
Unlocking and generating new streams of local, live data; and capturing, storing and visualising data safely and securely to support innovation, improved service delivery and drive decision making.

ENVIRONMENTAL AND PLACE MONITORING
Deploying environmental and place sensor networks to generate valuable insights on local conditions and make real-time data and insights available to improve quality of life, support resilient and sustainable environments, moderate impacts of climate change, respond to critical events and make places more accessible and liveable.

SMART PLANNING AND OPERATIONS
Using new digital solutions and technology to improve planning and support infrastructure through its lifecycle to achieve efficiencies, reduce costs, improve environmental outcomes and engagement with communities.

SMART MOBILITY
Finding new ways to support our customer journeys and connect people and goods sustainably and efficiently.

COLLABORATION AND GOVERNANCE
Working together to deliver on the ambitions of a Smart Central River City.

Image 2 Artist impression of Parramatta Square

A beating heart for Greater Sydney

We will support the **growth and prosperity** of the Central River City using smart technology and data solutions.

At its heart, the Central River City has a growing economic corridor of strategic importance to Greater Sydney and NSW. It is also one of the most historically significant places in Sydney.

In the coming years and decades, the Central River City will grow substantially, capitalising on its location close to the geographic centre of Greater Sydney. It is being transformed by unprecedented public and private investment, which is contributing to new transport and other infrastructure.

Additionally, the Greater Parramatta and the Olympic Peninsula Economic Corridor taking in Parramatta CBD, North Parramatta, Westmead Health and Innovation District and Parramatta Park; the advanced technology and urban service sectors in Camellia, Rydalmere, Silverwater and Auburn; and the Sydney Olympic Park lifestyle precinct, is forecast to be centred on world-class entertainment, health, education and research institutions as well as finance, business services and administration (Greater Sydney Commission, 2016).

The people of the Central River City

We will **recognise and celebrate the cultural history and diversity** of the people in the Smart Central River City.

For over 65,000 years, the area comprising present-day Central River City has been the traditional land and meeting place of the Bidjigal, Burramattagal, Dharawal, Dharug, Wangal, Wategoro and Weymaly peoples (Greater Cities Commission, 2022).

The Central River City is home to people who are socially, economically, culturally and linguistically diverse. Multi-cultural influences have led to vibrant food and retail offerings, events and festivals and a strong night-time economy.

Forty per cent of the Central River City's population within its thriving economic corridor is aged between 25 and 34, providing a youthful working-age population (Greater Sydney Commission, 2016).

Like many places across Australia and the world, the COVID-19 pandemic has significantly changed the way people live in the Central River City. It has:

- unlocked a need and desire for people to be able to work/ study from anywhere
- built an understanding of the importance of data to assist decision making and to inform provision of and access to services (Gartner, 2021)
- changed attitudes about the collection and use of personal data (Deloitte, 2021).

Image 3 Open Streets, Auburn Street Festival

Growth and change

We will use this Blueprint to help coordinate across all sectors to **deliver digital and connectivity infrastructure and smart solutions** needed to support change in the Central River City.

The population of Greater Sydney is forecast to grow to 8 million over the next 40 years, with almost half of that population residing west of Parramatta (Greater Sydney Commission, 2016).

The population of the Central River City is projected to increase substantially over the next 20 years. This will transform many parts of the city from a suburban to an urban environment (Greater Sydney Commission, 2016).

The city's rich heritage will be preserved and celebrated; cultural events and facilities will continue to improve the city's liveability.

Parramatta's Community Infrastructure Strategy (2020) predicts that by 2041, about 70 per cent of people will be living in high-density housing.

The NSW Government and local councils are working together to meet the needs and support the change underway in the Central River City.

This includes:

- addressing existing and future demand for infrastructure driven by housing and population growth
- setting the foundation to accommodate growth in people and jobs over the next 40 years
- enabling job creation in the Central River City to help rebalance opportunities in Western Sydney
- leveraging the clustering of catalytic infrastructure investment at the western end of the corridor
- Digital, technology and data solutions all play a critical role in realising the ambitions of the Central River City.

Image 5 Melrose Park, smart-technology community

Digital inclusion and connectivity

We will take action to ensure no one is left behind, and **everyone can participate** in the Smart Central River City.

Digital connectivity is critical to achieving growth, economic competitiveness and productivity outcomes.

The Central River City outperforms the national average in relation to digital accessibility, affordability and digital ability (Australian Digital Inclusion Index, 2021). However, the region lags the Eastern Harbour City and the experience within the Central River City varies widely.

Australian Digital Inclusion Index (ADII) 2021 ratings

Central River City

72.3

+1.2
higher than national average

Eastern Harbour City

76.6

+5.5
higher than national average

Western Parkland City

71.6

+0.5
higher than national average

Council area	ADII 2021 score	Performance relative to national average
Canterbury-Bankstown	67.0	-4.1
Cumberland	70.0	-1.1
Georges River	70.0	-1.1
Blacktown	71.0	-0.1
Parramatta	76.0	4.9
The Hills Shire	80.0	8.9

Digital technology use is strong in areas of high economic activity such as the Westmead Health and Innovation District and Parramatta CBD. There is opportunity to improve digital connectivity and increase the use of digital connectivity in other places across the Central River City.

A digitally connected Central River City

We are setting an **ambitious goal** to enable the Smart Central River City with 100-gigabit residential connections and 1 terabit business connections by 2040.

In the Smart Central River City, internet bandwidth, speed and responsiveness (sometimes called delay or latency) are all important.

- High bandwidth is required to transmit increasingly large amounts of data from connected technologies (like sensors and cameras) and to also allow people and businesses to upload and download data.
- Fast connections are needed for business enterprises and people on the move, and to convey the data and insights generated in in near or real-time from public places.

High bandwidth, responsive, high speed internet connectivity will enable Smart Central River City to support:

- specialised high-demand applications like e-health, autonomous industry (for example, construction, manufacturing, transport, labour augmentation and robotics) and autonomous vehicles
- more immersive experiences, including augmented and virtual reality
- more video and gaming content, including high-end content such as high definition
- growing business adoption of cloud computing, data and analytics, machine learning and artificial intelligence and remote working and teleconferencing
- growing use of wireless devices, increasing demand on mobile networks, which also require the fixed-line network.

Figure 1 shows the different uses in a place or precinct that can be supported by variable speeds, delay and bandwidth.

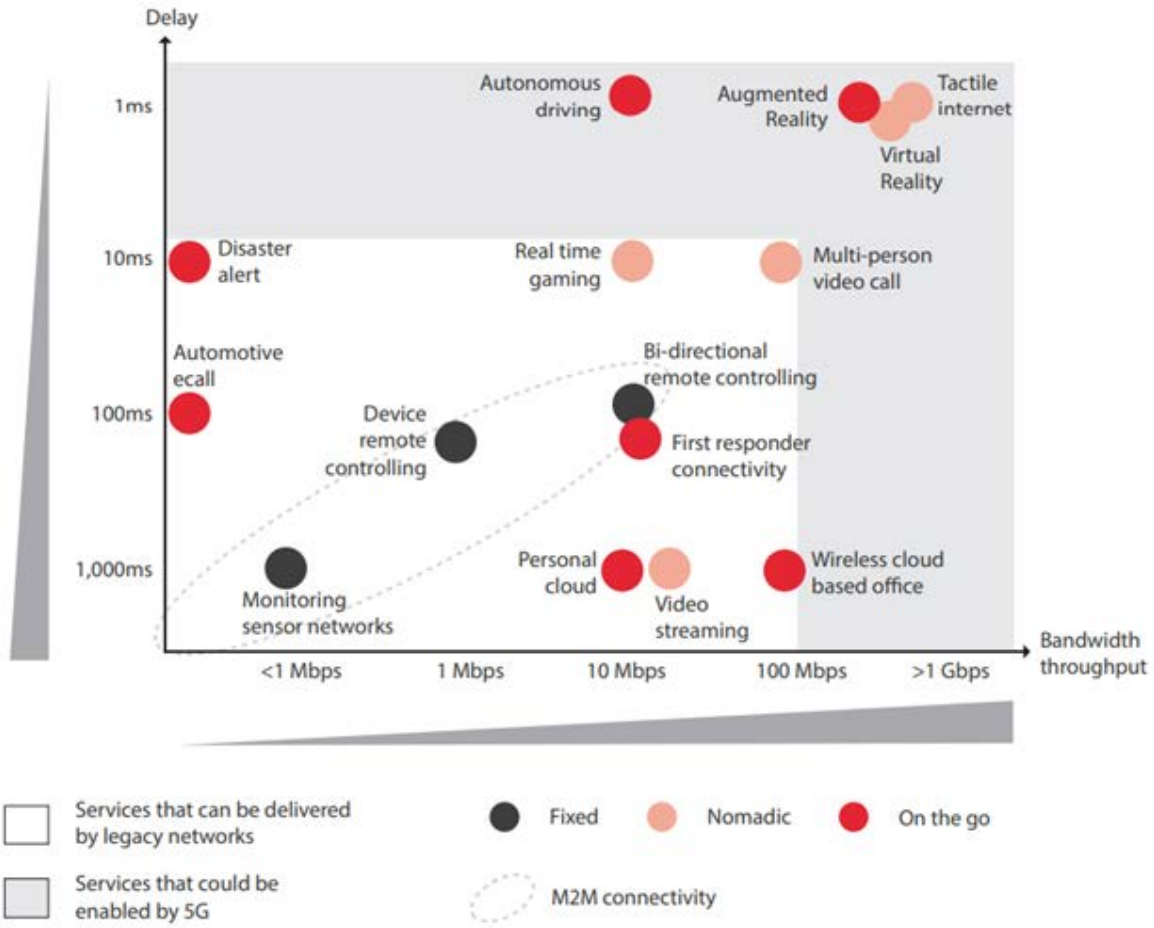


Figure 1 Bandwidth and Latency Requirements of Potential 5G Use Cases (GSMA Intelligence,2014)

The impacts of COVID-19

The COVID-19 pandemic accelerated the consumer and business demand for connectivity and changed patterns of consumption.

In NSW, there was an average 25 per cent increase in data usage, between June 2019 and June 2020. This was driven by real-time video streaming, which represents 45 per cent of the download traffic, along with work, health, education and social connection (BCAR, 2020). During the peak of the pandemic, in Australia:

- 30 per cent of the Australian workforce was working from home, and this option could become 80 per cent more common across a range of occupations.
- There was an increase in telehealth demand. More than 3 million Australians conducted a telehealth consultation between March and April 2020.
- Online education was occurring across all the education age ranges, from primary to tertiary levels. Moving forward, this trend is likely to increase to also support retraining of workers to refresh knowledge and skills (BCAR, 2020).

A move to 1 terabit

Globally and domestically, 10-gigabit optical fibre networks are used to attract investment, businesses and new jobs to an area.

However, the 'race to 10' is expected to be surpassed in the next two to five years, and it is likely that we need to plan for 100-gigabit networks and beyond this, 1 terabit networks.

Formula for remaining globally competitive over 20 years

Massive increase in connected devices + Increasing use of high bandwidth applications + The race to higher speed tiers internationally = **100 gigabit** residential connections **1 terabit** business connections

Image 9 Parramatta Square, one of many new developments in the Central Business District

Smart-Central River City vision

The Central River City will be the region's **true, connected, unifying centre** using technology and data to create a future-focused, liveable and sustainable economic corridor, with access to jobs and housing.

A Smart Central River City will provide digital connectivity and use connected technologies and data to create a place that is: collaborative, liveable, productive and sustainable.

Smart Central River City outcomes

COLLABORATION

We collaborate to create great places which become centres of economic productivity and brings together stakeholders in businesses, health, education, arts and heritage.

LIVEABILITY

We create accessible places, with diverse housing options. We support thriving neighbourhoods; healthy, resilient communities; access to active and public transport and sports infrastructure; services; and a strong arts and culture sector.

PRODUCTIVITY

We connect people to jobs within 30 minutes of where they live.

We build job opportunities in health, education and industry and knowledge-intensive sectors.

SUSTAINABILITY

We find new ways to make our city resilient, with great environments. We use resources wisely, and efficiently aiming for net zero emissions by 2050. We increase and improve open space, the green and blue grid and tree canopy so the city is cool, green and inviting.

Seven smart opportunities

There are seven key areas for new technology and data solutions to have impact in the Central River City. The Smart Central River City Blueprint outlines how local councils, place owners and government agencies may collaborate to meet the challenges for each theme.

CUSTOMER EXPERIENCE

Applying the Smart Places Customer Charter, placing our customers at the heart of the Smart Central River City to:

- support quality of life and enable the aspirations of all people who live, work, play and invest in the Central River City
- retain, develop and attract knowledge workers to the Central River City
- enable people to live, work and study anywhere, anytime
- help all our customers access a wide range of digital city services and real-time information relevant to their lives, regardless of who they are or where they are
- provide a safe and vibrant 24-hour economy
- celebrate and respect the environment and culture of our First Nations people
- use digital solutions to increase participation in arts, culture, sport and participation in the digital economy and STEM.

DIGITAL CONNECTIVITY

Providing fit-for-purpose, seamless and reliable internet connectivity across the Central River City to:

- support forecast growth and economic development
- attract knowledge-intensive industries and talent to the Central River City by providing ultra-fast broadband connectivity to priority precincts
- enable people to work and learn anywhere, with fast, reliable and high-speed fixed and wireless internet connectivity across Central River City and Economic Corridor
- provide the digital connectivity needed to support future demand and the operations of a Smart Central River City
- provide a consistent and reliable digital experience for people across the Central River City.

DATA MANAGEMENT

Unlocking and generating new streams of local, live data; and capturing, storing and visualising data safely and securely to:

- support innovation and improved service delivery
- drive decision making, program design and help us achieve great place outcomes.

ENVIRONMENTAL AND PLACE MONITORING

Deploying environmental sensor networks to generate valuable insights on local conditions and make real-time data and insights available to:

- make better decisions for places
- improve quality of life, support resilient and sustainable environments, moderate impacts of climate change, and respond to critical events
- support local government quality assurance processes for local environmental management plans; improve environmental management during construction; and inform place activation plans
- help customers make informed decisions to reduce their environmental impact, reduce their cost-of-living, and improve their health and wellbeing
- help place and asset owners plan deliver, and maintain assets and infrastructure, reducing costs and improving efficiencies
- inform place planning, activation and management.

SMART PLANNING AND OPERATIONS

Using new digital solutions and technology to improve planning and support infrastructure through its lifecycle to:

- help the community engage with changes in their community and the planning process
- design, build, deliver and maintain infrastructure more efficiently or effectively
- increase efficiency and effectiveness of development assessment processes for local councils
- reduce whole-of-life costs, reduce carbon emissions and enhance productivity
- measure the performance of the Central River City and identify investments needs.

SMART MOBILITY

Aligned with the *Future Transport Strategy* (TfNSW, 2022), finding new ways to support our customer journeys and connect people and goods sustainably and efficiently to:

- allow people and goods to move efficiently and safely across the Central River City, helping realise the vision for a 30-minute city
- increase active and public transport journeys and enable within 15-minute neighbourhoods
- help us achieve our net zero ambitions.

COLLABORATION AND GOVERNANCE

Working together for a Smart Central River City to:

- foster a joined-up approach to the development and delivery of smart services and infrastructure strategy across state agencies, local councils and delivery authorities
- deliver on the ambitions of a Smart Central River City.

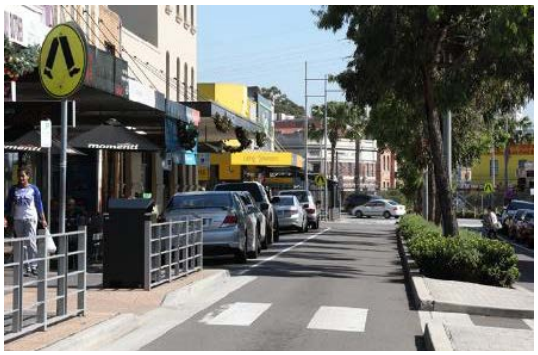
Delivering a Smart Central River City

The transformation of the Central River City into a digitally enabled, smart place, is already underway, catalysed by development, investment in infrastructure and leadership from the State Government and local councils.

A Smart Central River City Working Group has been collaborating since 2021 to build upon the leadership of local place owners and to harmonise the approach to technology and data solutions across the City.

This Smart Central River City Blueprint aims to inform local planning and delivery in local government areas and State precincts, including Sydney Olympic Park, Westmead Health and Innovation District and Camellia-Rosehill.

SMART GRANVILLE PRECINCT



Target outcomes

- ✓ PRODUCTIVITY
- ✓ LIVEABILITY
- ✓ SUSTAINABILITY

Smart opportunity

CUSTOMER EXPERIENCE

DATA MANAGEMENT

Since 2020, Cumberland City Council has been gathering data using a range of embedded technologies to help create a vibrant, safe and liveable Granville centre.

The data generated is also helping improve Council services and make better planning decisions.

Granville is using technology to help it understand traffic and parking patterns, waste generation and collection needs, local temperature and humidity, water movement in Duck Creek, people movements and patterns.

The free and ubiquitous IoT LoRaWAN Network set up in Granville provides an opportunity to grow innovation and support local businesses, educational institutions and citizens in their pursuits.

This project received a co-contribution from the Commonwealth Government's Smart Cities and Suburbs Program.

SAFER ROADS FOR CENTRAL RIVER CITY

Target outcomes

✓ PRODUCTIVITY
✓ COLLABORATION

Smart opportunity

DATA MANAGEMENT
ENVIRONMENTAL & PLACE MONITORING
COLLABORATION AND GOVERNANCE

Canterbury-Bankstown and Cumberland City councils are participating in a Transport for NSW trial, to improve the way roads are maintained, making them safer for all road users.

Sensors and cameras are being fitted to garbage trucks and buses to gather real-time information on the condition of roads. Artificial Intelligence is using and analysing the data to detect any damaged roads and early warning signs of emerging potholes.

The insights generated by the system will help guide government decision making on road maintenance and could even lead to predictive maintenance.

The project received a co-contribution from the Smart Places Acceleration Program, part of the NSW Government Digital Restart Fund.

CHILLOUT AND CONNECT IN GEORGES RIVER

Target outcomes

✓ PRODUCTIVITY
✓ LIVEABILITY

Smart opportunity

CUSTOMER EXPERIENCE
DATA MANAGEMENT
DIGITAL CONNECTIVITY

Georges River Council has installed smart ChillOUT hubs that offer people a free, comfortable place to meet, work and play. The data collected through the hubs also helps councils to monitor utilities, visitation and the microclimate.

Each hub is right for its community. The Kogarah Hub site is just outside the library. It supports and serves a culturally diverse and dense area. Its hub offers a place to take a break along a busy thoroughfare or work outdoors using the free wi-fi and charging points.

The Mortdale Hub is in the town centre, and tests a completely off-grid, solar-powered solution. It also features long tables for community meetings and providing a place for workers to share lunch.

The Hurstville Hub is in a suburban park, offering a place for family gatherings and parties.

This project received a contribution from the Commonwealth Government's Smart Cities and Suburbs Program.

SMART PHILLIP STREET

Target outcomes

- ✓ PRODUCTIVITY
- ✓ LIVEABILITY

Smart opportunity

- CUSTOMER EXPERIENCE
- DATA MANAGEMENT
- DIGITAL CONNECTIVITY
- ENVIRONMENTAL & PLACE MONITORING
- SMART MOBILITY

City of Parramatta is transforming Phillip Street in Parramatta's CBD into a Smart Street and 'urban forest', enhancing one of the City's main gateways to the river and cultural precinct.

The project continues the transformation of Parramatta's CBD, leveraging light rail investment and revitalising an important streetscape with smart city elements including condition-responsive lighting, street furniture with built-in USB ports, smart irrigation, connected CCTV, public artwork and lighting.

The roll-out of fibre-optic cable will future-proof the street by allowing new digital services as technology evolves.

The project received a grant as part of the NSW Government Your High Street Program.

COOLER, GREENER SYDNEY OLYMPIC PARK

Target outcomes

- ✓ SUSTAINABILITY
- ✓ LIVEABILITY

Smart opportunity

- CUSTOMER EXPERIENCE
- ENVIRONMENTAL & PLACE MONITORING

Sydney Olympic Park Authority is leading a project to cool the microclimate in Bicentennial Park by optimising the irrigation system using machine learning and technology.

The system draws air temperature and soil moisture data from a network of embedded sensors to help fine tune how the park is watered.

This is reducing urban heat and helping Sydney Olympic Park Authority use water more wisely.

Insights will be shared with park visitors so they can easily discover the coolest and shadiest places in the park for picnics, play and exercise.

The project received a co-contribution from the Smart Places Acceleration Program, part of the NSW Government Digital Restart Fund.

CLIMATE RESPONSIVE NEIGHBOURHOOD

Target outcomes

- ✓ PRODUCTIVITY
- ✓ LIVEABILITY
- ✓ SUSTAINABILITY
- ✓ COLLABORATION

Smart opportunity

- CUSTOMER EXPERIENCE
- DATA MANAGEMENT
- ENVIRONMENTAL AND PLACE MONITORING

City of Parramatta, PAYCE and UTS have teamed up to turn a 25-hectare brownfield development site into a climate-responsive neighbourhood for 5,000 new homes.

The Melrose Park construction area and surrounding streets are equipped with about 70 environmental sensors, capturing data on the temperature, humidity, air and water quality, noise and stormwater.

The project is capturing, analysing and visualising this local environmental data before, during and after construction and making it publicly available.

The project is helping Council better understand real-time, continuous data can be used to improve environmental outcomes during major developments.

This project received a contribution from the Commonwealth Government's Smart Cities and Suburbs Program.

Glossary

24-hour economy: The NSW Government is committed to providing vibrant, safe and diverse urban centres to support economic activity at all times of the day. The Government has released a 24-Hour Economy Strategy that will support the creation of jobs, foster arts and culture, and reinforce Sydney's status as Australia's only truly global city.

30-minute city: Living in a 30-minute city will mean residents can access jobs and services in their nearest metropolitan or strategic centre within 30 minutes by public transport, walking and/or cycling, seven days a week.

Augmented Reality (AR): AR morphs the mundane, physical world into a colourful, visual one by projecting virtual pictures and characters through a phone's camera or video viewer.

Bandwidth: The maximum amount of data transmitted over an internet connection in a given amount of time.

Digital economy: The 'digital economy' has been defined by the Australian Government as 'the global network of economic and social activities that are enabled by information and communications technologies, such as the internet, mobile and sensor networks.

Gigabit: In data communications, a gigabit is one billion bits, or 1,000,000,000 (that is, 109) bits. It's commonly used for measuring the amount of data that is transferred in a second between two telecommunication points. Many cities recognise the value of becoming a gigabit city, which means that ultra-high-speed broadband is available citywide at speeds of 1 gigabit per second (1Gbps) or faster. This makes it easier for citizens to access the internet, and for businesses to thrive and expand. It's considered by many to be an essential component of smart city technology.

On-demand: An on-demand service is available at any time that you want to use it.

Optical Fibre Networks: Optical Fibre Networks use signals encoded onto light to transmit information among various nodes of a telecommunication network. They operate from the limited range of a local-area network (LAN) or over a wide-area network (WAN). They are widely deployed as the basic physical network infrastructure.

Smart Central River City Working Group: The NSW Government Smart Central River City Working Group (the Working Group) collaborates to identify opportunities for smart technology to support outcomes in the Central River City. The group collectively plans for and is delivering a Smart Central River City.

Smart Places Customer Charter: To harness the potential of new technologies to meet the needs of citizens, smart places should be built for people and designed with people. The NSW Smart Places Customer Charter captures customer expectations of smart places in six principles which have been shaped by direct community input.

Virtual Reality (VR): VR takes these same components to another level by producing an entirely computer-generated simulation of an alternate world.

References

BCR Bureau of Communications and Arts Research, 2020, *Demand for fixed line broadband in Australia 2018-2028 working paper*, https://www.infrastructure.gov.au/media-centre/publications/demand-fixed-line-broadband-australia-2018-2028-working-paper. Accessed 8 December 2022

Australian Digital Inclusion Index, 2021, *The Australian Digital Inclusion Index*, https://www.digitalinclusionindex.org.au/the-adii/. Accessed 2 December 2022

City of Parramatta, 2020, *Community Infrastructure Strategy*, https://www.cityofparramatta.nsw.gov.au/community-infrastructure-strategy. Accessed 2 December 2022

Deloitte, 2021, *Digital Consumer Trends - Post-pandemic privacy*, https://www2.deloitte.com/au/en/blog/technology-media-telecommunications-blog/2021/digital-consumer-trends-post-pandemic-privacy.html. Accessed 2 December 2022

DPE Department of Planning and Environment, 2021a, Population Projection Explorer for *Cumberland, Parramatta, Georges River, Hills, Blacktown, Canterbury-Bankstown,* https://pp.planningportal.nsw.gov.au/populations. Accessed 5 December 2022

DPE Department of Planning and Environment, 2021b*, Sydney Housing Supply Forecast*, https://www.planning.nsw.gov.au/Research-and-Demography/Sydney-Housing-Supply-Forecast. Accessed 8 December 2022

GSMA Intelligence, 2014, *Understanding 5G: Perspectives on future technological advancements in mobile*, https://www.gsma.com/futurenetworks/resources/understanding-5g-perspectives-on-future-technological-advancements-in-mobile-gsmai-report-3/ Accessed 8 December 2022.

Gartner, 2021, *Future of Work Trends: Future of Work-Life Integration in Smart Cities*

Greater Sydney Commission, 2016, *Greater Parramatta and Olympic Peninsula Place-based Infrastructure Compact*, https://greatercities.au/thought-leadership/infrastructure. Accessed 8 December 2022

Greater Cities Commission, 2022, *The Six Cities Region – Data insights for each city*, https://greatercities.au/six-cities-region/six-cities-region-vision. Accessed 8 December 2022

TfNSW Transport for NSW, 2022, *Future Transport Strategy*, https://www.future.transport.nsw.gov.au. Accessed 13 December 2022

TfNSW Transport for NSW, 2022, *OpenData: Employment Projections*, https://opendata.transport.nsw.gov.au/dataset/employment-projections. Accessed 8 December 2022

NSW GOVERNMENT