DRAFT – FOR PUBLIC EXHIBITION AND FEEDBACK

RYDE RESILIENCE PLAN 2030

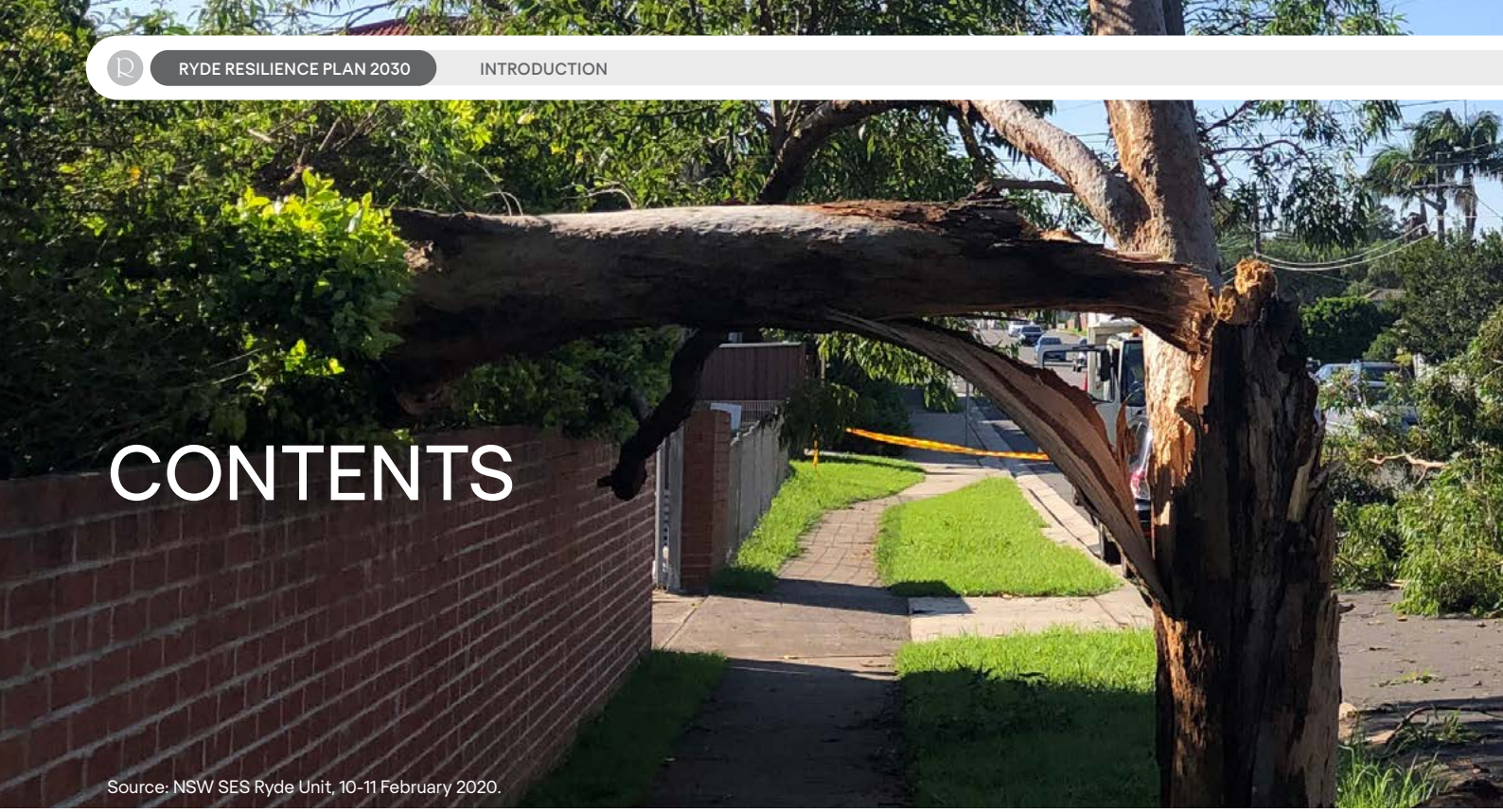
VOLUME 1

COUNCIL AND COMMUNITY WORKING TOGETHER TO ADAPT, SURVIVE AND THRIVE

MAY 2020

City of Ryde

RESILIENT RYDE | RESILIENT SYDNEY



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Source: NSW SES Ryde Unit, 10-11 February 2020.

ACKNOWLEDGEMENTS

Resilient Ryde was prepared by a project team within the Environment Department of Council, including:

Paul Bateson ("Pablo"), Resource and Resilience Officer, as principal author and project manager for the Plan's development.

Kylie McMahon, Manager Environment, as project director and who initiated the Plan, and the City of Ryde's ambassador to the Resilient Sydney program.

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Publication and contact details

www.ryde.nsw.gov.au/resilienceplan

For more information on resilience at the City of Ryde go to www.ryde.nsw.gov.au/resilientryde

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May 2020


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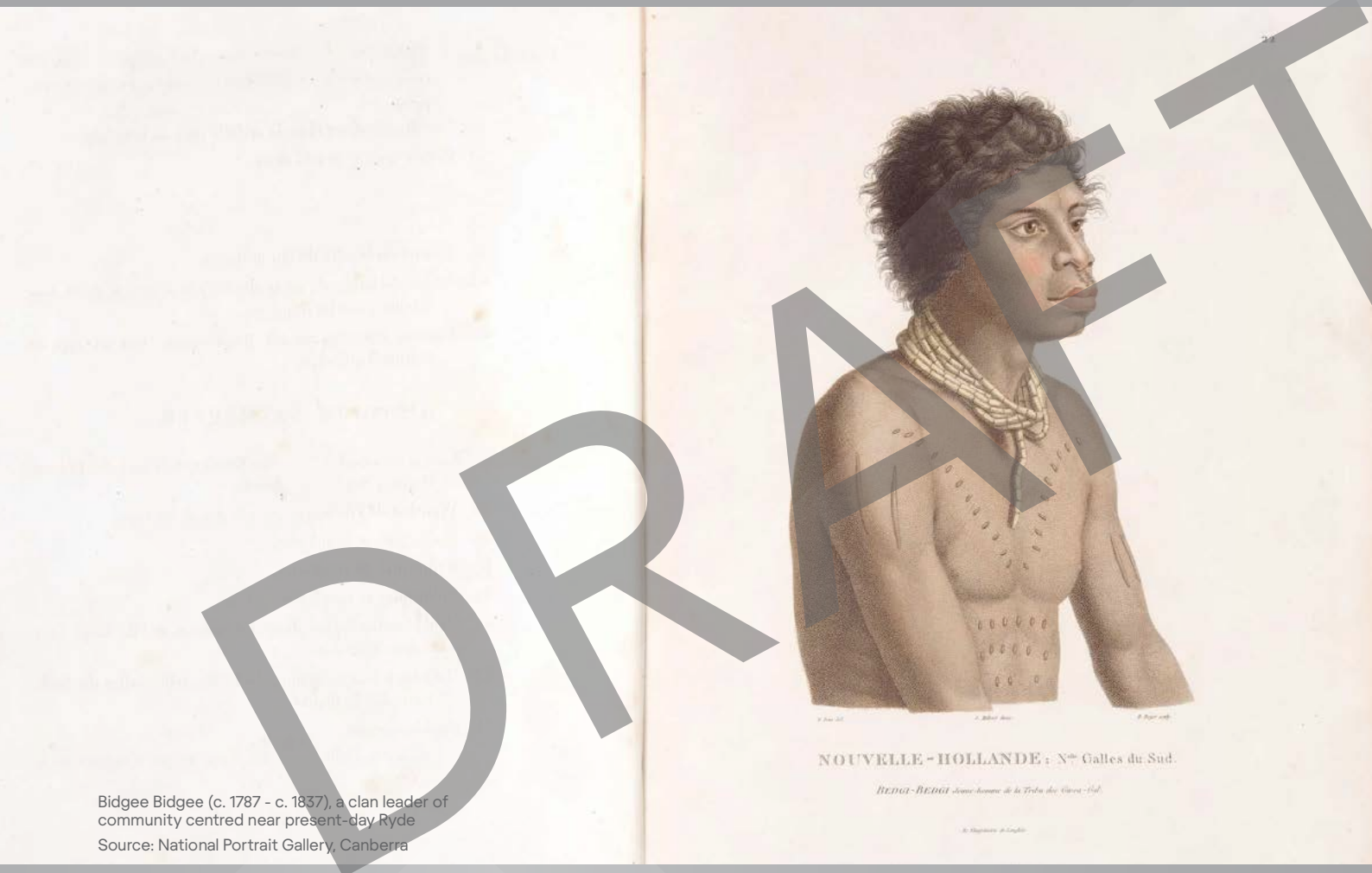
INTRODUCTION

Acknowledgement of Country and history of the Wallumedegal

Message from the Mayor

A statement of support from Resilient Sydney



Bidgee Bidgee (c. 1787 - c. 1837), a clan leader of community centred near present-day Ryde
Source: National Portrait Gallery, Canberra

ACKNOWLEDGEMENT OF COUNTRY

The City of Ryde would like to acknowledge the Traditional Custodians of this land, the Wallumedagal clan of the Darug nation.

Traditionally, the Darug nation was divided into many clans who resided in a particular geographic area.

The traditional clan of the Ryde area is the Wallumedegal whose cultures and customs have nurtured, and continue to nurture, this land since the Dreamtime.

The City of Ryde would also like to pay respect to Elders both past, present and emerging.

History of the Wallumedegal

Aboriginal 'First Nation' people lived for thousands of years in what we now call the City of Ryde. When the first Europeans settled at Sydney Cove in 1788 the traditional owners of this area were the Wallumedegal. That name was told to Captain Arthur Phillip, first governor of the convict colony of New South Wales, by Woollarawarre Bennelong who came from the clan called the Wangal on the south side of the river.

It is likely that the name Wallumedegal or Wallumattagal was derived from wallumai the snapper fish, combined with matta, a word used to describe a place, usually a water place, as with Parramatta and Cabramatta. That would mean they were the snapper clan and the fish was their totem, just as burra (the eel) was the totem of the Burramatta or Boromeda-gal or clan at Parramatta and cobra (the white grub of the shipworm) that of the Cobragal at present Liverpool and Cabramatta.

Wallumedegal territory followed the north bank of the Parramatta River from Turrumburra (Lane Cove River) in the east to Burramatta at the head of the river to the west. The northern boundary would logically be the Lane Cove River and the northern neighbours therefore the Cameragal or spear clan.

The Wallumedegal survived for generations in a rich environment of river flats, creeks and mangrove swamps, fishing with pronged spears and hand-lines, feasting on shellfish, hunting birds and small game, and collecting a variety of edible bushfood plants. They spoke the same language as the Port Jackson and coastal clans, from Botany Bay to Broken Bay.

The most enduring symbol of the Aboriginal presence in the City of Ryde is the grave of Bennelong and Nanbarry, two key figures in the history of early Sydney. Bennelong, who was captured late in 1789 on the orders of Governor Arthur Phillip, escaped after six months. Bennelong died in 1813 and was buried in the orchard of brewer James Squire at Kissing Point (Ryde).

This section is based upon abstracts from the paper 'Wallumedegal: An Aboriginal History of Ryde' (Keith Vincent Smith, 2005).

MESSAGE FROM THE MAYOR

We are the first Council in Australia to develop a local Resilience Plan to build future resilience and adaptation in these challenging times ahead.

Dear resident,

The draft Ryde Resilience Plan 2030 is a roadmap for the City of Ryde's journey to build future resilience for our whole community.

As the global population continues to grow, our reliance and consumption of natural resources is increasing, placing tremendous strain on our ecosystems.

This is occurring on a local level where our natural areas and waterways are impacted from urban development and a changing climate with increasingly intense weather events.

These events can disrupt and change in every area of the community, from vital assets and infrastructure to our mental health and wellbeing.

In response, the City of Ryde has been on the front foot in identifying these areas of impact and those most at risk.

We are the first Council in Australia to develop a local Resilience Plan to build future resilience and adaptation in these challenging times ahead.

This draft Ryde Resilience Plan 2030 shows how Council can lead the organisation and community in becoming more resilient to major shocks and chronic stresses that may disrupt, challenge or even threaten our quality of life and way we function.

Last year, the City of Ryde became one of the first councils to declare a climate emergency. In response, there is an imperative for action through mitigation, adaptation and resilience planning.

As part of this process, our Council can make a difference by continuing to:

- Push harder for a transition to 100 percent renewable energy and a low carbon economy
- Fight the 'war on waste' by reducing and recycling and efficient use of resources
- Support the community in shifting to energy and water efficient households and businesses
- Prepare for a new Local Environment Plan and updated Development Control Plan to incorporate urban design excellence for sustainable development
- Collaborate as one the 33 participating councils in the Resilient Sydney regional strategy, which is part of the global 100 Resilient Cities initiative
- Contribute proactively to collaboration with other councils in the region on key issues including urban heat, emergency management, Parramatta River catchment management, bushfire management, carbon reporting, procurement and sustainable transport
- Advocate for more actions on climate change by the State and Federal governments
- Divest its investment portfolio away from fossil-fuel industries

To achieve these outcomes, we are committed to help equip our community with the tools to prepare for, respond to and bounce back from shocks and stresses, including the current coronavirus pandemic.

We have recently seen and experienced the impact of an unprecedented combination of ongoing drought, heatwaves, severe and widespread bushfires and hazardous air pollution. These events have been exacerbated and become more intense by accelerating climate change caused by increasing carbon emissions from human activities and global warming.

As a community, we can work together to reduce the severity and negative impacts these events have on the community.

A community engagement process with residents, schools, local businesses, advisory committees, and culturally and linguistically diverse groups, has already received direct contributions from more than 300 participants to help with development of this plan.

This local plan when implemented will assist with building this collective strength and working together through change for the long term wellbeing of the community and its environment.

I encourage people living, working or studying in the City of Ryde to carefully consider the contents of the draft Ryde Resilience Plan 2030 and provide further feedback in the public exhibition period.

Clr Jerome Laxale
City of Ryde Mayor

A STATEMENT OF SUPPORT FROM RESILIENT SYDNEY

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RESILIENT SYDNEY

14 April 2020
Ref: 2020/062036

Dear Councillor Jerome Laxale - Mayor of the City of Ryde,

I write to congratulate the City of Ryde on the release of the draft Ryde Resilience Plan 2030. This is a major milestone as the first local-level plan of its kind in Greater Sydney. We are delighted that the Plan responds to the City of Ryde's participation in Resilient Sydney and the Resilient Sydney strategy (2018).

Resilient Sydney is a collaboration of all the 33 councils of metropolitan Sydney, the NSW government, business and communities. The City of Ryde has been a leader within local government in embedding resilience within strategic planning and programs. This new plan continues this work by building resilience within local communities and City operations.

In the past year, Sydney and Eastern Australia have experienced a sequence of disastrous bushfires, prolonged intense heat, flooding and extended periods of hazardous air pollution. Underlying chronic stresses in our community and infrastructure make the impacts of these events much worse. There is a critical need for locally relevant responses to the challenges we face so our community can adapt, survive and thrive.

The research undertaken for the Resilient Sydney Strategy showed that communities who are well connected and cohesive are the most resilient to respond and recover from shocks and chronic stresses. At every level; as individuals, households, neighbourhoods, businesses, schools or organisations, we encourage all the Ryde community to read, engage and provide feedback on this plan. Resilience is a team sport.

Resilient Sydney and your partner councils look forward to sharing our knowledge and connections to support the City of Ryde and its residents to implement this innovative local plan. Together we will help build a resilient future for your part of Sydney and advance the resilience effort regionally, nationally and world-wide.

Yours sincerely

Beck Dawson
Chief Resilience Officer
Resilient Sydney

Resilient Sydney
A 'Global Resilient Cities Network' with metropolitan Sydney
Hosted by the City of Sydney

Pioneered by the Rockefeller Foundation, formerly '100 Resilient Cities'
www.resilientsydney.com.au

EXECUTIVE SUMMARY

This draft *Ryde Resilience Plan 2030* sets out a vision, goals and strategic directions for creating local urban resilience in the city and for our community. It highlights the global and local drivers and pressures which frame the development of the resilience plan.

The Plan acknowledges what the community and its stakeholders have told Council in relation to current and future issues inhibiting or developing resilience in our city. These were achieved through a robust community engagement program and through using an evidence-based approach to shape the Plan, develop its structure and inform the outcome areas.

This Plan uses a holistic approach for the future and long term resilience of our city's residents, assets and infrastructure (physical and social) and natural systems protection. It will deliver for the whole of community, as well as leading to improve Council's own operations.

Volume 1 introduces nine key response areas of most importance supported by proposed actions that guide, build, encourage and facilitate preparedness for acute shocks and emergency situations so that the community are able to adapt, survive and thrive in these times. The main issues, challenges and opportunities for resilience for our city are also highlighted and defined. This sets a context for an understanding the priorities for action for achieving these resilience objectives.

Volume 2 sets out a framework for implementation of the Resilience Plan and each key response area is divided and links to an overall goal, strategic direction, targets and outcomes for delivery. Each of these have responses and actions for 'making it happen', and identifies key partnerships and timing for delivery.

Using data and better practice from around the world, actions developed by Council for this Plan will better help community connectedness and cohesion. These are aimed to strengthen governance and leadership roles for enabling greater resilience to recover from shocks and overcome stresses long term.

The Plan outlines the roles individuals, households, neighbourhoods, businesses, schools or organisations play in increasing and building resilience as a connected community. It recognises that the social fibre of our community is weakened if the journey of resilience is not a collective one and the collective role of community partnerships including those extending beyond our local government boundary.

There is acknowledgement of the vital need for responses to involve the more vulnerable or isolated sections of the community, especially those requiring additional or more tailored assistance.

Delivery of the Plan will include monitoring and evaluation as an essential element of its implementation and continuous improvement. This means tracking the delivery of its progress for measurement and reporting to be conducted regularly to ensure Council delivers on its actions and resilience for community.

How do I give my feedback to help shape our future resilience?

The Draft Ryde Resilience Plan 2030 is available to be viewed at **www.ryde.nsw.gov.au/haveyoursay/ResiliencePlan** and we welcome the community to have their say in a number of ways, including:

- Complete the online survey at **www.ryde.nsw.gov.au/haveyoursay/ResiliencePlan**
- Email: **cityofryde@ryde.nsw.gov.au**
- Post: **General Manager, Locked Bag 2069, North Ryde NSW 1670**
- Drop off: **Ryde Library After Hours Chute, 1 Pope Street, Ryde (corner Pope and Devlin Streets, within Top Ryde City Shopping Centre)**

Written submissions must be clearly marked as 'Draft Ryde Resilience Plan 2030' and will be received up until **Wednesday 3 June 2020.**

For more information

More details about local resilience in Ryde are available by going to **www.ryde.nsw.gov.au/ResilientRyde** or call Customer Service on **(02) 9952 8222**.

1 OUR RESILIENCE

1 OUR RESILIENCE

The severe bushfires and drought of 2019-20 serve as a reminder that our way of life can be severely disrupted by major climate-related events. These events compound other chronic stresses that affect many of us on a day-to-day basis.

For this reason, local government and individual councils are starting to devise resilience plans to help their communities become more resilient in the face of chronic stresses and acute shocks, thereby enhancing well-being. An example is the Resilient Sydney strategy (2018) involving all 33 councils in the metropolitan region.

1.1 Why does Ryde need this plan?

In 2018, the City of Ryde made a commitment to prepare a local Resilience Plan, and subsequently appointed a Resource and Resilience Officer to devise it. This document presents the resilience plan for the City of Ryde, which is contained in two parts.

Volume 1 presents the narrative behind the need for a resilience plan, the key areas on which Council will focus are, goals and strategic directions.

Volume 2 presents the recommended actions to be taken by Council and the community to help ensure the City of Ryde is more resilient.

The response (action) plan includes targets, desired outcomes, who should be responsible for carrying out the actions and a timeframe for completion over a 10-year period (to 2030).

The structure of this Plan is based on holistic 'quadruple-bottom-line' (QBL) sustainability and uses local knowledge and data from Resilient Sydney and Ryde's own engagement data. This QBL approach is based upon social, environmental, economic and governance pillars, principles and outcomes across the community and Council's own operations.

This Resilience Plan draws on a review of comparable work by councils, State, nationally and internationally, and is consistent with the framework undertaken by Resilient Sydney.

Council will monitor against delivering this plan to revise and update Resilience Plan as circumstances change and evolve.

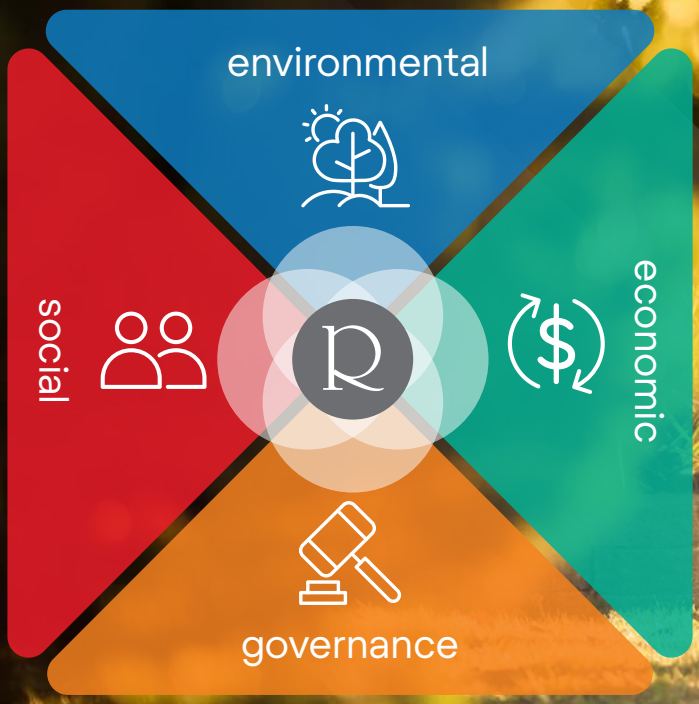
1.2 What is resilience?

City resilience involves the capacity of individuals, communities, businesses and systems to survive, adapt and thrive in the face of whatever chronic stresses and acute shocks they experience (Resilient Sydney 2018).

Chronic stresses can weaken the fabric of a city on a day-to-day or cyclical basis. Examples include: homelessness and unaffordable housing; lack of access to public transport systems; mental health issues; transport congestion; air and water pollution; discrimination; family violence; climate change; urban heat island effects; structural inequity; social isolation and lack of connectedness; and shortages of food, water or basic services.

Acute shocks are sudden, short-term events that can threaten a city and its inhabitants. Examples include: heatwaves, bushfires, severe storms and floods; dust storms; disease outbreaks; essential and infrastructure services failures; conflicts and terrorism; and cyber-attacks.

1 | OUR RESILIENCE



quadruple-bottom-line (QBL) sustainability

1.3 Why is resilience important?

Disasters and disruptions can be expensive and life changing, whether they are caused by short-term shocks or chronic stresses. People can lose their lives or livelihoods and quality of life, and mental health can be threatened. Governments, businesses and the community are required to fund losses and recovery costs when infrastructure fails, lives are impacted, markets change, or the environment is damaged.

Because chronic stresses and acute shocks affect all of us, it is essential that we are prepared for and resilient against them.

When disruptions are expected, planned for and turned into opportunities, they can even offer economic, environmental, social and cultural benefits. These opportunities can be achieved through:

- Preventing or mitigating stresses and shocks
- Adapting to unexpected shocks and stresses
- Rapidly returning to normal and revitalising after disruptions
- Productive, peaceful prosperity and improved equity in times of stability

FIGURE 1 CAPTURES THE MAIN ELEMENTS OF WHAT RESILIENCE IS AND WHY IT IS IMPORTANT TO THE CITY OF RYDE.

Learn more about our

Ryde Resilience Plan 2030

What is our motivation?

The City of Ryde is working on a local Resilience Plan that will explore ways everyone in the community can better respond to local and global pressures negatively impacting our way of life and enhance overall well-being of its residents.

Every neighbourhood, business, community and city is faced with risks and yet most do not have a clear direction of what to do when faced with difficulties. Council aspires to be a leader in resilience, equipping our community with the tools to prepare for and bounce back from shocks and stresses.

What is resilience?

Resilience is the capacity to withstand and recover quickly from difficulties. It means strengthening the ability to survive, adapt and thrive. Within the context of Ryde, it involves the capacity of individuals, households, communities, businesses, ecosystems and infrastructure to bounce back from hard times.

These difficulties fall into two main categories:

Chronic stresses	Such as affordability of housing, global or national economic downturn, climate change, transport congestion, food security, shortage of services, social isolation, lack of connectedness, mental health.
Major shocks	Emergency situations such heatwaves, bushfires, floods, storms, infrastructure failures.

Why do we need a Plan?

Having a Resilience Plan means we can anticipate and better prepare for these difficult situations. If we know how to react, who to help and how to help, then we can work together to reduce the severity and negative impacts on the community. When a community, including residents, neighbours, local organisations and businesses, and Council is well organised, cohesive and connected it is stronger. The local Plan will help take actions to build this collective strength and work together through change.

City of Ryde
Lifestyle and opportunity
@ your doorstep

Extract from City of Ryde community engagement information leaflet (September 2019)

2 GLOBAL, REGIONAL AND LOCAL CONTEXT FOR RESILIENCE

2 GLOBAL, REGIONAL AND LOCAL CONTEXT FOR RESILIENCE

The idea of resilience is a reasonably new concept to most. Some key global and Australian resilience programs, strategies, plans and initiatives are highlighted below.

2.1 100 Resilient Cities

100 Resilient Cities (100RC) is a program pioneered by The Rockefeller Foundation and managed as a sponsored project by the Rockefeller Philanthropy Advisors (RPA).

It is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. The project initially aimed to recruit 100 cities committed to building resilience through the key themes of urbanisation, globalisation and climate change.

As well as helping individual cities become more resilient, 100RC program facilitates the building of a global practice of resilience among governments, NGOs, the private sector, and individual citizens.

2.2 Resilient Sydney

In Australia, Sydney, covering the greater metropolitan region, and Melbourne, are participating in 100RC.

Metropolitan Sydney is one of the most diverse cities in the world with a population of over five million people, with residents from at least 200 distinct ethnic cultural backgrounds. The city is renowned for the beauty of its natural environment, iconic attractions and outdoor lifestyle, but is struggling to sustain liveability and equity during a time of rapid growth and change.

As part of the 100RC network, *Resilient Sydney: A strategy for city resilience 2018* marks a new spirit of collaboration, connection and commitment for actions across the metropolis of Sydney.

The strategy is the result of over two years of effort and contributions including technical studies and a comprehensive engagement process with more than 1,000 people from business, government and communities (residents) across the greater Sydney region. Every council in the metropolitan area (including the City of Ryde) was engaged in the process.

Resilient Sydney strategic directions (refer to Appendix A for details)

PEOPLE CENTRED CITY

LIVE WITH OUR CLIMATE

CONNECT FOR STRENGTH

GET READY

ONE CITY

The Resilient Sydney Strategy encourages all participating organisations, particularly all 33 member councils in the region, to:

- Investigate and understand metropolitan scale community risks, as well as the 'local' place-based risks organisations face.
- Engage with the people in the city, most impacted by organisational decisions.
- Clarify the role of each organisation in resilience of the city.
- Engage in training and capacity building across each organisation.
- Collaborate to develop an action plan for each organisation.
- Undertake action and investment.

This Strategy sets the context for the City of Ryde (and other councils) to prepare its own local resilience plan to locally deliver resilience programming.

Using a Resilience Risk Assessment tool, *Resilient Sydney* shows that Sydneysiders are experiencing a range of chronic stresses such as lack of affordable housing and transport congestion. They need to be prepared for shock events such as climate change exacerbated bushfires, heat waves and storms, as well as cyber-attacks. In the northern district of Sydney, which includes the City of Ryde, community engagement showed that transport, bushfire threats and the lack of solar technology uptake were three areas of most interest.

2 GLOBAL, REGIONAL AND LOCAL CONTEXT FOR RESILIENCE

2.3 North District Plan – Greater Sydney Commission

The North District of Sydney covers the local government areas of Hornsby, Hunter's Hill, Ku-ring-gai, Lane Cove, Mosman, North Sydney, Northern Beaches, Ryde and Willoughby.

The Greater Sydney Commission's *Our Greater Sydney 2056, North District Plan* (2018) is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. It is a guide for implementing the Greater Sydney Region Plan – *A Metropolis of Three Cities (2018)* at a district level, and is a bridge between regional and local planning.

A Metropolis of Three Cities was prepared concurrently with the NSW Government's *Future Transport Strategy 2056* and Infrastructure NSW's *State Infrastructure Strategy 2018-2038* to integrate land use, transport and infrastructure across the region. In this context, all the transport initiatives outlined in the North District Plan are sourced from the former strategy.

The North District Plan informs local strategic planning statements and local environmental plans, the assessment of planning proposals as well as community strategic plans and policies. The document assists councils to plan for and support growth and change, and aligns their local planning strategies to place-based outcomes. The Plan includes a snapshot of the Ryde LGA (refer to Appendix B).

This guides the decisions of State agencies and informs the private sector and the wider community of approaches to manage growth and change. Within the North District Plan, the four theme areas covering planning priorities are: infrastructure and collaboration, liveability, productivity, and sustainability. Relevant objectives, strategies and actions from *A Metropolis of Three Cities* are embedded in each of the planning priorities, to integrate the North District's challenges and opportunities with the Greater Sydney vision.

The importance of collaboration by councils under 100 Resilient Cities (and being facilitated through the Resilient Sydney strategy, adopted in late 2018) is recognised in the North District Plan within the resilience section of the sustainability theme.

2.4 Local strategic plans – City of Ryde

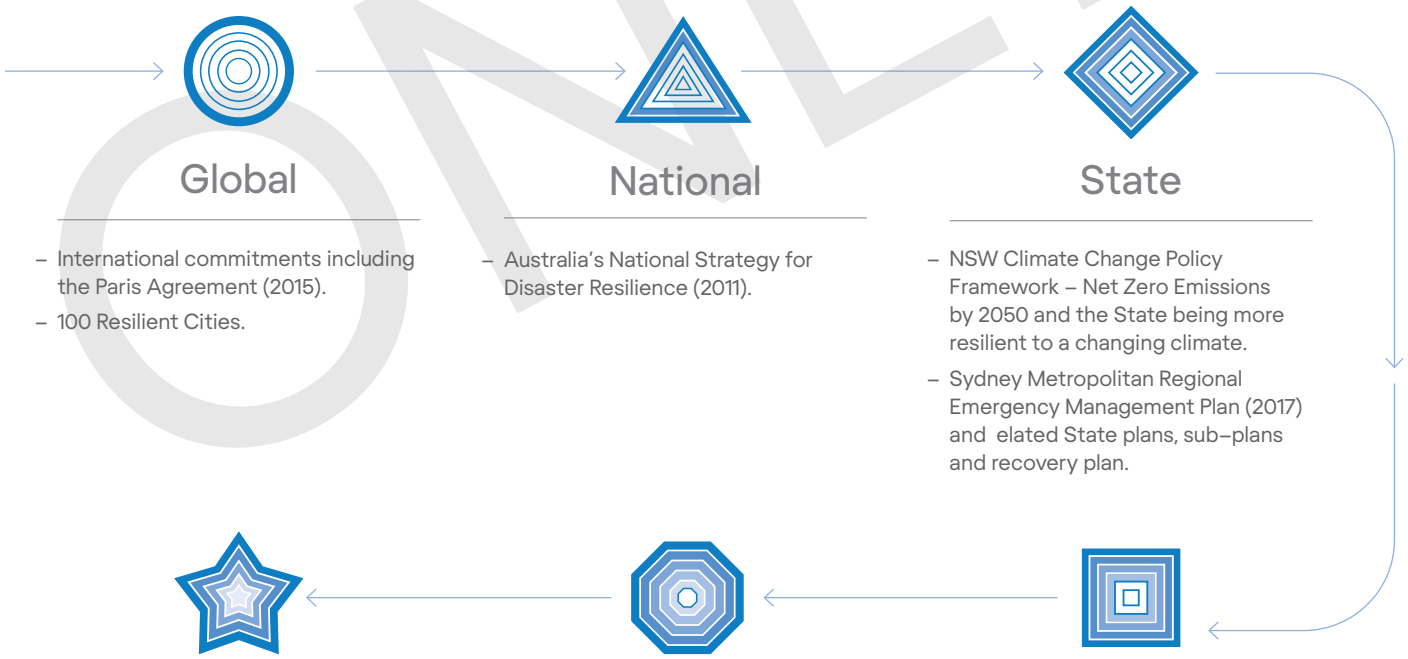
The planning priorities and associated actions of the North District Plan also set a context for the Local Strategic Planning Statement for Ryde (to be adopted in 2020). This statement responds to 'Planning Priorities' nominated by the Greater Sydney Commission and addresses its four themes for planning of the City of Ryde including the next local environment plan (LEP) until 2040 and updated development control plans (DCP).

These strategic documents along with the Resilient Cities framework provide a basis for the priorities and actions in the Ryde Resilience Plan 2030.

2.5 Relationship of key initiatives, strategies and plans from global to local

A number of local, district, regional, State, national and international strategies, policies and plans complement, and have helped to guide, the Ryde Resilience Plan 2030. They are summarised in *Figure 2*, and listed in the bullet points below.

FIGURE 2: GLOBAL TO LOCAL INITIATIVES, STRATEGIES AND PLANS



Global

- International commitments including the Paris Agreement (2015).
- 100 Resilient Cities.

National

- Australia's National Strategy for Disaster Resilience (2011).

State

- NSW Climate Change Policy Framework – Net Zero Emissions by 2050 and the State being more resilient to a changing climate.
- Sydney Metropolitan Regional Emergency Management Plan (2017) and elated State plans, sub–plans and recovery plan.

Regional

- Resilient Sydney: a strategy for city resilience (2018).
- Greater Sydney Region Plan–A Metropolis of Three Cities–connecting people (Greater Sydney Commission, March 2018).

District

- Our Greater Sydney 2056 – North District Plan – connecting communities (Greater Sydney Commission, March 2018).
- Parramatta River Masterplan (Parramatta River Catchment Group, 2019).
- Ryde–Hunters Hill Local Emergency Management Plan (Ryde–Hunters Hill Local Emergency Management Committee, 2016).
- Bushfire Risk Management Plan (Hunters Hill, Ryde, Lane Cove, Willoughby Bush Fire Management Committee2010), with updated Draft Bushfire Risk Management Plan 2019–2024 (currently on public exhibition).
- Northern Sydney Regional Organisation of Councils (NSROC).

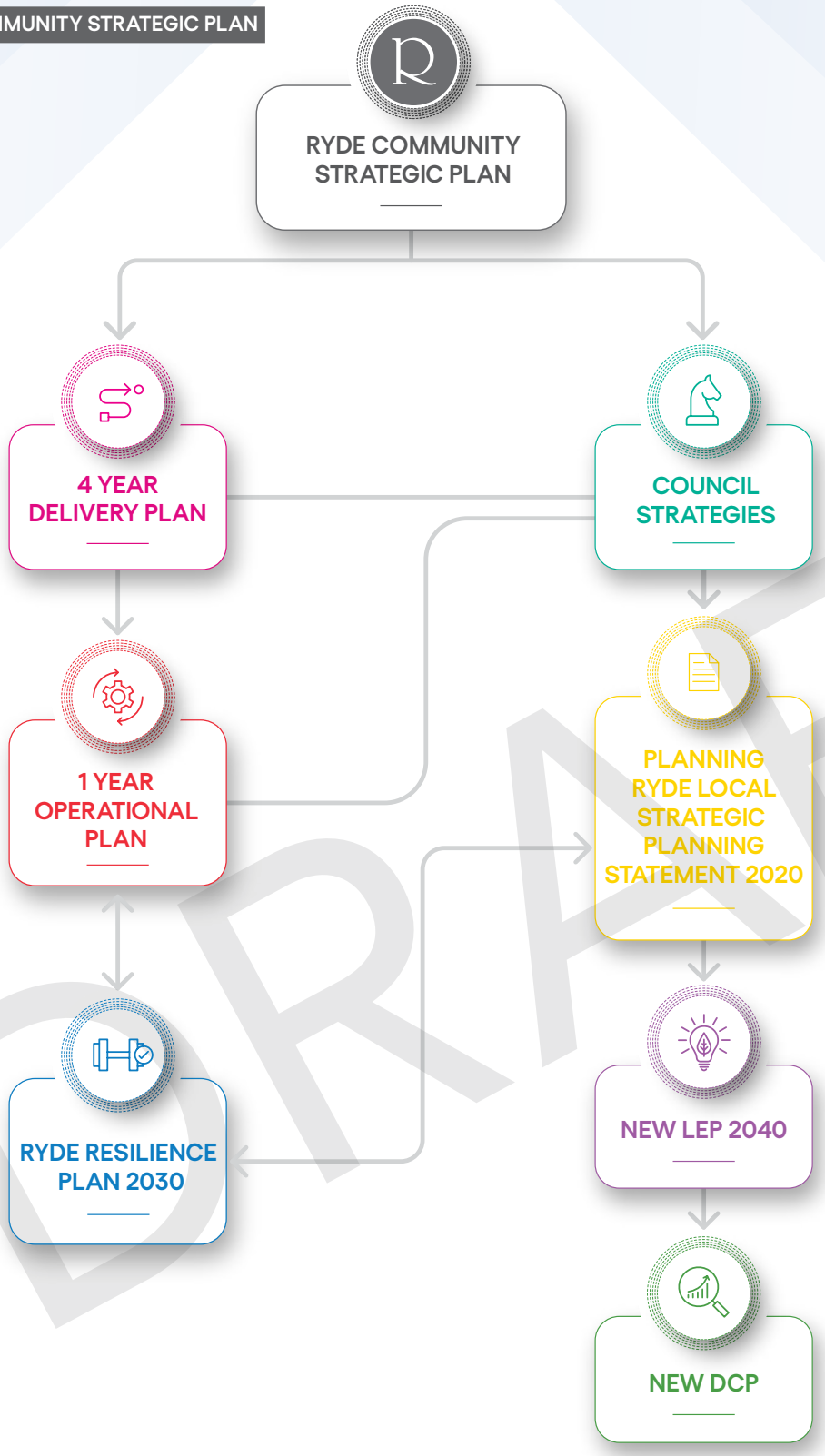
Local

- Ryde 2028 Community Strategic Plan (adopted 2018).
- Ryde Resilience Plan 2030 (draft for exhibition early 2020).
- Planning Ryde Draft Local Strategic Planning Statement 2019 (draft exhibited July 2019, for adoption in early 2020), new Local Environmental Plan 2040 (due for completion in 2020), and relevant development control plans to be updated.
- City of Ryde Social Plan (adopted 2019).
- City of Ryde Climate Change Risk Assessment Adaptation Report (Statewide Mutual Liability Scheme and Echelon Australia, 2010) – currently being updated.
- Floodplain Risk Management Study and plans for various catchments.
- Other local plans, strategies and policies of Council.

2 GLOBAL, REGIONAL AND LOCAL CONTEXT FOR RESILIENCE

Figure 3 shows the plan's structure and links with other strategies, policies and key documents of Council that relate directly to resilience.

FIGURE 3: RYDE COMMUNITY STRATEGIC PLAN



3 DRIVERS AND PRESSURES TO FRAME THE LOCAL RESILIENCE PLAN

3 DRIVERS AND PRESSURES TO FRAME THIS LOCAL PLAN

Over coming decades, the City of Ryde will experience rapid development, population increases and climate change. By 2031, there is projected to be 17,000 new dwellings, an increase of more than a third from 2018 (Greater Sydney Region Plan). Such growth will have far-reaching impacts on quality of life and will continue, and place pressure on local resources.

3.1 Local drivers

To address this challenge, Council will need to:

- Ensure its asset management frameworks and plans consider the risk from increasing climate exposure and factor this into budgets and delivery programs.
- Help promote a shift from private vehicle use. Within the City of Ryde, there is a continued heavy reliance on cars. To become a more resilient community, we will need to promote a shift to active transport options. by pedestrians, mobility aid users and cyclists. This includes a better integrated system of local walkways and cycle-ways, and to public transport for medium and longer distance trips.
- Promote collective leadership, knowledge sharing, collaboration, and connections across the government and business sector. Integrated approaches are required for decision making that embraces resilience thinking across government, agencies, non-government organisations, business and local communities.

There are seven key areas that will help overcome these challenges and drive resilience in Ryde, which are summarised and highlighted below in *Figure 5*.

FIGURE 4 DRIVERS FOR RESILIENCE IN RYDE

1	Extent of opportunities for growth, diversification and innovation from a dynamic economy
2	Access to employment, education services, skills development and training
3	Strength of inclusive, engaged and cohesive community and neighbourhoods
4	Clear leadership, direction and integrated strategies of Council delivered by skilled workforce
5	Depth of good governance, transparency and collaboration with stakeholders
6	Health of the environment and ecosystems
7	Availability of adequate resources and infrastructure to meet basic and essential needs

3 DRIVERS AND PRESSURES TO FRAME THIS LOCAL PLAN

3.2 Local pressures

There are many known pressures that this Resilience Plan will seek to address, which include:

- Demand for public transport
- Connectivity and mobility
- Active transport needs
- Housing supply/choice/affordability
- Recreation facilities and open space
- Use of resources, including waste management
- Energy supply, consumption and security
- Water supply, consumption, catchment quality and security
- Social cohesion
- Environmental and mental health risks
- Transport congestion
- Local liveability, land-use planning and heritage protection
- Conservation of biodiversity and natural systems
- Emergency management and preparedness
- Local economic development and employment opportunities

There are many known pressures that this Resilience Plan will seek to address.

4 WHAT OUR LOCAL COMMUNITY AND STAKEHOLDERS ARE TELLING US

The *Our Vision for Ryde 2028: Community Strategic Plan* (2018), which involved substantial community engagement, identified that people do not want to see the kind of development that destroys the character and liveability of the City of Ryde. The community instead wants Council to focus on protection and enhancement of public open spaces, street trees and green areas around new developments.

Residents say they want Council to demonstrate environmental and sustainability leadership and protect the natural environment (including bushland) from the pressures of development. They want to see new measures, including planning controls, to encourage and facilitate responsible disposal of waste; use less energy and water; recovery resources with increased recycling of waste and materials; a reduced environmental footprint; and improve the cleanliness and health of streams and rivers.

There were many elements and stages of engagement with community and external stakeholders, including through surveys, interviews, focus groups and pop-up cafes, local business networking events, displays, digital resources and distribution of promotional materials.

Beyond the broader community, the specific target audiences for focus groups included senior citizens and the elderly, culturally and linguistically diverse (CALD) background residents, and those with significant mobility constraints and living with disabilities.

These were specifically targeted by Council to ensure sufficient voice was provided to the most vulnerable, potentially marginalised or impacted communities in our city and measures identified directly by these groups to guide the plan.

One of the biggest expressed needs of participants in the community engagement from July to November 2019 was for Council to provide information, resources and support for residents to be better prepared for and respond to acute shocks, including emergency situations and events such severe storms, bushfires, heatwaves and failures of the main power grid supply.

Residents say they want Council to demonstrate environmental and sustainability leadership and protect the natural environment (including bushland) from the pressures of development.

5 LOCAL VISION, GOALS AND INGREDIENTS FOR RESILIENCE IN RYDE

5 LOCAL VISION, GOALS AND INGREDIENTS FOR RESILIENCE IN RYDE

After extensive community engagement conducted during 2019 to inform the preparation of this Resilience Plan, the following vision, goals and strategic directions have been developed to address the local challenges, enabling principles, essential steps and pressures and meet our community's expectations.

5.1 Vision for a Resilient Ryde

The City of Ryde will as a resilience leader enable the local community to be adequately prepared to withstand and survive future shocks and stresses that may affect them, and thrive into the future.

Our places and spaces, including dependent and vulnerable ecosystems, will be managed and protected to adapt sustainably and resourcefully for future change and the impacts of climate change.

5.2 Goals for a Resilient Ryde

Nine goals have been developed to help achieve the vision for a resilient Ryde:

Energy security – A low carbon community and economy that makes maximum use of renewable energy, lower emissions transport and cool living in homes and across neighbourhoods

Water security – A water sensitive city that protects the function, amenity and quality of our creeks and rivers, efficiently provides for the clean water needs of people through adaptive technology, and provides access to healthy water-based leisure opportunities

Resource efficiency – Making continual improvements to the sustainable use of resources, thereby delivering economic, environmental and social outcomes

Climate change, extreme weather events and other natural hazards – A community that adapts to potential impacts of climate change on comfort, safety, health and protection of the environment

Biodiversity and natural systems – Natural systems that are sustained and biodiversity connections that are increased, providing social, cultural, economic, environmental and health benefits for the community

Transport and connecting our community – Transport infrastructure and people movement networks and systems that are efficient, responsive, multi-modal, equitable, resilient and long-lasting

Health and wellbeing – A diverse, inclusive, resilient and well prepared community in which every resident and worker feels they belong, are valued and supported

Emergency management for preparedness, responses and recovery – A community that is well supported by Council in terms of emergency preparedness for, responses to, and recovery from, major shocks

Direction, collective leadership and collaboration – An inclusive, resilient 'one city' community with good governance, engagement and capacity to withstand shocks and stresses

5 LOCAL VISION, GOALS AND INGREDIENTS FOR RESILIENCE IN RYDE

5.3 Enabling principles for a Resilient Ryde

There are 10 'enabling' principles that will guide the development and implementation of strategic directions and responses associated with planning to make the City of Ryde more resilient:

- Organisation of integrated emergency management
- Identification and application of current and future risk scenarios
- Strengthening of financial capacity for operations
- Pursuit of urban design excellence based upon sustainability
- Safeguarding of buffers for and maintaining ecosystem functions
- Engaging with and building capacity of community for resilience
- Strengthening of institutional capabilities for resilience
- Increasing resilience of infrastructure (physical assets and social)
- Establishment of disaster preparedness and response
- Facilitation of recovery and bounce back for improved resilience

DIRECTIONS FOR RESILIENCE VISION

GOALS 1-9

ENABLING PRINCIPLES 1-10

ESSENTIAL STEPS 1-3

STRATEGIC DIRECTIONS 1-10

5.4 Essential steps to build resilience of Ryde

To complement and enact the 10 enabling principles, there are three essential steps for strengthening resilience:

Confirm

1. Confirm known and perceived shocks and stresses as experienced or known by the community, and then establish a framework for generating pathways for the community to better respond to local shocks and stresses and global pressures, through including more socially connected and self-resilient communities.

Identify

2. Identify and implement measures for Council to be a leader in resilience planning and response through its own operations and by equipping our community with the right tools and support to plan, prepare for and bounce back from major shocks and chronic stresses.

Strengthen

3. Strengthen the ability of our ecosystems to survive, adapt and thrive to effectively respond to the threats of climate change, resource depletion and environmental health challenges that can compromise the longer term sustainability and quality of life for our community.

5.5 Strategic directions for responses to make Ryde resilient

Specific action planning through local responses for resilience will be underpinned by the 10 strategic directions, and these are reflected under the goals for each nine key response areas in Volume 2. These directions are:

1. Develop a collective response to a changing climate, population growth and other local and global pressures, chronic stresses and future shocks to build resilience of the community through planning, adaptation, better emergency preparedness, strengthened social cohesion, collaboration and where necessary recovery.
2. Deliver through partnerships with our community and with other levels of government and regional entities, programs to reduce greenhouse gases emissions and increase the use of renewable energy in transition to a zero carbon jurisdiction, including by taking advantage of emerging technologies, alternate fuel sources including 'hydrogen power' and energy conversion alternatives.
3. Continue work towards reducing city waste, including diversion from landfill, recycling and recovery as a valuable resource.
4. Improve local waterways through integrated water cycle management as a key focus for projects such as capture of stormwater and rainwater for reuse, sustainable land management through planning and working with regional partners to manage water issues.
5. Encourage integrated sustainable design to reduce the effects of urban heat in public areas, the built environment and parkland settings.
6. Work with developers, owners and tenants by working to improve and raise environmental standards across all sectors of the built environment, including innovative solutions to deliver sustainability performance, and advocate for improved building standards for our community.
7. Develop programs that help to cool our city through enhancing or increasing urban canopy cover through green links, supporting thriving biodiversity and adapting the urban landscape with a growing focus on integrated paths, trails and routes for pedestrians, cyclists and mobility aid users with green and blue spaces of parks, waterways and bushland to relax, escape to and enjoy.
8. Improve local air quality with a gradual introduction to and take up of cleaner technologies and lower emissions vehicles with more sustainable and responsive local active transport programs that contribute to reducing traffic congestion and car dependence, including through innovation and collaboration.
9. Advocate for improved public transport services and connections to, through and within Ryde to build strong socially connected and healthy communities.
10. Implement local initiatives and measures to help manage the impacts from major shocks and chromic stresses and constrain the long term cost burden to Council and the community, and pursue ambitious and necessary local targets for the City of Ryde's contribution to limiting the impacts of global warming from carbon emissions.

6 SHAPING OF THE RESILIENCE PLAN

6 SHAPING OF THE RESILIENCE PLAN

The Plan, in two volumes, covers actions for both Council and the community and includes a mix of mechanisms, tools, programs and projects including mitigation and adaptation measures.

6.1 Structure of the Plan

Community involvement will cross areas including and have been identified in the plan for bushfire control, many health related challenges, employment and financial situations or events, disruptions to essential services and public utilities, public transport and emergency services.

Council will continue strong advocacy, proactive contributions to and collaboration with other lead organisations (including regional and State agencies and authorities, NGOs and Federal bodies), and will carry out actions and responses to strengthening resilience for our community.

6.2 Making it happen - the importance of good governance and collaboration

Research and evidence from 100RS showed that poorly integrated governance is a key factor that inhibits the building of community resilience.

In response, with key elements of this Plan there is a strong emphasis on collaboration, collective leadership, knowledge sharing, community participation, diverse stakeholder engagement and building capacity.

Ongoing funding for the plan's implementation will require budgetary commitments by Council under its four-year Delivery Plans and annual Operational Plans for those initiatives or projects that cannot otherwise be absorbed under existing programs. Other funding opportunities will be pursued including grant programs and partnerships with government, and the corporate and not-for-profit sectors. Cost sharing will continue for specific projects with other councils and regional organisations of councils at district, sub-regional and regional levels.

Council will monitor the implementation of the Resilience Plan, which will also contribute to Integrated Planning and Reporting under the Local Government Act. Ongoing monitoring will ensure that the various departments of Councils will deliver on commitments to building or maintaining resilience standards including the development of adaptive management strategies where necessary.

Apart from ongoing engagement (through for example, surveys) with the community to evaluate the effectiveness of the responses, Council will communicate with residents, locally operated businesses and other stakeholders about the status of the Plan's implementation. This will be undertaken through Council's annual reports, the yearly 'Smarter Cleaner Greener' Achievements reports and to the Biodiversity and Environment Advisory Council (BEAC), Renewable Energy Advisory Council (REAC) and Social Inclusion Advisory Council (advisory committees) of Council.

Information collected and integrated into reports from reviews will be fed back into decision making for Council's overall ongoing resilience delivery under its delivery and operational plans.

This will include specific existing projects, for proposed projects or programs over each of the three stages of the Plan's implementation.

Targets in the Plan are specifically linked to strategic planning outcome areas in Council. These alignments include our local environment plan and planning controls, and are also reflected in Council's corporate reporting KPIs to ensure tracking and delivery.

The nine key response areas of this Plan are presented in Sections 7-15.

7 ENERGY SECURITY

7 ENERGY SECURITY

Cities provide more than half of global gross domestic product (GDP) (Dobbs et al., 2011). However, they have higher energy intensity than rural areas and contribute 60-80 percent of world energy demand (Hallegate and Corfee-Morlot, 2011), and emit 40 percent of global greenhouse gas emissions (Rosenzweig et al. 2011).

7.1 Background

Fifty-seven percent of our built environment emissions come from homes according to the Green Building Council of Australia (GBCA 2019).

There is a global imperative to limit warming to within two degrees Celsius average to prevent and withstand even more dangerous climate change. Many scientists and policy makers believe that this should be 1.5 degrees, to further reduce the risk of 'tipping points' being reached for runaway climate change.

There is a critically important relationship between energy and greenhouse gases, with reduced emissions via renewable energy and efficiency a key factor in limiting global warming and dangerous climate change (100% Renewables, 2019).

As a result, there is an imperative for all communities to shift away from fossil fuels in the transition to a low carbon economy. A low carbon economy will help to minimise climate change impacts; thus, effective carbon emission management plays a critical role in ensuring resilience.

In response, under Council's Local Strategic Planning Statement (LPSP) there are targets for gradual reductions to 'net zero' carbon emissions by 2050 and increases to a minimum of 60 percent renewable energy across all of Council's operations. Although the City's contributions to global emissions are small, it is important that we play a part in helping to limit global temperature rises.

Another reason why communities need to shift to renewable energy is that non-renewable sources of energy continue to be depleted. Global production will most likely follow a long undulating plateau over decades before declining slowly. In Australia, there has been a gradual decline in our known oil reserves.

In November 2017, Council resolved to divest its term portfolio from all fossil fuel aligned financial institutions, such as oil, coal and gas companies, as one means of demonstrating leadership towards tackling climate change and protecting the environment.

Fifty-seven percent of our built environment emissions come from homes according to the Green Building Council of Australia (GBCA 2019).

7 ENERGY SECURITY

7. 2 Renewable energy

Renewable technologies are steadily becoming more cost-competitive. Consequently, the renewable energy sector is continuing to grow rapidly. Globally, about one out of every two newly added megawatts of power comes from renewable sources. By 2030, at least 50 percent of all electricity generated is predicted to be from renewable energy (Australian Government, 2017).

The expansion of renewable energy to reduce greenhouse gas emissions, while also achieving cost savings, is expected to continue in the residential sector.

Community interest in more sustainable homes among buyers is growing, with 60 percent of consumers saying energy efficiency is a factor when buying a home. The City of Ryde continues to grow its Sustainable Home Waste Advisory Service (which provides tailored advice for our residents to improve their liveability and reduce bills through solar energy installations and other sustainability actions) and introduce initiatives including targeting renewable energy.

In 2019, over 10.2 per-cent of the Ryde residential population had solar PV installed (Sunspot APVI, 2019). Council anticipates this to continue to grow as grid-based energy prices increase and the cost of solar battery storage decreases and council will continue to advocate and support community though this change.

Batteries will play an increased role in energy storage to reduce reliance on fossil fuel based sources in times of increased grid black-outs in hot weather and for working families who cannot utilise the solar energy in daylight hours and as the residential model of the home transition into more self-sufficient and reliant model such and the home micro-grid.

Council has a key role to play in educating and supporting the community to achieve solar access and equity, advocating for better BASIX standards, and updating local planning standards for non-residential development as they relate to renewable energy. This work has commenced under the Resilient Sydney program with the Department of Planning.

Council is developing a pathway towards achieving a minimum 60 percent renewable energy target for its operations by 2030 (as part of a range of initiatives towards achieving the State government's 'Net Zero by 2050' target for carbon emission reduction). This pathway looks at a range of opportunities for increasing Council's proportion of renewable energy use through onsite renewable energy generation, offsite renewable power purchase agreements and other mechanisms.

Electric vehicles (EVs) (where powered by renewable energy sources) have the potential to shift motor vehicle usage from a reliance on fossil fuel based internal combustion powered engines. The issues and opportunities for the expanded application of this option are covered in detail in Section 12, which covers Transport and connecting the community.

Other emerging technologies include hydrogen power, which is currently generated by electrolysis of water to generate gas streams of hydrogen and oxygen. The captured hydrogen contains no carbon, and can be considered as renewable 'pollution-free' energy (providing renewable electricity is used to undertake electrolysis).

GLOBALLY ONE OUT OF EVERY TWO
NEWLY ADDED MEGAWATTS OF POWER COMES FROM RENEWABLE SOURCES[1]

BY 2030 50 PERCENT OF ALL ELECTRICITY
GENERATED IS PREDICTED TO COME FROM RENEWABLE ENERGY[1]

60 PERCENT OF CONSUMERS SAY ENERGY EFFICIENCY IS
A FACTOR WHEN BUYING A HOME[1]

A micro-grid is a local energy system made up of individual customers that have the capability to generate, store and export power. A control system enables these customers to operate as a unified energy community.

7.3 Micro-grids and independent power generation

Micro-grids can be autonomous grids which can operate without being connected to existing grids and can combine different assets and loads. Australia is slowly transitioning within this space how due to regulation Mini-grids operate like micro-grids but remain connected in some way to the larger network (and are technically described as an embedded network according to the AEMC). Mini-grids are the present popular model operating in Australia.

As more countries incorporate renewable sources into their energy mix, micro-grids are becoming increasingly important.

In Australia, they offer a means to address the challenges of rising electricity costs, aging infrastructure and the need to serve a large geographic area and increasing energy demands from the digital age. Recent advances in micro-grids mean more options for energy generation via solar, wave, wind and energy storage projects.

An example of a mini-grid / embedded network is the Mooroolbark Mini Grid Project on the outskirts of Melbourne. This involves powering 14 homes in a suburban street with a combination of solar panels, storage batteries and the main power grid. The system enables individual participants to capture, store and optimise the use of both solar and grid energy to reduce their power bills and increase the use of renewable solar energy with carbon emission reductions.

All of these homes can operate as a unified energy system, as a mini-grid network with shared energy. The mini-grid interacts with and supports the main power grid for most of the time, with the ability to disconnect and operate independently for short periods.

There is potential for mini-grids / embedded networks to be established in precincts in the City of Ryde including in Macquarie Park.

As part of a distributed energy network, micro-grids and embedded networks offer opportunities for:

- Community groups and organisations to reduce local emissions and improve supply reliability.
- Councils to deliver cost savings, strengthen energy security and climate resilience for communities and businesses.
- Property developers to add value and points of differentiation to their development projects.
- Energy providers to invest in renewable energy projects.
- Energy retailers to retain customers and derive wholesale market benefits.

1. Source: (Australian Government, 2017).

7 ENERGY SECURITY

7.4 Carbon management

To minimise the further loss of biodiversity and reduce additional impacts on natural and human systems from climate change, it is critical to commit to a pathway that reduces greenhouse gas emissions sufficiently in order to help limit global temperature rises to 1.5 degrees Celsius.

According to guidance from the IPCC, this requires reducing global net anthropogenic CO2 emissions by about 45 percent from 2010 levels by 2030 and reaching net zero emissions by around 2050.

To achieve these necessary greenhouse gas reductions, councils must lead by example in carbon management and facilitate partnerships, programs and assistance with the community and business so they are induced to make better contributions.

In the City of Ryde, the main carbon intense sectors are transport, energy consumption and waste.

Measuring and reporting these carbon emissions involves monitoring three 'scopes':

Scope 1

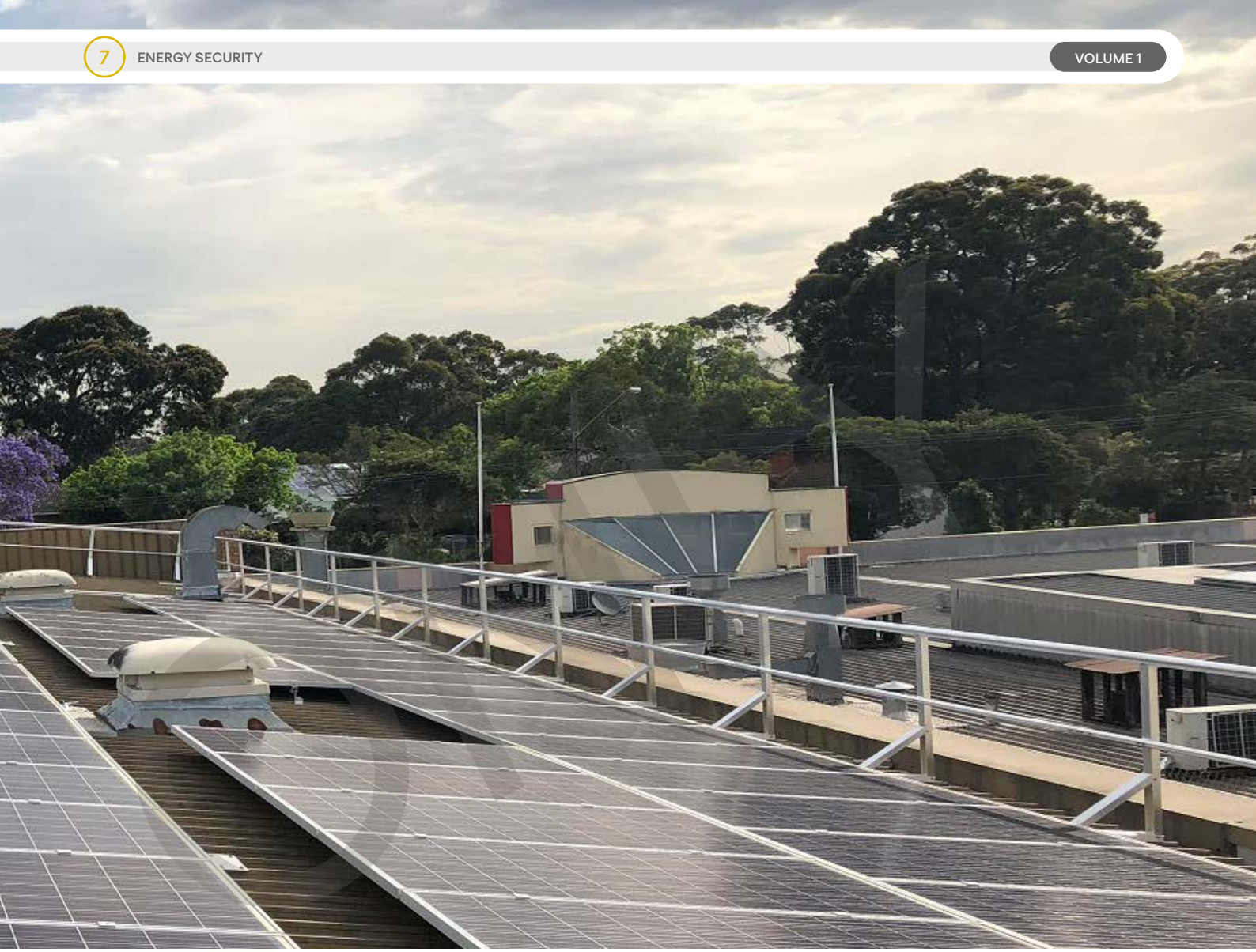
– Scope 1 emissions are direct emissions associated with facilities or assets which an organisation directly controls, such as emissions such as from burning of fuel in vehicles and in facilities owned by an organisation / fugitive emissions / industrial processes / emissions from landfills owned by the organisation.

Scope 2

– Scope 2 emissions are indirect emissions from the use of electricity.

Scope 3

– Scope 3 covers indirect emissions due to operations and activities outside of an organisation's direct control and in the wider economy, such as from the manufacture of purchased goods and services, business travel, staff commuting, waste disposal to landfills not owned by the organisation, use of sold products, transportation and distribution (up and downstream), investments, leased assets and franchises.



Despite not being compulsory, Council has identified that measuring our water and energy consumption is essential for good environmental management for reducing our carbon footprint within all our assets and operations where possible. Consumption is monitored by Council's Environment team, and the data is used to inform efficiency programs and projects.

The City of Ryde actively participates in Resilient Sydney's carbon measurement project, the 'Sydney Metro Carbon Project' (Resilient Sydney Action 13 to "Measure metropolitan carbon emissions and report on progress"). This provides a standardised platform of community emissions data to help provide intervention pathways for emissions reductions in the areas of built environment, transport, energy and waste.

7.5 Development controls

Preparation of a local strategic planning statement (LSPS) in 2019, a new LEP in 2020 and associated updates of DCPs will provide the City of Ryde with more opportunities to integrate requirements covering renewable energy, energy efficiency and other mitigation options for a low carbon future. Council controls will seek to align with broader State and Council targets to ensure our community's emissions have a pathway for limiting potential future increases.

The 'Making It Happen' supplementary volume (Attachment 4) of the draft LSPS includes other proposed updates for planning controls relating to the built environment that would help to reduce energy demands (for example by increasing tree canopy coverage and placing controls on impervious surfaces). These controls would bring many other positive community benefits including reduced urban heat impacts, reduced reliance on energy through improved passive and urban sustainability and design, and better overall health and wellbeing.

It is critical to commit to a pathway that reduces greenhouse gas emissions sufficiently in order to help limit global temperature rises to 1.5 degrees Celsius.

8 WATER SECURITY

8 WATER SECURITY

Planning for water security will become increasingly important as the population grows and the climate gets warmer. Climate change is likely to lead to more very hot days and for longer periods, and reduced rainfall, especially in autumn and spring.

8.1 Background

Council aspires to become an integrated water sensitive (or water wise) city. This will require a strategic approach to delivering more ambitious water efficiency to help ensure enough water for people, the economy and the environment.

This means prioritising the model of integrated water cycle management in all that we do to sustainably plan for and manage water for our city and its residents. Delivering this outcome of an integrated water sensitive city will require Council involvement in the following areas: infrastructure and land use planning and associated controls; managing our waterways as assets; alternative water supplies; and water sensitive urban design to manage pollutants.

It will also require partnerships with Sydney Water, The Parramatta Catchment Group, neighbouring catchment councils and the community.

An important regulation in greater Sydney's drought response is to reduce water demand when we are not getting enough rain (Droughts are being exacerbated by climate change). This involves water restrictions (at the time of writing, Sydney Water had imposed Level 2 water restrictions), which have practical implications for water management at Council's parks and sport fields.

Because the demand for potable (drinking) water will continue to increase as population grows, there is a need to help our community understand the importance of water efficiency, savings measures and alternatives like water capture and reuse options. (By 2036, overall water demand across the Eastern Harbour City will increase by 23 percent and waste water demand by over 25 percent.)

There is an increasingly critical need to invest in diversified sources to secure water for our long-term future. For example, the harvesting and storage of rainwater or stormwater can provide an alternative source of water for irrigation for households or community facilities to help withstand drought, and provide greater water security. These can be delivered through options such as grey and black water recycling, rainwater tanks and small-scale water sensitive urban design such as tree pits and bio-retention systems.

BY 2036
OVERALL WATER DEMAND ACROSS THE EASTERN HARBOUR CITY

WILL INCREASE BY
23 PERCENT

AND
WASTE WATER DEMAND BY
OVER
25 PERCENT

8 WATER SECURITY

8.2 Stormwater management and water sensitive urban design (WSUD)

Capturing and keeping water in the landscape has many benefits. It can help to reduce flood risk to properties and better prevent erosion in our natural areas from peak rainfall events; it will also provide relief through cooler green places and micro-climates for our community during more frequently occurring hot days.

The City of Ryde covers two main catchments; the Parramatta River and Lane Cove River. There have been significant flood events, including a major event seriously affecting the Eastwood town centre in 1984, as well as extended periods of rainfall deficiency.

The risks from flooding will be exacerbated with climate change, including more intense rainfall events of short duration associated with severe thunderstorms and others from East Coast Lows and Council using modelling data is upgrading infrastructure and plans to manage and alleviate infrastructure stress into the future through replacement programs.

Capturing and keeping water in the landscape can be done by:

- Implementing policies that reduce the area hard surfaces. This will reduce the amount of bacterial pollution that reaches our waterways and reduce direct sources of pollution.
- Increasing the amount of tanks and amount of water held in rainwater tanks.
- Stormwater harvesting.
- Technologies such as permeable paving, passive irrigation techniques and bio retention systems or rai-gardens.
- Naturalisation of existing canals to retain water in the landscape, this will benefit community in recreational capacity but broader environmental benefits.

Council already has adopted Water Sensitive Urban Design Guidelines which apply to certain classes of development within the City of Ryde. However, there is currently no State-wide or regional policy on water sensitive urban design.

Consequently, Council's current management and delivery against water quality targets from such installations and devices is poorly executed, making it difficult to achieve improved voutcomes.

Many local government practitioners have identified this lack of a specific policy and associated regulations as being one of the main barriers to achieving a consistent and effective approach to stormwater management.

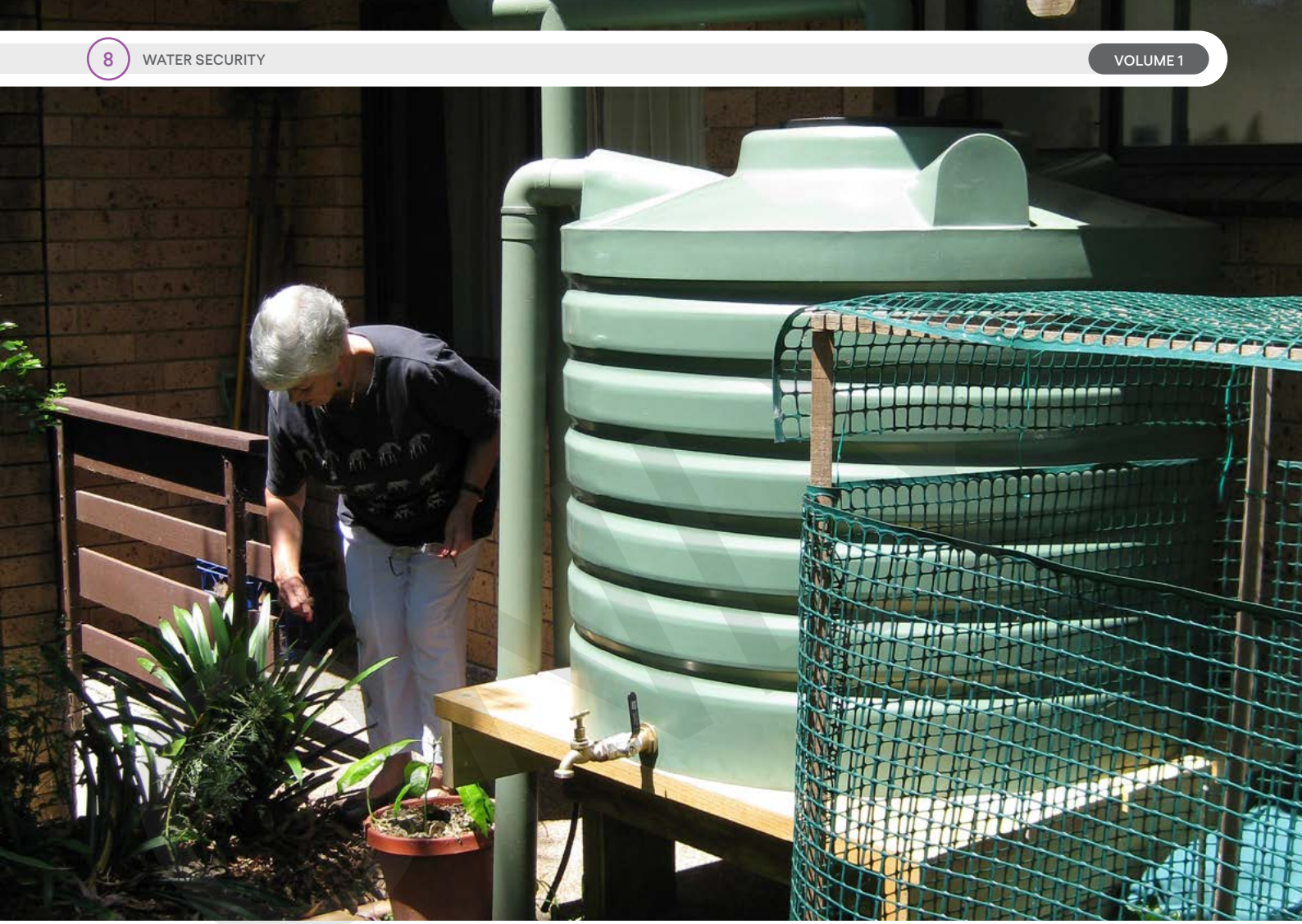
Council in partnership with 10 other councils in the Parramatta River Catchment Group, has adopted the Parramatta River Masterplan which includes a range of actions including to "Standardise the Standards" plan to seek adoption of a regional approach to the installation, maintenance and reporting of stormwater capture and reuse and water sensitive urban design infrastructure. Other actions from the Parramatta River Masterplan seek to undertake a Riverwatch monitoring program, reduce stormwater runoff and improve overflows.

Sydney's waste water system is well over 100 years old, and was originally built for a smaller city. When it rains, stormwater can flow into and overload the wastewater system, causing it to overflow into our creeks and rivers. Understanding where and when this happens and putting measures in place to prevent it, is an essential part of improving water quality. Council works with the NSW Environment Protection Authority and Sydney Water to improve water quality and quantity outcomes through targeted wet weather overflow and other management programs.

Maintaining key partnerships, such as with Sydney Water, will be essential in managing future wet weather overflows and aging infrastructure impacting water quality in our waterways and impacts on Council's stormwater drainage networks.

Stormwater runoff, and all the rubbish and other pollution it brings, is one of the main ways our river gets 'dirty'. A catchment-wide approach to reducing this stormwater through integrated governance for waterway management, water sensitive design which absorbs rain where it lands, community education and infrastructure management will contribute to the aim of long-term improvements for water quality.

Source: NSW SES Ryde Unit, 10-11 February 2020



The role of advocacy and governance in stormwater management and advocating for obtaining standards for water quality will assist with ensuring our waterways, such as the Parramatta River and Lane Cove River, have strong ecological health and water quality for the future.

8.3 Water efficiency

A strategic approach is needed to deliver water efficient practices in both our community and Council operations to reduce demand on potable water supplies.

Data collection is also vital, to influence the way people use water we need to understand how and why they use water the way they do.

Council, as part of its ongoing program of environmental monitoring, continues to monitor consumption from our community assets in order to make continual efficiency improvements to reduce potable water consumption and increase self-reliance.

Council also utilises a range of measures to reduce potable water usage at various assets. These measures include active leak detection and monitoring, use of efficient appliances and fittings, rainwater tanks, efficient irrigation practices and installation of synthetic grass on sports fields. Council also has a Water Saving Action Plan (due to be updated in 2020) that includes further water efficiency opportunities for its assets and operations.

Community water efficiency is encouraged by Council's Energy Smart Water Wise DCP and Water Sensitive Urban Design Guidelines (2015) that includes initiatives for potable water conservation through water efficient appliances and fittings, and water efficient landscaping.

There is also scope for Council to increase water efficiency education to support residents to use water resources wisely. This includes promotion of efficient technology, tailored programs, metering, voluntary use reductions and supporting regulatory measures (for example, improvements to BASIX requirements and National Construction Code (NCC)).

Sydney's waste water system is well over 100 years old, and was originally built for a smaller city. When it rains, stormwater can flow into and overload the wastewater system, causing it to overflow into our creeks and rivers.

8 WATER SECURITY

8.4 Water reuse and alternative water sources

Water recycling reduces the amount of water we take from dams, and ranges from large-scale wastewater recycling to sewer mining and stormwater harvesting. Recycling local water and harvesting stormwater, especially in increased climatic and extended dry spells, creates opportunities for maintaining the standard of our public open spaces including parks, ovals and school playgrounds.

Council's Water Sensitive Urban Design Guidelines (2015) already encourage applicants for certain types of developments to consider water reuse and alternative water sources.

As part of water security, key agencies such as Sydney Water recognise the need to plan and implement projects that support recycled water.

There is scope for Council to pursue further partnerships, such as with Sydney Water, for precinct scale recycled and wastewater (sewer) reuse in major developments, and recycled water offtake to alleviate current infrastructure pressures and provide assistance to council for open space irrigation and to build upon the Macquarie University project. Support for recycling initiatives will be critical in times of extended water shortages and can deliver water quality to various standards according to the required end use.

Apart from advocacy to increase BASIX and NCC requirements, there are other potential water resource opportunities through collaborative planning for residential lots to more effectively capture and reuse water. These will be explored within future planning considerations.

Pictured: Water recycling facility

Stormwater harvesting systems are currently operating to support irrigation demand and town centre sanitation. The City of Ryde currently has stormwater harvesting systems in place at Ryde Park, Meadowbank Park and Bill Mitchell Parks. Such systems use 100 percent recycled water sources (as at October 2019) and will increasingly become an important investment to ensure the quality of our green spaces is not reduced in times of drought.

8.5 Water quality

The Parramatta River Masterplan (2018) in its Ten Steps delivery includes works to improve water health under the Lane Cove and Parramatta rivers coastal zone management plans for the Lane Cove and Parramatta river catchments.

A co-ordinated governance approach is required to ensure that river health enables swimming in the river for the future, and includes wet weather overflow and infrastructure management, education, gross pollutant devices and WSUD.

Having local areas for connecting with our foreshores - for recreation, swimming or splash play - is important for our community for health, social connectedness and as cool spaces to cope with increasing urban heat.

The Parramatta River is one of Australia's most significant river systems and was once swimmable along most of its length. However, by the 1950s most of our previously 'safe' river swimming spots were closed due to pollution from local industry, sewage and stormwater runoff. Over the last 20 years, the river's health has gradually improved due to advancements in regulation, technology and raised community awareness.

Under the Parramatta River Masterplan, our community will be able to enjoy a splash play site at Putney Park by 2025. In 2020, the seawall will be upgraded providing a series of sandstone steps down to the shore. Water quality will also be monitored to help inform about swimming conditions.

A Riverwatch water monitoring program will help us measure change over time, protect existing swimming spots and open new ones, and understand what makes water quality change over time. This program is a multi-council partnership with the EPA and NSW Health to develop 'swim-safe' measurement criteria for swimming or splash play in a post industrialised river system. When finalised, these will be the first of their kind in Australia.

The waterways in Ryde are indicative of disturbed, urban waterways. The encroachment of development has meant that these streams are now highly modified from their original state and are unlikely to return to the original, natural form.

For almost two decades, the City of Ryde has been consistently monitoring the water quality of five major waterways. This monitoring program gives Council a bi-annual snapshot of the health of these ecosystems measuring macroinvertebrates (organisms indicating the health of the waterway by the diversity and abundance of their presence) and providing a chemical analysis to indicate the presence of pollutants or oxygenation.

This data is communicated to the community via our online web portal and assists Council to inform future waterway restoration projects. Additional programs within the community space include Streamwatch, with data hosted by the Department of Primary Industry and Environment's SEED portal.

In 2012 a Water Quality Monitoring Strategic Overview for water sensitive urban design opportunities across the city was undertaken as well as a Riparian Assessment Study (2013) to further provide information on the state of these areas for improvement programs. To date council has installed a number of bio-retention systems across the city, with the largest one at Santa Rosa Park, which captures a very large catchment to pre-treat for pollutant removal and provide clean habitat for aquatic species.

Council continues to undertake these projects as seen at Wilga Park (Shrimptons Creek), Jim Walsh Park, Forrester Park and Abuklea Road (Terrys Creek) to deliver improved water quality outcomes and provide future resilience for these creek-lines in high flow events.

A combined approach involving community education for water quality and health, projects including naturalisation and riparian restoration will collectively assist in driving outcomes towards improved water health. To ensure continuous improvement occurs within these spaces, Council will be developing a Water Strategy based on the integrated water cycle to manage the health of these critical ecosystems in the face of population growth and encroachment, and climate change.

8.6 Development controls

Improved BASIX and National Construction Code (NCC) targets are needed to include setbacks for permeable surfaces and increased efficiencies. The addition of riparian mapping for public and private land could assist to ensure these critical corridors are retained, to maintain good water quality and ecosystem health, and support objectives for the 'green/blue grid'. This mapping to inform development consent conditions within planning controls and complement Council's 'environmentally sensitive lands' maps (in the LSPS) to protect these areas.

Under the Parramatta River Masterplan, our community should be able to enjoy a splash play site at Putney Park by 2025.

Pictured: Putney Hill

9 RESOURCE EFFICIENCY

9 RESOURCE EFFICIENCY

Although our growing economy has brought prosperity to many Australians, an increasing strain on the use of our resources has resulted in more waste being produced than ever before. We have ultimately become a 'throw-away society' as many businesses make, market and sell products to "make our life easier". Yet, most of these products are not built to last.

9.1 Background

We have only recently started to seriously look at the repercussions of our throw-away society largely dictated by the global waste management crisis, with cumulative and visual environmental impacts from waste. Recycling has increasingly been on the international agenda with countries in East Asia now rejecting our exported recyclables due to contamination and limitations on processing capacity.

Waste such as carpet, mattresses and e-waste continue to be the most problematic without higher government intervention. Apart from education and awareness-raising in local communities to reinforce priorities of the waste hierarchy (avoid-reuse-recycle), councils have limited power to change this situation. This is due to geographical placement of processing facilities and offshore waste contract limitations determining which sources they can process. There is therefore a need to develop markets within Australia that can process our recyclables.

The City of Ryde is part of a Northern Sydney Region of Councils (NSROC) 'Community Recycling Centre' to assist in the collection and recycling of various waste streams outside of general collections. Waste-to-energy is also an important tool to utilise waste that would otherwise have gone to landfill as long as resource recovery had been maximised beforehand.

Regional collaboration has extended City of Ryde involvement in the Southern Sydney Regional Organisations of Councils (SSROC) led energy contract and 2018 power purchasing agreement (PPA). Council also operates a Home Waste and Sustainability Advisory Service with solutions to increase resource efficiency, home comfort and savings on home bills.

Water is also a critical resource that must be used efficiently. This issue is addressed in Section 8.

Recycling has increasingly been on the international agenda with countries in East Asia now rejecting our exported recyclables due to contamination and limitations on processing capacity.

9 RESOURCE EFFICIENCY

9.2 Waste management

Servicing the waste produced by a growing local population, with minimal impact on the environment, is an enormous challenge for Council.

Council needs to plan for future developments to incorporate and facilitate sustainable waste management practices.

To meet the target, Council continues to work with, and educate, residents and businesses to improve recycling and diversion rates. It also provides services targeting more environmentally responsible and sustainable waste management solutions. Even smaller local programs to increase home organic waste can provide numerous benefits (such as reduced landfill, reduced transportation, reduced greenhouse gas emissions, and improved soil from home composting).

A circular economy (often referred to simply as "circularity") is an economic system aimed at eliminating waste and the continual use of resources. As part of this system, it is vital to educate and influence the community to take on long-term changes to reduce unnecessary waste at its source, and offer opportunities to reduce, reuse and renew valuable resources which would otherwise be sent to landfill.

Promotion to the community of goods made from recycled materials helps to close the loop on the circular economy. It is important for Council to encourage the local residents to take up the installation of energy and water efficient home appliances.

Council is presently reviewing the Sustainable Procurement Policy to build improvements into processes, practices and opportunities within its supply chain to prioritise the use of recycled or environmentally friendly materials across the organisation. This approach is consistent with Council's notice of motion to prioritise recycled materials in its operations.

In 2018, Council endorsed "Phasing out Single Use Plastics for Council operations". A policy will be implemented across Council operations, which includes engagement with businesses and the community, to help reduce and improve the environmental impact of single use plastic. Programs towards this gal have since commenced and will expand in 2020.

This initiative builds on the continuous litter and community programs to reduce litter from our town centres and from entering our waterways. Such as the 'Zero litter to River by 2030' motion also passed by Council in 2019.

Australia currently recovers about 58 percent of its waste through recycling and energy generation. However, other developed economies are outperforming us, including the UK, Norway, Denmark and the United States. The statistics clearly show that Australia generates more waste than the average Western economy and the proportion it recycles is a little less than the average.

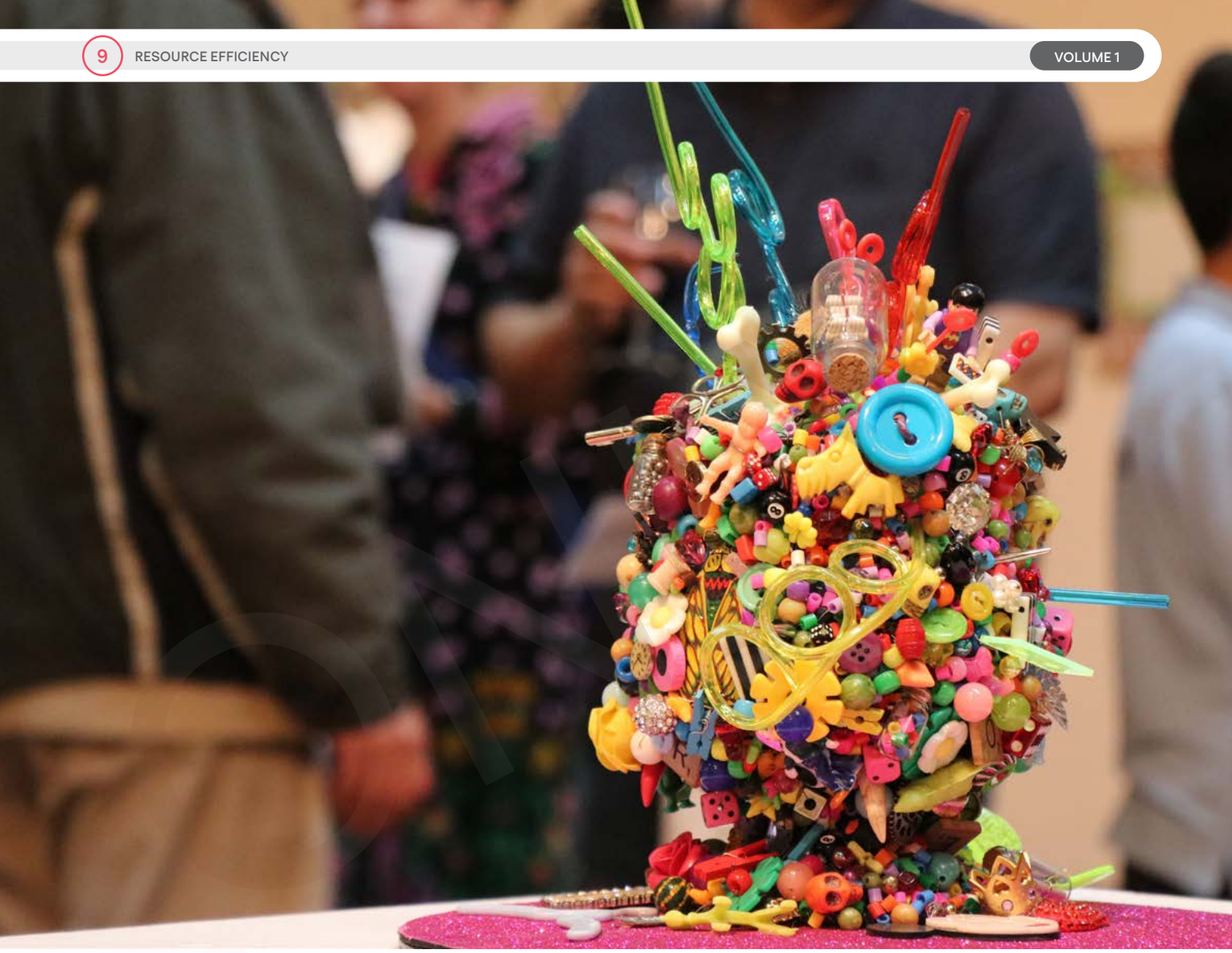
Alternative waste treatments (AWT) offer other potential methods for Australia to manage our waste streams.

The best solution, however, is to encourage and deliver waste avoidance through community education programs (by councils), product stewardship and manufacturing assistance by the State and Federal governments.

The recently introduced Container Deposit Scheme in NSW, which aims to combat single use bottles in waterways, in one initiative helping consumers to deliver a proactive waste solution. This will need to be extended to deliver solutions for another 23 waste streams.

There is a need to identify and adopt the most suitable technology to recover resources from our 'left-over' (residual) waste. This, along with strong engagement and education to support a reduction and avoidance approach for consumer behaviours, can lessen the negative impact of these streams.

Carbon emissions generated from waste significantly contribute to global warming and climate change. Council is looking to address the impact of waste by adopting low emission waste management solutions where feasible, within the aspirational stretch goals of 'towards zero waste' and 'net zero carbon'. Currently, most landfill sites harness the methane pollution generated and turn it into gas and electricity.



9.3 Procurement

In 2018, Council passed motions for prioritisation of recycled materials in procurement as well as avoidance of single use plastics for all of its operations.

A plan initially targeting the 'Top 4' largest materials procured to transition towards more environmentally friendly alternatives, which will cover supply chain management, carbon footprint, ethical impacts and material content.

9.4 Building construction waste

Building and construction waste is a huge contributor to resource inefficiency. There is an imperative for the construction industry to reduce waste by managing and monitoring the output of waste from new developments. Support programs such as the Green Building Council of Australia recognise waste from construction as a key issue and as such target certification goals to support minimisation in these areas as key.

A growing number of services specialise in managing building waste, including crushing and reusing bricks, concrete and sandstone for road base, processing fibreboard, timber and plastics for use, and fire kilns for energy at cement works.

Over recent years, Council has developed and implemented a business that crushes excavated materials from old roads, and concrete from footpaths to be reused as road base at the Council owned Porters Creek Facility. In the 2018-2019 financial year, this facility diverted around 120,000 tonnes from landfill.

AUSTRALIA CURRENTLY RECOVERS 58 PERCENT

OF ITS WASTE THROUGH RECYCLING AND ENERGY GENERATION

10 CLIMATE CHANGE, EXTREME WEATHER EVENTS AND NATURAL HAZARDS

10 CLIMATE CHANGE, EXTREME WEATHER EVENTS AND NATURAL HAZARDS

Human induced climate change is already altering the frequency, intensity and duration of many different types of weather events and patterns in Australia. These processes will continue to cause increasing impacts on human health and wellbeing along with disruptions to infrastructure, including energy and water supply, sewerage and transport systems. There will be a lot more major disruptions and losses for local, regional and national economies and rising costs from much higher insurance premiums or much less ability for securing adequate cover.

10.1 Background

Planning through collaborative governance involving the State government with local councils (including the City of Ryde) is vital to ensure infrastructure (physical and social) is designed and supported to help withstand such impacts.

The most recent State of the Climate report (CSIRO & Bureau of Meteorology, 2018) includes the following predictions with a high degree of confidence for Australia:

- Further increase in temperatures, with more extremely hot days and fewer extremely cool days.
- Ongoing sea level rise.
- A decrease in cool-season rainfall across many regions of southern Australia, with more time spent in drought.
- More intense heavy rainfall throughout Australia, particularly for short-duration extreme rainfall events.
- An increase in the number of high fire weather danger days and a longer fire season for southern and eastern Australia.

In the Sydney region, there is already a trend to an increased number of hotter days exceeding 35 degrees Celsius, hot day periods and heatwaves, with fewer cooler nights. The risk of bushfires is also increasing due to an intensification and increased frequency of weather conditions that are conducive for such a hazard.

For comparison, the 'Black Saturday' bushfires in Victoria in February 2009 claimed 173 lives and around the same period heatwave conditions led to a significant impact on mortality with 374 deaths recorded.

The very recent (October 2019 to January 2020) unprecedented bushfire emergencies and disasters across Eastern Australia have led to at least 32 deaths, destruction of and serious damage to many thousands of homes and farm infrastructure and small businesses, social displacement, economic losses (including tourism), widespread ecological impacts and huge losses of native wildlife species.

It is yet unclear how many deaths have occurred from the associated heatwaves and extreme heat conditions and weeks of hazardous air pollution from bushfire smoke affecting millions of people across five States and Territories.

In the Sydney region, there is already a trend to an increased number of hotter days exceeding 35 degrees Celsius, hot day periods and heatwaves, with fewer cooler nights.

10 CLIMATE CHANGE, EXTREME WEATHER EVENTS AND NATURAL HAZARDS

The frequency of years with a rainfall deficit below the long-term historical average for annual precipitation has become much greater and future forecasts project the time spent in drought to increase over the course of the century (and beyond), which will magnify droughts and water crises.

As well as increased drought conditions, the incidence and intensity of dust storms may see a continued increase for the Sydney region. Along with episodic deterioration of air quality (for example bushfire smoke and 'smog') in the region, these hazards have potentially serious health implications, especially for vulnerable people already living with chronic conditions and is expected to rise in importance as an impact from climate change.

So far, State and Federal policies and plans do not adequately recognise the human health implications of climate change and many communities look towards councils to support those deficiencies.

Sea level rise from global warming is accelerating and will increasingly threaten our foreshore communities, assets and environment.

This means that inundation in low-lying areas of the harbour, Parramatta River and Lane Cove River tidal estuaries is more likely to occur including in combination with high tides and storm and flooding events.

Climate change is also having major impacts on ecosystems and biodiversity. These include effects on habitat, lack of food and water sources for species, which is affecting their behaviour and movement under stress, with some species moving into more urban areas to survive. Many key species (birds, insects such as bees, flying foxes) will have disruption to their natural cycles as critical pollinators and seed dispersers that contribute to ensuring the long-term health and viability of plant species and forest communities.

Apart from individual climate variables, major weather events are often the result of the combined influence of extremes in multiple variables occurring simultaneously. These compound events are commonly the most impactful and hazardous, and planning for such events is an important component of disaster risk reduction and resilience and are now being experienced (bushfires 2019/2020) where unique weather patterns called 'pyro cumulonimbus' have been created combining heat, dust and severe storms resulting in fire blazes.

Compound extreme events can occur in various ways. For example, they can include a major storm surge, combined with extreme rainfall, leading to coastal inundation. Similarly, extreme rainfall and extreme high wind events along the New South Wales coast are often associated with the simultaneous occurrence of an intense low pressure system, cold front arrival and thunderstorms.

Council will address climate change and the likely increased frequency of shocks from weather events by planning for preparation, response and recovery covering specific types of events and compound events. This will include regular updates and review of documents including the City of Ryde's Climate Change Risk Assessment Adaptation Report, which looks at climate risks and impacts relating to Council assets and operations to inform future climate adaptation actions such as upgrades for asset management.

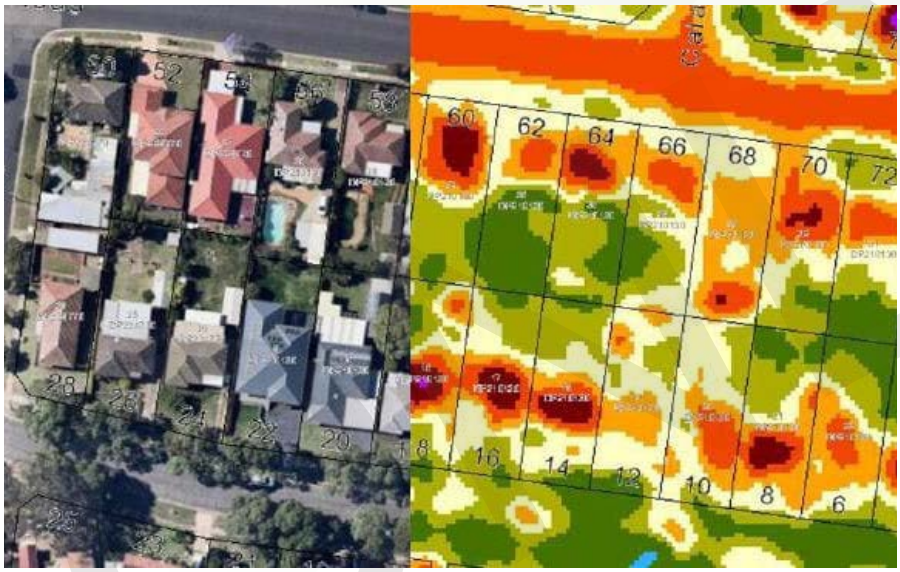
The impact from these event based shocks is often exacerbated or magnified by pre-existing chronic stresses in the community such as health, isolation and disadvantage which collectively can result in detrimental community impacts.

RESILIENT SYDNEY (2017) ESTIMATES

ON AVERAGE
AN ADDITIONAL
79 DEATHS
PER YEAR FROM HEAT STRESS BY 2050 FOR THE GREATER SYDNEY REGION

AN ADDITIONAL
5–10 DAYS
WITH EXTREME HEAT OVER 35 DEGREES
PER YEAR BY 2030 IN THE WESTERN SYDNEY REGION

ON 4 JAN 2020,
THE SHADE TEMPERATURE
AT PENRITH REACHED A
MAXIMUM OF
48.9°C
THE HIGHEST OFFICIAL RECORDED MEASUREMENT ANYWHERE ON THE PLANET FOR THAT DAY



Pictured: Urban heat in residential areas

10.2 Heatwaves and the urban heat island effect

Cities are often hotter than surrounding areas because native vegetation (and canopy shade cover) is replaced with buildings, impervious (hard) surfaces and infrastructure made of dark materials like bitumen, concrete and dark roofing materials. These materials cause the temperature to rise and radiate heat back into the atmosphere. Climatic heat issues lead to increased use of air conditioning units, creating localised 'heat sinks' with impacts on the nearby community. Because of the Sydney's geography often sea breezes either do not penetrate far inland or fail to develop.

Resilient Sydney (2017) estimates that for the greater Sydney region "it is expected that (on average) an additional 79 deaths per year from heat stress by 2050". Western Sydney will be particularly at risk with an expected 5 to 10 additional hot days (extreme heat over 35 degrees) per year by 2030 as a consequence of global warming, and with effects exacerbated by further urban construction.

On 4 January 2020, the shade temperature at Penrith reached a maximum of 48.9 degrees which was the highest official recorded measurement anywhere on the planet for that day.

Apart from increases in the ambient air temperatures, the mean radiant temperature (MRT), which is a means of expressing the influence of surface temperatures on human comfort, can sometimes reach more than 75 degrees Celsius.

Such temperature differentiation has enormous implications for the prioritisation and design of mitigation programs and projects to reduce the urban heat island effect especially in and around medium and high density developed town centres and precincts.

Even on more 'typical' summer days with an ambient air (shade) temperature of around 27 degrees it is not unusual for the corresponding mean radiant temperature (MRT) to be in excess of 55 degrees from surfaces like lighter coloured sealed footpaths. Such contrasts were demonstrated locally in a collaborative research project of the University of NSW with City of Ryde in 2019.

The 2018 urban heat island mapping provided to all Sydney councils by the NSW Office of Environment is to assist with planning and delivery of programs and other measures to reduce future heat impacts.

Urban heat represents the highest risk of climate change and weather related hazards for the broader community across the City of Ryde and especially to vulnerable members of community who may not have adequate cooling devices or financially able to run them. This is a critical risk due to the potential of illness or death for those less mobile, socially isolated, chronically ill, elderly or economically supported with less ability to adapt or withstand such events or stresses.

Adaptation initiatives will be a suite of mechanisms, including through the new LEP and DCPs with specific clauses covering urban heat, 'cooling' urban tree canopy enhancement and expansion programs for streets and open spaces (public and private). According to 'Technical Guidelines for Urban Tree Cover' by the NSW Office of Environment and Heritage every 10 percent increase in tree canopy can reduce land surface (ambient) air temperatures by 1.13 degrees Celsius.

Council, in developing the new LSPS, will include a target for reducing urban heat island impacts in our town centres, targeting a two degrees Celsius average reduction in these key areas.

Baselines will be established based on placed-based criteria for different settings within town centres to measure urban climate, especially heat. This involves ongoing monitoring of sites to determine progress towards achievement of targets to mitigate against 'hot weather periods', which can be either intense 'heatwaves' over a relatively short period of days, or more extended periods of increased seasonal heat.

10 CLIMATE CHANGE, EXTREME WEATHER EVENTS AND NATURAL HAZARDS

Source: NSW State Emergency Services

10.3 Bushfires

There has been a long-term increase in extreme fire weather, and in the length of the fire season, across large parts of Australia including the Sydney region. Metropolitan Sydney is expected to experience an increase in average and severe fire weather in the future. These projected changes by 2070 are mainly for summer and spring (OEH, 2014).

The CSIRO and Bureau of Meteorology (2018) have predicted with confidence an increase in the number of high fire weather danger days and a longer fire season for southern and eastern Australia, which includes our metropolitan region. Several lines of research indicate an increasing bushfire risk in temperate forested areas of NSW, and suggest that when fires do occur, they will be harder to control.

Although hazard reduction is one of many key tools for managing bushfire risks, opportunities to undertake such planned events can be constrained by challenging climatic and weather conditions in the lead up with the window for 'safe' burns dramatically shortening with hotter climatic periods and by the proximity of urban development.

Conditions are increasing the likelihood of bushfires at any time of the year, well beyond what was previously defined as the 'traditional fire season'. Fires are more likely to be rated as 'catastrophic' in intensity and resembling 'wildfire' extremity, thus posing a greater risk than previously experienced. Much warmer daytime conditions will exacerbate the urban heat island effects and produce more frequent higher risk fire conditions, including most recently experiences in the 2019-2020 nationwide bushfires crisis and more frequent pyro-cumulonimbus thunderstorm weather phenomena.

The hazards from bushfires are considered to be the second highest risk to the community in the City of Ryde of all the weather related events influenced strongly by climate change.

As well as direct threats to life, properties and assets, an increasing frequency and intensity of bushfires can permanently alter the structure of native vegetation communities, habitat and species diversity and dependency upon these areas to survive.

Smoke from bushfires (either wildfires or hazard reduction) also has a potential adverse health impact on humans, especially for more 'at risk' sections of the community, as covered in Section 10.6.

It will be imperative for residents to minimise this bushfire risk on their properties, especially those close to bushland areas or for safe guarding in fire season from ember attacks. Reducing fuel loads, establishing fuel-free zones, clearing gutters, ensuring home electrical infrastructure is safe, installing rainwater tanks with an off-grid powered pump, and correcting ember attack weaknesses in buildings will be necessary for self-resilience and home hazard minimisation in those periods. Planning for bushfire attack is the responsibility of stakeholders across the community including Council programs to support preparedness and risk reduction planning.

The Rural Fire Service (RFS) works with councils to update their district Bush Fire Risk Management Plans (BFRMP) and bushfire prone land maps, which identify areas of highest risk of fire for planning. Councils have local emergency management officers whose duty in times of fire events is to assist with support and provision of access for services in suppression activities.

The City of Ryde through its natural area management has ongoing programs which maintain 'Asset protection zones' that separate bushland from assets and homes.

These follow standards provided by the RFS for minimising fire risk to homes. Other programs delivered maintain fuel load and growth within our natural areas and are supported by Council's ongoing Bushcare programs to minimise the potential risk to life, property and assets.

Within the City of Ryde, the north-western corridor, including the area adjoining the Lane Cove National Park and along the river valley, is identified as the area of highest risk. Council planning controls under the LEP are updated to match the approved and adopted mapping of the RFS.

Council is a proactive member of the Hunters Hill, Lane Cove, Parramatta and Ryde local Bush Fire Management Committee. The joint BFRMP identifies assets in each area and the respective treatments required for bushfire resilience planning.

10.4 Heavy rainfall, storms and flooding

There is evidence from BOM observed weather station records that a higher proportion of total annual rainfall in recent decades has come from heavy rain days.

For short-duration, extreme rainfall events, observations in Australia generally show a larger than seven percent increase. Such intense rain, often associated with thunderstorms and flash flooding, will become more frequent in the Sydney region.

With a warming climate, heavy rainfall is expected to become more intense, based on the physical relationship between temperature and the water-holding capacity of the atmosphere. For heavy rain days, total rainfall is expected to increase by around seven percent per degree of warming.

The Sydney region has the highest risk of all major population centres in Australia for damaging hail, usually from severe thunderstorm activity or 'super cells'. This has enormous potential implications for insurance premiums, homes becoming uninsurable and broader economic costs to governments, businesses and the community.

East Coast Lows (ECL), which can produce heavy rainfall and damaging winds, occur frequently off the NSW coast including Sydney. Climate modelling predicts a decrease in the number of small to moderate ECLs in the cooler half of the year. However, intense or extreme ECLs in the warmer months may increase in frequency and affect the Sydney region more often.

Outside of our immediate region, although there will be less tropical cyclones, the proportion of high-intensity storms will rise, with ongoing large variations from year to year. There is ongoing potential for areas within Sydney to be affected by the 'tail end' of ex-tropical cyclones originating in or tracking through the Coral Sea region.

In Ryde, the impact of high rainfall events was demonstrated at Eastwood (part of the Terrys Creek catchment) in November 1984, when severe floods which caused major damage and disruption to local businesses and the community. These flash or high intensity rain events place significant strain on existing infrastructure (Council and Sydney Water) and can reach maximum capacity within short periods.

There is an imperative for a collective response to smarter water management to reduce these limitations by holding back and retaining more water on site.

As much as 90 percent of rain can be lost from a site in an event due to run-off and for longer drought periods integrated water cycle management solutions will be critical for maximising capturing of this resource.

As highlighted in the stormwater sub-section 8.2 for Water security, Council will also be encouraging residents to install residential onsite water detention for management. Cumulatively, these initiatives can reduce high flow stormwater volumes and thus decrease localised flooding, as well as providing an alternative water supply for other times of the year.

Council, as part of its flood management, has mapped each of its catchments to model for future planning controls to reduce flooding risks and to plan for future infrastructure to manage this hazard.

Council's role will be to ensure our infrastructure is sufficient to manage times of rainfall stress, provide education for preparedness and, where possible, warnings to assist emergency agencies in ensuring our community is safe within these periods. In many bushfires affected towns (2019-2020 emergencies), these communities exhausted their water supply both for fighting the fires and for human consumption.

Source: NSW SES Ryde Unit, 10-11 February 2020

10 CLIMATE CHANGE, EXTREME WEATHER EVENTS AND NATURAL HAZARDS

10.5 Drought and water crises

The projected worsening of rainfall deficits will lead to much greater risks of drought and, thus, associated water crises, across the Sydney metropolitan region.

This threat to water security will be generally from longer duration 'stresses' (that is, long periods of drought). However, acute shocks from supply failures may also occur from other weather related events such as during bushfire emergencies or heatwaves which can compound to include power failures affecting the operations of pumping stations.

One way to make our community more water resilient is to harvest as much rain for our community lands as possible. This will help to ensure the usability and quality of our community spaces.

Local water efficiency measures, harvesting of rainwater and stormwater and reuse of water, referred to in Section 8, can contribute to help mitigate against water resource depletion, supply shortages and mandatory water use restrictions.

Council has invested in several stormwater harvesting systems to capture, clean and store water that would have otherwise not been used.

2019/2020 BUSHFIRES
CAUSED AIR POLLUTION LEVELS AT MACQUARIE PARK TO REACH
2200PPM
(PARTS PER MILLION) WHEREAS SAFE MAXIMUM LIMITS ARE SET AT 200PPM

Expansion of these technologies, to ensure that the quality of our community lands is not compromised, will need to extend to other areas including through public-private partnership projects.

For impacts on biodiversity (see Section 7.4.1), extended periods of rainfall deficiency may have potentially disastrous consequences for local ecosystems and individual species from habitat loss. This threat is especially for those that have much more limited ability to adapt and evolve within accelerating time frames and prolonged stresses which may be compounded.

10.6 Air quality and dust storms

Air quality in the shallow basin of the Sydney region is influenced by topography, climate and local weather conditions interacting with a range of fine particles from various sources. These pollutants include toxic compounds and contaminants from vehicle, industry and power generation emissions, ozone concentrations, smoke from domestic wood burning and bushfires, and dust. Bushfire smoke (either wildfires or hazard reduction burns) are a potentially major episodic source of air pollution.

The bushfires emergencies (2019/2020) produced hazardous air pollution over two months across many parts of Eastern Australia, including in the Sydney region and the City of Ryde. For example, on some days the pollution level from smoke at Macquarie Park reached over 2200 parts per million (ppm), whereas safe maximum limits are set at 200 ppm.

More prolonged drought conditions in eastern Australia associated with climate change may well increase the risks and frequency of severe dust storms from the western inland of NSW moving into the Sydney region.

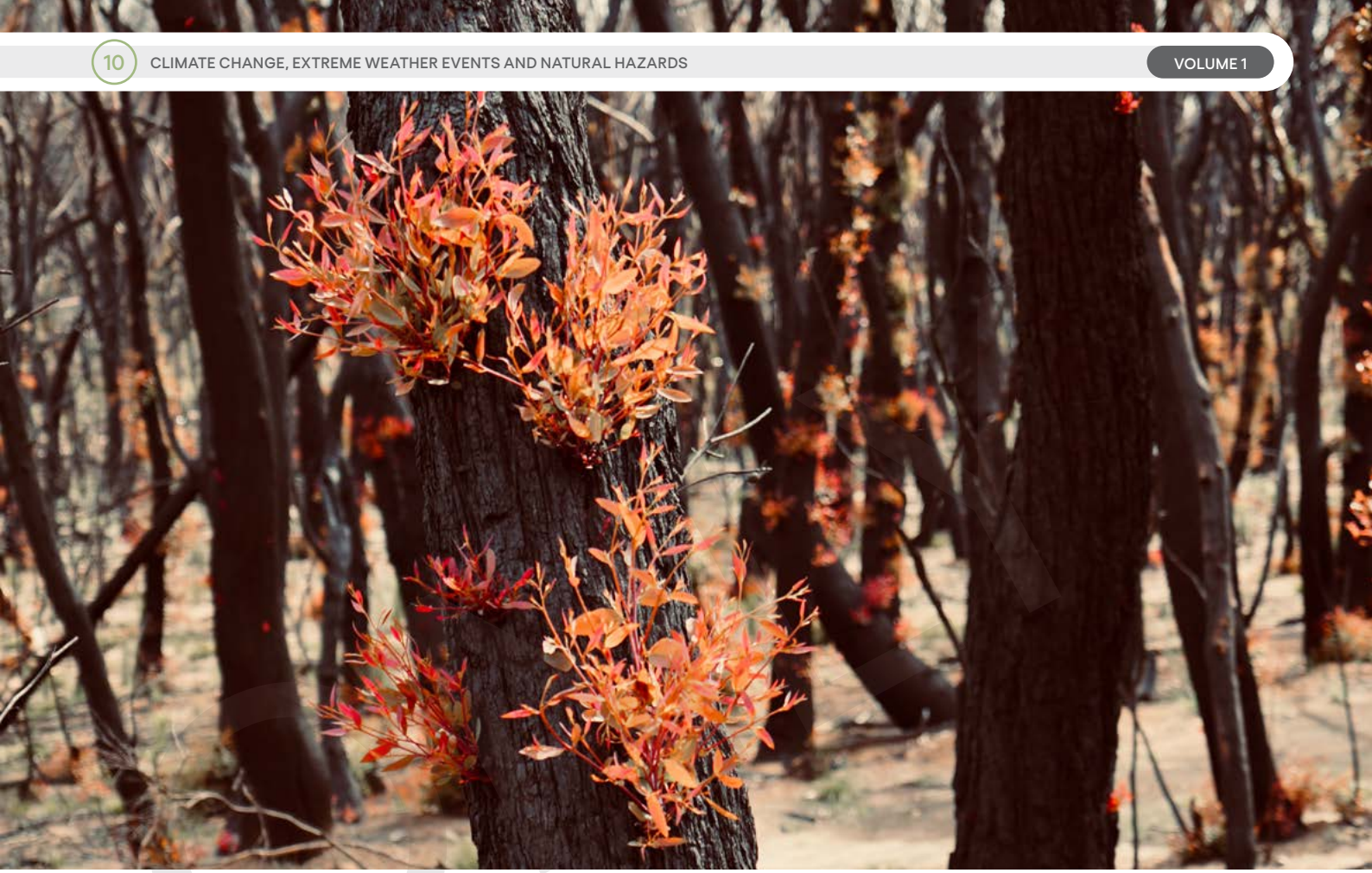
These events, along with episodic deterioration of air quality (for example bushfire smoke and 'smog') in the region, have potentially serious health implications. Those with higher risk and vulnerability include people already living with chronic conditions (for example, asthma and pre-existing cardio-thoracic disease) and the aged.

Although not included in the Sydney Metropolitan Regional Emergency Management Plan (REMP) referred to in Appendix D, dust storms are recognised by the City of Ryde to be a potential major hazard with consequential risks. Residual impacts, beyond the treatment of acute and chronic health conditions, include the associated economic costs and loss of services when air quality and exposure risks limit operations or the delivery of services.

For example, in late September 2009 the Sydney region experienced the "Eastern Australian Dust Storm". This unprecedented event created widespread impacts on transport systems (airports and flights, roads, ferries), serious health warnings, hospitalisation of asthma and other chronic condition sufferers, closure of construction sites, disruptions to schools and cancellation of events. Several days later a second dust storm affected Sydney which once again pushed the EPA Air Quality Index into the 'Poor to Hazardous' range.

Since then, there have been more dust storm events (notably in November 2018 and early September 2019) that have affected the Sydney region, including the City of Ryde.

There are chronic and acute health impacts of air pollution fine particles which can pass through the throat and nose and into the lungs, causing or exacerbating respiratory disease problems such as asthma and hay fever, cardiovascular disease, eye irritations, and headaches such as migraines. The occurrence of these conditions is anticipated to increase in frequency, linked to climate change related weather events.



The risk of complex health problems increases from a combination of prolonged exposures and air quality compound events. These health impacts also impose large economic cost burdens on the community and health services industry.

The implications for the community of Ryde from localised air pollution and other emergency events and situations related to human health are covered in Section 13.2 under Community health and wellbeing.

10.7 Sea level rise and inundation

The potential implications for coastal and estuarine management of sea level rise associated with climate change include:

- Higher projected storm surge and inundation levels.
- Submergence and landward recession of sandy shorelines.
- Salt water intrusion and landward advance of tidal limits within estuaries, which may have significant implications in the medium to long term for freshwater and saltwater ecosystems and development margins, particularly building structures and foundation systems close to the shoreline including foreshore parks.
- Existing coastal gravity drainage, stormwater infrastructure and sewerage systems may become compromised.
- The level of protection provided by existing seawalls and other hard engineering structures will decrease due to the increasing threat from larger storm surges and inundation at higher projected water levels.
- Damage or loss of functionality of Council assets and infrastructure and a reduction in public open space areas.

Extreme weather events such as ECLs combined with high tides can increase the risk of inundation to low-lying foreshores along the Parramatta River. More sustained intense heavy rainfall in the latter catchment and the Lane Cove River can produce flooding that coincides with high tides to exacerbate inundation especially for those most exposed along foreshore areas.

Council acknowledges that future sea level rise can damage infrastructure within certain sections of foreshore identified in previous flood mapping for risk. Storm surges are currently a greater risk to some foreshore areas within Ryde.

Together, these risks will be mitigated under existing Council asset condition assessment and monitoring programs and through the seawall renewal and upgrade capital works program. Council will also respond to sea level rise by developing a new coastal management program and mapping coastal vulnerability areas in line with Coastal SEPP requirements.

10.8 Development controls

Local planning controls have a major role in mitigating against the effects of urban heat and localised microclimate heat increases. For example, a building facade can drastically increase heat within an area, especially when coupled with adjoining dark pavements and minimal vegetation cover including inadequate tree canopy.

Current planning controls through the delivery of food mapping studies inform acceptable areas for development and the related requirements for approval. Where required, these will be revised through Council's new LEP.

11 BIODIVERSITY AND NATURAL SYSTEMS

11 BIODIVERSITY AND NATURAL SYSTEMS

The resilience of natural systems and humans is definitively interrelated and entwined. Consequently, natural systems cannot be viewed nor managed independent of each other.

11.1 Background

Biodiversity is the variety of life, including plants and animals, from vegetation communities to individual species and the genes they contain. Our quality of life depends on maintaining biodiversity so that ecosystem services such as the availability of fresh water, food, and fuel sources remain. The key is to make our use of biodiversity sustainable, so that the social, economic, environmental and health services provided by healthy ecosystems can continue to provide their benefits for current and future generations.

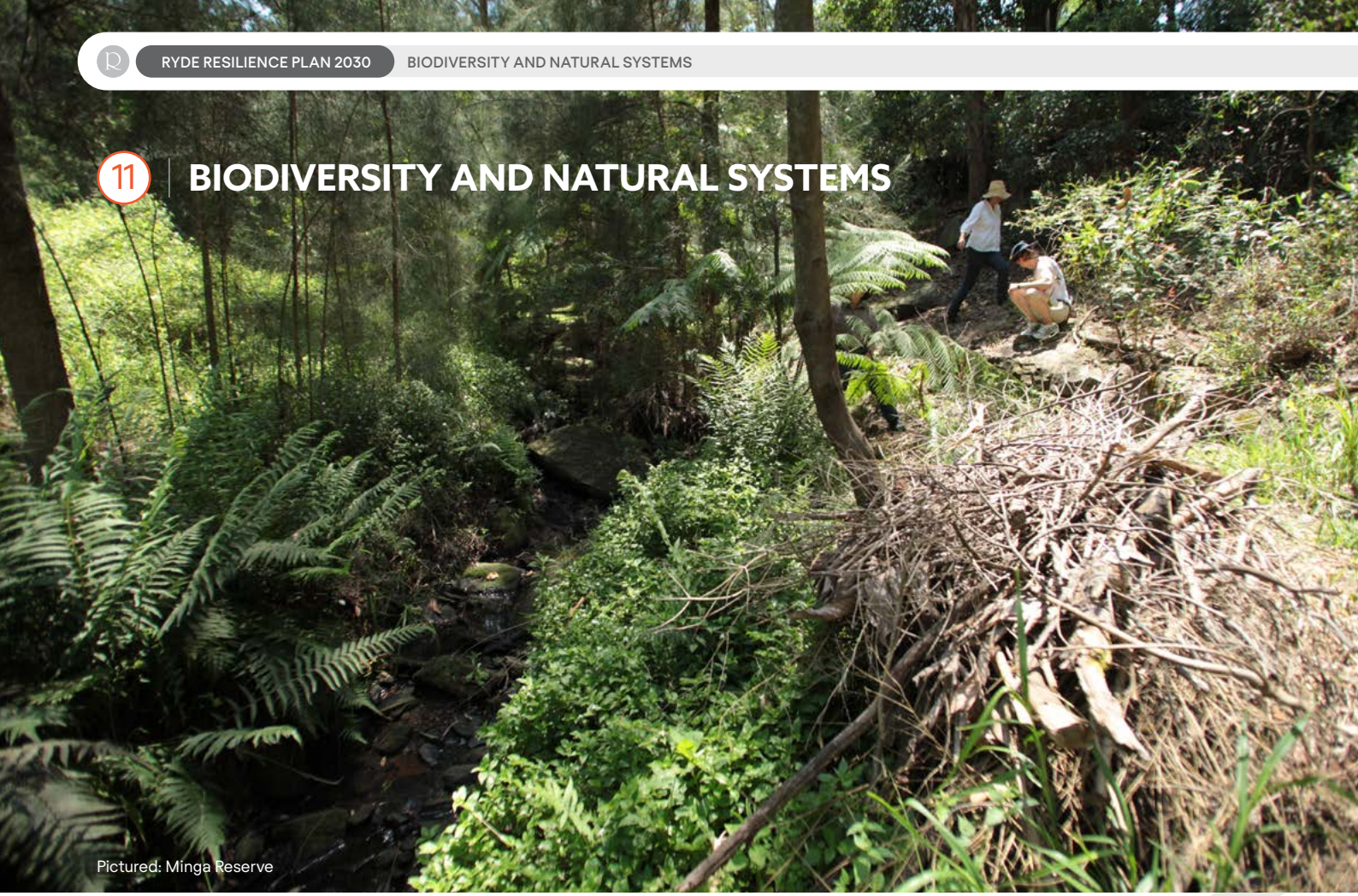
Climate change is expected to be one of the main causes of biodiversity loss in the next century, affecting terrestrial, aquatic and marine biodiversity (DECCW 2010b, Steffen et al., 2009). In New South Wales, climate change has been listed as a key threatening process under the *Threatened Species Conservation Act 1995*. Threats to biodiversity from climate change are changes in the physical and chemical environment including through rainfall, atmospheric carbon dioxide (CO2) concentrations, temperature, acidity, and soil structure and function (Steffen et al. 2009).

Much of the City's biodiversity is found in parks and reserves, in areas categorised as Natural Area (part of Community Land classified under the NSW *Local Government Act*), and more specifically bushland. Lands of all tenures contribute to biodiversity conservation; with private lands able to provide integral connections between otherwise isolated parks or reserves. These can include backyard gardens, street trees and open space areas.

A strategic framework to help manage, enhance and protect natural areas and biodiversity has been developed under the *Ryde Biodiversity Plan* (2016). This plan identifies the values and threats to biodiversity values within Ryde and strategic wildlife corridors on a local and regional scale.

Climate change is expected to be one of the main causes of biodiversity loss in the coming century, affecting terrestrial, aquatic and marine biodiversity.

11 BIODIVERSITY AND NATURAL SYSTEMS



Pictured: Minga Reserve

11.2 Bushland and natural areas

The City of Ryde is located within the Cumberland sub-region of the Sydney basin bioregion, including the area between the Parramatta and Lane Cove rivers known as the Hornsby plateau. It is dominated by ridges of higher ground running east–west, interrupted by watercourses that cut through the Wianamatta Shales of the plateau to the underlying Hawkesbury Sandstone.

The City of Ryde Council manages 205 hectares of natural areas as urban bushland distributed between 71 parks and reserves.

Biodiversity or natural area corridors ensure connectivity between bushland reserves and identified potential infill areas that require revegetation to link reserves and improve the degree of connectivity for fauna movement, habitat and food sources. They are critical links to provide the last natural spaces to protect and ensure our fauna can survive and thrive.

These spaces are increasingly strained due to development and urbanisation and most commonly remain in urban areas along waterways. In Ryde, the corridors link the northern foreshores of the Parramatta River to the upper catchments and Lane Cove National Park.

Detailed assessments of Ryde's bushland reserves have been undertaken to determine the conservation significance, threats and management priority for each reserve and are framed under the Ryde Biodiversity Plan (2016).

A baseline for the management of these areas has been validated through ongoing flora and fauna studies and proactive live wildlife monitoring. Localised on-ground works under Council's bushland volunteering 'Bushcare' program continues to ensure these areas are enhanced and protected, complemented by regeneration contractors.

The risk and threats from weeds are managed as part of biosecurity from a regional strategy (NSW Local Land Services 2017), developed in partnership with the Greater Sydney Regional Weed Committee to identify problematic species monitor spread and control. Warmer weather and intense short duration rainfall are contributing to excessive growth in many areas and a higher cost for management.

The latter provides a basis for management funding and on-ground works. A Generic Plan of Management for Natural Areas provides a framework for the management of bushland, watercourses, wetlands and escarpments within parks and reserves owned or managed by Council and works to balance biodiversity and city growth for future strategies.

Another consideration from climate change effects is soils. They are a vital element for maintaining and sustaining the health of biodiversity and tree canopy cover (see sub-sections following) and the influence of climate change is challenging due to the below related processes. Soils can be impacted by:

- Streambank erosion from increased rainfall intensity and extreme precipitation events.
- Saline incursions in some foreshore areas likely due to sea level rise and seasonal higher rainfall.
- Production of potential acid sulphate soils from higher average temperatures.
- Soil structure and carbon affected by both temperature and soil moisture, through changes to rainfall patterns (alternating periods of higher rainfall and drought).

- Mass movement on vulnerable slopes due to seasonal increases in rainfall.
- Changes in nutrient retention from sea level rise (due to saline incursion) and leaching from increased rainfall and temperature, with effects on vegetation.
- Changes to vegetation types, abundance and distribution; biomass availability; and fire intensity.
- Removal of top soil in flash flooding and high intensity rain events.

Representatives from the community provide advice and input to Council on bushland protection, conservation and management topics through the Bushland and Environment Advisory Committee (BEAC).

11.3 Parks and open space

The City of Ryde has 355 hectares of open space, which includes community land and 197 specific areas and parks. The projected population growth will lead to an intensification of demand for use of open space and associated recreation facilities. The forecast for increased participation of residents from 2017 to 2036 includes:

Over 16,000 more walkers and 6,000 runners in parks and on streets

Almost 3,800 extra adult cyclists on our streets and bicycle paths

Over 3,400 more football (soccer) players, and well over 200 additional teams

More than 1,000 extra netballers, and nearly 120 additional teams

Over 2,000 additional adult bushwalkers in our natural areas and bushland

The open space network is already under pressure from high use and increasing needs especially in the higher density growth areas of Macquarie Park, Ryde and North Ryde. There is a need to ensure adjoining bushland areas of biodiversity are not compromised from this demand and encroachments.

Chronic stresses from climate change have profound implications for the planning and management of open space, in terms of changes to recreation use patterns (for example, to avoid extreme heat times/periods) and also the impact on physical infrastructure, facilities and maintenance (such as from heat and drought on playing field surfaces).

Another challenge for Council relates to misguided perceptions and behaviours within some sections of the local community, relating to trees and perceived 'risks'. Council will need to address these attitudes through education and communication and strengthen local planning and development controls to ensure the retention and expansion of canopy cover and that biodiversity linkages are not lost from unnecessary removal.

11 BIODIVERSITY AND NATURAL SYSTEMS

11.4 Street trees

Trees within the City of Ryde are collectively known as the 'Urban Forest' which consists of public tree assets (streets, parks and bushland) and trees on private land. Our urban forest is under pressure through extensive development, in a time where infill housing is encouraged. It is often the trees and therefore the canopy cover and deep soil areas that are sacrificed in order to facilitate these developments and growth.

With this in mind, it is Council's responsibility to compensate for this loss and to provide an environment that will be liveable in the future. A key priority is to maintain and seek to increase the total canopy cover within the City of Ryde. This is integral for our communities to stay cooler and mobile in hot weather periods.

Council has policies that guide planting programs. Trees are an intergenerational asset, meaning that 'the tree you plant today will benefit everyone's tomorrow'.

Council's Street Tree Masterplan assists in determining the location of planting projects that are beneficial for habitat corridors or landscaping features and which can be triggered through community demand. This is an ongoing program delivered annually across the city.

Council has a budget for street and park tree planting projects, and a 2019 grant initiative from the NSW Government's '5 Million Trees' program means this funding availability could effectively be increased over coming years.

Council has also been partnering in multi-university programs on urban heat climate measurement, monitoring the ability of tree species to adapt in times of increased climatic stress; this work will inform Council's planning, expansion of canopy cover and biodiversity programs.

Importantly, trees help to keep our city cool for community health and wellbeing. They mitigate the urban heat island effect by ensuring our streets and community places are useable, improving local air quality and reducing local high energy use by households when planted in appropriate locations.

Trees also reduce stormwater runoff as they can intercept, absorb and store rainwater within their canopy and release it slowly to infiltrate into the soil profile or evaporate into the atmosphere. This reduces the pressure on stormwater runoff systems and these critical deep soil areas are vital as population and impervious surfaces also increase to minimise flooding impacts.

The estimated reductions in stormwater runoff range from 3.2kL to 11.3kL per tree on an annual basis. By contrast, runoff can be increased by as much as 26 percent during a summer storm season without adequate tree cover or absorption (DECC, 2008).

Under its Local Strategic Planning Statement (LSPS), Council will be delivering a tree canopy target aligned with the State Government's target of 40 per cent coverage by 2030. This is to ensure green links are increased and not lost through development, and that our cities are cooler, or at least kept within acceptable limits.

A challenge with delivery of this target is that many of these areas nominated for tree canopy expansion are constrained by underground services, overhead power lines and areas prioritised for shared user recreation such as bike lanes. This apparent conflict needs to be recognised and resolved to balance the need more active transport with the need to mitigate urban heat.

11.5 Impact of urban development

Rapid densification is leading to the redevelopment and clearing of blocks for larger dwellings or dual occupancies reducing tree canopy cover, green space and permeable surfaces. Tree cover is also being impacted by projects designed to improve active transport provision; these projects have included the proposed removal of mature canopy trees. This needs to be properly addressed during early planning and development phases to deliver integrated shared benefits and outcomes.

Council, through its development control plans, assessment of applications and adherence to legislation, has a duty to minimise these impacts on biodiversity. The new Local Environmental Plan will consider development controls that enable more canopy establishment, control canopy loss, and provide programs to encourage residents to increase these strained natural areas.

TREES HAVE THE POWER TO

KEEP OUR CITY COOL
FOR COMMUNITY HEALTH AND WELLBEING

THEY MITIGATE THE URBAN HEAT ISLAND EFFECT
BY ENSURING OUR STREETS AND COMMUNITY PLACES ARE USEABLE

THEY IMPROVE LOCAL AIR QUALITY
REDUCING LOCAL HIGH ENERGY USE BY HOUSEHOLDS WHEN PLANTED IN APPROPRIATE LOCATIONS

REDUCE STORMWATER RUNOFF FROM 3.2-11.3kL
PER TREE ON AN ANNUAL BASIS

12 TRANSPORT AND CONNECTING OUR COMMUNITY

12 TRANSPORT AND CONNECTING OUR COMMUNITY

A major issue in the City of Ryde is the high proportion of trips that are made by private vehicle.

12.1 Background

Of the people living in City of Ryde in 2016, 59 percent used a private vehicle for the journey to work, while for those coming to City of Ryde, 69 per cent used a private vehicle. However, higher-density areas near railway stations have the lowest percentage of private vehicle usage for the trip to work (Travel to Work Data 2016 from City of Ryde Data Explorer, IDcommunity, 2019 and City of Ryde 2016 Census Community Profile, Australian Bureau of Statistics 2019).

These reports also show that the proportion of commuter and work-related business trips within the City of Ryde is above the Greater Sydney average. The associated patterns of car dependency are reflected by above average congestion issues in the LGA.

Reducing the proportion of inbound work trips by private vehicle is challenging given dispersal of where these people live across Greater Sydney and the disconnection of public service availability across the City of Ryde.

Macquarie Park has a single direct railway line with a limited catchment and bus services that can be a less attractive option than private cars in terms of service frequency, travel times and the presence of considerable parking in the area. The huge number of 'white collar' highly-skilled professional jobs increases the number of private vehicle trips to the precinct.

Other major transport issues include:

- The above average ratio of jobs to residents, needing balancing of public transport use across times of day.
- The wide dispersal of incoming workers.
- The rate of population and employment growth exceeding the rate at which patrons are moving to non-private-car transport options.
- Through traffic, which is creating amenity problems on minor and local streets.
- Complex parking demands and patterns, including congestion in localstreets.
- Gaps in bus routes.
- Gaps in cycling and footpath networks and the need to support development of this infrastructure.
- The need to plan for future transport technologies, such as connected automated vehicles (CAV), shared autonomous passenger vehicles and drones.
- The need to plan for evolving usepatterns.

An integrated approach for transport needs to lead a shift away from private motor vehicle dependence towards active transport solutions and measures that increase mobility and community connectivity with reduced carbon emissions.

The latter goal will be progressed through other initiatives such as Council's fleet management with a gradual transition to hybrid and electric vehicles (EVs) that also set an example to and encourage the community to take up these lower emissions technologies.

OF THE PEOPLE LIVING IN RYDE IN 2016

59 PERCENT
USED A PRIVATE VEHICLE FOR THE JOURNEY TO WORK

WHILE FOR THOSE COMING TO CITY OF RYDE
69 PERCENT

12 TRANSPORT AND CONNECTING OUR COMMUNITY

12.2 Strategic pathways

The Greater Sydney Commission's vision under the Future of Transport 2056 Plan sets the context for the Metropolitan Regional Plan informing the district plans to maximise both active and public transport links to major transport hubs. The Greater Sydney Commission's '30-minute city' performance indicator is a goal for measuring the proportion of residents able to reach their nearest metropolitan centre/cluster or strategic centre using public transport and/or walking within 30 minutes.

The idea behind the '30-minute city' is that people regardless of where they live, can reach the places that they need (for work, study or leisure) within this timeframe. It is based on increasing short trip journeys (1-2km) by active transport (walking and cycling), 2-5km trips by public transport, with private vehicular trips for longer trips (5-10 km) or where public transport is not an option.

The Northern District Plan includes priorities consistent with this goal of "delivering integrated land use and transport planning and a 30-minute city". In addition, the City of Ryde Integrated Transport Strategy 2016-2031, along with LSPS (currently under review) deliver strategic pathways to achieve these outcomes.

The idea behind the '30-minute city' is that people regardless of where they live, can reach the places that they need (for work, study or leisure) within this timeframe.

12.3 Active transport

Council has a limited ability to determine major city shaping regional transportation networks, although at a local level it is able to enable infrastructure and influence private vehicle usage levels.

In particular, the City of Ryde has many opportunities for providing enhanced or new connections to enable our community to use active transport. Ryde has the opportunity to learn from many other global cities that have recognised and responded to this as a key solution for reducing city congestion, improving air quality and increasing personal wellbeing through physical exercise.

Planning priorities for active transport are critical as the City of Ryde becomes more densely developed and populated, with reduced ability to efficiently move people in peak conditions and times using private vehicles.

Council initiatives to reduce vehicular congestion include:

- Developing an extensive bicycle network including on-road and off-road paths. Plans to improve the network and increase the uptake of bicycle use are included in the City of Ryde's Bicycle Strategy and Masterplan 2014.
- Developing and delivering Pedestrian and Accessibility Mobility Plans (PAMPs) and capital works improvement projects for our key town centres.
- Sustainable transport planning, through Green Travel Plans, 'Travel Plan Guidelines', and the City Parking DCP.

The latter were developed by Council for large developments to show how residents and employees of these new developments can reduce private vehicle travel and congestion and improve local air quality by providing active transport opportunities (such as bicycle parking, car share spaces, and end of trip facilities).

12.4 Public and sustainable transport

The City of Ryde is served by a range of public mass transit services, including numerous connector bus routes, the Northern Rail line, Sydney Metro North West and Sydney ferries. The Macquarie Park area provides the greatest opportunity for connectivity across most of these services and for increasing sustainable transport options.

Council is a partner of the 'Connect Macquarie Park and North Ryde' program, which continues to play a key role in encouraging public and sustainable transport uptake in these precincts. This program includes the CoHop carpooling app, Connect concierge, member transport audits and travel plans, and promotion of innovative services such as on-demand bus services operated by Keoride.

The draft City of Ryde Local Strategic Planning Statement (2019) includes a Transport Structure Plan which identifies additional connections that Council will investigate to meet future demand and growth requirements. It sets out required public transport connectivity through travel demand movement based on the principles of 're-mode, re-route, reduce, re-time'.

This includes regional investigations into improving connectivity from Macquarie Park to Mona Vale and via Mass Transit or Light Rail from Hurstville via Rhodes to Macquarie Park, Bays Precinct to West Ryde and Carlingford to Macquarie Park.

The City of Ryde is working to develop a Sustainable Transport Strategy which will cover the future of mobility in Ryde, and transition our community towards new technologies and sustainable transport options. This Strategy will be incorporated into the Council's Integrated Transport Strategy and Active Transport Strategy, with these expected to be finalised by 2021.

As technology (for example, automated and on-demand passenger services) rapidly progresses in the transport space, cities will slowly shift away from personal car ownership in high density areas. The City of Ryde recognises this and through planning, and dedication will continue to progress this transition to new forms of transportation.

12.5 Council fleet management

We are now entering a major transition to lower emission vehicles with different types of electric vehicles (EVs) available from a range of manufacturers and extending to include fuel cell electric vehicles (FCEV) in the longer term.

EVs offer major benefits over conventional vehicles including much lower fuel and maintenance costs, reduced local air pollution, and quieter operation.

Australia is one of the slowest developed nations in transitioning to mainstream take-up of low emission and electric vehicles. There are still relatively low numbers of EVs available in our nation.

This languishing uptake is attributed to a lack of broader government adoption and support, and policy and taxation measures that inhibit uptake. In contrast, the global transition to EVs is advancing rapidly, driven by improving technologies, falling battery costs and government policies.

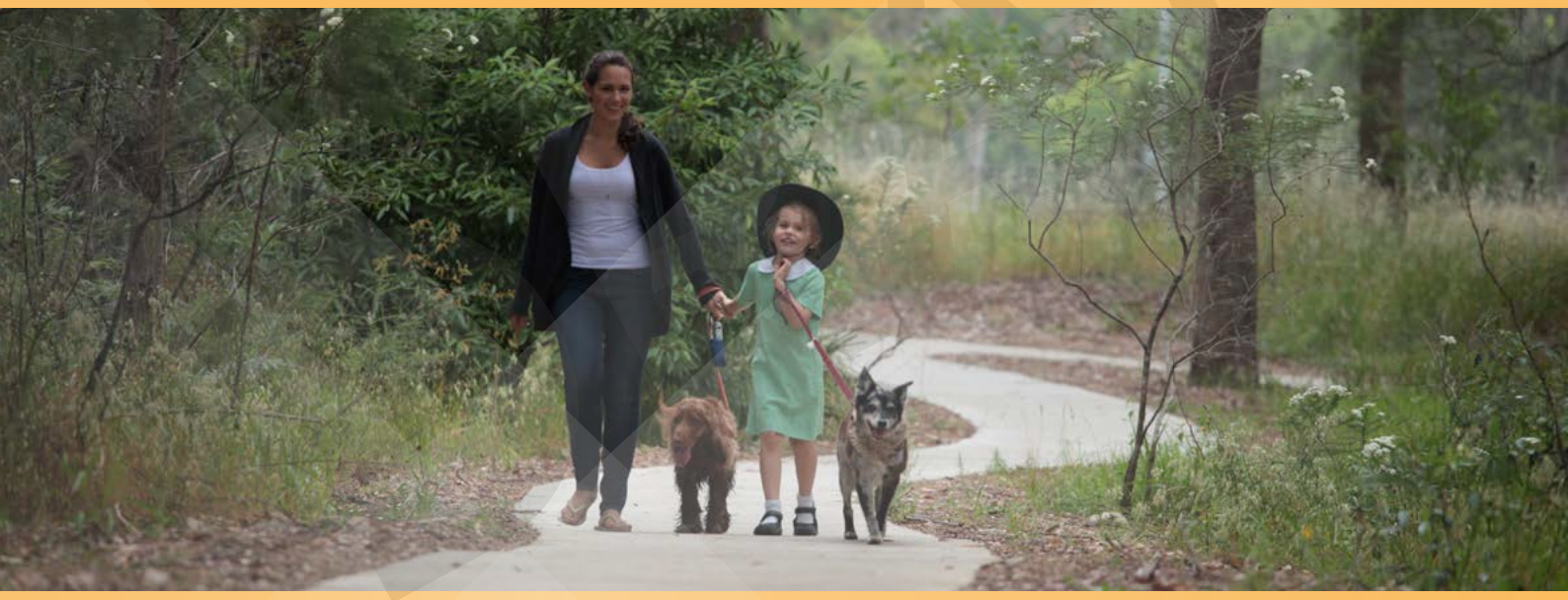
According to the State government in its NSW Electric Vehicle and Hybrid Vehicle Plan (2019), the light passenger vehicle fleet of 2.95 million vehicles includes 1,700 battery EVs and 28,000 petrol-electric hybrid vehicles (as of September 2018).

To show leadership and help our community transition to lower emission vehicles, Council has undertaken steps to reduce its fleet emissions, with the inclusion of efficient vehicle options such as hybrid and smaller internal combustion engine vehicles in its fleet, and by limiting fleet selection through measuring tail pipe carbon emissions.

Council is committed to develop strategies and take action consistent with the Transport 2056 four major technology trends known as "ACES" (Automation, Electrification, Connectivity, and Sharing).

In moving towards a lower carbon environment, Council will be undertaking a review of its own fleet with goals to include an audit of vehicular needs, the provision of increased sustainable transport alternatives where possible and a shift of the organisation's fleet into lower emissions for all operations. These initiatives will be covered within the Sustainable Transport Strategy.

13 HEALTH AND WELLBEING



13 HEALTH AND WELLBEING

Rapidly increasingly population growth and the associated changing demographics will mean the location and design of social, cultural, housing and economic infrastructure and provision of services must be responsive to help the community maintain health and wellbeing, improve the quality of life and become more resilient.

13.1 Background

The City of Ryde estimated resident population for 2018 was 127,446, with a density of 31.48 persons per hectare. (Source City of Ryde Community Profile).

Key trends over the next 20 years will include:

- An increase in the proportion of the population aged 65 years and older.
- An increase in younger people moving closer to employment and education opportunities.
- Growth in the cultural diversity of the community.

The proportion of residents speaking a language other than English at home is increasing and higher than the average across the Sydney region, with greater spatial concentrations in the east and north. Data from the ABS Census (2016) for the City of Ryde shows that about 48 percent of people spoke a language other than English at home, mostly those of Chinese and Korean cultural background.

This includes maintaining and building programs to strengthen social inclusion, connections, harmony (for example, to counter racism) and cohesion.

The City of Ryde is taking a place-making approach to develop the public domain into activated, vibrant and attractive spaces.

Key objectives are to:

- Create accessible, clean, safe, connected and unique places and spaces.
- Empower and support the community to activate its places and spaces.
- Promote and encourage a more walkable urban environment, and promote active transport.
- Deliver high quality open, green and passive spaces for recreational enjoyment and wellbeing.

To build upon the above outcomes, there are already five main clusters of social and cultural infrastructure provided in the urban centres of Top Ryde, Eastwood, Gladesville, West Ryde and Coxs Road.

There is little such infrastructure in the north, with deficiencies particularly around Macquarie Park which is identified in Council's LSPS as needing such facilities and services.

Council currently has limited built for purpose and flexible, multi-use spaces for the needs of young people, and those from culturally and linguistically diverse backgrounds. To address this deficiency Council will, through its Halls and Facilities Strategy and opportunities such as development contributions and potential partnerships, design and provide more publicly available assets to meet the needs of our population and its diversity.

Extensive research, including that by Aldrich (2012, 2019) and the Institute of Medicine (2015), encourages organisations such as councils to prioritise investment in social, not physical infrastructure, for disaster mitigation and acceleration of recovery processes.

KEY TRENDS OVER THE NEXT 20 YEARS WILL INCLUDE

AN INCREASE
IN THE PROPORTION OF THE POPULATION AGED
65 YEARS AND OLDER

AN INCREASE
IN YOUNGER PEOPLE
MOVING CLOSER TO EMPLOYMENT AND EDUCATION OPPORTUNITIES

GROWTH IN THE CULTURAL DIVERSITY
OF THE COMMUNITY

13 HEALTH AND WELLBEING

13.2 Health

With changing, more intense and variable climatic conditions, there will be increased risks from certain diseases. These will include chronic stresses and potential shocks, including epidemics and pandemics (for example, influenza, coronaviruses and other emerging viruses), heat illness and mosquito-borne infections. The 2020 crisis around the novel coronavirus originating in China and the SARS pandemic of 2003 highlight the risks associated with such health threats.

These risks will also extend to potential emergency events involving air and water pollution affecting human and environmental health. As conditions for the habitat of organisms that can carry infectious diseases become more conducive, the community will have increased risks of broader exposure levels, and extended durations and geographic range of transmissions could occur.

Some chronic conditions can be exacerbated by extreme weather events or even caused by hazards such as long-term exposure to air pollution, toxic compounds, moulds or exposure to contaminants such as industrial, fuel storage and transport accidents.

The health of our rivers, air, soils, ecosystems, and water and food supplies has a direct relationship with human wellbeing.

In 2017, Melbourne suffered a phenomenon known now as 'thunderstorm asthma'. Although the same pre-existing conditions with a type of grasslands pollen remain a potential threat, they are largely restricted to Victoria. However, more extreme weather conditions affecting the Sydney region may be a catalyst for, or contribute to, an exacerbation of similar health related hazards.

Mechanisms, approaches and tools to help our community become more resilient to disease through prevention, alleviation and more effectively management include:

- Build collaborations and partnerships across local government and State agencies, health related organisations and community groups. This involves integrated approaches across all key stakeholders and organisations with major roles in preparedness, response and recovery from emergency management situations involving health hazards and shocks.
- Engage and communicate with and educate the community, and those with professional roles and responsibilities to protect and enhance community health.
- Design, develop, update, implement, monitor and evaluate strategies, plans, policies, programs and projects specific to resilience to disease from acute shocks and chronic stresses. This can integrate the promotion of healthy lifestyles.

District and regional health services play an instrumental role in supporting our community's health (mental and physical) and wellbeing including our local Macquarie University and Ryde Hospitals, North Primary Health Network, Transcultural Mental health Centre and Multicultural Health Service. Addressing service gaps and barriers, and ensuring affordability and accessibility, is a key priority to connect our community to services that meet their diverse physical and mental health needs.

Local service providers, including Northern Sydney Local District Health reported that they are facing increased demand and complexity of cases with limited capacity due to constrained funding.

Partnerships are vital to help overcome such pressures and Council can play an important role in the promotion and communication of preventative health measures. This includes raising community awareness and options via distribution of materials produced by other reputable peak organisations and agencies for detection and treatment of conditions.

The health of our rivers, air, soils, ecosystems, and water and food supplies has a direct relationship with human wellbeing. Measures to protect the environment are covered in other areas of this Plan, and which are also vital to ensure community health is protected.

13.3 Safety and security

The adopted Social Plan 2029-2024 (City of Ryde, 2029) includes objectives to make Ryde "a welcoming and safe place".

Council develops and implements road and community safety (crime, domestic violence, anti-racism, social inclusion) programs and initiatives including local educational campaigns targeting children, young people and senior citizens, by working in partnership with other stakeholders such as the Ryde and Hunters Hill Domestic and Family Violence Committee, Ryde Intercultural Network and Macquarie University.

Resilience so often begins with individuals being better prepared for home safety including fire and potentially hazardous materials, which means that Council in collaboration with other organisations and agencies can help to promote, raise awareness and inform the community about measures to reduce such risks.

Three other issues that our whole community needs to be mindful and aware of are threats from cyber security, terrorism and biosecurity.

Cyber-attacks and crime are some of the biggest potential shocks facing organisations. Council's approach to cyber security includes a range of preventative and response measures, via onsite and offsite systems. This includes back-up and recovery procedures, Disaster Recovery Plan annual tests, 'next gen' antivirus utilising machine learning and artificial intelligence (AI), and security policies and procedures. As technologies continue to advance so do the increased risks from cyber-attacks with potential data loss and high economic impact and disruptions.

Terrorism is another security issue that councils need to address. The NSW Counter Terrorism Plan (2018) informs the general public, business, those working in the counter-terrorism field and all levels of government about NSW's counter terrorism arrangements. It outlines responsibilities, authorities and the mechanisms to prevent, prepare for, respond to and recover from acts of terrorism within NSW.

Currently this plan remains at a State focused level, and yet it is within the local context that communities are often most impacted from failing to prepare for and respond to these threats. Council has identified these and, through its community events and public spaces plan, aims to address the threats through operational and infrastructure planning.

Biosecurity (animals and plants) emergencies are addressed in a Sub Plan of NSW EMPLAN, and cover a wide range of potential risks, hazards and scenarios, including relevant to the City of Ryde.

13 HEALTH AND WELLBEING

13.4 Social inclusion, cohesion and cross cultural engagement

A socially inclusive society is one in which all people feel valued, their differences are respected and basic needs are met so they can live in dignity. Social inclusion allows all people to belong, feel informed, connected and contribute to society socially, culturally, economically and politically.

Societies that are socially inclusive and cohesive are more resilient than those that are not.

Everyone has a role to play in building socially inclusive communities. This includes every level of government, the community sector, businesses and all individuals.

The role of volunteerism (refer to Section 13.6) and local self-help, co-operation and support to deal with ongoing day-to-day stresses and pressures can establish stronger social infrastructure to withstand major shocks and emergency situations when they come along.

In 2017, Council adopted a "Social Justice Charter" with the aim to respect and recognise the human rights of all who live, work and play in our community by reducing disadvantage, strengthening wellbeing and making sure no one is left out socially or economically.

A socially inclusive society is one in which all people feel valued, their differences are respected and basic needs are met so they can live in dignity.

A national survey (ANU Centre for Social Research and Methods 2019) of more than 200 people found that 82 percent of Asian-Australians, 81 percent of Middle Eastern background Australians and 71 percent of Indigenous Australians had experienced discrimination. This occurred mostly at shops and restaurants, followed by workplaces and educational institutions.

The overarching principles that Council has adopted to promote human rights, social equity and anti-discrimination are:

Recognition of Indigenous Australians, in particular respecting the Wallemedegal first nation peoples as the traditional owners of this region.

- **Cultural diversity.**
- **Equity.**
- **Community participation.**
- **Social inclusion.**

These principles are expressed in Council's guiding key documents and plans including the Disability Inclusion Action Plan, 'No Excuse for Abuse' training, Refugee Welcome Zone and 'Racism it Stops with Me' campaign partnership. Council is also developing a local Reconciliation Action Plan, with a view to recognising and utilising the unique traditional knowledge and cultural understanding of indigenous people, and building a more resilient and sustainable community.

The focus areas for inclusion have a clear set of actions, which are:

- Developing positive community attitudes and behaviours.
- Creating liveable communities.
- Supporting access to meaningful employment.
- Improving access to services through better systems and processes.

13.5 Culture, leisure and sports

Town centres are focal points of City activities, so locating social and cultural facilities within such precincts can facilitate a stronger sense of place, greater vibrancy, more social connections and networks, stronger economic opportunities and ultimately more social cohesion.

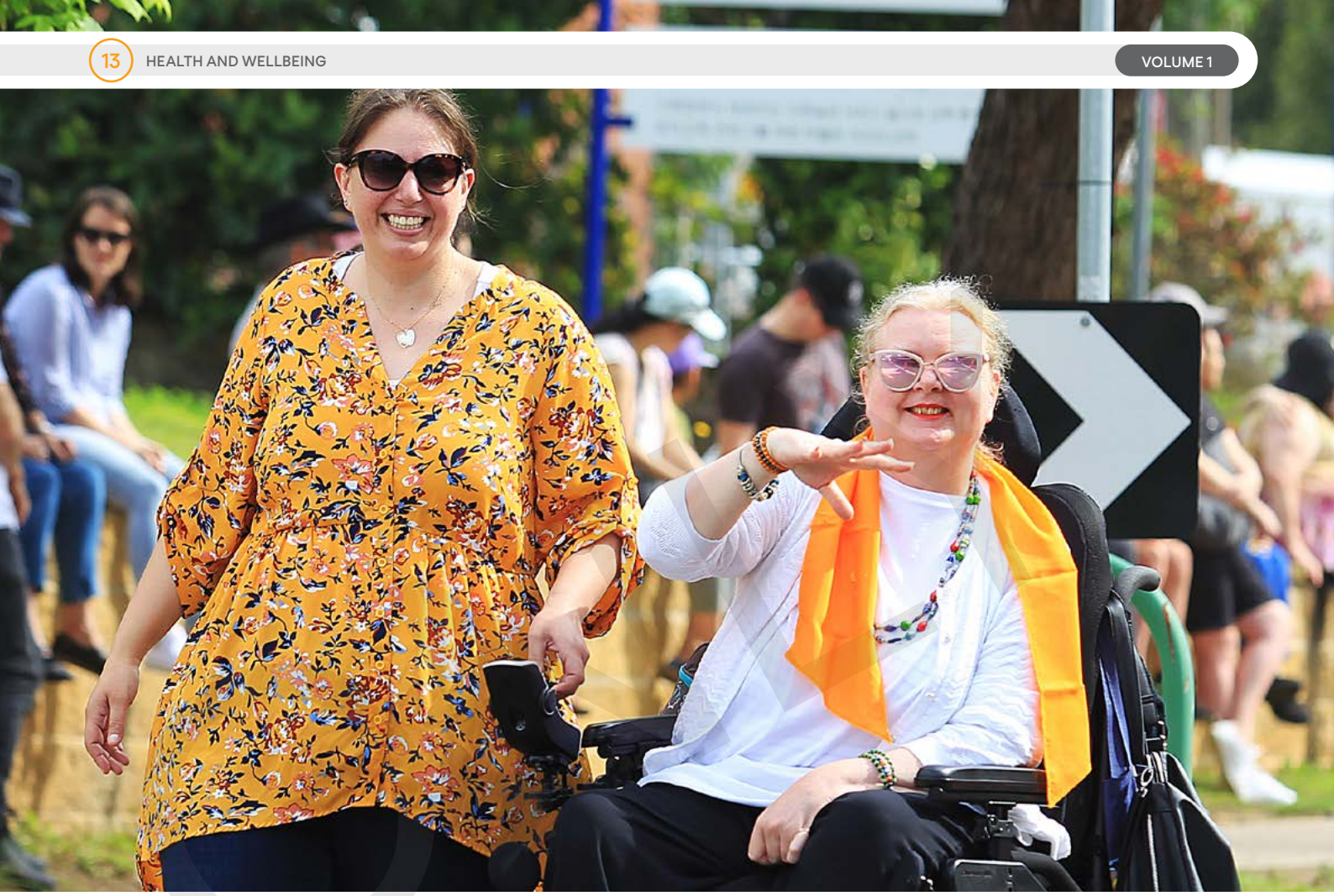
Council operates a large central library and several branch libraries, although most of the latter do not have the flexibility to increase capacity or functionality. With the exception West Ryde Community Centre as a child and family hub, the many facilities are generally small scale with inappropriate design and inflexible for use.

Council recognises the importance of a vibrant and robust arts and cultural life and is providing resources through a range of initiatives and public programs.

The City's biggest and main indoor sports facility is the Ryde Aquatic Leisure Centre which includes swimming pools and water slides, stadium style seating, gym and fitness centre, and access to tennis courts.

For outdoor sports and recreation Council manages numerous sport fields (including synthetic all weather pitches for football), ovals, courts (for netball, tennis and basketball), skate/scooter/BMX rider facilities, walking trails and cycle ways, playgrounds, BBQ and picnic facilities, gardens and cafes.

Macquarie University has extensive facilities that include an aquatic centre, gym and sports fields and library that are available for public use. Council in addressing the population projections under the North District Plan (2018) is prioritising planning outcomes with these leisure activities in mind. The provision of shared and multi-function recreation spaces is considered in new developments and Council upgrades of its facilities for these spaces.



13.6 Volunteers and neighbourhood support

Volunteering is a rewarding activity both for the community and for those who volunteer their time and skills to make a difference and to help build social cohesion. People may volunteer to meet new friends, learn new skills or contribute to their local community by helping others in need.

The City of Ryde has a high level of volunteering. In 2016, about 19 percent of residents said they carry out some form of volunteering work in (2016 Census). In a more recent survey of 403 residents carried out for City of Ryde's Social Plan, 31 percent of residents said they were involved in volunteering. Both results are substantially higher than for the Greater Sydney average of 16.7 percent.

To complement the regional Northern Sydney Volunteer Network, the Ryde Hunters Hill Volunteer Referral Service links prospective volunteers with satisfying jobs in community organisations that are located within the Ryde and Hunters Hill local government areas.

13.7 Affordable housing and household debt

Recent data shows that the City of Ryde's population growth is about 2,000 new residents and around 4,000 new businesses (mostly small) each year, although balanced against significant attrition.

Council has limited capacity to provide equitable access to affordable rental accommodation, yet ongoing advocacy on behalf of the local community and, where possible, support, is essential due to insufficient funding through State and Federal programs. The City of Ryde Housing Strategy provides a pathway to towards equitable access.

In the City of Ryde, over 18 percent of people reporting a need for assistance with household debt in were in households with an income of over $2,500 per week.

The Ryde/Hunters Hill Home Modification and Maintenance Service provides a modification, maintenance and consumer help service for people living in the Ryde and Hunters Hill local government areas. This assists frail aged people (65 years and over) with access, safety and independence in daily living activities so they can keep living in their own home or with their carers.

13.8 Employment

Population growth is generating employment growth across a range of sectors and providing new opportunities for residents to study and work close to where they live.

Macquarie Park, which includes the Macquarie University, is the largest employment precinct in the City of Ryde, and one of the largest in the Sydney region and indeed Australia. It is the main IT hub of Sydney with some of the largest employers and companies in the country.

Council within its LSPS recognises the importance and role of both small and large businesses, and commercial as well as industrial, to create employment diversity and opportunity for residents of Ryde and in future planning to deliver on this innovation and diversity. Council is itself a major employer, with its operations supported by many hundreds of permanent full-time and part-time positions.

13 HEALTH AND WELLBEING

13.9 Critical infrastructure and public utilities

When it comes to the protection of assets, critical infrastructure and essential public utilities are the highest priorities. They ensure our city can function, thrive and provide continuity of life within the communities that people live, work and play. The role of this infrastructure (physical and social) also ensures chronic stresses are minimised for community heath.

Critical infrastructure in the City of Ryde includes:

- **Health** (hospitals, clinics, care facilities)
- **Emergency services** (police, fire, ambulance, SES)
- **Communications and information technologies**
- **Energy** (electricity and gas), water, sewerage and fuel
- **Transport** (railways, roads, bridges, tunnels, ferries)
- **Food supply chain**
- **Banking and finance**
- **Council operations**

Acute shocks with higher risks for this infrastructure include natural hazards associated with severe weather events, a range of other disasters and emergency situations, and longer term chronic stresses such as from climate change.

When energy demand increases during a heatwave, electrical infrastructure is more likely to overload and fail, causing outages to communications systems, and reducing the ability of people to seek help. Along with other extreme weather events, these can trigger other shocks such as failures of power and digital networks, water networks and other public utilities.

Council's approach to ensuring continuity of electricity includes uninterruptable power supply and onsite back-up power generation for its critical operating systems. It has limited control over supply for the community beyond the development consent stages, with Ausgrid being the approval authority for new connections and load balancing. Areas for improved local resilience and more sustainable power supply that Council can influence include the promotion of solar PV and battery uptake to reduce grid reliance and exposure to asset vulnerability.

The Local Emergency Management Plan (EMP), Sydney Metropolitan Regional Emergency Management Plan (REMP) and other sub-plans covered in Section 14 outline planning for management of responses to such potential hazards and risks.

13.10 Food security, supplies and shortages

Major shocks and chronic stresses can also interfere with the distribution of adequate and equitable supplies of food across the broader community.

Increasingly we are becoming even more dependent on major supermarket and bulk supply chains for our food. Results from the Sydney Food Futures project shows that in 2011 farmers of the greater Sydney region were producing around 20 percent of the city's agricultural food needs. Of much concern, this will drop to six (6) percent by 2031 as urban sprawl replaces these land uses and the proportion of foreign food products imports increases.

This trend and associated deficiencies highlights the importance for councils to collaborate on advocacy for protection of farmland against urbanisation and to promote and support local and sustainable food production in urban homes and gardens through facilitation of programs for those communities in residential apartment living situations.

One way for households to be prepared for a short-term interruption to food supplies is to create a 72-hour emergency (non-perishable) food supply kit.

Increasingly we are becoming even more dependent on major supermarket and bulk supply chains for our food.

14 EMERGENCY PREPAREDNESS, RESPONSES AND RECOVERY

13 EMERGENCY PREPAREDNESS, RESPONSES AND RECOVERY

The joint Local Emergency Management Plan (LEMP) for the City of Ryde with Hunter's Hill Council (2016) is an important document that addresses preparedness and responses in the event of an emergency. The City of Ryde is part of the Ryde-Hunter's Hill Local Emergency Management Committee, which prepared the LEMP. This plan to be used as a strategic base to inform Council's delivery plans and local operational response in times of emergency.

14.1 Local Emergency Management Plan

This plan outlines the responsibilities of local and State personnel and agencies for application of relevant local plans, supporting plans and policies. Hazards have been identified as risk of causing loss of life, property, utilities, services or the community's ability to function within its normal capacity, and the potential to create an emergency.

14.2 Consequence Management Guide and State-regional plans

A Consequence Management Guide (CMG) is a hazard-specific document which provides agreed emergency management arrangements in a checklist. This is particularly useful during the initial stages of an emergency and provides for easy reference.

Urban-based councils such as Ryde generally take on a support role to other front-line agencies, such as Police, Fire and Rescue, and Ambulance. Also, Council provides evacuation centres, additional human resources and equipment.

The relevant State government coordinated NSW EMPLAN, with sub-plans, supporting plans and regional plans (refer to Appendix D), sets a context for the LEMP and covers a wide range of potential risks, hazards and scenarios, including those relevant to the City of Ryde.

14.3 Co-operation, partnerships and responsibilities

Emergency management requires a collective approach and response for effective function. Due to disjointed governance structures within Australia and as populations densify within cities around constrained infrastructure, there are concerns about how well cohesive responses in times of major emergency are able to co-ordinate efforts to rapidly and effectively support communities.

A huge challenge is achieving further improvements for more integrated approaches to emergency and disaster planning, response and recovery operations across all three tiers of government, and with hospitals, local community and neighbourhood groups, and other relevant organisations such as the Australian Red Cross.

Council's role in these situations and events is primarily as a support agency for State level emergency services. The City of Ryde also provides on-the-ground operational mitigation works, maintenance, communications, education, community liaison and support services.

From community engagement for this Plan, it was evident that there is a significant lack of understanding by many residents of the risks exacerbated by climatic change, the growing need for emergency planning, and who is responsible for ensuring effective management and safety of the community.

Self-reliance and preparedness is vital for individual safety. Public services and support in highly critical emergencies is largely constrained by the level of available resourcing and the ability to minimise exposure or potential danger.

It is up to individuals to take measures to safeguard their homes, families and neighbours.

Planning and preparation by households and families is an imperative as cities grow and the capacity of government bodies and agencies are constrained.

There are many potential collaborative opportunities for Council with not-for-profit organisations, charities and groups to provide education and support to assist with this community preparedness.

At a council level, partnerships are integral to effective and efficient emergency planning, responses and recovery. Such relationships can include local, regional, State, national and even international level collaborative projects, programs, events and other initiatives. It is here where councils can provide the most support and connection between these major stakeholders and take the benefits directly back to the community.

13 EMERGENCY PREPAREDNESS, RESPONSES AND RECOVERY

14.4 Potential hazards for Ryde

Along with the long-term risks associated with climate change, there are many potential hazards for the City of Ryde. From the joint Ryde-Hunters Hill Local Emergency Management Plan (2016), these include (not in any order of priority):

- **Biosecurity** (animal and plant) emergency
- **Bridge or building collapse**
- **Cyber-attack and communication meltdown**
- **Earthquake**
- **Fire** (bushland, industrial, commercial, and residential)
- **Flood** (including short duration intense rainfall event)
- **Hazardous release**
- **Heatwave**
- **Human disease**
- **Landslip**
- **Storm** (thunderstorm, wind, hail, dust)
- **Transport emergency** (air, road, sea)
- **Tsunami**
- **Utilities and infrastructure failure** (including power, water, gas, fuel)

Each of these hazards has had a Consequence Management Guideline (CMG) documented to ensure that each government agency is aware of their responsibilities in responding to the specific hazard.

Of the weather related hazards, the highest risks for the broader community of Ryde come from heatwaves, followed by bushfires, floods and storms. In terms of Council's own operations, bushfires are the greatest threat followed by risk from storm and flooding events.

Storm events often result in tree damage to properties. Flooding can result in the displacement of parts of the community, as the flooding tends to be localised rather than widespread. Large hail can damage roofs, windows and vehicles.

14.5 Community preparedness

Community preparedness, including social capital and cohesion, is essential as it builds capacity for people living and working in the City of Ryde to better meet the challenges coming from shocks associated with severe weather events, major hazards and other disaster events or situations requiring emergency management planning and response.

The critical importance of social capital in building resilience is reinforced by evidence from research (Aldrich 2012, et al) of post-disaster recovery processes after Hurricane Katrina (New Orleans 2005), the tsunami in Tamil Nadu (2004) and earthquakes in Japan (Tokyo 1923 and Kobe 1995). These examples, with varying in degrees of development and national wealth, demonstrated strong resilience when faced by disaster. Recovery times were significantly reduced for specific communities with high social cohesion and community connection.

The State government, through its "Get Ready NSW" program, raises awareness in the community about risks and preparing for all hazards. There are extensive community preparedness campaigns being implemented by NSW emergency services agencies with major roles across the Sydney region complemented by other organisations that include the Australian Red Cross.

At the local level, the role of Community Services in Council is critical for the planning, co-ordination and facilitation of collaboration with NGOs and other levels of government. The provision of well promoted 'fit for purpose' shelters for evacuees in emergency situations is a critical role for Council based on higher levels of community awareness, including CALD background residents. Council has also launched numerous support and preparedness tools on its website for getting prepared.

Emergency evacuation centres in the City of Ryde include the Ryde Civic Hall, Eastwood Hall, Marsfield Hall and the North Ryde School of Arts (Coxs Road).

Long-term recovery from some disasters requires substantial rebuilding and reconstruction of infrastructure and relevant planning controls may need to evolve in response to such challenges.

15 GOVERNANCE WITH DIRECTION, COLLECTIVE LEADERSHIP AND COLLABORATION

15 GOVERNANCE WITH DIRECTION, COLLECTIVE LEADERSHIP AND COLLABORATION

Collaborative governance and more inclusive participatory governance are well recognised approaches that can engage and empower the community in the decision making for resilience responses.

The City of Ryde is committed to delivering collective leadership, collaboration and sharing knowledge and demonstrated through partnerships such as the Resilient Sydney program, implementing priorities and actions of the Greater Sydney Commission's North District Plan and through delivering on our responsibilities consistent with the aspirations of the Ryde Community Strategic Plan.

Under the Resilient Sydney program critical investigative research for developing the Resilient Sydney Strategy (2018) identified very early on that a key fundamental element for building future resilience for Sydney was severely lacking and disjointed in its approach. This crucial element was cohesive governance across all levels of government, state agencies in connecting to and working with community.

Delivery of programs and agencies operated in isolation in many occasions and not only provided community support in a variety of ways but created uncertainty within community around who they could turn to in times of events or stress. In many areas, duplication of work led to ineffective management and delivery not achieving optimal outcomes.

In acknowledging these deficiencies, the Resilient Sydney team framed delivery of the Strategy around ensuring this was priority in developing the final document. Council also recognises the role of effective and cohesive governance at a local delivery level and has integrated this within Volume 2 of the Plan for delivery.

The Ryde Plan emphasises at a local level, the importance of key roles by the community, local groups, businesses, agencies and Council through collaboration to truly deliver a 'resilient city'. Consequently, the key response areas and detailed actions includes defining these roles that key stakeholders play in developing cohesive partnerships supported by Council.

Through the community engagement process for developing the Plan, the community highlighted to Council some critical areas for resilience improvement work. These included defining the term of what resilience is and how it translates in a personal perspective. Our community told Council that in times of events they were not necessarily sure of who to turn to, and the role that local government played in supporting their safety and their ability to 'bounce back'.

Research and engagement showed that areas within community such as our most vulnerable members will require additional support to ensure they are connected, healthy and protected in such challenging times during and following emergency situations.

Through this process, evidence also showed the level of support and trust that the community has for Council in assisting and supporting them.

The governance structures as applied by the City will embrace sustainability for a quadruple bottom line (QBL) outcomes (social, economic, environmental, governance) to strengthen resilience through mitigation and adaptation for all the community.

As part of this inclusive 'one city' approach, Council has recognised the strong role advocacy has in delivering the resilience on behalf of community to ensure factors that are not within direct control and responsibility of Council are lobbied and actively advocated for. The one city approach will communicate with and engage the community and its key stakeholders, and facilitate and support partnership programs for capacity building and the generation of self-reliance through co-operative learning and practical skills development.

Council recognises the important role it plays as the interface to and on behalf of our community. As a connector to agencies and across groups, it is recognised that every every issue impacting the city cannot be resolved. Yet our Council can advocate, lead and drive many initiatives to increase future resilience on behalf of community.

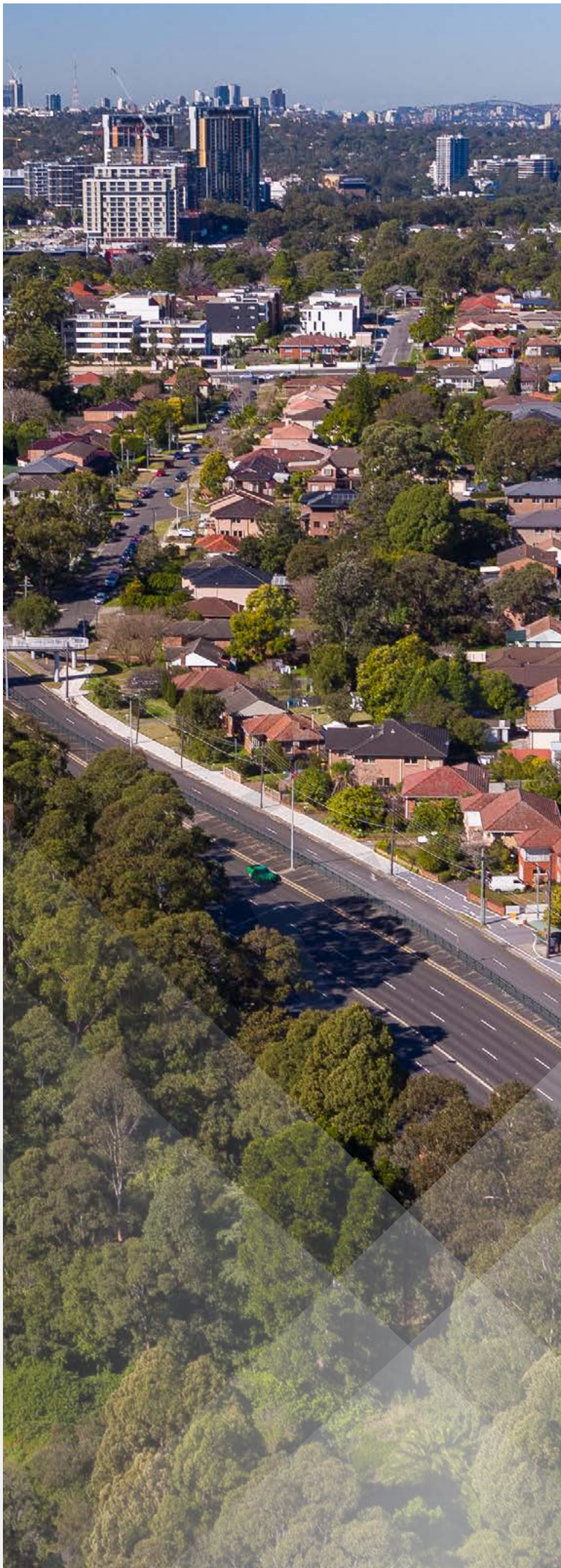
GLOSSARY OF TERMS AND ABBREVIATIONS

Active transport	Rather than using motorised vehicles, active transport includes walking and cycling as a more convenient, safe, healthier and enjoyable transport option especially for short trips as part of more connected, liveable and productive cities and town centres. A Pedestrian Access and Mobility Plan (PAMP) is a comprehensive strategic and action plan to develop local pedestrian policies and build pedestrian facilities. They provide framework for developing local or neighbourhood pedestrian routes or areas identified by the community as important for enhanced, sustainable safety, convenience and mobility.
Acute shock	Major events which negatively impact and restrict or damage a community's ability to function normally, including emergency situations such as heatwaves, bushfire, floods and infrastructure failures.
Adaptation	Climate change adaptation helps individuals, communities, organisations and natural systems to deal with those consequences of climate change that cannot be avoided. It involves taking practical actions and building the capacity to manage the risks from climate impacts, including the protection of infrastructure (economic and social) and strengthening resilience of the community. Adaptation can involve gradual transformation with many small steps over time, or major transformation with rapid change.
Biodiversity	The variety of nature is known as biological diversity of biodiversity, which is more than just the number of different plant and animal species. It includes many types of forest, wetland, grassland, and other ecosystems and habitats. Our scientists study and measure biodiversity at the genetic, species, and ecosystem levels.
Carbon emissions	Carbon dioxide (CO2) is a colourless, odourless and non-poisonous gas except in unusual situations with extreme concentrations. It is formed by the combustion of carbon and in the respiration of living organisms, and is considered a greenhouse gas (refer to separate definition). Emissions are the release of greenhouse gases or their precursors into the atmosphere over a specified area and period of time. Carbon dioxide comes from the burning of oil, coal and gas in energy production, and to a lesser extent the burning wood and waste materials and from some industrial processes such as cement production.
Catchment	A catchment is an area drained by a river or body of collected water which can be modified by development. Within the context of Sydney region's water catchments, and relevant to the City of Ryde are the Parramatta River and Lane Cover River and their tributaries or 'sub-catchments'. Catchment management is an integrated approach to planning and managing the community's water both in terms of quality and quantity, and by ensuring protection for the source catchments, our environment and its natural systems.
Chronic stress	Day to day events that negatively affect, and decrease the efficient functioning of a community; such as climate change, housing affordability, global or national economic downturn, transport congestion, food security, social isolation, lack of connectedness, service shortages and mental health.
Climate change	Climate change refers to any long-term trends or shifts in climate over many decades or centuries, rather than variability evident from year to year. Human-induced climate change is being caused by the increasing emission of greenhouse gases (particularly carbon and also methane) that lead to global warming of our atmosphere. The accelerating change means a raft of new challenges and threats for this current generation and those to come. This is through increases in extreme weather associated events (like heat waves, storms, droughts, bushfires, floods) and other changes, such as sea-level rise and ocean acidification as the latter absorbs more carbon dioxide. The changing climate is superimposed on 'natural variability', leading to a change in the frequency, intensity and duration of extreme events, some of which are compound.
Climate risk	There are risks and potential consequences from climate change with the probability of such hazards requiring a management response.
Connectivity	Connectivity seeks to improve linkages for bicyclists, pedestrians and mobility aid users in urban areas and precincts where people can meet for social, educational, and recreational activities, and for places of employment, transportation hubs, and business districts. The goal of the connectivity initiatives is to make conditions safer and more accommodating for pedestrians and bicyclists, thereby encouraging more people to use these healthy and environmentally sustainable modes of travel. Such improvements enhance liveability and mobility within and across residential neighbourhoods, community facilities, open space areas, retail and business precincts, and education institutions.
Disaster	A generally unpredicted major disruption to a community, society or ecosystem in causing human, infrastructural, economic or environmental destruction, is known as a disaster.
Engagement	A consultation process such as with the community or external stakeholder is where a particular group is engaged to gather their input in relation to a particular proposal, challenge, set of options or desired outcome(s).

Greenhouse gases	Gaseous compounds (particularly carbon dioxide and methane) absorb infrared radiation, trap heat in the atmosphere, and contribute to the greenhouse effect. The major sources for these gases are from the production of energy from power plants and industry, land use through the production of meat for human consumption and deforestation, and the transportation sectors including by motor vehicles, road trucking industry, aircraft and shipping.
Hazard	Hazards are potentially human-induced or natural events that could cause injury, loss of life, or other health impacts, as well as damage and loss to property, infrastructure (economic and social) or communities.
Impacts	The consequences or outcomes of natural or human induced hazards include impacts.
Inclusion	Social inclusion within the Australian context has four key domains including the opportunity to: participate in society through employment and access to services; connect with family, friends and the local community; deal with personal crises (for example, ill health), acute external shocks and chronic stresses; and being heard (by government, corporations, other institutions and the rest of community). Social cohesion is an important part of inclusion, including support between and interaction with others close by in the local community.
Mitigation	Mitigation is the effort and measures to reduce the risks and lessening the impact on the community, property, assets and environment from a range of different threats and natural hazards, in particular those associated with climate change.
Network	People or groups that we frequently interact with, rely upon or even collaborate with are known as networks.
Quadruple bottom line	Sustainability has four key pillars including social, environmental and economic goals commonly referred to as the 'triple bottom line'. This latter has been extended to governance as the fourth essential element. Progress for achievement of outcomes for the other three is largely dependent upon good governance at all levels, including the public and private sectors and democratically elected institutions.
Renewable energy	Renewable energy is produced using natural resources that are constantly replaced and never run out. Solar is one of the most well-known, wind-power is one of the most widespread, and hydropower is one of the oldest. Other renewable technologies harness geothermal energy, bioenergy or ocean energy to produce heat or electricity. There are new enabling technologies that help to manage renewable energy so it can be produced day and night while strengthening the electricity grid. These include battery-storage, supply prediction and smart grid technologies. Renewable energy can be generated for use by consumers linked to a large grid, a local micro-grid with control capability (can disconnect from the traditional grid and operate autonomously) or for completely 'off the grid' independent self-sufficient operation.
Resilience	The capacity of individuals, communities, businesses, organisations and systems within a city to survive, adapt and thrive in the face of whatever kind of chronic stresses and acute shocks they experience.
Sustainable development	"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report 1987 - Our Common Future). The 'wise use' of resources is at core of sustainable development. Within this context, 'sustainability' is pursuing the achievement of social, environmental and economic goals, also known as the 'triple-bottom-line' (TBL). More recently this has been acknowledged as extending to a 'quadruple-bottom-line' (QBL) approach that includes governance. Alternatively, others such as some within Indigenous communities and First Peoples have integrated 'culture' as the fourth pillar of sustainability.
Urban Heat Island	Cities are often hotter than surrounding areas. This is because humans have cleared vegetation and replaced it with concrete, bitumen and other heat absorbing materials, resulting in energy being trapped in and around buildings and infrastructure. This is then radiated back out, heating the air and people. The effects for humans include health risks, reduced wellbeing and enjoyment, disruptions to outdoor activities and discouragement of pedestrian and other active transport movements. Also, it contributes to higher demand on the operation of air conditioning and increases stress on gardens, landscaped areas and trees which means more reliance on watering systems.
Water Sensitive Urban Design (WSUD)	WSUD is a land planning and engineering design approach which integrates the urban water cycle, including stormwater, groundwater and wastewater management and water supply, into urban design to minimise environmental degradation and improve aesthetic and recreational appeal.
Zero-carbon	The achievement of zero carbon emissions means causing or resulting in no net release of carbon dioxide into the atmosphere.

GLOSSARY OF TERMS AND ABBREVIATIONS

APZ	Asset Protection Zones
AWT	Advanced Waste Treatment
BEAC	Bushland and Environment Advisory Committee
CALD	Culturally and linguistically diverse (community)
CoR	City of Ryde
CWC	Climate Wise Communities
DCP	Development Control Plan
EMP	Emergency Management Plan
EV	Electric vehicle
FCEV	Hydrogen fuel cell electric vehicle
GBCA	Green Building Council of Australia
GSC	Greater Sydney Commission
HWSA	Home Waste and Sustainability Advisory Service
LEMC	Local Emergency Management Committee
LEMP	Local Emergency Management Plan
LEP	Local Environmental Plan
LGA	Local Government Area
LSPS	Local Strategic Planning Statement
MUD	Multi-unit dwellings
NDP	North District Plan
NSROC	Northern Sydney Regional Organisation of Councils
NSW	New South Wales
PAMP	Pedestrian Access and Mobility Plan
PRCG	Parramatta River Catchment Group
QBL	quadruple bottom line
REAC	Renewable Energy Advisory Committee
REMP	Regional Emergency Management Plan
RFS	NSW Rural Fire Services
SES	State Emergency Service
SWAP	Sustainable Waste to Art Prize
ULEV	Ultra-low-emission vehicle
WSUD	Water Sensitive Urban Design
WSAP	Water Action Savings Plan
ZEV	Zero-emission vehicle
100RC	100 Resilient Cities



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APPENDICES

Appendix A	Executive Summary Resilience Sydney (two page flyer)
Appendix B	NSW Emergency Management Sub Plans, Supporting Plans and Regional Plans

APPENDIX A EXECUTIVE SUMMARY RESILIENCE SYDNEY

Resilient Sydney

A snapshot of the strategy for city resilience 2018

The Resilient Sydney strategy sets the directions we must take to strengthen our ability to survive, adapt and thrive in the face of increasing global uncertainty and local shocks and stresses. The strategy offers a five year action plan with key directions, priority flagship actions and 35 actions. Resilient Sydney calls on business, government, academia, communities and individuals to lead and work as one city.

This Resilient Sydney strategy has been developed with an unprecedented level of collaboration across metropolitan Sydney. All 33 metropolitan councils have participated in the development and are working with the NSW Government, business and communities to implement the actions.

Vision

Metropolitan Sydney is connected, inclusive and resilient

Mission

Sydney will understand and be prepared to manage our resilience challenges

RESILIENT SYDNEY | 100 RESILIENT CITIES

APPENDIX A EXECUTIVE SUMMARY RESILIENCE SYDNEY

Cover photo: Sydney Harbour Bridge. Photo: iStock/Boyloso

What is Resilient Sydney?

Resilient Sydney is a member of the 100 Resilient Cities initiative - pioneered by the Rockefeller Foundation. A metropolitan steering committee provides oversight. The Resilient Sydney Office is hosted by the City of Sydney on behalf of the 33 Councils of metropolitan Sydney.

100 Resilient Cities help cities around the world become more resilient to physical, social and economic challenges. Cities in the network develop a roadmap to resilience. Sydney has joined Melbourne, Wellington and Christchurch in implementing resilience strategies across Oceania.

Developing the strategy

Since joining the network in 2015, Resilient Sydney has researched and created an urban resilience road map for Sydney. This strategy follows engagement with over 1,000 people and more than 100 organisations, including all of Sydney's metropolitan councils, the NSW Government, business, academia and community organisations.

Resilient Sydney drew from 100 Resilient Cities' tools and frameworks, as well as local and global expertise, to identify our shocks and stresses. We asked everyone involved, including residents of metropolitan Sydney, to review our risks and identify actions to address our challenges. There were consistent themes and priorities across all groups. The daily lives of residents highlighted the system connections between people, organisations and critical infrastructure, and our vulnerabilities to shock events.

Community priorities underpin the vision, mission, directions and actions of the strategy, providing a clear call to action for a connected, inclusive and resilient metropolitan Sydney.

For more information, visit
resilientsydney.com.au
100resilientcities.org/cities/sydney/
twitter.com/resilientsydney

PIONEERED BY THE ROCKEFELLER FOUNDATION
100 RESILIENT CITIES

APPENDIX B NSW EMERGENCY MANAGEMENT SUB PLANS, SUPPORTING PLANS AND REGIONAL PLANS

Sitting above the LEMP is the NSW EMPLAN which is supported by Sub Plans, Supporting Plans and Regional Plans co-ordinated and adopted by the NSW government.

These cover a wide range of potential risks, hazards and scenarios, including many relevant to the City of Ryde:

Sub Plans

Asbestos Emergency
Aviation Emergency
Biosecurity (Animal and Plant) Emergency
Bush Fire
Counter Terrorism
Cyber Security
Electricity
Flood
Food Industry Emergency
Hazardous Materials/Chemical, Biological, Radiological and Nuclear
Heatwave
Human Influenza Pandemic
Major Structure Collapse
State Waters Marine Oil and Chemical Spill Contingency
Storm
Tsunami Emergency

Supporting Plans

Agriculture and Animal Services
Energy and Utility Services
Engineering Services
Environmental Services (ENVIROPLAN)
Gas Supply Disruption
Health Services (HEALTHPLAN)
Public Information Services
Recovery Plan
Telecommunications Services (TELCOPLAN)
Transport Services
Welfare Services Functional Area

Regional Plans

Sydney Metropolitan Emergency Plan

City of Ryde

RESILIENT RYDE

SUPPORT EACH OTHER • ADAPT TO CLIMATE CHANGE • CONNECT FOR STRENGTH • GET READY • PREPARE OUR CITY