



ENVIRONMENTAL SUSTAINABILITY STRATEGY

Regenerative, climate positive and
resilient Parramatta



| PARRAMATTA

2024 – 2033

ADOPTED BY COUNCIL 12 AUGUST 2024

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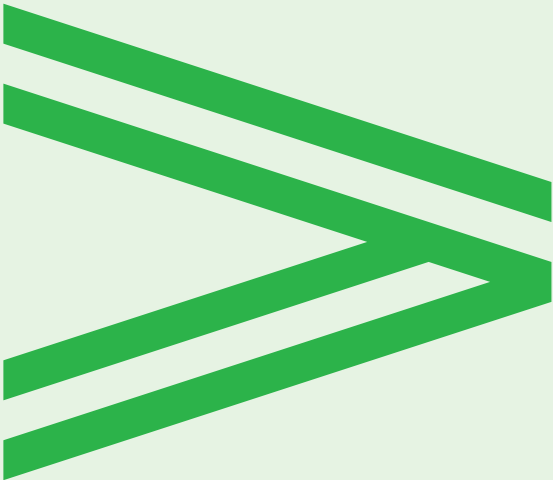
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FIRST NATIONS ACKNOWLEDGEMENT

Nunanglanungdyu baramada gulbaga
mawa naa Baramadaḡal dharuḡ
nurrawa badura baramada dharuḡ yuru

We respectfully acknowledge the
Traditional Owners and Custodians
of the land, waters and skies of
Parramatta, the Dharuḡ people.

City of Parramatta proudly acknowledges that First Nations people have a vital role in the ecological, economic (trading and bartering), social, and cultural life of Parramatta, while maintaining distinct Cultures built on the principles of Caring for Country, nationhood, the primacy of family, and the dignity and governance by Elders.

As the longest living continuous culture, First Nations peoples have managed and nurtured the lands and waters of Parramatta, for thousands of generations and continue to do so today. The Burramattagal of the Dharug Nation first settled upon the upper reaches of the Parramatta River, and the name Parramatta is based upon the Dharug word *Burramatta* meaning 'place where the eels lie'.

The local landscape is of great value to the Dharug and is core to their cultural practices and obligations. Wellbeing of Country recognises the interconnectedness of all, including past, present, and future generations.

At the City of Parramatta, we are committed towards a future where the cultures, histories, and rights of all First Nations peoples are understood, recognised, and respected by all.

Council is committed to embedding meaningful First Nations and Dharug-led involvement at all levels of urban planning and decision-making, to improve sustainability and resilience.

City of Parramatta is proud to acknowledge the ongoing custodianship of Country by Dharug and we recognise the Dharug peoples as true sovereigns and caretakers of the land, plants, animals, water, and skies now known as Parramatta.

Nura (country) and
Yura (people) are one.

LORD MAYOR MESSAGE

Environmental sustainability is a primary concern for our community and requires urgent action. Our environment is at the heart of Parramatta's identity and wellbeing. It is central to how we will respond to the challenges we face with climate change and the growth of our community.

To inform the Strategy, we conducted extensive engagement with the community through workshops, pop-ups, and via the Participate Parramatta platform. We engaged with our Environmental and First Nations Advisory Committees, delivery teams across Council, and key external partners. Our community had a strong desire for Council to facilitate and support them to be environmental custodians.

This strategy builds upon the strong environmental achievements from our 2017 Environmental Sustainability Strategy (ESS) including swimming returned to Lake Parramatta and our exemplar CBD and growth precinct planning controls that incorporate heat resilience, urban cooling, and energy and water efficient outcomes. Since 2022, Council's operations have been powered by 100% renewable electricity. We have delivered NSW's largest smart LED streetlighting upgrade, and we became Western Sydney's first carbon neutral council. This Strategy seeks to build on this success and further progress Parramatta towards a resilient and sustainable future.

The Strategy has been developed in consideration with other Council Strategies and Plans, ensuring alignment of priorities over the next 10 years to 2033. It sets direction for our community and Council to:

- Act on climate change - through Council leadership and advocacy, we can support our community in reducing carbon emissions and reduce cost of living through sustainability initiatives.

- Foster a resilient community that can adapt and respond to challenges like flood, fire, and urban heat – through good planning, early warning technologies, and sharing information our community will be prepared for key environmental risks.
- Creating a regenerative City that actively restores its natural environment, supports the health and vitality of people, plants, and animals – with expansive waterways, two regional parklands, and the most extensive urban bushland network in Sydney, Parramatta is a City in nature that we must continue to care for.

We need to work together with industry and our community to achieve our aspirations. A prosperous, climate-resilient future requires strong leadership and a commitment to supporting, educating, and empowering our community in the face of change. Council will monitor progress on our action plan annually, to ensure we are achieving our goals and responding to opportunities as they emerge.

I look forward to working with our community to ensure the City of Parramatta continues to be a great city that cares for Country, people and our global green future.

Councillor Pierre Esber, Lord Mayor



STRATEGY

➤ AT A GLANCE

Credit: City of Parramatta

VISION

A City for nature. Sustainable, resilient, and on a journey of regeneration.

Our environment is at the heart of Parramatta's identity and wellbeing. It is central to how we will respond to the challenges we face with climate change and the growth of our community.

Building on the long-term vision outlined in our Community Strategic Plan 2018- 2038 (CSP), and through consultation with the community and stakeholders, the Environmental Sustainability Strategy 2024-2033 outlines our plan to make this vision a reality.

This Strategy drives:

- **Climate action:** addressing the immediate and urgent need to reduce our emissions.
- **Urban resilience:** supporting our community's capacity to collectively respond and adapt to challenges.
- **Regeneration:** growing the viability and capacity for people and nature to thrive together.

PRINCIPLES

This Strategy is founded on the principles below, which will guide our actions:

- **Community empowerment:** we empower the community through education and engagement.
- **Council leadership:** we demonstrate environmental leadership and ambition.
- **Strong partnerships:** we work with others to test new ideas and increase our impact for the benefit of the community and nature.
- **First Nations collaboration:** we work together with First Nations peoples, especially the Burramattagal of the Dharug nation.

Through our vision we aim to support local environmental values including positively supporting First Nations cultural values and caring for Country.

PRIORITIES

To achieve our vision for Parramatta, this Strategy establishes five priority areas:

- **Climate positive:** implementing urgent, strong, and equitable climate change action to move beyond net zero.
- **Future ready community:** leading Parramatta towards a resilient and sustainable future.
- **Blue green City:** creating a living City defined by healthy waterways and green spaces.
- **Nature positive:** safeguarding our natural spaces, waterways, and wildlife.
- **Circular economy:** championing the circular economy and whole-of-waste system transition.

Council's decision-making will be guided by these priorities. From building on the strengths of our City, to leveraging ongoing partnerships and investments, these priorities set the direction of our future. These five priority areas will empower our community and ensure the environment is at the heart of Parramatta's identity and wellbeing.

ACTIONS

To realise the aspirations outlined in this Strategy, we must actively build upon our City's capacity and embrace opportunities as they emerge.

Our actions invite all levels of government, organisations, and our community to join Council to position Parramatta for regenerative, climate positive, and resilience success. Progress on actions will be monitored annually and will be updated after four years to ensure progression of the Strategy's implementation.

INTRODUCTION

01



"Eels have been important to this place and my people for tens of thousands of years. They still run through this place. There's a story of the Great Eel Creator, *Gurungady*, who moved through the landscape gouging out the rivers and creating mountains."

Leanne Tobin
Dharug artist and community educator



09

OVERVIEW

Our environment is at the heart of Parramatta's identity and wellbeing. It is central to how we will respond to the challenges we face with climate change and the growth of our community.

Environmental sustainability is a critical concern for our community and the time to act is now.

This Strategy places people, our communities, our partners, and Council leadership at the centre of environmental action. It is through our shared cultural environmental practice that we shape our City and our relationship with the environment.

By focusing on **regeneration**, **resilience**, and **climate action**, the five priorities in this Strategy are interconnected, setting a framework that encourages a range of environmental outcomes that bring people and nature together (Figure 1).

What is environmental sustainability?

Environmental sustainability involves the active renewal, restoration, and enhancement of the environment through both ecological and social systems.

This regenerative lens to environmental sustainability is inspired by nature and recognises First Nations perspectives, nature-human interconnections, and the United Nations Sustainable Development Goals (SDGs).

Regeneration is a process of renewing, restoring, and improving. It is a dynamic process of actively improving and evolving, going beyond the status quo of maintenance and subsistence.

To foster regeneration as a city is to grow the viability and capacity for life to continue to evolve within a place.

Regeneration speaks to where Parramatta is headed as a City, our aspirations for our waterways, land and wildlife, our culture, our communities, and the legacy we leave future generations.

What are we trying to achieve?

Through a regenerative lens we seek to create a global city that proactively responds to the following environmental imperatives:

Urban resilience – ensuring our growing community, environment, and City are prepared with the capacity to adapt and respond to challenges.

Climate action - immediate and urgent need to reduce our emissions and contribute to global efforts to reduce the severity of climate change impacts.

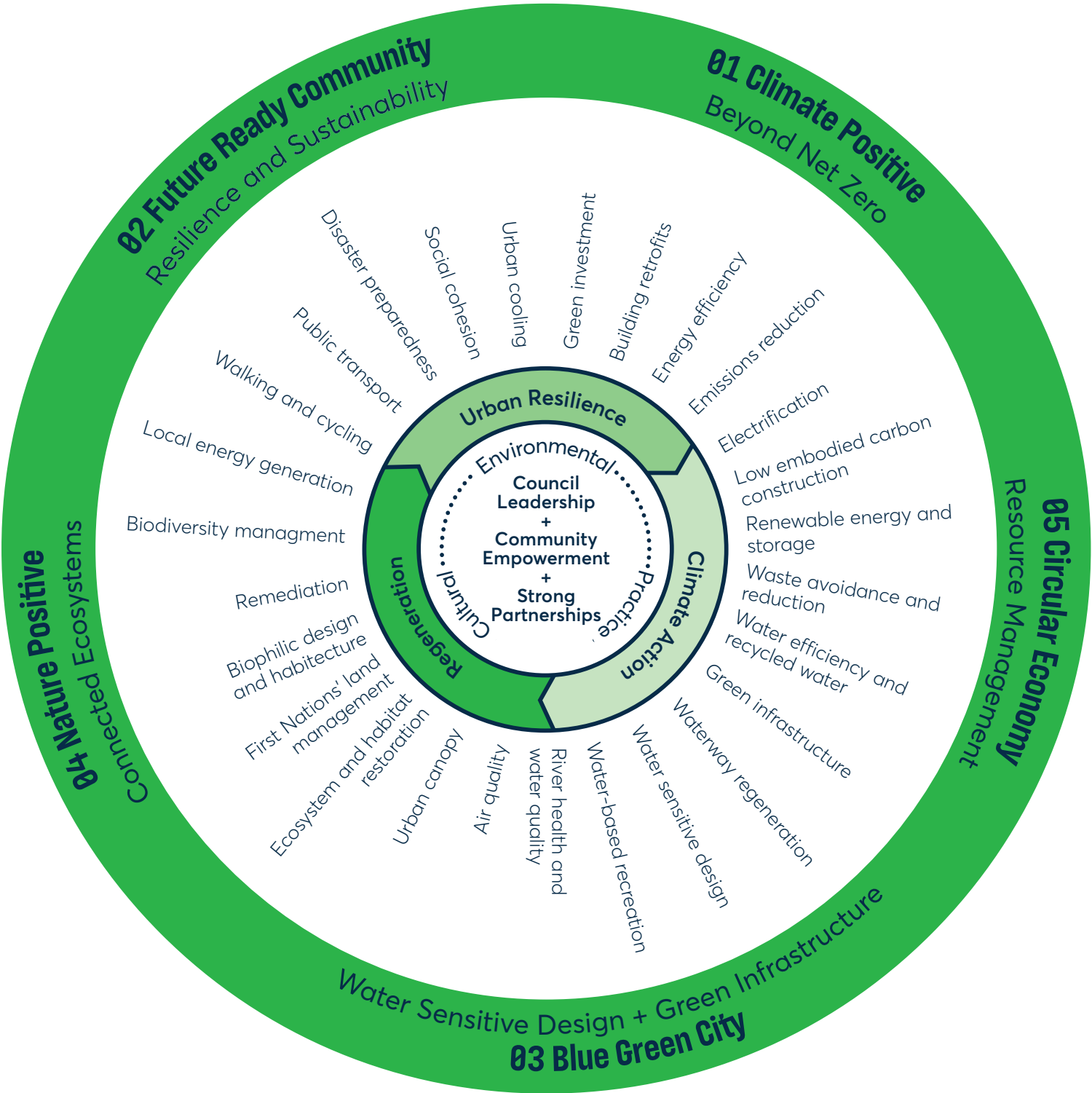


Figure 1: Environmental Sustainability Strategy 2024-2033. Our five priorities set a framework that spans a range of environmental and sustainability outcomes, radiating from our strategic drivers and implementation principles.

OUR JOURNEY SO FAR

People’s relationships with the local environment and Parramatta as a place, has a long history. Environmental action is critical to our well-being and success as we become a global city.

For thousands of years Parramatta has been an important meeting place for First Nations peoples, with the Burrumattagal, a clan of the Dharug, first settling along the upper reaches of our iconic Parramatta River. Wellbeing of Country recognises the interconnectedness of all, including past, present, and future generations.

Extensive river, wetland, and land modification commenced in 1788 with colonial settlement, European agriculture, industrial development, and urbanisation (Figure 2). This shift in land management resulted in a legacy of environmental challenges and health risks, including the decision to disallow swimming in Parramatta River in 1943 due to unsafe water quality.¹

COMMUNITY ACTIVATION

From as early as 1970, community concern has shaped action around the Parramatta River. Concerns for the health of residents and the River, led to changes in environmental legislation such as the *Clean Waters Act 1970* as well as new on-ground restoration, and remediation programs.

A key shift in the momentum of this environmental action was marked by the regenerative agenda associated with the 2000 Sydney Olympic Games. Alongside the preparations to host the games, over 640ha of industrial land was transformed into nature, parkland, and new urban precincts.² This restoration and renewal of post-industrial land, was one the most extensive projects of its time and established a great environmental legacy.

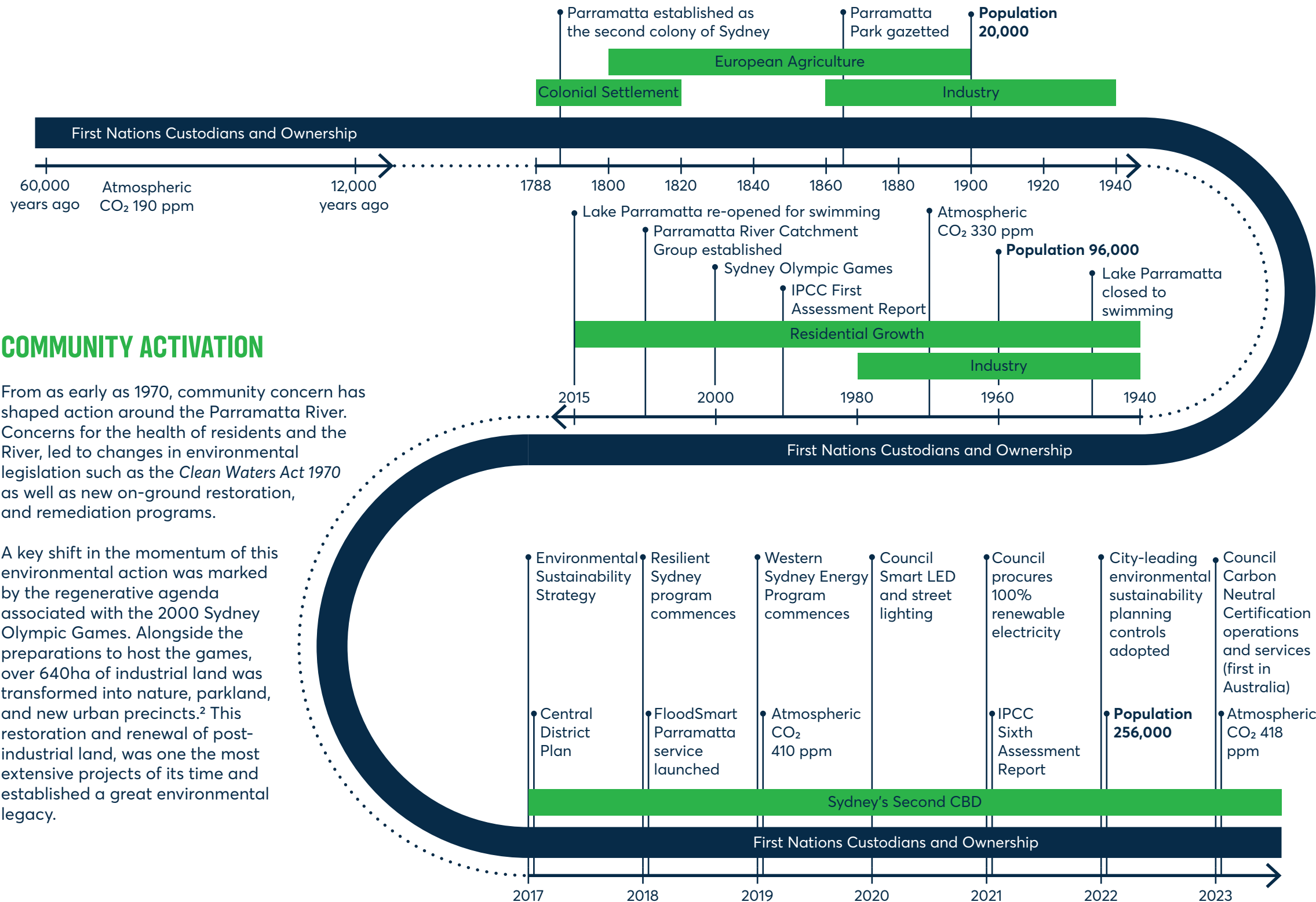


Figure 2: Our journey: Timeline of key events influencing Parramatta’s environmental journey. Changing population and carbon emissions highlight increasing challenges.

OUR JOURNEY AHEAD

"Love of place, affective bond between people and place."

Yi-Fu Tuan 1990

GROWING MOMENTUM AND OPPORTUNITY

The transformation associated with the 2000 Sydney Olympic Games set a new level of ambition for Sydney and helped re-define thinking around Parramatta's role at its centre.

More recently, State government district plans released in 2017 nominated Parramatta as the geographic and demographic heart of Sydney, setting a direction for Parramatta as a global city and Sydney's Central River City.

As more people call Parramatta home, our relationship and connections with the environment become increasingly important. The health, wellbeing, and liveability of our waterways, nature, and people are interwoven.

Higher density living can reduce carbon emissions from traditional, low-density development. It also provides opportunities for coordinated services including resource recovery and circularity, electrification, renewable energy, and electric vehicle charging.

An increasing population presents challenges around managing climate hazards and ensuring people living in higher density have easy access to nature, waterways, and green open space.

TOWARDS A REGENERATIVE FUTURE

Sustainability and resilience are central to Parramatta's identity and integral components for a regenerative future.

To drive a regenerative future, there is a need for continuing leadership that involves our community as part of the solution. There is also a need for strong, empowering partnerships with all levels of government, community, organisations, and investors.

Council's inaugural and award-winning Environmental Sustainability Strategy was endorsed in 2017. It nominated Parramatta as a great City that grows better every day. Marking a key shift in Council's environmental leadership, the 2017 Strategy set strong foundations to shape a nature-inspired, efficient, and resilient City.

Council has been leading by example, delivering well-researched, innovative, and partnership benefits to our community, including reducing emissions, pollution, and creating new economic opportunities for our City.

This Strategy builds upon these achievements, placing our environment at the heart of Parramatta's future as a global city.



FROM EGO TO ECO

To be environmentally sustainable, there needs to be a shift from a human-centred approach which places people at the top of the ecosystem hierarchy and decision-making process, instead to an eco-driven approach which recognises the interconnectedness of all beings (Figure 3).

Disrupting this narrative and changing from ego to eco also acknowledges that this has been the approach of generations of First Nations peoples in supporting the wellbeing of Country.

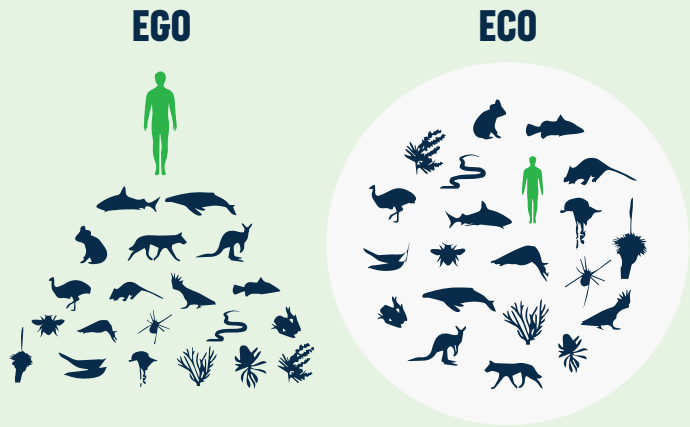


Figure 3: Human-centred and eco-driven management approaches. Achieving wellbeing of Country requires shifting from a human-centred approach (left) to an eco-driven (right) approach that recognises the interconnectedness of all beings. Adopted from Connecting with Country Framework, Government Architect NSW.

HOW WE DEVELOPED THIS STRATEGY

The following steps were undertaken in development of this Strategy:

➤

Best Practice Research

➤

Identified leading approaches implemented by successful regenerative, resilient, and sustainable cities.

➤

Strategic Review

➤

Analysed international, federal, state, and local legislative commitments, scientific evidence, and reporting frameworks. Identified opportunities to embed resilience and regeneration within Council processes and systems.

➤

Independent Expertise

➤

External specialists undertook net zero and water sensitive analysis to identify key areas of Council's influence and actions of value. A risk audit of Council's ESS 2017 reviewed governance frameworks, state and federal targets, and appropriate metrics.

➤

Community Engagement

➤

Engaged more than 25 environmental experts, including Council's Environmental Advisory and First Nations Committees, 50 stakeholders, 100 internal staff, 350 community members, and reviewed 950 responses to Council's 2022 Environmental Behaviours Survey to gather input and feedback. Synthesised community views shared with Council since 2017 on a range of issues, plans, and strategies.

KEY AREAS TO ADDRESS

The following challenges and opportunities were identified through the community and stakeholder engagement process:

CUSTODIANSHIP

Our community want to be environmental custodians, but many are unaware or unsure how they can make a difference. They want First Nations voices, culture, and custodianship to be heard and embedded into Council's decision-making. They are seeking support to improve their environmental practices, reduce their environmental impacts, and adopt cost-effective environmental solutions.

BLUE AND GREEN SPACES

People want parks, waterways, and bushland to relax in, escape to, and enjoy. They want connected and healthy ecosystems for wildlife to thrive within, and for swimming to return to Parramatta River. Increasing green and blue spaces for urban cooling is critical. They also want Council leadership in flood, bushfire, and storm impact mitigation and management.

WELL MANAGED GROWTH

People view growth as important, but not at any cost. They want a holistic approach to development that also sees the environment, economy, and other social outcomes improved. They want our City to be future ready, with great places that enable people to come together, and live sustainably and safely.

A RESILIENT AND SUSTAINABLE CITY

People want an eco-efficient, smart, and responsible City with resilient, regenerative, and low emission buildings, precincts, and public domain. They want to reduce, reuse, and value water, energy, and waste. They are seeking Council leadership to enhance City resilience during community-wide challenges, and to mitigate city-system disruptions to electricity, water, transport, and internet.

ENVIRONMENTAL ADVISORY COMMITTEE (EAC)

Council's EAC was formed in November 2022 to seek ongoing community and expert advice, input, and feedback on environmental and sustainability issues in relation to Council policies, programs, and services. Their valuable contributions influenced the development and implementation of this Strategy.

STRATEGIC CONTEXT

The best practice research identified the following policies and initiatives as influential for this Strategy (Figure 4):

The **2015 Paris Agreement** legally binds Australia to reduce emissions to keep climate change to below 2°C. As Sydney's third highest carbon emitting LGA, this Strategy ensures Parramatta is aligned to achieving this goal.

The **United Nations Sustainable Development Goals** include 17 goals, with this Strategy aligning to the following 7 goals: clean water and sanitation; affordable and clean energy; sustainable cities and communities; responsible consumption and production; climate action; life below water; and life on land; (Goals 6, 7, 11, 12, 13, 14 and 15 respectively).

The **Australian State of the Environment Report** (2021) highlights how growing urban populations and resource demand, plus threats of climate change, contribute to wellbeing in urban environments. This Strategy addresses these issues in Parramatta.

The **NSW Climate Change Policy Framework** sets the State's goal of achieving net zero emissions by 2050, which this Strategy aligns to while working to make our LGA more resilient to climate change.

The **Central City District Plan** informs strategies and policies across the cities of Parramatta, Blacktown, Cumberland, and the Hills Shire Council, through identifying priority areas to manage growth and improve liveability. Waterway health, biodiversity, bushland, open space, and urban canopy cover are highlighted within the District Plan and are supported by this Strategy's priorities.

The **NSW Waste and Sustainability Materials Strategy** targets reductions in food waste, plastic consumption and litter while improving recovery, recycling, and reuse of waste by 2041, which this Strategy is aligning to.



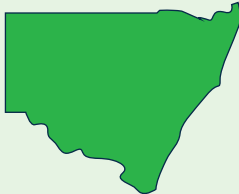
LOCAL

- Parramatta LGA
- Environmental Planning and Assessment scheme
 - Integrated Planning and Reporting Framework (featuring Community Strategic Plan)
 - Council's strategies, policies, and plans.



REGIONAL

- Dharug Nation (dotted)
Central District Plan (green)
- Resilient Sydney Strategy
 - Six Cities Discussion Paper
 - Central City District Plan
 - Parramatta River Masterplan
 - WSROC Turn Down the Heat Strategy
 - Western Sydney Energy Program & Electric Vehicle Roadmap
 - Western Sydney Waste and Resource Recovery Plan
 - Sydney Olympic Park Masterplan
 - Regional Litter Prevention Strategy.



STATE

- Climate Change Adaption Plan 2022
- Climate Change Policy Framework
- Energy Plan
- Net Zero Plan
- Future Transport Strategy 2056
- Premier's Priorities
- Sustainable Buildings SEPP 2023
- Greater Sydney Water Strategy
- Circular Economy Policy Statement
- Waste and Sustainable Materials Strategy
- Biodiversity Strategy
- Blue Carbon Strategy 2022
- Plastics Ban 2022.



NATIONAL

- State of Environment Report 2021
- National Climate Resilience and Adaptation Strategy 2021
- Climate Change Bill 2022
- Environment Protection and Biodiversity Conservation Act
- National Waste Policy and Action Plan and National Waste Report 2022
- Resilience and Hazards SEPP
- Nature Positive Plan 2022
- Australian Rainfall and Runoff 2019.



GLOBAL

- Paris Climate Agreement
- Glasgow Climate Pact
- United Nations Convention on Biodiversity
- Global Biodiversity Framework
- United Nations Sustainable Development Goals
- State of the Global Climate 2022
- Intergovernmental Panel on Climate Change (IPCC) Climate Change Report 2022
- United Nations Declaration of Rights of Indigenous People.

Figure 4: Local to global policies and initiatives that influence, guide, and support this Strategy.

HOW WE PLAN

INTEGRATED PLANNING AND REPORTING

All planning at Council is conducted within the Integrated Planning and Reporting (IP&R) framework – a mandatory framework for all NSW councils (Figure 5).

City of Parramatta’s Community Strategic Plan 2018 – 2038 (CSP) is the leading plan in this framework. The CSP sets out the City’s long-term goals and outlines our vision to become:

“Sydney’s Central City: sustainable, liveable and productive – inspired by communities.”
The Environmental Sustainability Strategy 2024-2033 has been developed in response to the CSP, and addresses the challenges currently facing the community. It supports our CSP vision by establishing further priorities and action areas that foster a climate positive, resilient, and regenerative Parramatta.

COUNCIL’S ROLE

Council plays a very broad role in delivering the Strategy across the City. To support clarity around our levels of responsibility this Strategy uses a ‘deliver, partner, advocate’ model.

➤ DELIVER

Council delivers a wide range of programs and services including waste collection, libraries, childcare, maintenance of local roads and public spaces, recreation facilities and programs, community care, special events and regulatory functions.

Example – We can deliver sustainability outcomes through our business operations, community and infrastructure services including waste, recycling and litter, drainage, and green space management.

➤ PARTNER

Council builds strategic partnerships with federal and state government agencies, the private sector, community organisations, and a range of other stakeholders that will contribute to delivering the Strategy’s objectives.

Example - We can partner with other organisations to deliver water quality improvements over an entire river catchment, or across areas we might not have responsibility for, such as Sydney Water’s sewer system.

➤ ADVOCATE

When we are not in partnership or do not have direct control over an issue, Council gives voice to the needs and aspirations of the community through advocacy. We advocate for changes in policy and action at relevant levels of government and industry to bring about the best outcomes for our community and environment.

Example - We can advocate for planning and legislation changes at state and federal government levels that enable progress on climate action for our local community.

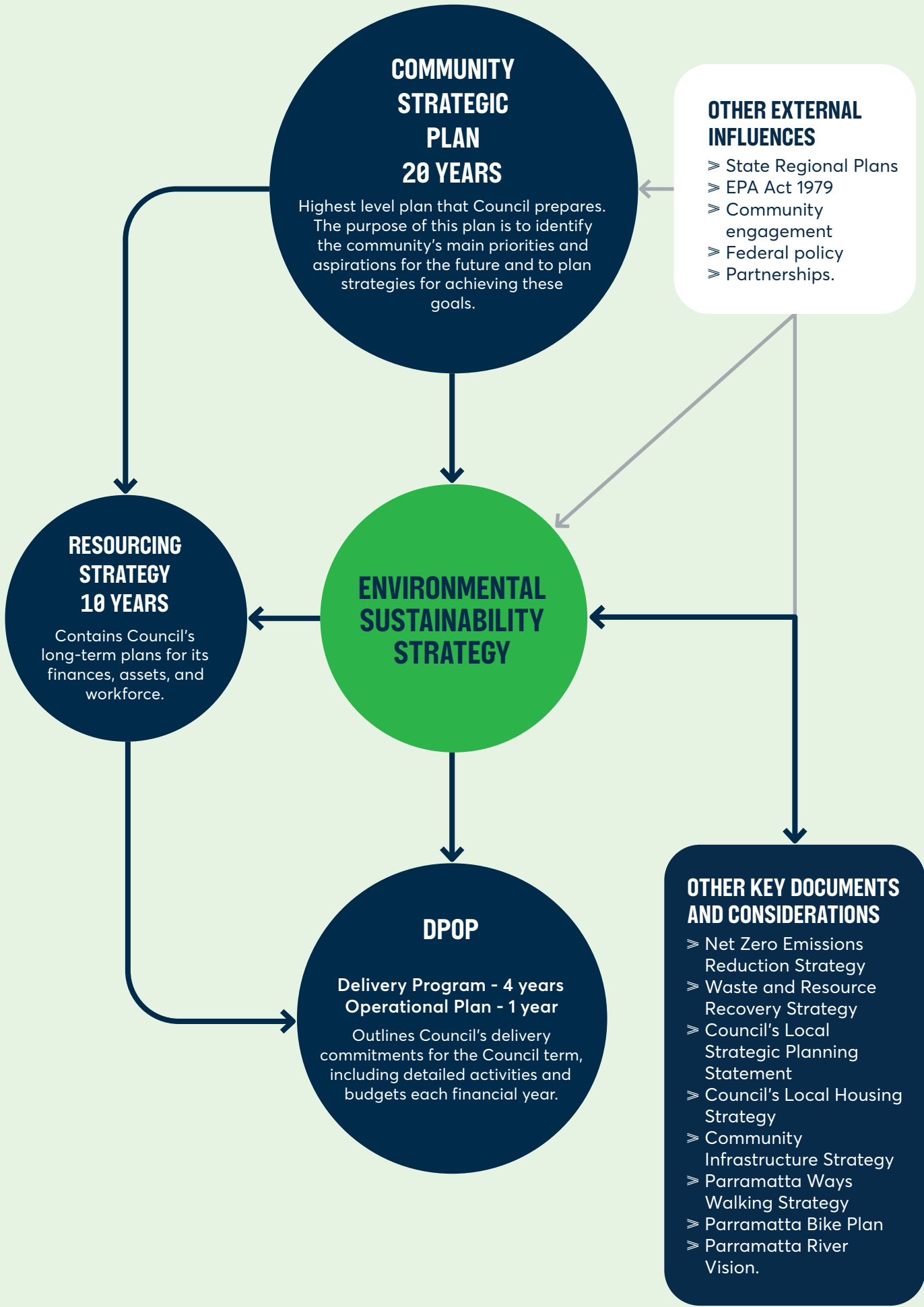


Figure 5: Council’s Integrated Planning and Reporting framework



OUR CITY

02



Our environment is at the heart of Parramatta's identity and wellbeing. It is central to how we will respond to the challenges we face with climate change and the growth of our community.



A CITY IN NATURE

Parramatta is a City in nature, located at the head of Sydney Harbour. At its heart, flows the Parramatta River, an ancient waterway that has attracted and sustained communities for thousands of years.

Regarded as a living entity by First Nations people both in spirit and body, Parramatta River provides life and is a valuable transition zone between salt and fresh water. Our 105km of waterways support extensive networks of 863ha green open space including 389ha remnant bushland, intrinsically valued by wildlife and our community (Figure 6). Our urban tree canopy provides important urban cooling for our parks, streets, walking and cycleways.

Parramatta is also defined by two regional parklands: Parramatta Park and Sydney Olympic Park. Centrepieces of an expansive network of open space, they are of vital cultural and environmental significance, and contribute to the health and social wellbeing of our community and Greater Sydney.

As Australia's second oldest city, community and visitors readily experience the intermingling of past and present. Destinations such as the UNESCO World Heritage listed Parramatta Park, Parramatta North Heritage Precinct, or the nationally significant Harris Park heritage precinct provide a glimpse into Parramatta's storied past and present.

City-shaping infrastructure projects like Parramatta Light Rail, Civic Link, Powerhouse Parramatta, PHIVE, Parramatta Square, and the Parramatta Aquatic Centre continue to redefine Parramatta as a global city that is connected and vibrant, with diverse natural and cultural opportunities.

With an additional 100,000 people set to call Parramatta home in the next 10 years, where and how people live is rapidly changing.³ With 13 growth precincts identified across the LGA, new high and medium density living is presenting opportunities for renewal and innovation when it comes to planning for environmental benefits.

The extent of Parramatta's growth alongside our quantity of natural assets truly sets us apart as a City in nature.

GROWTH PRECINCTS	NEW DWELLINGS
01 Camellia	10,000
02 Carlingford	4,470
03 Carter Street	5,860
04 Epping	8,910
05 Granville	5,830
06 Melrose Park	9,610
07 Parramatta CBD	14,350
08 Parramatta East	3,610
09 Parramatta North	800
10 Sydney Olympic Park	10,260
11 Telopea	4,890
12 Wentworth Point	8,980
13 Westmead	5,470

Source: City of Parramatta's Local Housing Strategy, July 2020. Accessed: 11 June 2024

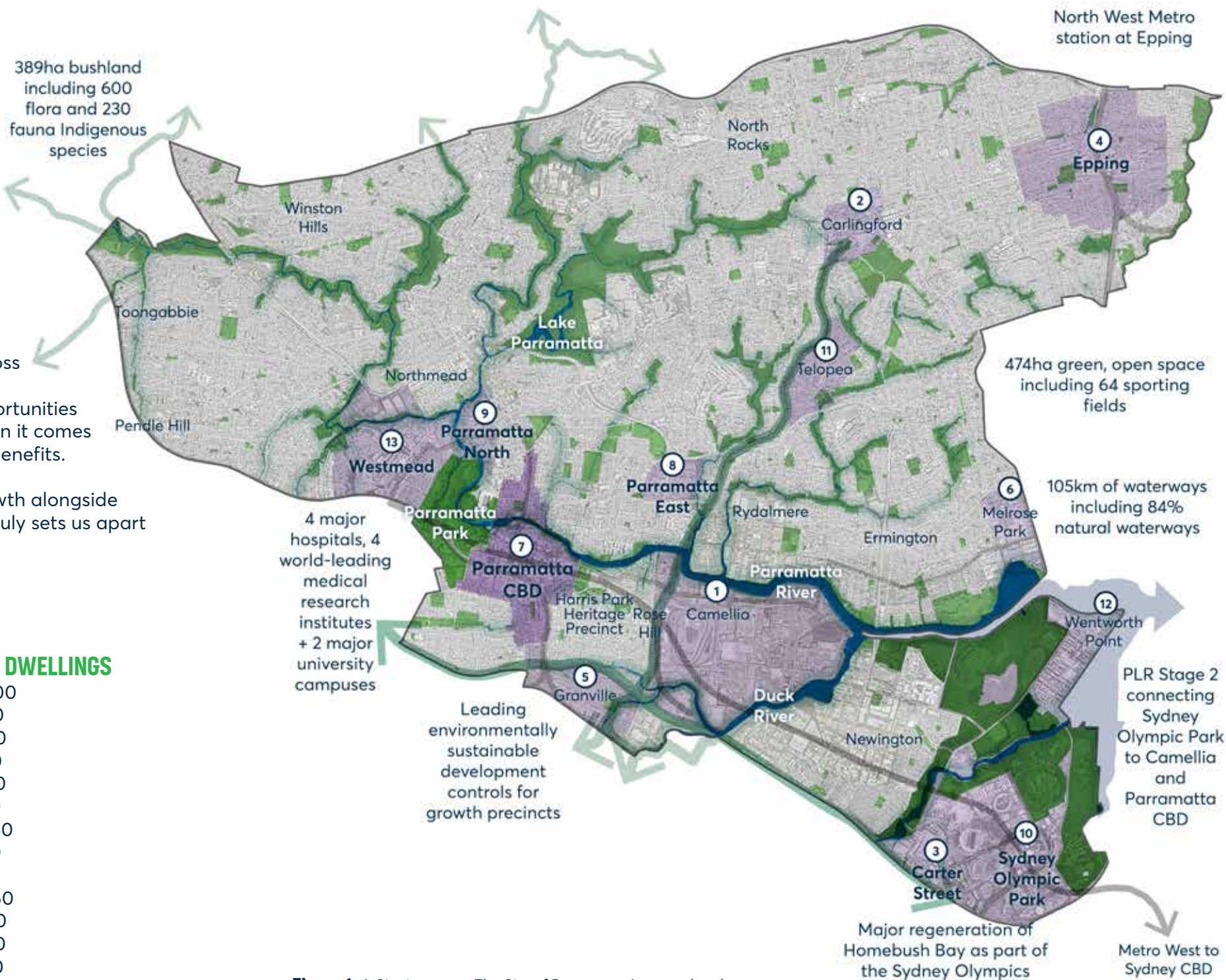


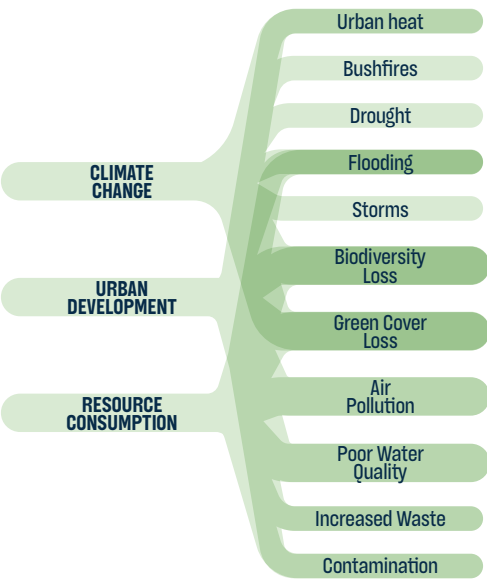
Figure 6: A City in nature. The City of Parramatta's natural and urban features.

THE BIG ISSUES

Our environment is deteriorating, impacting the wellbeing of all Australians.

The Australian Government’s 2021 State of Environment report clearly articulates growth, climate change, and resource consumption as the big issues for urban areas (Figure 7).⁴

Together, these issues create compounding and interrelated impacts on our community, and they must be addressed simultaneously.



CLIMATE CHANGE

Our climate is changing due to increased carbon emissions⁵ in the atmosphere.⁶ Australia has experienced warming of 1.4°C and the planet is on track to surpass both the 1.5°C and 2°C thresholds.⁷ To stay within the 1.5°C threshold, Australia would need to cut emissions by 74% by 2030 and reach net zero emissions by 2035.⁸

Climate impacts within our LGA include higher temperatures, an increased number of heat, flood, and bushfire events, reduced rainfall, sea level rise, more intense rain events, and infrastructure damage (Figure 10).

Natural disasters affect our health, productivity, liveability, and economy. They currently cost the Australian economy \$38 billion each year and this figure is estimated to increase to \$73 - \$94 billion by 2060.⁹

Climate change increases the risk of human health impacts such as heat stress. Increased heat and weather extremes also contribute to higher consumption of energy and water, which may result in an increase in cost of living. These impacts put our most vulnerable communities at risk.

We must plan for, mitigate, and adapt to the effects of climate change to ensure our community is prepared and can bounce back.

GROWTH

City of Parramatta’s population is estimated to increase to 375,000 people by 2033.¹⁰ The number of dwellings is estimated to grow by 77%, while the number of people commuting for work and visiting is also expected to increase.

Parramatta is uniquely placed in Sydney due to our density and projected growth. With 63% of our community living in high and medium density dwellings, Parramatta is developing at a significantly higher rate compared to the rest of Greater Sydney.¹⁰

Investment and changes to land use provide opportunities to improve degraded land and waterways, and accelerate the electrification and renewable energy transition. It also creates challenges, including managing competing demands for space, increases in water and resource consumption, waste generation, and carbon emissions.

We must plan for sustainable growth that enhances our natural environment.

WELLBEING

Population growth, urban development, and loss of natural environment all impact quality of life for our community.

The wellbeing of our community relies on places for everyone to play, relax, and connect with nature and each other. Bushland, waterways, and green spaces improve happiness, physical health, and mental health, especially for children.¹¹

These must be protected to ensure Parramatta remains a great place to live. Planning for our environment is planning for the wellbeing of our community.

Figure 7: 2021 State of Environment Report: Big issues and their compounding and interrelated environmental impacts.

THE STRATEGY

03



"The first rule of ecology
is that everything is
connected."

Barry Commoner, *The Closing Circle* (1971)



Credit: City of Parramatta

OUR VISION & PRINCIPLES

OUR VISION

A City for nature. Sustainable, resilient, and on a journey of regeneration.

Parramatta will be a regenerative city that cares for the environment through taking climate action, strengthening urban resilience, and empowering our community.

Parramatta River and healthy waterways are central to our identity. Our built environment operates in harmony with the natural landscape and our community are empowered custodians in caring for the land.

Our liveability is enhanced by being a water sensitive city that not only manages flooding but retains, reuses, and celebrates water throughout our local neighbourhoods and open space corridors.

Strong social cohesion ensures the community is prepared, adaptive, and resilient in the face of climate hazards. Biodiversity is thriving and utilises blue and green corridors across our local government area, connecting our community to nature.

Parramatta's flourishing economy embraces circular economy principles. Collaboration between enterprises, research institutes, and community promote a culture of innovation and drives economic competitiveness, including emerging renewables and sustainability focused industries.

Embracing circular and green economy principles creates a City that cares for Country, community, and the global future.

FIRST NATIONS STRATEGY

The cultural environmental practices within this Strategy are guided by Council's draft First Nations Strategy and centred around its pillars of social justice, cultural leadership, social cohesion, celebration, and accountability.

OUR IMPLEMENTATION PRINCIPLES

This Strategy is founded on the following principles, which will guide implementation of our actions:

COMMUNITY EMPOWERMENT

Our community is passionate about protecting and enhancing the environment, and it is only through collaborative efforts that we can achieve significant environmental sustainability ambitions. Through continued education, engagement, and provision of knowledge and resources, the community will be empowered to participate in transforming Parramatta into a resilient and regenerative City.

COUNCIL LEADERSHIP

Achieving our sustainability ambitions requires strong organisational leadership. Council will respond to the climate emergency by reducing the City's environmental footprint and transitioning to a zero-carbon and regenerative economy.

We will show respect, have integrity, and be accountable. We lead by example and our organisation is governed responsibly and sustainably.

We have the courage to look for new ways and try new things, and to step up and take risks if it means making a difference. We will be ambitious in our journey to achieving our vision, leading the way for other local governments.

STRONG PARTNERSHIPS

To maximise environmental sustainability outcomes, governments, stakeholders, the private sector, academics, and our community must work together. We will maximise strategic partnerships to create a culture of collaboration, experimentation, and creative thinking that embraces new ideas and delivers environmental solutions to benefit our community and nature.

FIRST NATIONS COLLABORATION

We acknowledge the United Nations Declaration of Rights of Indigenous People (UNDRIP) and will work together with First Nations peoples, especially the Burramattagal of the Dharug nation, to value nationhood, primacy of family, language, cultural and spiritual identity, dignity, governance by Elders, and rights to and protection of Country.

OUR PRIORITIES

Creating a great City that cares for Country, community and our global future.

This Strategy responds to the big issues, challenges, and opportunities to support shared environmental cultural practice through the following strategic drivers:

CLIMATE ACTION

The need for immediate and urgent action to reduce our emissions, contributing to global efforts in reducing the severity of climate change.

URBAN RESILIENCE

The need to ensure our community, environment, and City is prepared and has the capacity to positively respond or adapt to external shocks and stresses such as climate change.

REGENERATION

The need to not only maintain or minimise our impact on our environment but to actively support its recovery, remediation, and capacity to thrive, supporting our health and that of future generations.

PRIORITIES

Our priorities set out our long-term environmental sustainability ambitions and the steps we are taking to progress them. Through consultation with our community, we have shaped our priorities to shift the dial on some of the key environmental issues we face. Together, our priorities provide key directions and a framework to support our community, businesses, and City across a broad range of interconnected environmental considerations relevant to Parramatta.

BY 2033 WE WILL TRANSITION ...

CLIMATE POSITIVE

From a carbon emitting community ➤ *... to a leader in climate action.*

FUTURE READY COMMUNITY

From a city of high growth precincts ➤ *... to resilient and sustainable communities.*

BLUE GREEN CITY

From the forgotten waterways at the head of the Sydney Harbour ➤ *... to a water sensitive city known for green spaces.*

NATURE POSITIVE

From a city with nature ➤ *... to a city for nature.*

CIRCULAR ECONOMY

From a city that manages waste ➤ *... to a no waste community.*

PRIORITY 01

CLIMATE POSITIVE

We will implement urgent, strong, and equitable climate change action to move beyond net zero.

“Sydney is not on track to meet its 2030 or 2050 targets.”

Committee for Sydney

Australia has already experienced 1.4°C of warming, and 2020-2030 has been identified as the critical decade for action.¹¹ We need greater coordinated action and more targeted efforts to mitigate the worst impacts from a changing climate.

Climate positive is the ambitious and important next step in the effort against climate change. It requires activity that goes beyond achieving net zero emissions to remove carbon from our atmosphere and create environmental benefit.

The Parramatta LGA is the third-largest source of carbon emissions in metropolitan Sydney (Figure 8). Council's key areas of influencing emission reduction includes electrification of buildings and transport, minimising waste, reusing resources to their highest value, and constructing or retrofitting buildings with minimum embedded and operational emissions (Figure 9).

Our target is to achieve a 75% reduction in both community and corporate emissions by 2038 and for Council to continue being carbon neutral certified. These targets align with Australia's required 74% emission reduction and net zero commitments by 2035 as per the 2015 United Nations Paris Agreement and the 1.5°C threshold.⁸

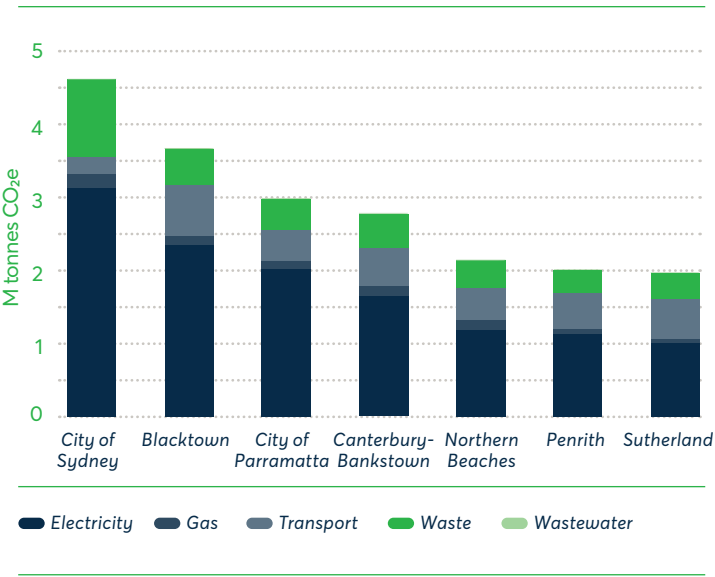
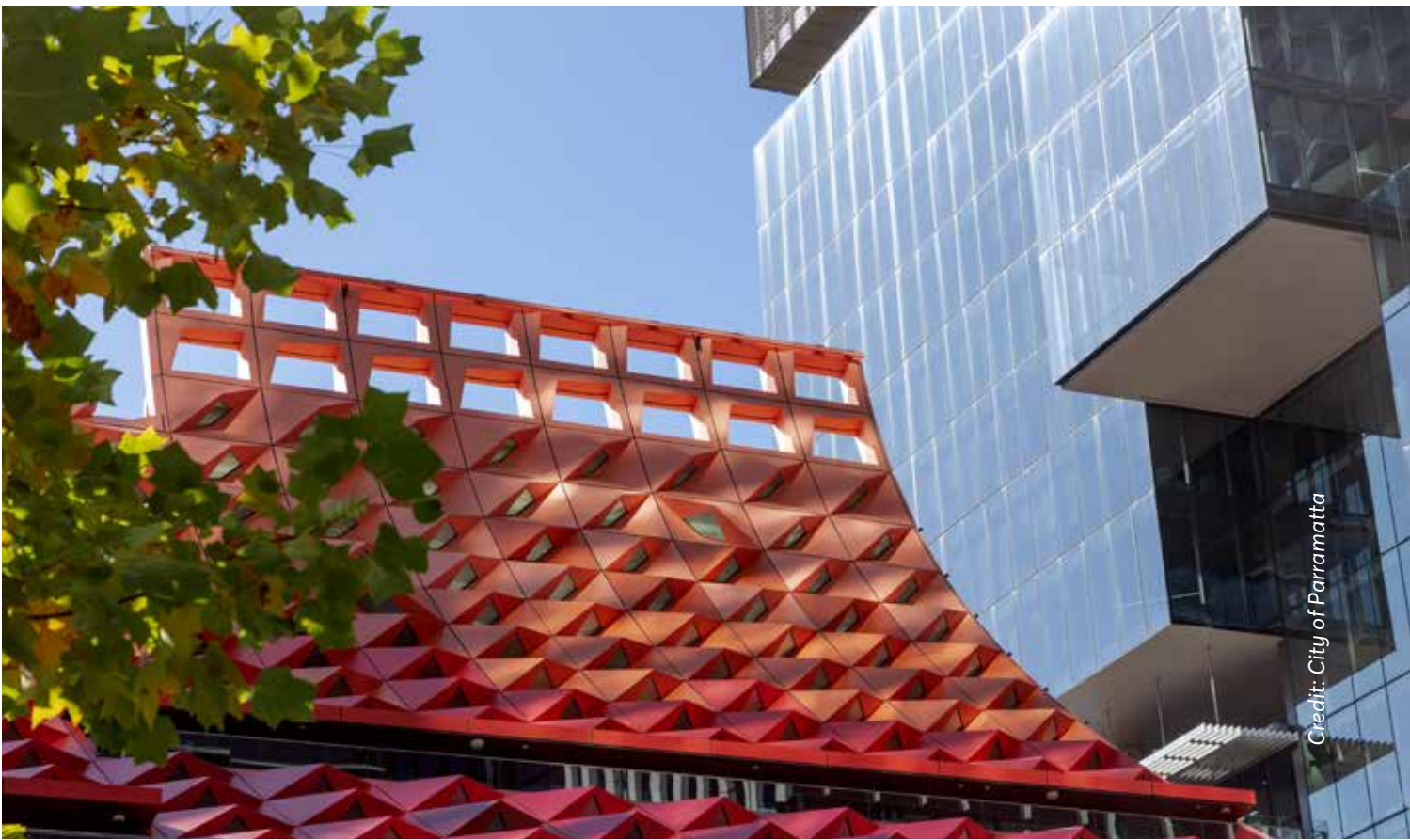


Figure 8: Metropolitan Sydney F21/22 carbon emissions by LGA. Parramatta LGA is the third largest carbon emitter in metropolitan Sydney, after City of Sydney and City of Blacktown. Source: Adapted from Resilient Sydney data platform (accessed June 2023)

CLIMATE POSITIVE ASPIRATION

Climate positive organisations go further than just achieving an overall balance between carbon emissions produced or consumed and carbon emissions removed from the atmosphere (net zero). To be climate positive, they remove more carbon than they emit, as well as deliver environmental benefits to other organisations and communities.

Council is seeking to be a climate positive organisation through avoiding and reducing operational emissions and continuing to be carbon neutral certified. Council will use carbon offsets as our last resort.

Climate positive opportunities could include initiatives like expanding Council's renewable energy production beyond organisational needs, or carbon sequestration through blue (mangroves and wetlands) and green (trees and bushland) infrastructure expansion.

HOW WE WILL ACHIEVE THIS PRIORITY

Council can have a significant impact on reducing local emissions through our waste services and planning controls. We can simultaneously demonstrate climate positive leadership within Council assets, operations, and services.

Council will advocate to state and federal governments seeking their leadership in implementing the significant decarbonisation and climate action required for Paris Agreement targets to be achieved.

We will support and advocate for our community to be net zero through education and community capacity building programs to facilitate decarbonisation.

“Greening the grid is the fastest way to net zero. Rapid transition would remove 3,833M tCO₂e from being generated by 2050”

Resilient Sydney Net Zero app

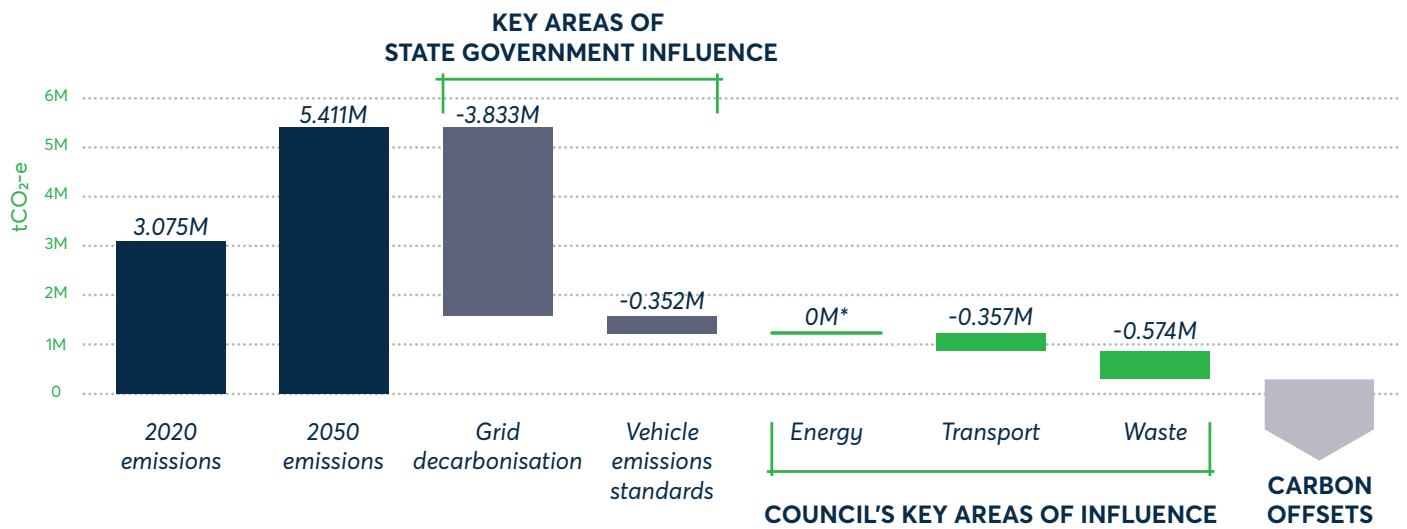


Figure 9: City of Parramatta's LGA emissions reduction pathway by savings type. We will target our actions to savings where Council has the most capacity to influence outcomes for our community such as waste, local transport initiatives, building performance and community behaviour change actions. Source: Adapted from Resilient Sydney Net Zero app (accessed May 2024). *Energy is 0 through grid decarbonisation. Council must ensure the electrification of buildings to maximise the benefits of grid decarbonisation.

COUNCIL SNAPSHOT

MOVING TO NET ZERO

With a focus on reducing emissions from our highest emission sources, Council is on track to achieve our 2017 ESS target of 60% corporate emission reduction by 2038 and providing a strong foundation for this Strategy. Since the introduction of the 2017 ESS, Council has:

- Transitioned residential streetlights to energy efficient LEDs and delivered NSW's largest smart and LED major road lighting upgrade, reducing streetlighting energy consumption by 74% and saving \$10 million.
- Achieved carbon neutral certification and eliminated street lighting and Council building electricity emissions through purchasing 100% renewable electricity (commencing July 2022).
- Built our first 6 Green Star building PHIVE (opened in September 2022) incorporating library, Council chambers and community spaces.
- Worked in partnership with eight other Western Sydney councils to collectively reduce annual carbon emissions by 500,000 tCO₂e through lighting and equipment upgrades, waste management, solar installations, electric vehicle transition and smart city initiatives. These savings equate to taking 100,000 cars off the road annually and has delivered financial savings of \$20 million.

“I have transitioned our home, car, and gardening tools to be powered by 100% electricity from our solar panels. The science shows we are in a climate crisis, and I wanted to decarbonise now to protect the planet for future generations”

Murray Sayle, local resident
Environmental Advisory Committee member



Credit: Joseph Mayers

HOW TO READ THE ACTION PLAN

Response to CSP reflects the relevant CSP goal that this work will contribute to (Fair, Accessible, Welcoming, Green, Thriving, and Innovative).

Council's role refers to the Deliver (D), Partner (P), Advocate (A) model of work adopted in the CSP.

Indicator refers to how we will measure progress towards achieving our objectives.

WHAT WE ARE DOING

These are Council's objectives and actions relating to climate positive.

OUTPUTS	NO.	ACTION	YEAR	RESPONSE TO CSP	COUNCIL'S ROLE	INDICATORS	TARGETS
OBJECTIVE 1.1	We champion equitable decarbonisation across our City through action and advocacy						
Work with partners to support equitable carbon emission reductions for our community	1.1.1	Resource key regional partnerships and research opportunities to support decarbonisation across our local area and communities	2	Green	<div>D</div> <div>P</div>	Total community tCO ₂ e reduced from baseline	50% (by 2030) and 75% (by 2038) carbon emission reduction from 2016/17 baseline
Encourage low carbon emission development, infrastructure, building retrofits, and public spaces	1.1.2	Undertake a review of current research on lowering emissions and supporting energy transition through planning controls and design standards to identify opportunities for application in Parramatta	2	Green Accessible	<div>D</div> <div>P</div>		
Reduce transport emissions	1.1.3	Promote low-carbon transportation through Council's integrated transport planning and advocacy	2	Green Fair	<div>P</div> <div>A</div>		
OBJECTIVE 1.2	Our community is empowered to make equitable net zero decisions						
Provide community education and behaviour change programs, supporting decarbonisation	1.2.1	Undertake a climate positive and sustainability focused education and behaviour change program, incentivising environmental custodianship and culture change	2	Green	<div>D</div> <div>P</div>	Community perception of Council's environmental leadership	Maintain or improve community's perception of Council's environmental leadership
OBJECTIVE 1.3	Council leads climate positive practices, research, and communication						
Transition Council to be climate positive, minimising carbon offsets	1.3.1	Elevate and prioritise delivery of Council's Net Zero Emissions Reduction Plan across all operations, services and procurement activities	2	Green	<div>D</div>	Corporate tCO ₂ e emissions reduced and removed from baseline	Maintain annual carbon neutral status
	1.3.2	Undertake a research paper and action plan to identify Council's climate positive leadership opportunities	2	Green	<div>D</div>		50% (by 2030) and 75% (by 2038) carbon emission reduction from 2016/17 baseline
	1.3.3	Improve Council's public reporting and communication on key environmental and resilience data, including corporate and community carbon emissions tracking	2	Green Innovative	<div>D</div>		

FUTURE READY COMMUNITY

We will lead Parramatta towards a resilient and sustainable future.

“If we want a prosperous, climate-resilient future, we must invest in sustainable infrastructure; it is the growth story of the future.”

The World Bank

Promoting sustainable places and strengthening community preparedness is critical for Parramatta to be a successful future ready City.

Creating a future ready community requires planning for the long-term, embracing innovation, as well as collective effort.

Planning for sustainability and resilience embodies this forward-thinking agenda and will support our community through shaping the type of built environment needed in the future.

Cities are complex systems which, like natural ecosystems, are subject to many different acute shocks and chronic stresses:

Chronic stresses are incidents that weaken the fabric of a city on a day-to-day or cyclical basis. In Parramatta, these include issues like climate change, housing insecurity and housing affordability, lack of access to crucial systems and services, family violence, structural inequity, and food or water shortages.

Acute shocks are sudden, short-term events that threaten the City, such as major storms, heatwaves, floods, bushfires, or disease outbreaks. These acute shocks can amplify chronic stresses and will often disproportionately affect the wellbeing of the most vulnerable in our community, including people experiencing socio-economic disadvantage, people experiencing homelessness, young people, older adults, individuals with a disability, recent migrants, and marginalised communities.¹²

The responsibility for managing these challenges goes beyond the jurisdiction of any one government agency or authority. Effective solutions require partnerships and collaboration. It is therefore critical that we prioritise working with others to ensure we can maximise our impacts and the levels of support we provide our local community.



Credit: City of Parramatta

CITY RESILIENCE

A resilient city refers to the capacity of individuals, communities, organisations, and systems within a city to survive, adapt, and thrive no matter what kinds of chronic stresses and acute shocks they may experience.¹³ Some of Parramatta’s greatest challenges include risks and impacts of urban heat, bushfires, storms, and flooding (Figure 10).

Resilience focuses on enhancing the performance of a system in the face of multiple hazards, rather than individual events. A resilience-led approach to risk management helps bridge the gap between disaster risk reduction and climate change adaptation.

“What makes a good community is people getting involved, even if that’s getting involved with just one thing. If everyone did one thing, together that makes a huge difference.”

Zyntaurus Doona-aroon
Bushcare leader and conservationist

HOW WE WILL ACHIEVE THIS PRIORITY

Empowering our community to respond to a range of challenges rather than single events or risks, requires strong partnerships, government co-ordination, research, and communication.

We will continue to collaborate with partners to share knowledge, research, and support innovation in the planning of our built environment.

We will continually improve community engagement and communications to support social cohesion, awareness, and preparedness.

We will respond to evolving technologies, for example smart grids, recycled water networks, community batteries, and smart meters to improve our ability to emerge stronger after tough times and function better in good times.

“In 2030, Parramatta is modelled to experience 15 days over 35°C including 6 days over 40°C. In 2090, this will further increase to 43 and 9 days respectively.”

NARClIM: NSW & Australian Regional Climate Model

DATA SNAPSHOT

If global emissions continue to increase, by 2090 Parramatta may experience...



Figure 10: Modelled climate change impacts to Parramatta's rainfall with 2090 rain increasing in Autumn and Summer instead of the current spring and winter patterns. Reduction in rainfall is predicted to occur by 2030, with up to 15% decrease by 2090. Of concern is the predicted increase in heavy rainfall events combined with Parramatta River levels rising. Source: Adapted from various sources.¹⁴

COUNCIL SNAPSHOT

PARTNERSHIPS

We have developed long-term, trusted, evidence-based and collaborative partnerships that strengthen the resilience of our community and prepare our natural and built environment for changing climates. Through these partnerships we:

- Advocate on shared issues
- Share knowledge, data, research, and insights
- Leverage strategic direction at a scale and reach beyond what an individual local government could normally achieve.

Since 2018, Council has worked in partnership with the State Emergency Service, Bureau of Meteorology, NSW Police, and other first responders to deliver the FloodSmart Parramatta service. City of Parramatta is prone to flash floods and the FloodSmart Parramatta service enhances community preparedness through innovative water level gauges, weather data, and real time updates and warnings.

Another example is Council's collaborations with university researchers, Resilient Sydney, and NSW Government to map tree canopy and urban heat (Figure 11). This work has informed Council's tree planting programs. With an investment of \$4.5million, Council is now planting over 15,750 trees to mitigate urban heat within the public domain.

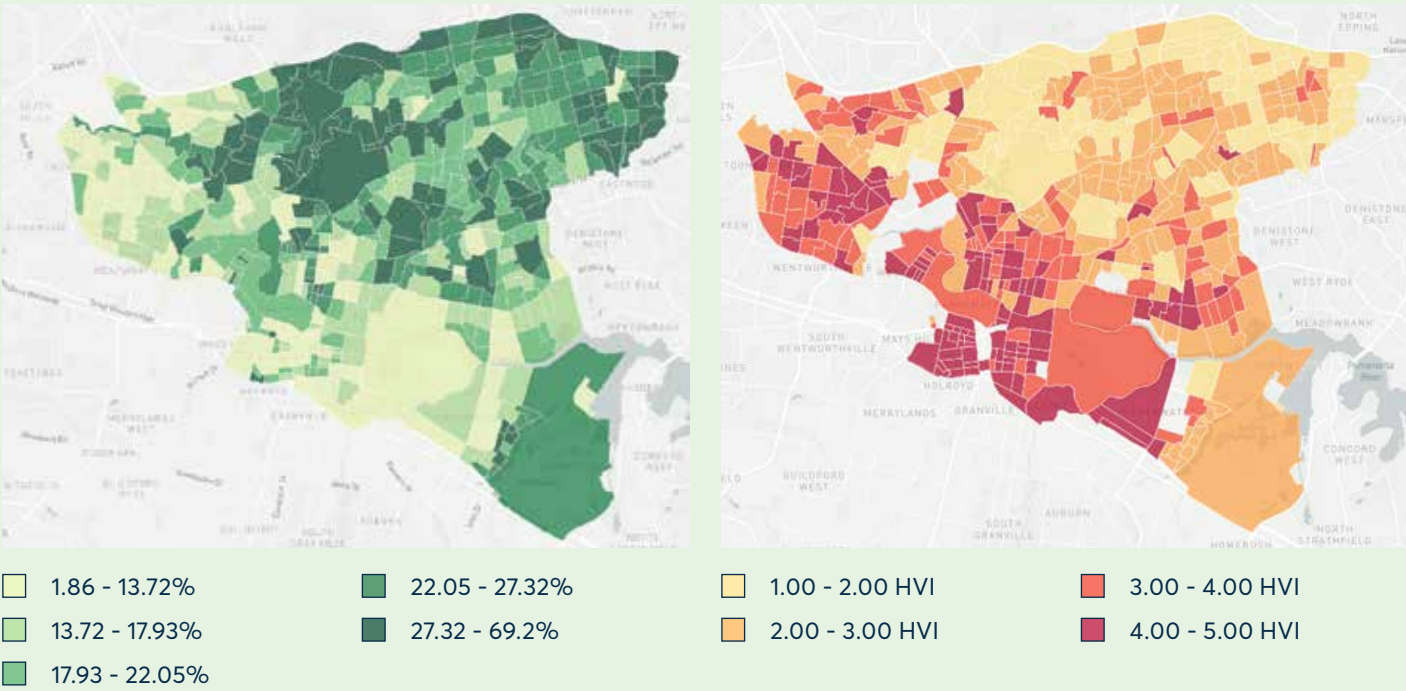


Figure 11: Tree canopy cover (left) is integral in reducing urban heat (right). Locations with high tree canopy cover (dark green) align to lower temperatures (yellow and orange). Source: Adapted from Department of Planning and Environment (2016).

HOW TO READ THE ACTION PLAN

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Indicator refers to how we will measure progress towards achieving our objectives.

WHAT WE ARE DOING

These are Council's objectives, expected outcomes and actions relating to Future Ready Community.

OUTPUTS	NO.	ACTION	YEAR	RESPONSE TO CSP	COUNCIL'S ROLE	INDICATORS	TARGETS
OBJECTIVE 2.1	Our city is resilient to a changing climate and leads on sustainability						
Shape our built environment to be sustainable and to support resilience	2.1.1	Update Council's existing Climate Adaptation Plan to strengthen resilience, and disaster preparedness	2	Green Innovative	<div>D</div>	Community living in disaster prone areas that feel prepared for a disaster (%)	Continual improvement in community preparedness for a disaster
	2.1.2	Identify and promote opportunities to incentivise sustainability focused retrofits, renewable energy, and building upgrades	2	Green	<div>D</div> <div>A</div>		
OBJECTIVE 2.2	Our community is prepared and has the information they need during key city shocks and stresses						
Prepare community for environmental emergencies	2.2.1	Support greater community preparedness for heatwave, bushfire, flood and storm events through specific community engagement on resilience planning	2	Green Fair	<div>D</div> <div>P</div>		
OBJECTIVE 2.3	Council is ready and plans for resilience, climate change adaptation, and mitigation						
Embed climate change mitigation and resilience into Council decision-making and operations	2.3.1	Review and update Council's policy framework to accommodate a clear position on management of climate change related risk, environmentally sustainable design and life-cycle analysis	4	Green Fair	<div>D</div>	Council public assets supported by climate resilience planning (%)	100% of Council public assets supported by climate resilience planning by 2026

BLUE GREEN CITY

We will create a living City defined by healthy waterways and green spaces.

“A healthy river supports and enhances life in many ways ... by introducing greater biodiversity, better air quality and access to activities such as swimming, picnicking, walking, cycling or just relaxing.”

Parramatta River Catchment Group

Recognising the importance of water and green spaces, is critical for the resilience and survival of both our City and nature. For a truly living and thriving City, both the built and natural environments must work together as integrated systems.

Water is the foundation for all life. How we manage, clean, and integrate water through the design and functioning of our City impacts the quality of it as a place to live.

Climate change is expected to exacerbate a range of water related extremes such as flooding, drought, heatwaves, and sea level rise. Water and sewer demand due to population growth is now nearing current infrastructure capacity.¹⁵

Seeking opportunities that move beyond traditional approaches to water supply, sewerage, and drainage infrastructure, towards planning for waterways, the water cycle, and urban resilience will overcome these challenges (Figure 12). Further, these opportunities recognise the importance of cultural connections to water and the broader role that healthy waterways play in shaping the identity and liveability of our City.

A blue green Parramatta prioritises planning for integrated water management and providing space for the retention of water in the landscape. This approach involves moving from traditional 'grey-infrastructure' towards living-infrastructure solutions and a water sensitive city.

We will capture the many benefits of integrating water in the landscape, including urban cooling, flood management, improved creek and river water quality, biodiversity, ecosystem health, surface permeability, access to nature, and a greener healthier city.



Credit: City of Parramatta

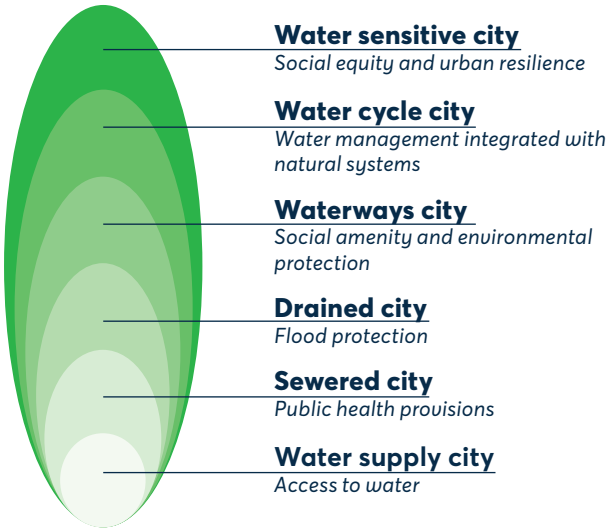


Figure 12: Water sensitive cities framework. Levels of ambition in water management required to achieve a blue green Parramatta. Source: Adapted from the Cooperative Research Centre for Water Sensitive Cities (2021).

WATER IN THE LANDSCAPE

Historically, city planning has removed water from our landscapes as quickly and efficiently as possible. This approach has fundamentally changed how our natural waterways operate, and reduced the visibility of water to our community.

As a result, our waterway health has suffered, and the link this has back to how our built environment is designed and managed is not always clear to our community.

The Parramatta River Catchment Group and Council have set the goal to bring back swimming to the Parramatta River. This goal elevates the issue of water quality by linking it back to a tangible but aspirational outcome for our community.

Council will continue with our goals to support improved water quality, by continuing our agenda to bring back swimming, connecting our community with water, and making its importance visible through how we design and build our city.

HOW WE WILL ACHIEVE THIS PRIORITY

Council plays a significant role in setting development standards as well as delivering stormwater and flood management.

We will support coordinated planning for more blue and green assets through:

- Flood zone planning and mitigation
- Wetlands for stormwater
- Biofiltration and water retention
- Green space and street tree water management
- Water-based recreation including swimming in Parramatta River
- Innovative cooling and irrigation methods
- Litter prevention in waterways
- Water storage and collection.

Council will continue to work with partners to share knowledge and advocate for water sensitive urban design, particularly within our growth precincts and major projects.

We will support and advocate for our community to be empowered to be water smart. Council will demonstrate integrated water leadership within Council assets, operations, and services.

COMMUNITY PROFILE

“Since I became a tree champion, I enjoy getting up in the morning to go see my tree. I walk more than before... I look after them, helping them grow bigger. They helped me get healthier. Trees and me help each other.”

Judy Chang
Local resident, 2021-22 Tree Champion

COUNCIL SNAPSHOT

PARRAMATTA RIVER CATCHMENT GROUP (PRCG)

The PRCG proactively supports advocacy and facilitation on key catchment management issues and on-ground integrated water management.

City of Parramatta was a key driver in establishing the PRCG, creating an alliance of Councils, government agencies and community groups working together to improve the Parramatta River's shores and clean its water. Through the implementation of *Duba, Buda, Barra: Ten steps to a Living River – The Parramatta Masterplan* since 2018, we are creating a home for nature and an oasis for the millions of people who live near it.

PARRAMATTA RIVER VISION

Council adopted the *Parramatta River Vision* in 2023, to re-establish the Parramatta River as central to the identity and value of Parramatta. The Vision sets out a future of improved access to and increased space for water and nature, leading to improved human health, well-being, and recreation outcomes (Figure 13).

With 75% of Parramatta's future growth to occur within a 10-minute walk or cycle of Parramatta River, the Vision identifies an additional 181ha of new public space to complement the existing 685ha managed by state and local government.



Figure 13: Parramatta River Vision with Parramatta River central to the identity and value of Parramatta.

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WHAT WE ARE DOING

These are Council's objectives and actions relating to blue green City.

OUTPUTS	NO.	ACTION	YEAR	RESPONSE TO CSP	COUNCIL'S ROLE	INDICATORS	TARGETS
OBJECTIVE 3.1	We are leaders in blue and green infrastructure network planning and delivery						
Implement regional-scale integrated water systems and green space networks planning	3.1.1	Scope a Water Sensitive City Plan that embeds integrated water management ambitions into Council practice and planning for our local government area	4	Green	<div>D</div> <div>P</div>	Local creek water quality	Increase in total creek health from 2017 baseline over next 4 years
Deliver green infrastructure and retain water in the landscape through planning and development	3.1.2	Prepare and implement a Tree Canopy Plan that protects, diversifies and enhances tree canopy across the local government area	1	Green	<div>D</div>	Green Infrastructure - total vegetation and tree canopy cover	Increase vegetation cover to 40% by 2038
Make Parramatta River and its tributaries central to the identity of Parramatta as a place	3.1.3	Advocate and lead government partnership supporting Council's vision for Parramatta River and its tributaries through co-ordinated land-use planning and project guidelines	2	Green Welcoming	<div>P</div> <div>A</div>		Increase tree canopy cover to 30% by 2050
OBJECTIVE 3.2	Water is a visible and valued resource central to our City and community						
Support community engagement and partnerships that champion and support healthy waterways	3.2.1	Reduce waterway litter and improve waterway health, through community engagement, activation, partnership and behaviour change programs	2	Green Fair	<div>D</div> <div>P</div>	Community rating for Council in community communications and programs focused on waterway health	Increase in performance rating for Council in community communications and programs focused on waterway health
	3.2.2	Review Council policy, funding and data collection options to ensure private water management systems are operational and effective	1	Green Fair	<div>D</div>		
OBJECTIVE 3.3	We embed integrated water management and green infrastructure practices within Council						
Deliver integrated water management and green infrastructure through our public domain and Council's operations	3.3.1	Embed water sensitive urban design (WSUD) standards and green infrastructure into Council's asset management, public domain, and major project processes	3	Green Innovative Fair	<div>D</div>	Non-potable and potable water use and consumption (ML)	No net increase in potable water use by 2038 (baseline 2016/17)

PRIORITY 04

NATURE POSITIVE

We will safeguard our natural spaces, waterways, and wildlife.

Parramatta is a City in nature, uniquely placed to connect nature and people. We have a responsibility to ensure nature is supported for nature’s sake.

A nature positive approach moves beyond conserving nature for human benefit or monetary value.¹⁶ Nature positive is about understanding the value of the natural environment in its own right, and focuses on how nature can be restored and enhanced alongside human activity.

Our planet’s health, including human health, depends on the natural systems that provide us with food, clean water, clean air, and a stable climate.¹⁷ Biodiversity loss is occurring at an unprecedented rate and is one of the great threats facing our planet globally.¹⁷ Cities play a significant role in this loss due to their direct impacts on habitats and natural resources through rapid growth and urbanisation. It is therefore important that cities play a key role in the solution to biodiversity loss both locally and globally.

“Biodiversity in cities is essential for sustainability, liveability and ecological resilience in urban life.”

World Economic Forum, 2022

There are many opportunities to apply nature positive initiatives in Parramatta - extensive wetlands, creeks, and river corridors co-existing with high rise development, transportation networks, and dense urban centres. Within this mix of built and natural environments, are key locations including Sydney Olympic Park, Lake Parramatta, and Parramatta Park. These locations are important habitat refuges and provide critical migratory stops for many species.

To embed our natural environment within our built environment, will require long term change. Council will advocate for a nature positive approach to planning and designing our City. Supported by innovation and technology we will plan for local biodiversity values, habitat connections, migration requirements, and ecosystem services.

Being nature positive is not just about increasing nature in our local area, it is also about minimising our impacts on nature more broadly through the decisions we make, such as the products we buy or where we invest our money. Transitioning to a nature positive global city, empowers Parramatta to pursue improved outcomes for nature, climate, and sustainable development.



Credit: Parramatta River Catchment Group

NATURE'S MASCOTS

Monitoring a species’ distribution and population can provide an overall insight of health and wellbeing of an ecosystem. The following five species’ presence, assists in monitoring the water quality and catchment health of Parramatta River’s estuarine, terrestrial, riparian, and freshwater ecosystems:

- Bar-tailed Godwit (*Limosa lapponica*) is a migratory shore species that undertakes the longest non-stop flight of any bird. Their presence indicates that our estuarine ecosystems, including mudflats and mangroves, are healthy.
- Eastern Long-necked Turtle (*Chelodina longicollis*) is a turtle with a neck almost as long as its body and whose presence indicates that we have healthy waterways.
- Powerful Owl (*Ninox strenua*) is an apex predator and the largest owl in Australasia. They are nocturnal birds that inhabit tree hollows, and their presence indicates that we have vegetation corridors with trees that are upwards of 100 years old.
- Southern Myotis (*Myotis macropus*) is a nocturnal fishing bat with large feet for catching its prey. Their presence indicates healthy waterways and suitable vegetation for roosting sites.
- Striped Marsh Frog (*Limnodynastes peronii*) is a large frog endemic to Parramatta and found in permanent water bodies (photo above). Their presence indicates that our waters are clean.

HOW WE WILL ACHIEVE THIS PRIORITY

We can safeguard our green spaces, waterways, and wildlife through nature-based urban transformation and strategic land use planning. We will demonstrate leadership through delivering integrated custodianship and landscape management actions that value nature and bring our community together.

We will continue to work with stakeholders, communities, and partners to embed nature positive values within and beyond Parramatta through:

- **Habitecture planning and biophilic city design:** integrating biodiversity into our built environment planning, design, and connectivity (e.g., wildlife bridges, fish weirs, and vertical forest building facades).
- **Nature and climate change together:** strengthening nature’s resilience through delivery of ecosystem management and restoration activities that align to future climatic events and habitat requirements (e.g., installing nest boxes for breeding and roosting, and aerial water misting systems to cool species during heatwaves or bushfire prevention).
- **Financing nature’s recovery:** investing in nature-based infrastructure solutions with mutually beneficial outcomes (e.g., investing in wetland drainage systems for stormwater management, water quality, and biodiversity outcomes).
- **Procurement transparency:** incorporating nature’s value into purchases so consumers and investors know the impacts of their choices (e.g., sourcing sustainably certified timber).
- **Decision-making:** considering nature’s value for healthier and more holistic outcomes (e.g., integrating data from biodiversity citizen science projects into decision-making processes, or considering nature benefits when planning and implementing community gardens).

“Australia’s natural environment is not resilient enough to withstand current or emerging threats.”

The Hon. Tanya Plibersek MP

COUNCIL SNAPSHOT

The City of Parramatta, Sydney Olympic Park Authority, Parramatta Park Trust, and other public land managers work in partnership to establish biodiversity baselines, develop research programs, and deliver community projects, to enhance native bush and riparian reserves.

NATURE FOR NATURE’S SAKE

Urbanisation has reduced the number of our local mature mangroves and eucalypt trees, and created barriers in our waterways, which impact the lifecycle and survival of many species including the Short-finned Eel, Powerful Owl, and Ring-tailed Possum.

The following nature positive initiatives have been taken by Council to support these species in their survival and for their ecosystems to function:

- On-ground restoration and expansion of protected mangroves and annually planting 100,000 indigenous species that provide food, shelter, and perching.
- Installing over 600 different nest boxes and carving hollows in stag trees, sized for different wildlife to use for shelter, nesting, rearing of young and protection from weather, especially during heatwaves and cold snaps.
- Installing fish ladders along our waterways allowing fish and eels to navigate obstructions such as weirs.
- Coordinating the Bushcare volunteer, staff and contractor partnership to deliver on-ground biodiversity improvements on Council-managed reserves.

COMMUNITY PROFILE

“Parramatta’s vibrant, it’s growing, and we have to ensure we conserve our natural spaces for future generations.”

*Annie Nielsen
Local resident, conservationist, environmental activist
and Environmental Advisory Committee member*



Credit: Joseph Mayers

HOW TO READ THE ACTION PLAN

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WHAT WE ARE DOING

These are Council's objectives and actions relating to nature positive.

OUTPUTS	NO.	ACTION	YEAR	RESPONSE TO CSP	COUNCIL'S ROLE	INDICATORS	TARGETS
OBJECTIVE 4.1	We actively manage and regenerate nature for both its own benefit and the identity of our City						
Embed nature sensitive planning and design standards supporting biodiversity across our City	4.1.1	Review and document local biodiversity and habitat connectivity spatial requirements in urban areas to better support land-use planning	2	Green	<div>D</div> <div>P</div>	Percentage of LGA dedicated to ecological functions in good condition.	Maintain natural areas in good condition from 2020/21 baseline
	4.1.2	Prepare and implement a Nature Positive Plan that protects, connects and enhances habitat across the local government area	3	Green	<div>D</div> <div>P</div>		
OBJECTIVE 4.2	Our community are custodians supporting nature in our City						
Support community engagement and partnerships that enable our community to become nature custodians	4.2.1	Scope the expansion biodiversity and waterway regeneration on private and public land through Council leadership, partnerships and communications	3	Fair	<div>D</div> <div>P</div> <div>A</div>	Native plant species richness and cover	Bi-annual increase in native plant species richness from 2020/21 baseline
	4.2.2	Lead nature positive community research and citizen science programs by working with partners	4	Green	<div>D</div>		Bi-annual increase in native plant % cover from 2020/21 baseline
OBJECTIVE 4.3	Council leads biodiversity enhancement and habitat restoration practices, research, and communication						
Support biodiversity regeneration through our community volunteers, partners and Council action	4.3.1	Assess how Council can minimise global environmental impacts through procurement, investment and business activities	2	Green	<div>D</div>	Council bushland reserves under active primary area restoration (ha)	Increase in areas under active management from 2020/21 baseline (187Ha) over next 4 years

CIRCULAR ECONOMY

We will champion the circular economy and whole-of-waste system transition.

“Circular economy gives us the tools to tackle climate change and biodiversity loss together, while addressing important social needs.”

Ellen MacArthur Foundation

Circular economy concepts represent new economic opportunities and benefits for the environment, industry, and community. Parramatta’s central location and ongoing transformation presents a unique context for applying these opportunities.

A circular economy is a regenerative approach to economic development that benefits business, society, and the environment. It requires a systemic and cultural shift to reduce the consumption of finite resources and maximise their re-use and recovery (Figure 14).

As Parramatta evolves as a global city, embracing a circular economy will be a cornerstone for economic growth, increasing environmental stewardship and promoting the responsible use of resources.

The transition to a circular economy is urgent. City of Parramatta is the third largest source of waste generation in metropolitan Sydney (Figure 15).

With Sydney’s limited landfill space and recycling systems challenges there is opportunity for innovative solutions to local waste servicing. Food Organics Garden Organics (FOGO), soft plastics and avoiding waste products are some key areas for improvement.

Our City is attracting attention from industry and government as a prime candidate for investments in technology, infrastructure, and utilities, including transport, recycled water, and renewable electricity.

With major health and education institutions and strong economic foundations through our commercial, retail, and industrial sectors, Parramatta has the essential elements to spearhead innovation in the transition to a circular economy.

Parramatta’s gross regional product is outpacing state-wide growth. Geographical location, extensive infrastructure investment, and urban transformation, means that our City is well placed to lead the transition to a circular economy and embrace its opportunities.



Credit: WSROC

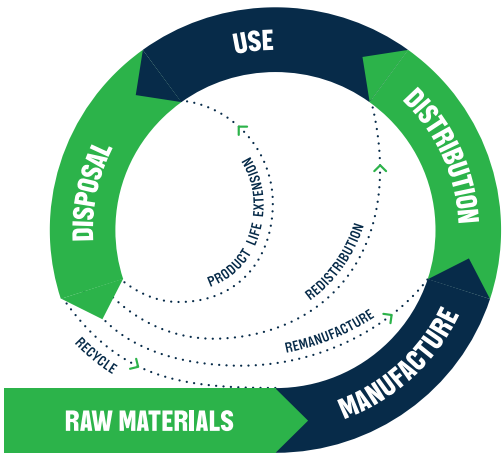


Figure 14: Circular economy concept. Source: Adapted from Innovate UK (2017)

REVALUING RESOURCES

Circular economy opportunities are achieved through the implementation of a whole-of-system approach which integrates societal benefits and environmental custodianship as core concepts. That is, designing products, materials, and services to retain their highest value through refusing, rethinking, and reducing raw materials (Figure 14).¹⁸

The revaluing of resources through circular economic opportunities will:

- Reduce pressure on Sydney’s limited water storage, landfill, recycling, and litter management infrastructure
- Strengthen electricity grid resilience through renewable electricity generation
- Transition from the current ‘take, make, and discard’ linear approach to waste that relies on the least preferred steps, recycling and recovery.

HOW WE WILL ACHIEVE THIS PRIORITY

Transitioning to a circular economy will require collaboration across all levels of government and organisations, and support from communities right down to the level of the individual.

Council will champion and advocate for a circular economy transition that supports our community through the whole-of-waste system transformation. This includes advocating for and delivering education initiatives that support and empower community members and businesses to value products and reduce wastage, especially food, water, and emissions. We will also advocate for innovation across practice in industry, utilities, government, and within our growth precincts.

We will demonstrate leadership through our community waste management services, such as FOGO collections. We will also seek opportunities to embed circular economy principles within Council's operations and services.

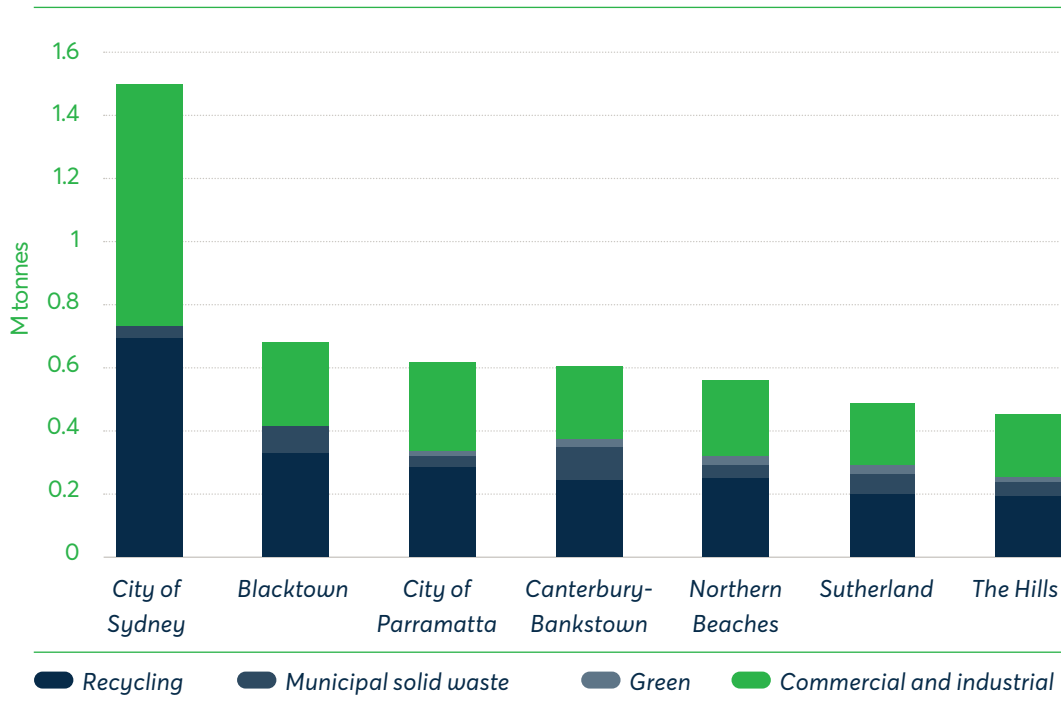


Figure 15: Metropolitan Sydney waste production by LGA. City of Parramatta LGA is third largest waste producer in metropolitan Sydney, after City of Sydney and Blacktown for FY 2021/22. Source: Resilient Sydney (2023).

COUNCIL SNAPSHOT

SUPPORTING COMMUNITY CHAMPIONS

Council's 2023 Citizen of the Year, Julz Strykowski is a passionate environmental educator empowering local communities to tackle plastic pollution at its source. She coordinates volunteers to transform post-consumer material, normally sent to landfill, into reusable cloth bags to replace plastic bags and to start conversations.

She also delivers circular economy outcomes through her award winning PluckFastic waste-to-art program, Greener Gatherings, Friends of Toongabbie Creek, and Plastic Free Parramatta initiatives.

RETHINKING AND REDUCING

Council has been supporting circular economy within existing governance systems including:

- Food organic and garden organic (FOGO)**
Council's residential collection service will commence at the end of 2024. The FOGO collection will divert waste from landfill and reduce emissions, and the organic material will be used in Council's parks and open space.
- Council's Reusable nappies and sanitary products rebate** avoided an estimated 776,000 single-use items (564,000 nappies and 212,000 sanitary items) being used or sent to landfill.
- Powerhouse Parramatta Dematerialisation Strategy** has been developed and implemented by Powerhouse Parramatta, to actively consider circular economy principles from design to delivery.

COMMUNITY PROFILE

"Individuals can make a difference. Participating in Boomerang Bags and other plastic free initiatives allow individuals to do something, to take action, to make awesome friendships, to be part of their community, a global movement and help the environment."

Julz Strykowski
2023 Citizen of the Year



Credit: Joseph Mayers

WHAT WE ARE DOING

These are Council's objectives and actions relating to circular economy.

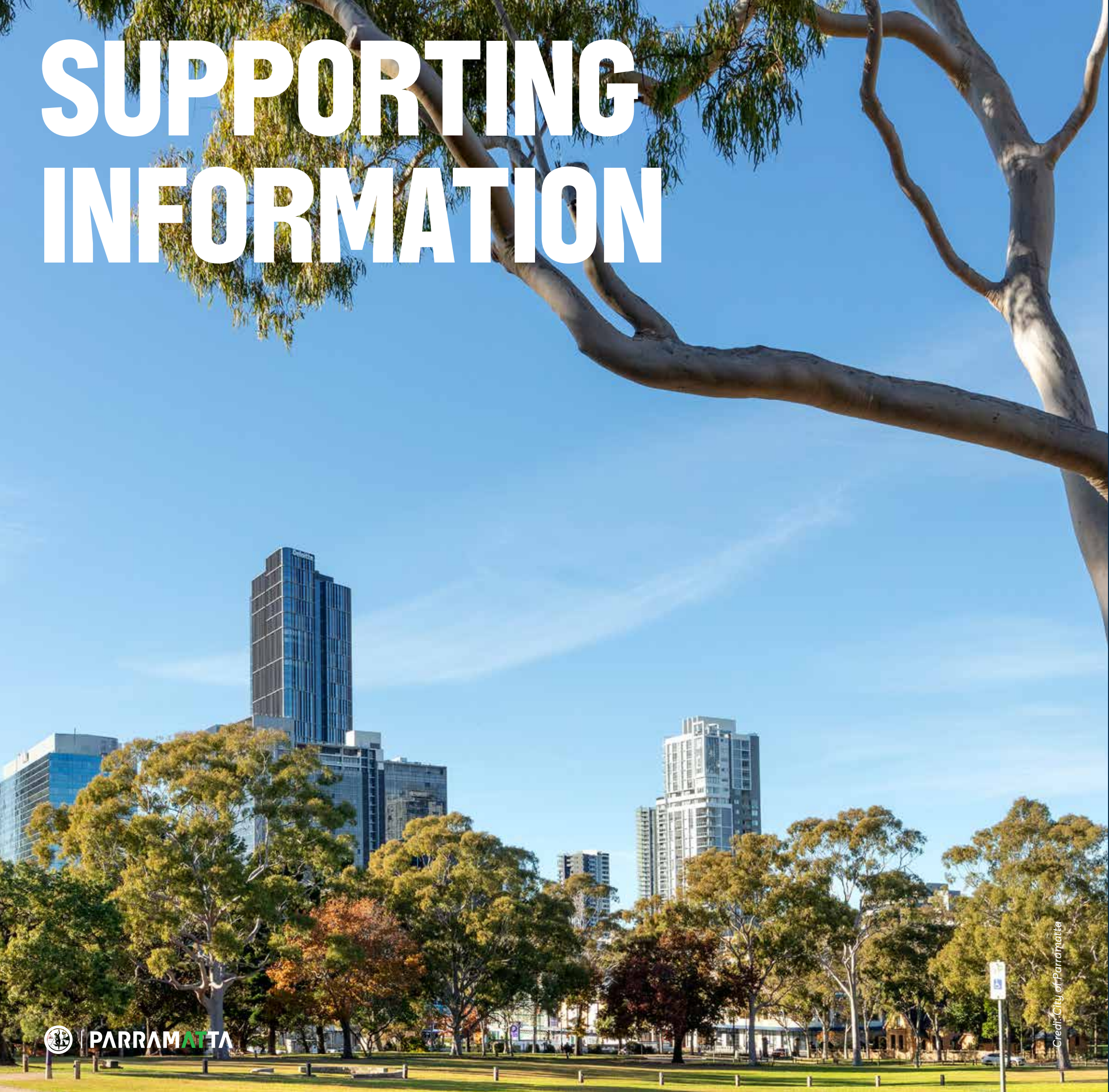
HOW TO READ THE ACTION PLAN

Response to CSP reflects the relevant CSP goal that this work will contribute to (Fair, Accessible, Welcoming, Green, Thriving, and Innovative).

Council's role refers to the Deliver (D), Partner (P), Advocate (A) model of work adopted in the CSP.

Indicator refers to how we will measure progress towards achieving our objectives.

OUTPUTS	NO.	ACTION	YEAR	RESPONSE TO CSP	COUNCIL'S ROLE	INDICATORS	TARGETS
OBJECTIVE 5.1	We seek opportunities for circular economy development across business and industry at the centre of Sydney						
Identify opportunities for Parramatta as a metropolitan leader in resource recovery and circular economy industry	5.1.1	Identify circular economy leadership and partnership opportunities through commissioning a research paper and benchmarking against best practice	2	Green Innovative	<div>D</div> <div>P</div>	Community waste diverted from landfill	85% diversion rate for community waste by 2038
	5.1.2	Review waste and resource recovery planning controls, policy and design standards that address current and future waste management requirements	2	Green	<div>D</div> <div>P</div>		
OBJECTIVE 5.2	Council empowers the community to support waste avoidance, recovery, and reuse						
Work with our community to implement effective circular waste management practices	5.2.1	Transition and expand waste and resource recovery services for residents, businesses and public places in-line with new industry directions and higher standards	2	Green	<div>D</div>	Community waste diverted from landfill	85% diversion rate for community waste by 2038
	5.2.2	Update Council's Waste and Resource Recovery (WARR) Strategy to provide a circular economy policy and implementation roadmap for community, business and Council	3	Green	<div>D</div>		
	5.2.3	Scope opportunities to deliver community engagement programs on waste avoidance and management, and circular products	4	Green Fair	<div>D</div> <div>P</div>		
	5.2.4	Establish a long-term behaviour change program to reduce illegal dumping across the local government area	2	Green	<div>D</div>		
OBJECTIVE 5.3	Council leads circular economy practices, research, and communication						
Embed circular economy leadership in Council decision-making	5.3.1	Implement City of Parramatta Circular Economy Report recommendations for embedding sustainability priorities and circular economy principles into Council operations, procurement, investment and business decision-making processes	2	Green	<div>D</div> <div>P</div>	Corporate waste diverted from landfill	70% (2030) and 90% (2038) diversion rate for Council's waste
	5.3.2	Investigate and implement, if viable, a self-sustaining fund that harnesses financial returns of sustainability initiatives to finance future project investment	2	Green	<div>D</div>		
	5.3.3	Embed resource avoidance, minimisation, recovery and reuse, and circular product use into Council policy, events, projects and operations	2	Green	<div>D</div>		



SUPPORTING INFORMATION

04



PARRAMATTA

Credit: City of Parramatta

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GLOSSARY

TERM	DEFINITION
Active primary area restoration (bushland)	Bushland under Council management that staff, volunteers and contractors actively restore to primary or best practice status
Acute shocks	Sudden, short-term events that threaten the city, including major storms, heatwaves, floods, bushfires, disease outbreaks, terrorism, and cyber-attacks. These can amplify chronic stresses
Atmospheric CO₂	Carbon dioxide that exists within the atmosphere of Earth can occur naturally or be produced by human activities. Of most concern is excessive atmospheric CO ₂ that comes from human activities
Biodiversity	Or 'biological diversity'. The variety of life within an ecosystem, relating to the number of different micro-organism, plant and animal species. It also considers how genetically different individuals of the same species are, and how variable different ecosystems are
Biodiversity enhancement	Improving the variety of life within Parramatta's ecosystems
Biophilic design	Design of buildings and spaces that fosters connection between buildings, humans and the natural world. Elements of biophilic design are sensory and look to nature for inspiration and solutions to modern architectural problems
Blue green infrastructure network	Web of natural and human-made features within our City that include water and vegetated spaces
Bushcare	Volunteers delivering biodiversity improvements and bush regeneration in partnership with City of Parramatta
Carbon emissions	Production of gases by natural processes and, of most concern, human activities, including burning of fossil fuels and using combustion engines. These processes release carbon dioxide, methane and other greenhouse gases into the atmosphere
Carbon neutral	Carbon emissions are balanced to zero. A carbon neutral company balances its carbon emissions by removing an equivalent amount of carbon from the atmosphere. Overall emissions can be neutralised by either funding carbon emission reduction initiatives elsewhere or by purchasing offsets or credits
Carbon offsets	Purchases that compensate for carbon emissions that remain after pursuing measures to stop or reduce emitting

TERM	DEFINITION
Central City District Plan	A 20-year plan to implement The Greater Sydney Region Plan – A Metropolis of Three Cities, that includes the Parramatta LGA as part of the Central River City within its vision
Chronic stresses	Incidents that weaken the fabric of a city on a day-to-day or cyclical basis, including climate change, homelessness and housing affordability, lack of access to public transport, family violence, structural inequity, and chronic food or water shortages
Circular economy	A whole-of-systems approach that replaces end-of-life concepts of waste and obsolescence with restoration and renewal, creating new opportunities for businesses and communities to survive and thrive while eliminating pollution and regenerating our environment
Climate change	Is a change in the pattern of weather, and related changes in oceans, land surfaces and ice sheets, occurring over time scales of decades or longer
Climate change adaptation	Taking action to change the environment, society and/or economy to better cope with and thrive under future conditions that are altered by climate change
Climate change mitigation	Taking action to reduce climate change by decreasing human contributions to climate change
Climate hazards	Possible events that may cause harm to a city and are related to the weather and climate change, including heatwaves, bushfires, and floods
Climate positive	Climate positive companies go further than carbon negative. They remove more carbon than they emit and deliver environmental benefit to other companies or localities. A climate positive business might, for instance, generate more renewable energy than it needs and feed the surplus back to the grid
Climate resilience planning	Creating a framework for managing the ability of the City, community and environment to survive, adapt and thrive under future climate conditions determined by climate change
Community	Relating to the people that regularly interact with Parramatta, including residents, businesses, workers and students
Community preparedness	A community's ability to prepare for, endure, respond to and recover from an adverse event that may occur. This requires communities and governments to be proactive and informed
Corporate	Actions, activities and emissions relating to City of Parramatta Council operations and services

TERM	DEFINITION
Cultural practice	The various interlinked customs, traditions, rituals, behaviours, activities and knowledge that are collectively shared. They are passed down within a specific cultural group and serve as a means of expressing identity, values, beliefs, and social cohesion, that guide and enhance connection to Country. Adapted from the Connecting with Country Framework, Government Architect NSW
Custodianship	Accepting responsibility for caring for or protecting the environment through individual and collective actions and behaviours
Decarbonisation	Is about reducing carbon emissions resulting from human activity, with eventual goal of eliminating them
Dharug Nation	Language group of the Australian First Nations people that are the traditional custodians of most of modern Greater and Western Sydney land, including Parramatta. The traditional lands of the Dharug Nation span from the Blue Mountains (west) to the coast (east), and between the Hawkesbury River's mouth (north) and Appin (south)
Disaster prone area	Extent of land that is more likely to be exposed to particular natural disaster events, including floods and bushfires. These areas differ depending on the characteristics of the disaster, such as flood level, with scenario modelling informing what space is disaster prone
Emissions	Scientists have developed methodology that allows all greenhouse gases (including carbon dioxide, methane, nitrous oxide) to be calculated as carbon equivalent (CO ₂ e)
Environmentally sustainable design (ESD)	Ensures development achieves both compliance with standards of environmental design, and environmental sustainability
First Nations custodianship	The important responsibilities of caring for and protecting the Country/ Place on which First Nations peoples live, ensuring the landscape is preserved and healthy. This custodianship includes maintaining and passing on culturally significant elements, including knowledge, song and dance
First Nations Ownership	Land and water under First Nations ownership
FloodSmart Parramatta	A service that provides vital information about flood risk to the City of Parramatta community. This ensures the community is prepared to stay safe and protect homes and businesses during flood events
Functional habitat connectivity	Ability of a species to move between habitat patches across a landscape, using other patches (e.g., parkland) or disconnected habitat features (e.g., street trees)
Green infrastructure	Network of naturally occurring or built living assets that incorporate the natural environment and engineering systems to provide an array of vital services for all species

TERM	DEFINITION
Green investment	Putting money in stocks, bonds or funds of companies who avoid fossil fuels, coal and gas with the expectation of achieving a profit
Grid decarbonisation	Reducing the carbon emissions associated with the electrical grid and generation of electricity, to eventually eliminate them. This includes moving away from coal-fired power stations and towards renewable sources of energy
Habitecture	Incorporates spaces for habitats into the design of the City's architecture
Healthy waterways	Flowing bodies of water that have acceptable levels of physical, chemical, microbial and metal pollution, have high biological integrity, and do not compromise environmental or human health
Integrated water	Recognises that all parts of the water cycle are linked, including water security (for now and the future), stormwater pollution, flooding, groundwater impacts and waterway health
Invasive species	Organisms that have been introduced to a region and threaten the integrity and biodiversity of their environments. These organisms often out-compete native species, threatening populations of native plants and animals
IPCC Assessment report	The Intergovernmental Panel on Climate Change (IPCC) completes Assessment Reports about every six years, assessing the current knowledge on climate change, its causes and impacts, both in the present and future, and how to respond
Key indicator species	Plant, animal or micro-organism that acts as a measure of the local environmental conditions or the state of an ecosystem
LED	Light emitting diode energy efficient light that reduces carbon emissions and electricity costs
LGA	Local Government Area
Life-cycle analysis	Assessing environmental impacts of each stage in the life cycle of a product, service or process to inform decision making, practices and management
Metropolitan Sydney	Encompasses the 33 LGA's within the urban boundary of Sydney
Nature positive	A halting and reversal of the loss of natural systems, where development and regeneration actively contribute to the increase in natural systems over time
Net zero	Achieving an overall balance between carbon emissions produced or consumed and carbon emissions removed from the atmosphere. Balanced to zero. Purchase of offsets usually required to achieve this
Non-potable water	Water that is unsuitable for consumption, including drinking or cooking. Can still be used for other purposes, such as irrigation

TERM	DEFINITION
Offsets	Activities or projects that either remove emissions from the atmosphere (e.g. tree planting) or avoid emissions (e.g. a wind farm)
Outdoor water-focused recreation	Activities that allow the community to engage with outdoor blue infrastructure for personal enjoyment, including kayaking, walking alongside waterways
Parramatta River Catchment Group (PRCG)	Alliance of community groups and local and state government agencies working towards making Parramatta River catchment sustainable, healthy and liveable
Parramatta River Vision	Adopted by Council in 2023 to re-establish Parramatta River as central to the identity and value of Parramatta by improving access and providing space for water, nature, human health, wellbeing, and recreation
PHIVE	Six GreenStar public building with library, Council chambers and community spaces, at 5 Parramatta Square
Planetary health	A concept that acknowledges the interdependence of human and environmental health. It pushes for evidence-based policy to improve human health while protecting and regenerating the environment, which contributes to the wellbeing of current and future generations. This concept recognises that a healthy planet allows for healthy humans.
Pledge for Nature	A commitment to curb biodiversity loss, maintaining planetary health and pursuing improved outcomes for nature, climate and sustainable development, endorsed by Australia in 2022
PluckFastic	A local community group dedicated to plucking plastic from our waterways and lands
Potable water	Water that is suitable for consumption, including drinking and cooking
ppm	Parts per million. Measure of concentration of atmospheric gases, including carbon dioxide, identifying how many carbon dioxide particles there are per one million atmospheric particles
Recycle	Reuse the materials of the product for application in new products
Reduce	Increase the efficiency of the machines in the production process or use fewer materials for the same product
Refusing	Making a product redundant by abandoning its function or by providing the same function in a different way
Regeneration	Renewing or restoring spaces where nature has been damaged or lost by providing the right conditions for ecosystems to recover and thrive. It is inspired by nature and recognises First Nations perspectives, nature-human interconnections, and the United Nations Sustainable Development Goals (SDGs)

TERM	DEFINITION
Regional scale	Outputs that are scaled up to a geographic area greater than our LGA, including Central City, Dharug Nation, Western Sydney, PRCG or Resilient Sydney
Renewable electricity	Electricity sourced from renewable or non-fossil fuel sources including wind, solar, battery and hydro
Resilient city	The capacity of individuals, communities, businesses, and systems within a city to survive, adapt and thrive no matter what kinds of chronic stresses and acute shocks they experience
Resilient Sydney	A collaboration of all 33 LGAs of Greater Sydney to develop and implement a city-wide resilience strategy
Resilient Sydney Net Zero app	Resilient Sydney on-line carbon emission data management and calculation tool to assist LGAs map their community emission pathway to net zero
Resource recovery	Separation of materials to prevent them from landfill and keep them in use for longer
Rethinking	Making product use more intensive by using (sharing) the product with more people or by giving the product more functions
Reuse	Reuse of discarded, functioning product in the same function by a different user
Structural habitat connectivity	Physical arrangement of habitat patches (e.g., parkland) and disconnected habitat features (e.g., street trees) within the landscape, and how close these areas are to one another
tCO₂e	Tonnes of carbon dioxide equivalent
Waste diverted	Volume of waste redirected away from landfill through recycling and source reduction activities
Water sensitive City	Water is managed in a way that meets a city's water needs while also supporting a city's urban liveability, sustainability, resilience, and productivity
Water sensitive urban design (WSUD)	A land planning and engineering design approach which integrates the urban water cycle into urban design to minimise environmental degradation and improve aesthetic and recreational appeal
Western Sydney Energy Program (WSEP)	WSROC project to realise energy, cost and emission savings for Western Sydney LGAs and their communities
Whole-of-waste system	Measures waste through its entire life cycle from generation to disposal or recovery
WSROC	Western Sydney Regional Organisation of Councils

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Figure 11: Various sources of data: Average temperature (Adapt NSW website and Parramatta City Council – Climate extremes risk assessment and adaptation plan); Average days over 35°C (The Australian Institute Heatwatch: Extreme Heat in Western Sydney report); Rainfall pattern and average rainfall (Climate futures exploration tool and Parramatta City Council – Climate extremes risk assessment and adaptation plan); Heavy rainfall (Climate futures exploration tool); and Sea-level (Parramatta City Council – Climate extremes risk assessment and adaptation plan; Marine Explorer; AdaptNSW website; Ch.9 IPCC Sixth Assessment Report, and Sea level rise science and synthesis for NSW).

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ENVIRONMENTAL SUSTAINABILITY STRATEGY

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