




04 Sustainability

Sustainability in planning aims to reduce the impacts of development on the environment and people's wellbeing.

This is achieved by protecting and enhancing the natural environment; maximising the efficient use and re-use of water, energy and waste in new buildings and precincts; and, improving the resilience of our natural and built environment to protect people from natural and urban hazards.

The following local priorities identify how the City will continue to improve the sustainability of our community:

Priorities

-  **S1** Protecting and enhancing the natural environment for a resilient city
-  **S2** Creating better buildings and places to reduce emissions and waste and use water efficiently
-  **S3** Increasing resilience of people and infrastructure against natural and urban hazards

Priority **(S1)**

Protecting and enhancing the natural environment for a resilient city

In giving effect to *A Metropolis of Three Cities* and the Eastern City District Plan, this Local Priority delivers on the following planning priorities:

- ▶ E14 – Protecting and improving the health and enjoyment of Sydney Harbour and the District's waterways
- ▶ E15 – Protecting and enhancing bushland and biodiversity
- ▶ E17 – Increasing urban tree canopy cover and delivering Green Grid connections

In giving effect to Sustainable Sydney 2030, this Local Priority delivers on the following directions:

- ▶ 2 – A leading environmental performer
- ▶ 9 – Sustainable development, renewal and design

Objectives

- ▶ The City has healthy natural waterways and foreshore environments that can be enjoyed by all
- ▶ Waterways, bushland and canopy cover contribute to resilience by reducing urban heat, enhancing biodiversity and improving liveability

Urban bushland, biodiversity and canopy cover

Sydney's landscape has changed dramatically, since the Gadigal of the Eora Nation cared for and sustained these lands. Today, the city's environment is highly developed and urban with almost all original vegetation and other natural features removed or modified. This has greatly reduced urban bushland, biodiversity and canopy cover in the city and so their preservation and improvement is important for the city's resilience.

Urban bushland, biodiversity and canopy cover are important to climate change adaptation and provide vast liveability benefits. Vegetation and canopy cover reduces the urban heat island effect^{xxxiii}, cleans air and water and assists with effective water management. The liveability benefits include improving amenity and wellbeing, while trees and greening can also improve property values.

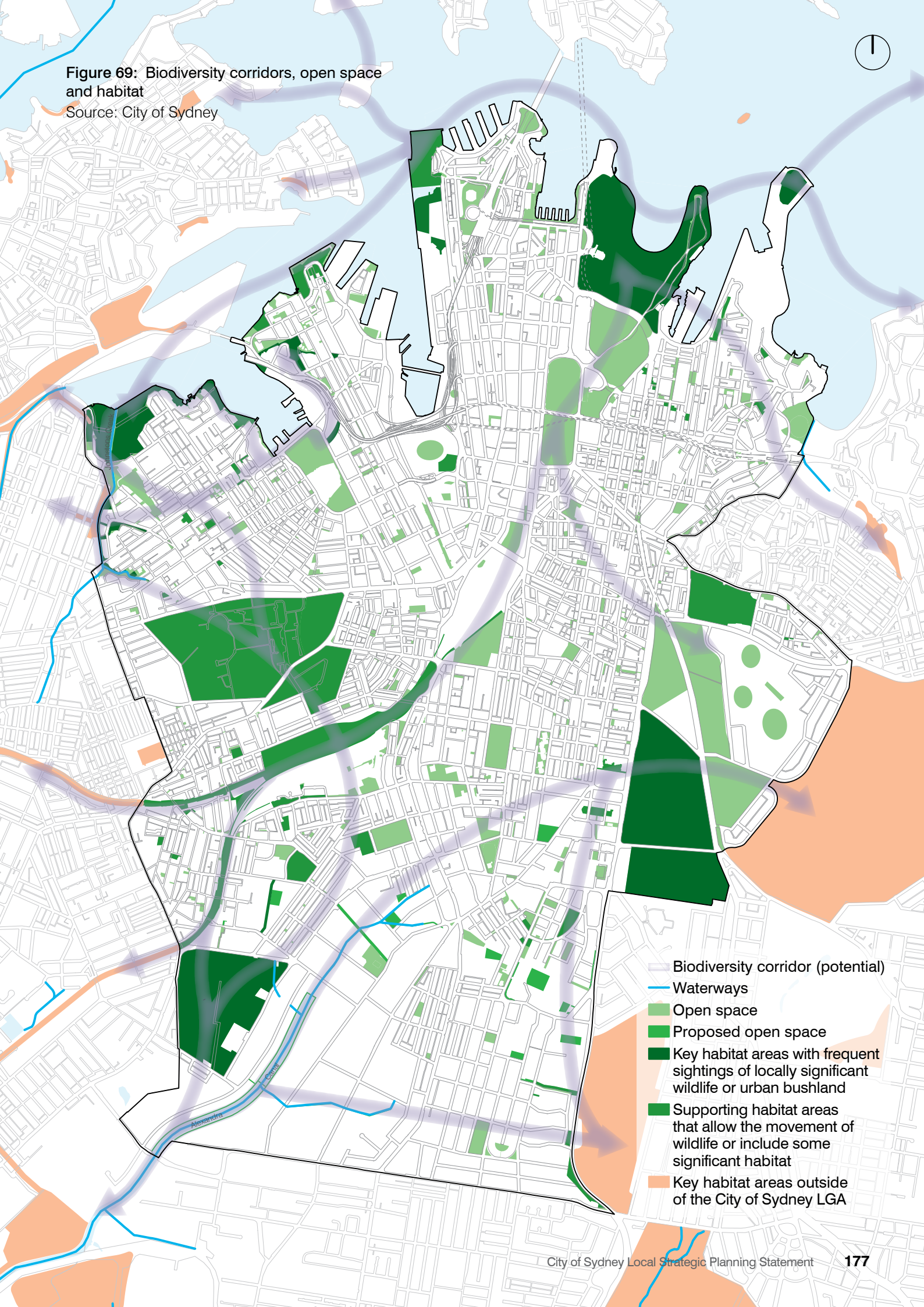
Bushland is remaining native vegetation or altered vegetation that is still representative of the native vegetation. There are areas of urban bushland throughout the city, including in Sydney Park, parks throughout Glebe and along the light rail corridor. The City has increased its bushland restoration sites by 300 per cent between 2012 and 2015. These sites need to be maintained and new sites established^{xxxiv}.

Currently, the city contains five significantly recreated vegetation communities, which are groups of plant species. These include the Sydney Turpentine Ironbark Forest, Eastern Suburbs Banksia Scrub and Coastal Saltmarsh, which are also listed as endangered. A flora survey conducted in 2011 indicated there are approximately 365 flora species, including 80 weed species, in the local area^{xxxv}. A fauna survey conducted in 2017/18 recorded 104 native species^{xxxvi}. Many of the species have adapted well to the urban environment.

Over time, development has reduced the connectivity between already fragmented habitat sites and reduced biodiversity. Habitat connectivity is essential for the long-term conservation of a diverse range of species and ecological communities. The City has identified the general location of habitat corridors; their implementation needs to be managed through the development process.

Figure 69: Biodiversity corridors, open space and habitat

Source: City of Sydney



In the City, 62 per cent of land is privately owned^{xxxvii}. The ability to implement biodiversity and canopy cover on private land is challenging due to small lot sizes in some parts of the city and intensive site coverage for commercial, industrial and high-density residential uses. This makes it challenging to increase urban bushland, habitat for biodiversity, canopy cover and other greening.

The community told us that tree canopy should be increased as much as possible.

Sustainable Sydney 2030 includes a target to increase canopy cover by 50 per cent from the 2008 baseline by 2030. Canopy cover in the city has increased from 15.5 per cent in 2008 to 18.1 per cent in 2019^{xxxviii} but needs to be 23 per cent to meet the target. The City is planting large amounts of canopy in the public realm, particularly in road reserves as they are under the City's care and control. Opportunities to increase tree planting on private land is limited but critical in meeting the overall canopy cover targets. In 2008, private land included 7 per cent of the City's canopy cover, even though it makes up more than half the City's area^{xxxix}. The City encourages increased canopy cover on private property through Landscape Code requirements in development applications.

In road reserves, vegetation and canopy cover compete for space with infrastructure, people, bicycles and cars, particularly as the Austroads standards for road design reduce the opportunity for vegetation and canopy cover. While there is opportunity to plant additional vegetation, including canopy cover, along canals, railway and light rail corridors and foreshores, these areas are also identified for active travel routes, resulting in further competition for space.

To support resilient urban ecosystems, the City will:

- protect and enhance locally indigenous vegetation which provides good habitat for fauna
- improve habitat connectivity across the city and to areas of habitat in adjoining council areas
- prioritise space for vegetation in road reserves
- protect and enhance canopy cover.

Priority areas and targets for canopy cover and biodiversity that relate to land uses will be identified, taking into consideration opportunities and constraints. The targets will then inform planning controls.

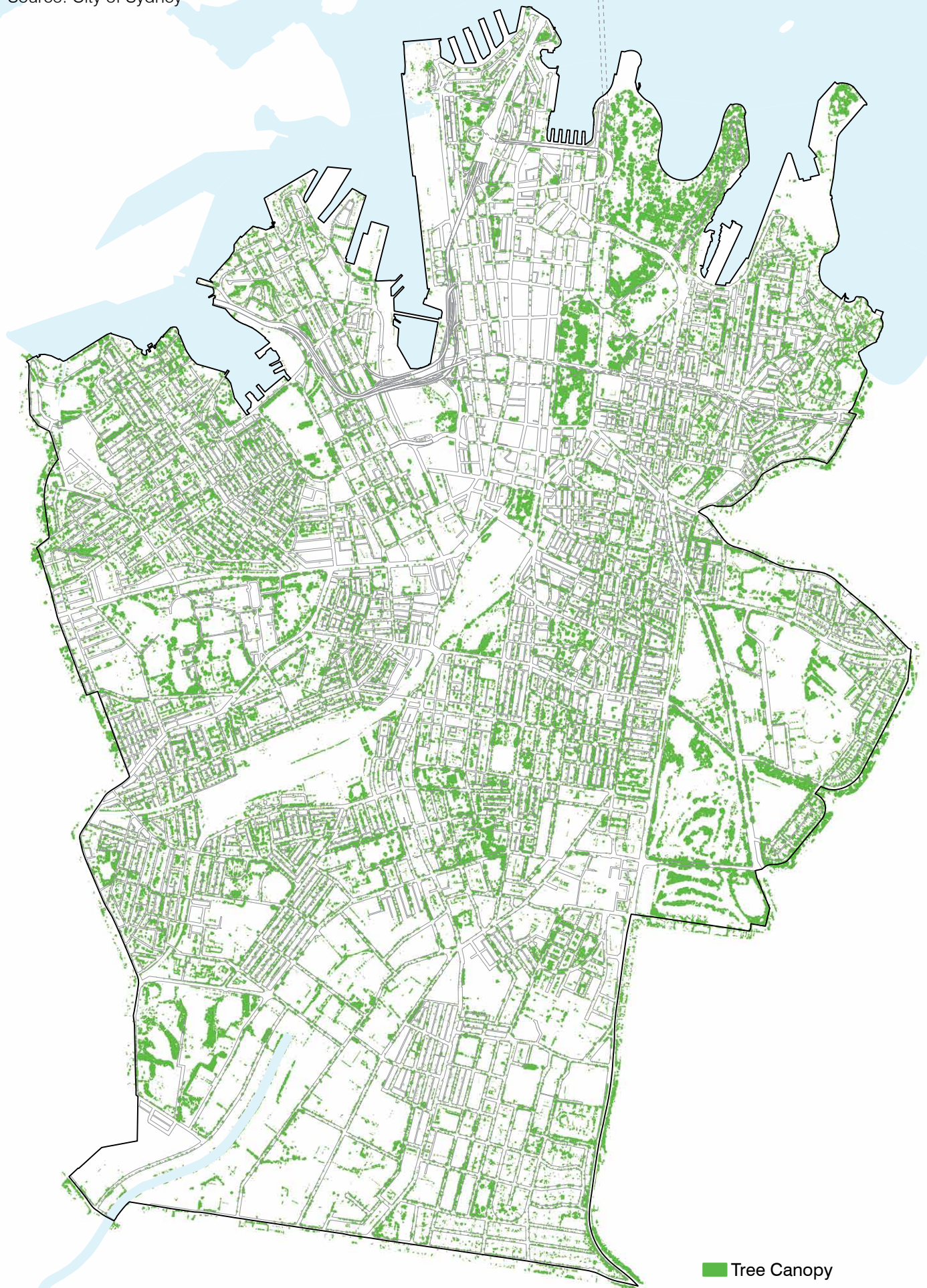
Review of the controls will also ensure they align with SEPP (Vegetation in Non-Rural Areas) 2017 and the City's Urban Ecology Strategic Action Plan, Urban Forest Strategy and Greening Sydney Plan.

Large precincts, urban renewal sites, State Significant Precincts and sites subject to a planning proposal offer opportunities to implement canopy cover and biodiversity. This is because there is the ability to reconfigure space to achieve both development and landscaping and canopy cover in deep soil areas.

Canopy cover and landscaping can also be realised through planting vegetation in the public realm. As the City works with others to reprioritise space for pedestrians, the City will identify opportunities to increase landscaping and canopy along streets, particularly on key pedestrian and cycling routes that require high amenity.

Given that space is limited, additional vegetation can be provided on the roofs and walls of buildings. Green roofs and walls are examples of biophilic design which seeks to increase people's connection with the natural environment by incorporating direct and indirect experiences of nature into buildings and spaces. Green roofs and walls can improve air quality, support biodiversity, better insulate buildings, reduce the heat island effect and improve stormwater management. They also create additional recreation space for people, beautify the city and promote physical and mental wellbeing. The City has almost 200 green roofs and walls with an estimated aggregate area of about 150,000 square metres. This has increased by about 50,000 square metres since 2014^{xl}. The City will continue to encourage green roofs and walls through its Green Roofs and Walls Policy, action plan, guidance documents and planning controls.

Figure 70: Urban tree canopy cover as of 2018
Source: City of Sydney



Waterways and foreshores

The City contains multiple waterways and foreshores, including Sydney Harbour, which provide significant cultural and recreational opportunities. The health of and access to waterways and foreshores is to be protected and enhanced.

The local area is bound to the north by the Sydney Harbour foreshore, which defines the character of this harbour city. While the harbour foreshore is iconic, its ecological function has been reduced, as the majority of the foreshore environment has been highly modified and replaced with sea walls.

Much of the harbour foreshore is managed by the NSW Government through a range of plans, State Environmental Planning Policies (SEPP) and Sydney Regional Environmental Plans (SREP). Additionally, some parts of the foreshore are managed by different authorities including the Royal Botanic Gardens & Domain Trust, Property NSW and the Barangaroo Delivery Authority.

There are a number of waterways which contribute to the city's ecosystems. The main waterways are Alexandria and Johnsons Creek Canals. Smaller waterways include Rushcutters Canal (formerly Rushcutters Creek), Munni Channel (formerly Sheas Creek), and the Tank Stream. There are also remnants of creeks throughout the city such as Lake Northam, a remnant of Blackwattle Creek, and Yurong Creek in Woolloomooloo which is now a stormwater pipe entering Garden Island Cove.

Most of the waterways have been substantially altered from their natural state, either being fully channelised or hard edged with concrete, to manage stormwater run-off from increased urbanisation. Stormwater run-off collects litter and sediments from private and public land and carries it to the waterways. This impacts waterway health as the infrastructure and surrounding land uses that treat land and water pollution don't adequately treat the stormwater before it enters the waterway. Retrofitting stormwater infrastructure is challenging and costly.

The City, in conjunction with Sydney Water, has initiated the Johnsons Creek naturalisation project, including the construction of a new freshwater wetland. This project will improve water quality, enhance biodiversity with increased habitat, reduce urban heat by removing concrete; and improve recreation and amenity.

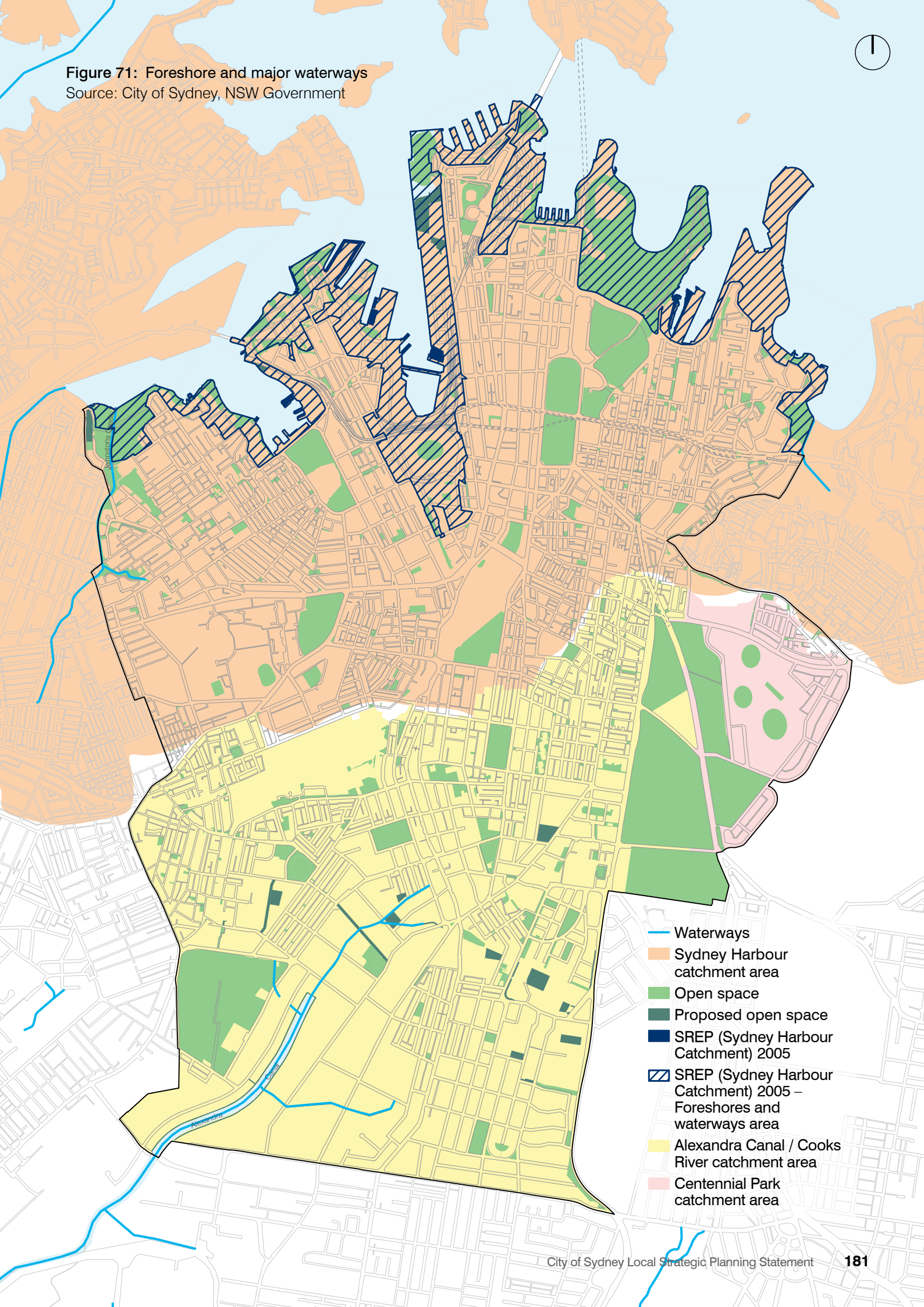
The City is planning for improved access and connectivity to Alexandra Canal with a walking and cycling connection to be delivered through the DCP. However, the canal's naturalisation is constrained by existing development, land ownership and state heritage status.

The City is helping to prepare two Coastal Management Plans, one for Sydney Harbour and the other for the Cooks River Catchment, which includes Alexandra Canal. They set the long-term strategy for the coordinated management of the waterway, with a focus on achieving the requirements of the Coastal Management Act 2016. These plans will include management actions for the current use of the waterway and catchment as well as identify sustainable development opportunities for the catchment area. The Sydney Harbour Coastal Management Plan may help to resolve fragmented land management and legislative constraints that impact the City's ability to integrate the foreshore into the city and manage it consistently. Additionally, the Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions could be used to manage land use impacts on waterway health from adjoining land.

New development provides opportunities to implement Water Sensitive Urban Design (WSUD) infrastructure. WSUD helps to reduce the impact of urban development and improve the health of waterways by reducing stormwater runoff and removing sediment and pollutants before they reach the city's waterways and foreshore. Systems such as raingardens, swales and wetlands have multiple benefits in addition to reducing land and water pollution, including passively irrigating green spaces, improving amenity and reducing the urban heat island effect. This will help achieve the City's targets of a 50 per cent reduction in the annual solid pollution load and a 15 per cent reduction in annual nutrient load discharged to waterways by stormwater by 2030 as identified in Environmental Action 2016–2021: Strategy and Action Plan^{xli}. The DCP also contains requirements relating to flooding and water management, including controls relating to stormwater pollution reduction. A consistent catchment approach delivered through WSUD requirements would further improve the health of waterways and ensure consistent approaches by councils.

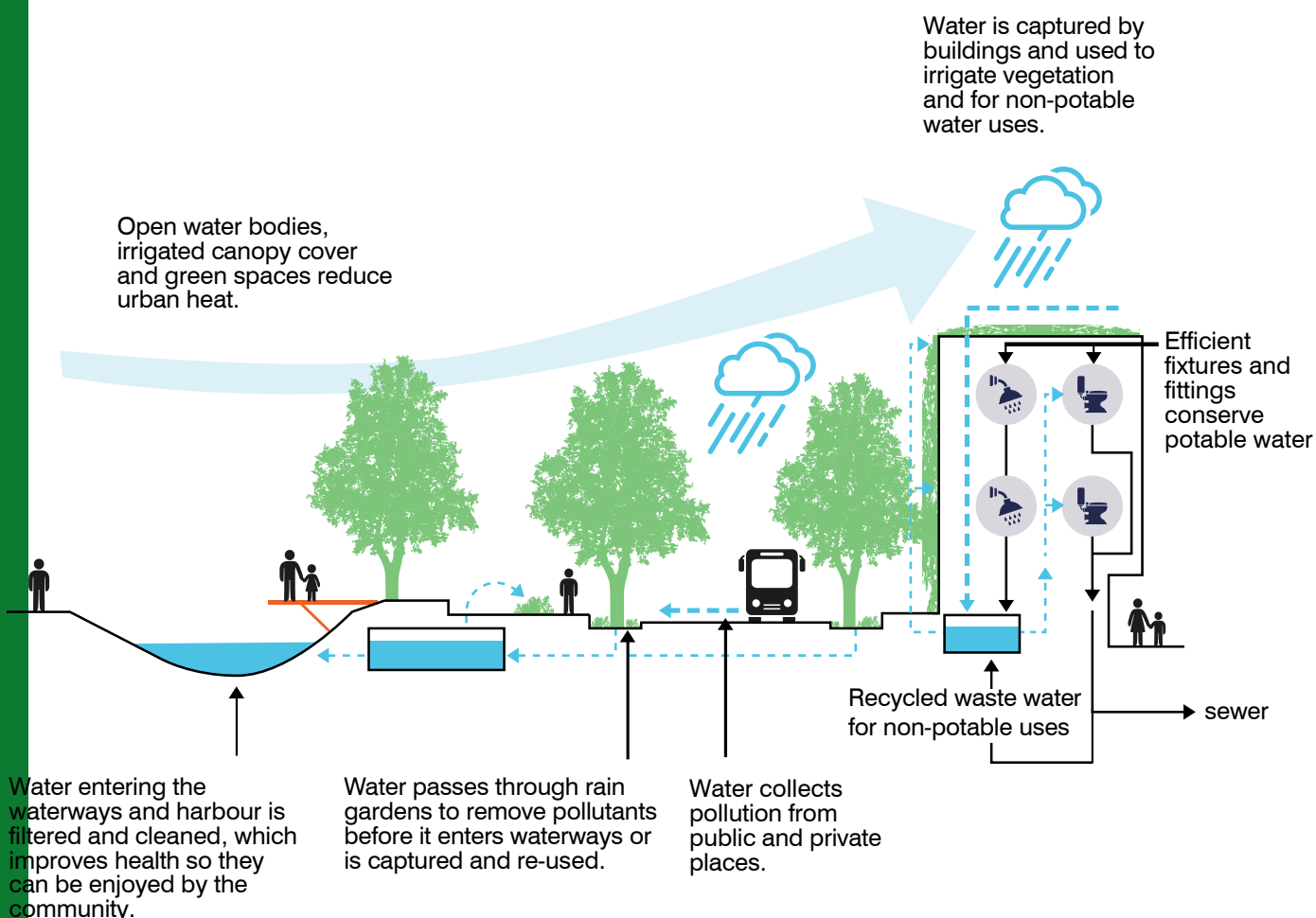
Naturalisation projects and the implementation of landscaping and canopy cover around waterways and foreshores, provides opportunities to reinstate riparian corridors, vegetated foreshores and habitat linkages. This will enhance flora and fauna, while reducing erosion and sediments entering the waterways and help reduce urban heat.

Figure 71: Foreshore and major waterways
Source: City of Sydney, NSW Government



- Waterways
- Sydney Harbour catchment area
- Open space
- Proposed open space
- SREP (Sydney Harbour Catchment) 2005
- SREP (Sydney Harbour Catchment) 2005 – Foreshores and waterways area
- Alexandra Canal / Cooks River catchment area
- Centennial Park catchment area

Figure 72: Water Sensitive Urban Design



Source: Adapted from *Opportunities for a Water Sensitive Greater Sydney* (2016), CRC for Water Sensitive Cities

Blue and green grid

The mapping of the blue and green grid identifies the blue grid, which are the waterways, creeks and streams and the green grid, which are the areas of bushland, biodiversity, canopy cover, as well as open space. These grids are connected and work together to increase biodiversity, lower temperatures, improve water retention and water quality, as well as provide

recreation and relaxation spaces for people. These grids are also connected by the City's active travel network, the Liveable Green Network. The City's blue and green grid also includes the NSW Government Architect's Sydney Green Grid, which links open space.

Figure 73: Blue and green grid



Actions

When will
it happen?

S1.1

Improve the health of waterways by:

- a) managing stormwater runoff from new developments to reduce land and water pollution
- b) implementing the Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions in collaboration with local and state government
- c) collaborating with Sydney Water to naturalise canals across the city
- d) reviewing and implementing water sensitive urban design controls and planning practices.

Ongoing

S1.2

Protect and enhance urban bushland and biodiversity, in particular locally indigenous vegetation, by:

- a) maintaining existing biodiversity and increasing vegetation and habitat opportunities in new development
- b) defining biodiversity corridors and reviewing controls to improve habitat protection and connectivity within and beyond the city
- c) advocating for the protection of and enhancement of bushland and biodiversity in NSW Government projects.

Ongoing

S1.3

Protect and increase canopy cover and vegetation across public and private land by:

- a) maintaining existing and implementing additional canopy cover and vegetation through the development process
- b) reviewing, implementing and monitoring targets and controls for tree canopy cover on private land with the aim to increase tree canopy
- c) identifying opportunities for vegetation, including canopy cover, in road reserves
- d) advocating for the protection of and increased canopy cover and vegetation in NSW Government projects
- e) collaborating with Government, utility providers and others, to minimise the impacts of infrastructure on canopy cover and vegetation and exploring opportunities to increase canopy cover by consolidating or undergrounding existing and new infrastructure.

Ongoing



Priority **(S2)**

Creating better buildings and places to reduce emissions and waste and use water efficiently

In giving effect to *A Metropolis of Three Cities* and the Eastern City District Plan, this Local Priority delivers on the following planning priority:

- ▶ **E19 – Reducing carbon emissions and managing energy, water and waste efficiently**

In giving effect to Sustainable Sydney 2030, this Local Priority delivers on the following directions:

- ▶ **2 – A leading environmental performer**
- ▶ **9 – Sustainable development, renewal and design**

Objectives

- ▶ Greenhouse gas emissions in the built environment are reduced to mitigate climate change
- ▶ Potable water use is reduced with recycled water systems and rainwater harvesting opportunities maximised to increase resilience in the natural and built environment
- ▶ Waste is re-used as a resource, reducing landfill and greenhouse gas emissions
- ▶ Precincts maximise their positive impact on the environment and increase resilience through precinct-wide sustainable energy, water and waste management systems

Energy

Energy use in buildings makes the largest contribution to the city's greenhouse gas emissions. Offices, hotels and apartments contribute to 68 per cent of emissions that result from energy used in buildings^{xiii}.

The City has a target of net zero emissions from the local government area by 2050. Achieving net zero emissions in the built environment means reducing greenhouse gas emissions by using less energy and increasing the use of renewable energy. This can be achieved through environmentally sustainable design, onsite and off-site renewable energy generation, waste reduction through recycling and re-use, efficient and sustainable transport, and offsetting any remaining emissions. To achieve this target and support the NSW Government's net zero emissions target, the City has a number of building-specific actions to reduce greenhouse gas emissions in *Environmental Action 2016–2021: Strategy and Action Plan* and the *Waste Strategy and Action Plan 2017–2030*.

Transitioning to high-performing net zero energy buildings will play a key role in reducing greenhouse gas emissions and mitigating climate change. Increasing the energy efficiency of buildings will also reduce running costs and increase the resilience of buildings.

The City uses its planning framework to reduce greenhouse emissions from buildings. The energy requirements for residential and commercial buildings under BASIX legislation and the National Construction Code are low and a missed opportunity. The City has set higher BASIX Energy scores and NABERS Energy ratings for specific sites in the Local Environmental Plan 2012. In addition, the City has NABERS Energy requirements for new office developments and major refurbishments in the Development Control Plan 2012.

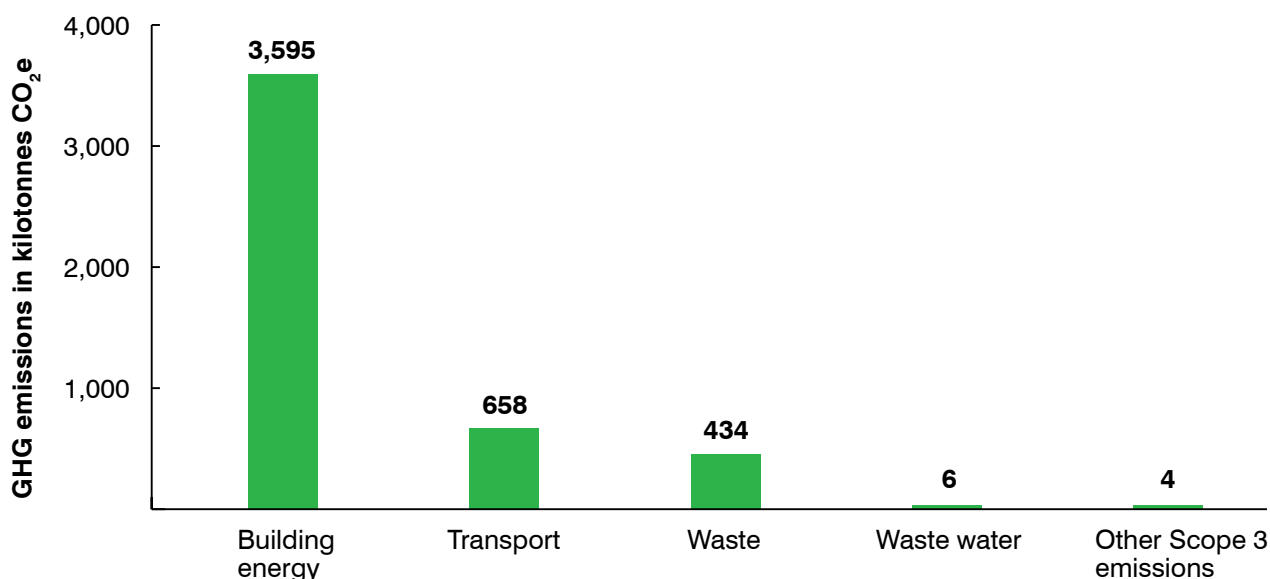
The draft Central Sydney Planning Strategy also identifies higher BASIX Energy scores and NABERS Energy requirements. However, for residential development, the City cannot impose higher BASIX targets without providing an incentive, such as additional height or floor space.

While the NSW Government has a net zero emissions target by 2050, it has not developed a pathway to achieve it. Based on the Exploring Net Zero Emissions for Greater Sydney report, the NSW Government's target for net zero emissions by 2050 is unlikely to be realised under current regulations. The report also identifies that improving building efficiency, such as through higher BASIX Energy scores and increasing local renewable energy generation will contribute to the NSW Government's net zero emissions target.

Climate Emergency Declaration

In June 2019 the City of Sydney Council declared a climate emergency in response to the serious risk climate change poses to the community. The climate emergency message has been echoed by 22 other Australian councils and over 700 jurisdictions worldwide. The City has called on the Australian Government to respond to this emergency through a range of measures, including reintroducing a price on carbon. Action from all levels of government is essential to reduce climate change risk. Although the City has actively been reducing greenhouse gas emissions and increasing its resilience to the impacts of climate change, there are opportunities to accelerate our action through the energy, canopy cover, biodiversity, waste and resilience actions in this planning statement. As the climate emergency continues, related shocks and stresses will impact the city. By anticipating and planning for changes we can create more resilient buildings and places that continue to maintain the city's high liveability into the future.

Figure 74: Greenhouse gas (GHG) emissions by source 2016–17



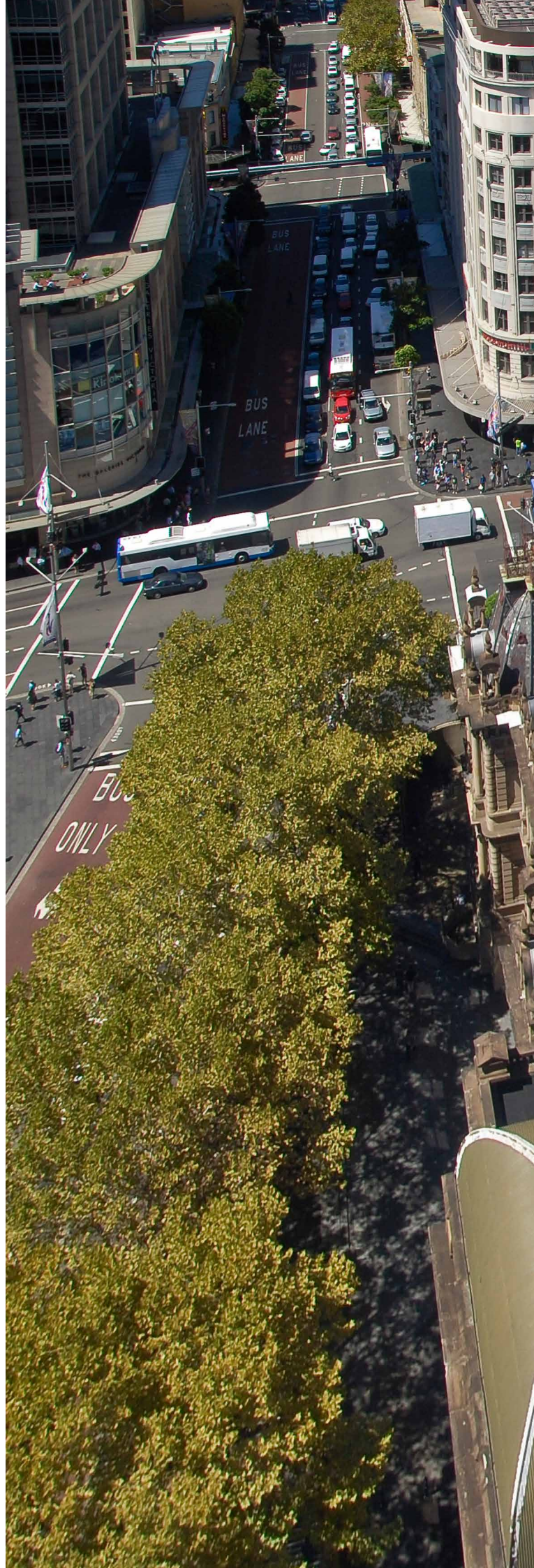
Source: City of Sydney, data from CCAP 2.0 reported through the City of Sydney's Environmental Sustainability Platform, Total greenhouse gas emissions analysis for 2016-17

Developing performance standard pathways to net zero energy buildings

The community told us they want a carbon positive city.

Reducing greenhouse gas emissions in new buildings will help the city to achieve net zero emissions by 2050. The Environmental Action 2016–2021: Strategy and Action Plan includes an action to develop a pathway for strengthening the City's planning controls over time to deliver net zero building standards. The City is developing performance standard pathways to achieve net zero energy buildings in Greater Sydney planning controls. The performance standard pathways will identify step changes in targets and timeframes to transition to net zero energy office, hotel, multi-unit residential, shopping centre and mixed-use new developments, as well as major refurbishments. The framework will be supported by an evidence base that includes a cost-benefit analysis, the findings from stakeholder forums held in 2018 and feedback from stakeholders. The City wants to ensure that Sydney's developers have a clear pathway to net zero energy with the required actions known up-front. Identifying step changes with advanced notice of their implementation will encourage innovation from the development industry.

The project will also investigate how offsite renewable energy generation or renewable energy offsets can be factored into the NSW planning system. It will also take into account the National Construction Code updates and COAG Energy Council's trajectory towards increasing energy efficiency in buildings. To implement the performance standard pathways framework, changes required in the NSW planning system will also be identified.





Water

The community told us that they want water efficiency improved in non-residential buildings.

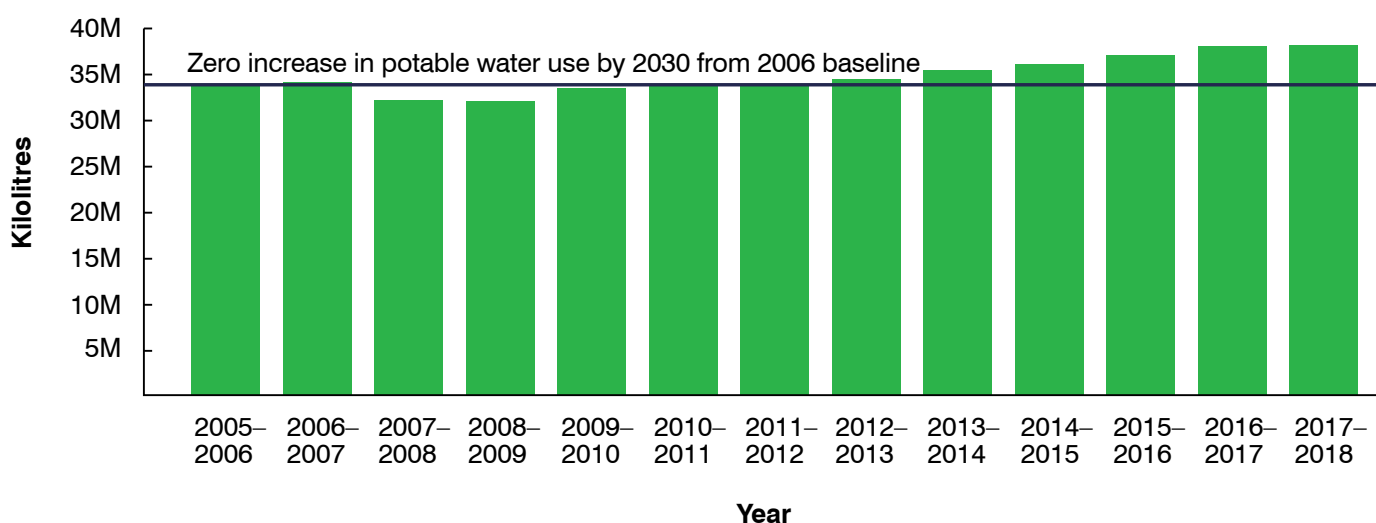
The City has a target of zero increase in potable water use by 2030 from a 2006 baseline across the local area. However, it is projected in Environmental Action 2016–2021: Strategy and Action Plan that water demand will rise by 30 per cent to 2030 from the 2006 baseline^{xliii}. Achieving a zero increase in potable water use in the built environment, while keeping the city green and cool, requires better efficiency and capturing and recycling alternative water sources, such as stormwater and wastewater. To achieve this target, the city has a number of actions to reduce potable water consumption in the Environmental Action 2016–2021: Strategy and Action Plan.

Without available and abundant alternative water supplies, it is challenging to maintain potable water consumption with a growing population and changing climate. We will need more water to green our city and improve resilience to increased heat and drought from climate change. Currently, flushing toilets, large-scale air conditioning plants and irrigation of parks represent about half the potable water consumed in the city^{xliv}.

A place-based approach, such as a recycled wastewater system, will reduce the consumption of potable water and diversify the city's water supply with a climate-resilient water source. In addition to implementing improved efficiency through the planning system, there are regulatory challenges outside the planning system including water pricing and regulation which affect the uptake of recycled water schemes.

Transitioning to a water-sensitive city will increase the city's resilience and future proof the city's water supply from Sydney's variable and changing climate and drought impacts. The City has introduced measures to reduce water consumption in new developments through the use of NABERS Water, higher BASIX Water scores and the provision of recycled water schemes. However, setting higher BASIX Water scores in residential development is limited to where incentives, such as height or floor space increases, are provided. Similarly, the use of recycled water in new developments, such as at Green Square Town Centre is currently dependent on voluntary planning agreements. The *Draft Central Sydney Planning Strategy* also identifies higher BASIX Water scores as a measure to reduce consumption.

Figure 75: Potable water consumption



Source: City of Sydney, 2016, Environmental Action 2016–2021: Strategy and Action Plan

Waste

The City has a long-term goal of zero waste, which is defined as greater than 90 per cent of waste diverted from landfill. Achieving this target will involve increasing recycling and re-use and encouraging innovation in the way waste and materials are managed. In the city, waste is generated at home, work, at the city's venues and events, and during construction of new buildings and infrastructure. This creates more than 5,500 tonnes of waste every day^{xiv} and contributes approximately 9 per cent to the city's total greenhouse gas emissions^{xvi}. The Leave Nothing to Waste Strategy and Action Plan 2017–2030 outlines various actions for waste management to help achieve the zero waste target.

Planning can support the target by influencing the design and construction of buildings and requiring that space is allocated for storage and separation of waste and recycling to maximise resource recovery. We also zone industrial areas with a buffer of business-only zones to allow for waste management and recycling facilities and help manage land use conflicts.

The City updated the Guidelines for Waste Management in New Developments in 2018 by including new requirements for allocating space for food waste storage and recycling in all new non-residential developments and single dwellings. The Guidelines also allocated more space for bulky goods and problem waste to reduce illegal dumping and increase recycling. The City is piloting a food waste collection program for residential developments including multi-unit residential housing and high-rise developments.

There are a number of challenges for waste and recycling management in the local area. There are no landfills or resource recovery facilities in the council area to manage waste and recycling locally. The City relies on a few depot stations, as well as commercially operated transfer stations to consolidate recyclables and waste before they are transferred by larger vehicles to resource recovery facilities outside the local area for processing. The ability for the City to meet its waste target cost effectively relies on commercial operators continuing to manage waste transfer and resource recovery facilities close to the local area.

To achieve its zero waste target, the City needs to collaborate with councils and the NSW Government to protect existing waste transfer stations and resource recovery facilities to ensure the continuity of recycling and support the development of a circular economy. The City also needs to continue to protect industrial land which allows for waste recycling and management opportunities for commercial operators.

Precincts

Precincts of a certain scale and mix of uses provide opportunities for sustainability innovation by pooling resources and sharing infrastructure. This can lead to greater sustainability, innovation, economic and social outcomes. They can also overcome issues relating to the cost and difficulty of implementation that may prevent an individual site from pursuing sustainability innovation. At a precinct level, sustainability initiatives can include distributed renewable energy generation, district heating and cooling (more sustainable and effective systems than heating and cooling individual buildings), recycled water schemes, organic waste to energy systems and electric vehicle charging stations.

The Central Park urban development project uses district heating, cooling and electricity for the commercial buildings on site, as well as hot water for the residential apartments. An onsite water recycling system minimises mains water demand by providing recycled water for non-potable uses. Recycled water from Central Park is also supplied to a nearby building being constructed at the University of Technology, Sydney.

Barangaroo uses district cooling, an onsite water recycling system and onsite renewable energy. The water recycling system supplies recycled water for toilet flushing and irrigation, while the onsite renewable energy generation is used to offset the energy consumed by the public spaces and the recycled water treatment plant.

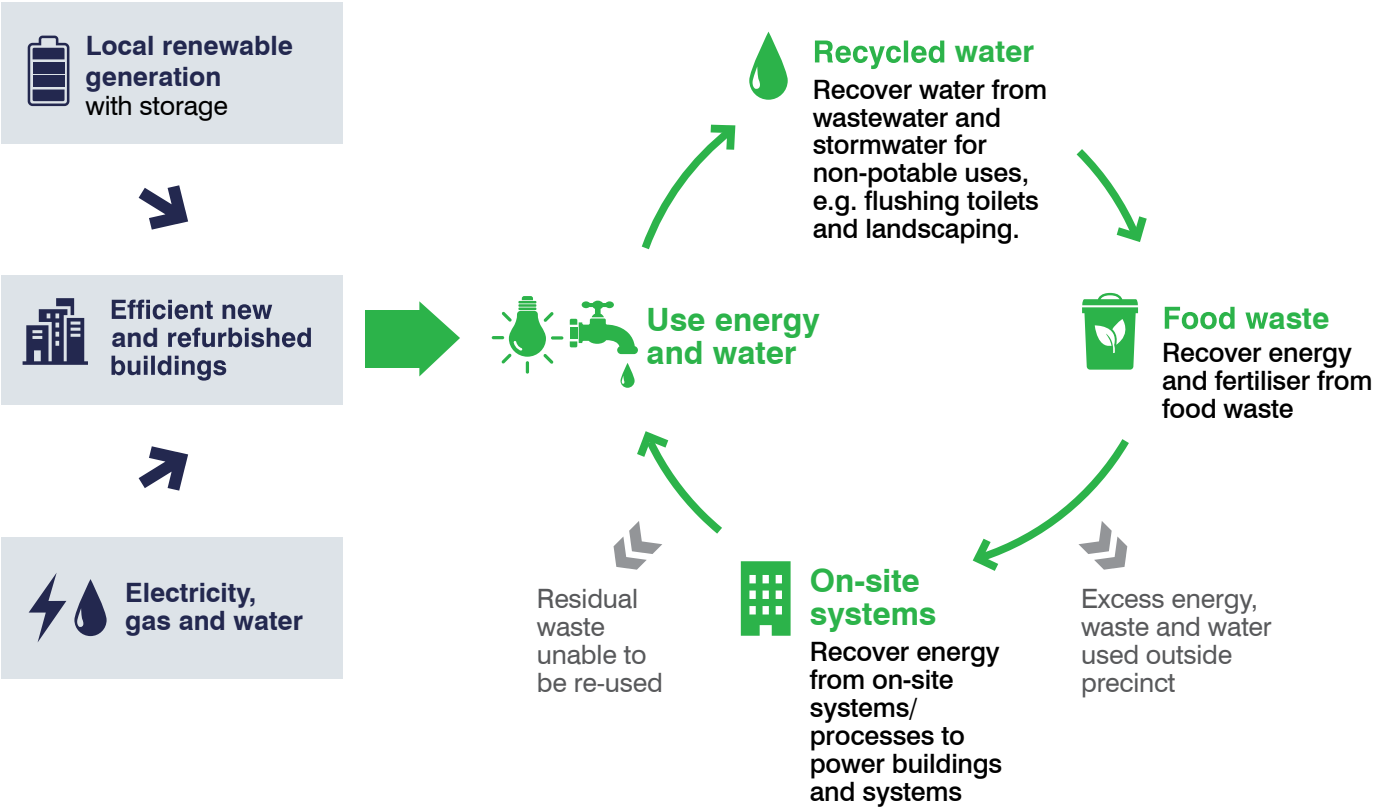
The City introduced precinct-scale sustainable water infrastructure at Green Square Town Centre. Households, community facilities, open spaces and businesses in the Town Centre have the capability to use treated stormwater for suitable non-potable end uses, including toilet flushing, clothes washing, car wash facilities, irrigation and cooling tower make-up water. Planning agreements and coordinated development at the Town Centre supported the roll-out of the infrastructure. A second water recycling scheme covering the greater Green Square area beyond the town centre is being investigated, although there are challenges with regulatory water pricing.

The Eastern City District Plan identifies an action to prepare low-carbon, high-efficiency strategies for any development which increases the total floor space by more than 100,000 square metres in any contiguous area of 10 or more hectares^{xlvii}. Any development of that size in the city will most likely be a State Significant Precinct led by the NSW Government. The City will collaborate with the NSW Government to assist the development of low-carbon and high environmental performance precincts in response to the Eastern City District Plan action. The City strongly advocates for sustainability outcomes to be implemented in State Significant Precinct projects such as the Bays Precinct and Waterloo Estate.

The lack of legislation, regulation and policy, as well as the pricing of energy, water and waste, limit the ability of all parties to implement shared sustainable infrastructure in the city. For example, there is no national energy policy and legislation does not allow the recovery of the upfront costs of sustainability infrastructure from owner corporations, even if the investment is beneficial. Additionally, pricing arrangements for recycled water systems often don't support the financial viability of this infrastructure. The City will continue to advocate for water pricing to support greater take-up of recycled water systems.

Another challenge to the implementation of precinct-scale sustainable infrastructure is the coordination of multiple developers and landowners to provide the economies of scale needed to support the infrastructure and make it feasible. Precinct-wide governance arrangements are needed to support precinct-scale infrastructure where multiple parties are involved.

Figure 76: Circular economy on a precinct scale



Actions

When will
it happen?

S2.1

Reduce greenhouse gas emissions by:

2021

- a) improving the energy efficiency and increasing the use of renewables in buildings and transport
- b) implementing the performance standard pathways framework to achieve net zero energy buildings
- c) advocating for increasing the minimum BASIX energy requirements
- d) Investigating passive design controls for all types of development, including measures such as shallow floor plates, external shading and natural light and ventilation.

S2.2

Onsite renewable energy generation is maximised by:

2021

- a) implementing renewable energy and battery storage systems in new and existing developments
- b) reviewing solar panel and battery storage controls, to increase implementation opportunities.

S2.3

Reduce the consumption of potable water by:

2021

- a) increasing water efficiency, rainwater harvesting and the use of recycled water in new developments
- b) reviewing existing controls, including investigating opportunities to implement NABERS Water requirements for non-residential buildings
- c) investigating the inclusion of controls for dual plumbing in areas with a recycled water supply.
- d) advocating for increasing the minimum BASIX water requirements.

S2.4

Continue to protect industrial land for waste recycling and management facilities, with buffers to manage land use conflicts, and collaborate with others to protect existing facilities and plan for future facilities.

2021

S2.5

Reduce the amount of waste going to landfill by:

Post 2021

- a) designing and constructing buildings to facilitate and maximise the re-use and recycling of resources
- b) considering the implementation of appropriate planning controls arising from sustainability pilot and education programs including reviewing waste management controls for multi-unit residential buildings after the completion of the organic food waste collection pilot.

Actions

When will
it happen?

S2.6

Design and construct buildings so the health and amenity impacts of waste are managed.

Post 2021

S2.7

Sustainable energy, water and waste infrastructure is increased by:

Post 2021

- a) encouraging the implementation of shared sustainable infrastructure in new precinct developments, including NSW Government projects
- b) investigating a suitable precinct size and density for the implementation of shared sustainable infrastructure
- c) investigating how the controls can support the transition to electric vehicles.

S2.8

Collaborate with the NSW Government and other stakeholders to deliver precinct scale energy, water and waste solutions and demonstration projects.

Ongoing

Priority **S3**

Increasing resilience of people and infrastructure against natural and urban hazards

In giving effect to *A Metropolis of Three Cities* and the Eastern City District Plan, this Local Priority delivers on the following planning priority:

- ▶ E20 – Adapting to the impacts of urban and natural hazards and climate change

Objective

- ▶ The city has the capability to respond to and recover from natural and urban hazards, while ensuring communities continue to thrive

Heatwaves, storms, drought and flooding are natural hazards that can impact the wellbeing of the community, the natural environment and the operation of infrastructure. Climate change can exacerbate these natural hazards. For Sydney in 2070, the changing climate will likely mean an increase in average temperatures and number of extreme heat days, variability in annual rainfall with an increase in extreme rain events, an increase in drought conditions and an increase in sea levels. The wellbeing of people can also be affected by urban hazards including noise, air and water pollution and soil contamination. These natural and urban hazards need to be managed to improve the city's resilience and protect liveability and productivity.

Research was conducted to understand the impact of climate change on the City and its community by 2070. *Adapting for Climate Change: A long term strategy for the City of Sydney (2015)* identifies the risks, opportunities and actions that the City and its communities should take to address natural and urban hazards. Other actions to respond to natural and urban hazards are identified in the City's Environmental Action 2016–2021: Strategy and Plan.

In 2016, the City of Sydney became a member of Resilient Sydney, which is a collaboration between councils in Greater Sydney, the NSW Government, business and communities. The aim of Resilient Sydney is to better understand the resilience challenges facing Sydney and identify ways to address them. Resilient Sydney identified the most pressing risks facing metropolitan Sydney in terms of shocks and stresses, including natural hazards. *Resilient Sydney – A Strategy for City Resilience (2018)* includes 5 directions and 35 actions to respond to the risks identified in the assessment. The actions will strengthen the City's capacity to address and respond to the chronic stresses which weaken the fabric of a city over time, and the acute shocks or sudden, sharp events that threaten a city.

Natural hazards

The average temperature in Sydney is expected to rise by 3.1 degrees by 2070 and 4.5 degrees by 2100. With increased temperatures, the instances of heatwaves will increase, with the days becoming frequently hotter and for longer periods. It is projected that heatwaves will become a 1 in 2 year event in 2070 instead of the current 1 in 100 year event^{xlviii}. Impacts will be exacerbated in parts of the city that currently experience the urban heat island effect. This is an issue as increased heat creates health problems, affects productivity and strains energy and transport infrastructure.

Urban heat island effect

The urban heat island effect is “localised warming due to the increase in the large amounts of paved and dark coloured surfaces like roads, roofs and car parks as a result of urban development. The sun’s heat is absorbed, not reflected, and causes the surface and ambient temperatures to rise. Anthropogenic heat production, such as the heat produced through car engines and air conditioners, also contributes to the urban heat island effect.” (Greening Australia).

Strategies to reduce the urban heat island effect include:

- retaining water in the landscape by increasing pervious areas
- installing vegetated stormwater management systems such as raingardens, irrigated parks, open spaces and water features
- increasing landscaping and canopy cover
- reducing energy use
- using more active and public transport
- using light-coloured, reflective or ‘cool’ materials.

The change in climate will also result in increased rainfall intensity and storm events^{xlix}. This may increase instances of flash flooding during storm events and may result in property and infrastructure inundation. However, while the rainfall intensity will increase, annual rainfall will still be variable and drought conditions will increase, which makes it challenging to maintain healthy vegetation and attractive open spacesⁱ.

Due to high urbanisation across the city there are not many natural creeks or open surface water bodies to accommodate stormwater. Generally, stormwater from frequent minor storm events is managed by conventional pits and pipe systems. In less frequent, but major rainfall events, stormwater in excess of the conventional systems travels along lower-lying areas, ultimately draining into Sydney Harbour and Botany Bay. The combination of steep and flat terrain, high-density residential, commercial and industrial areas has made areas susceptible to flash flooding.

The City has floodplain risk management plans for its eight catchments with a range of risk management measures to be implemented over time and in collaboration with NSW Government agencies.

Designing to mitigate damage from flooding can result in poor urban environments. This is particularly the case where street activity and retailing is desired as the requirements of flood planning can push ground floors up from the street, disconnecting the activity from people on the footpaths. The City will be updating its flood controls and ensure that they manage risks and create good places.

There is also the risk of sea level rise, which may have a flooding impact on the city’s low-lying areas like Woolloomooloo, with potential property and infrastructure inundation. This is not an immediate risk as current analysis identifies it will occur gradually over several decades. Given the existing development of these low-lying areas, an approach on how to address this hazard will need to be formulated. The City will also advocate to the NSW Government to take a policy position around sea level rise and flooding so that a consistent approach can be developed in Greater Sydney.

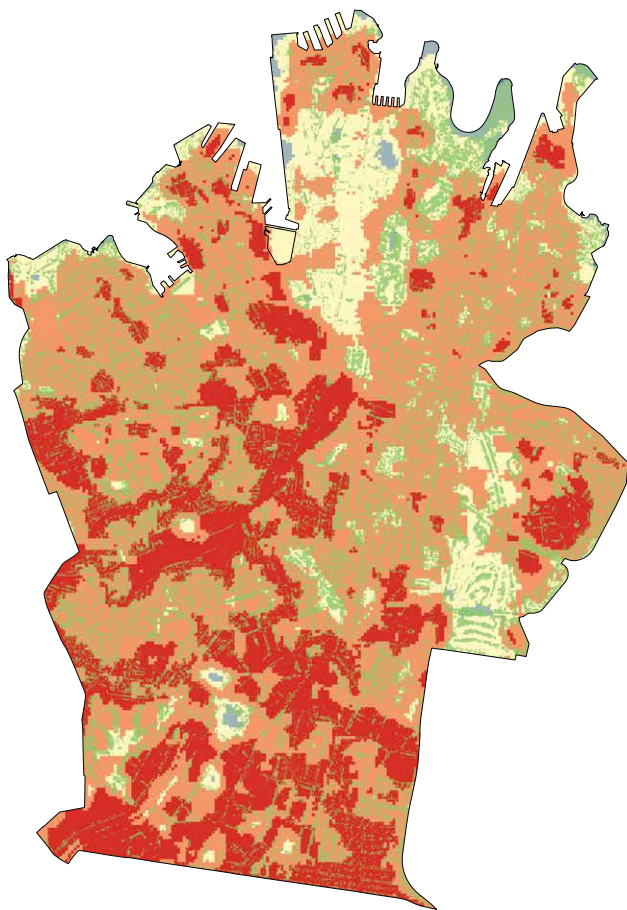


Figure 77: Urban heat at 10am during the summer of 2015-16

- Tree Canopy
- <0 degrees
- 0-3 degrees hotter than the surrounding non-urban vegetated area
- 3-6 degrees hotter than the surrounding non-urban vegetated area
- 6-9 degrees hotter than the surrounding non-urban vegetated area
- >9 degrees hotter than the surrounding non-urban vegetated area

Source: Commonwealth Scientific and Industrial Research Organisation (CSIRO)

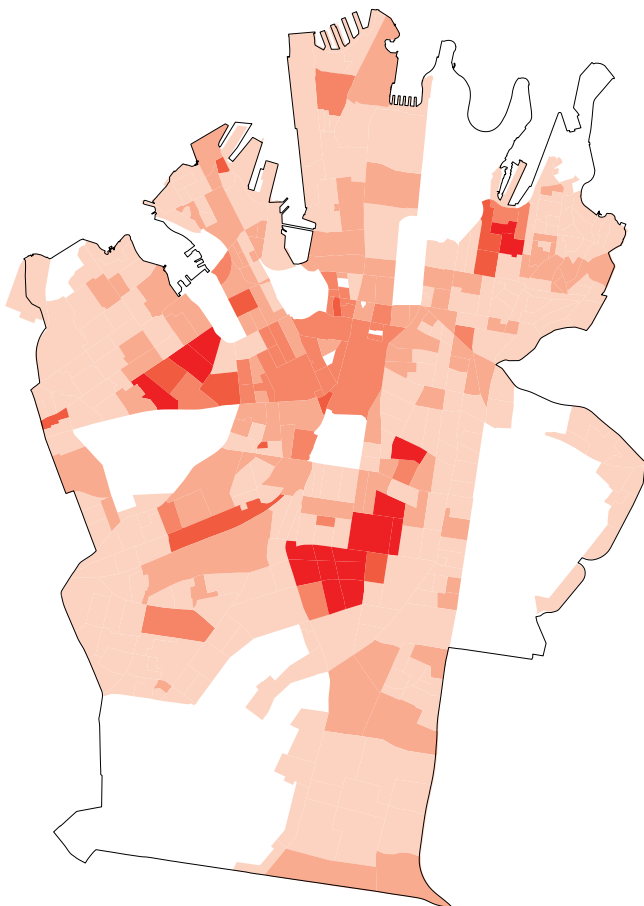
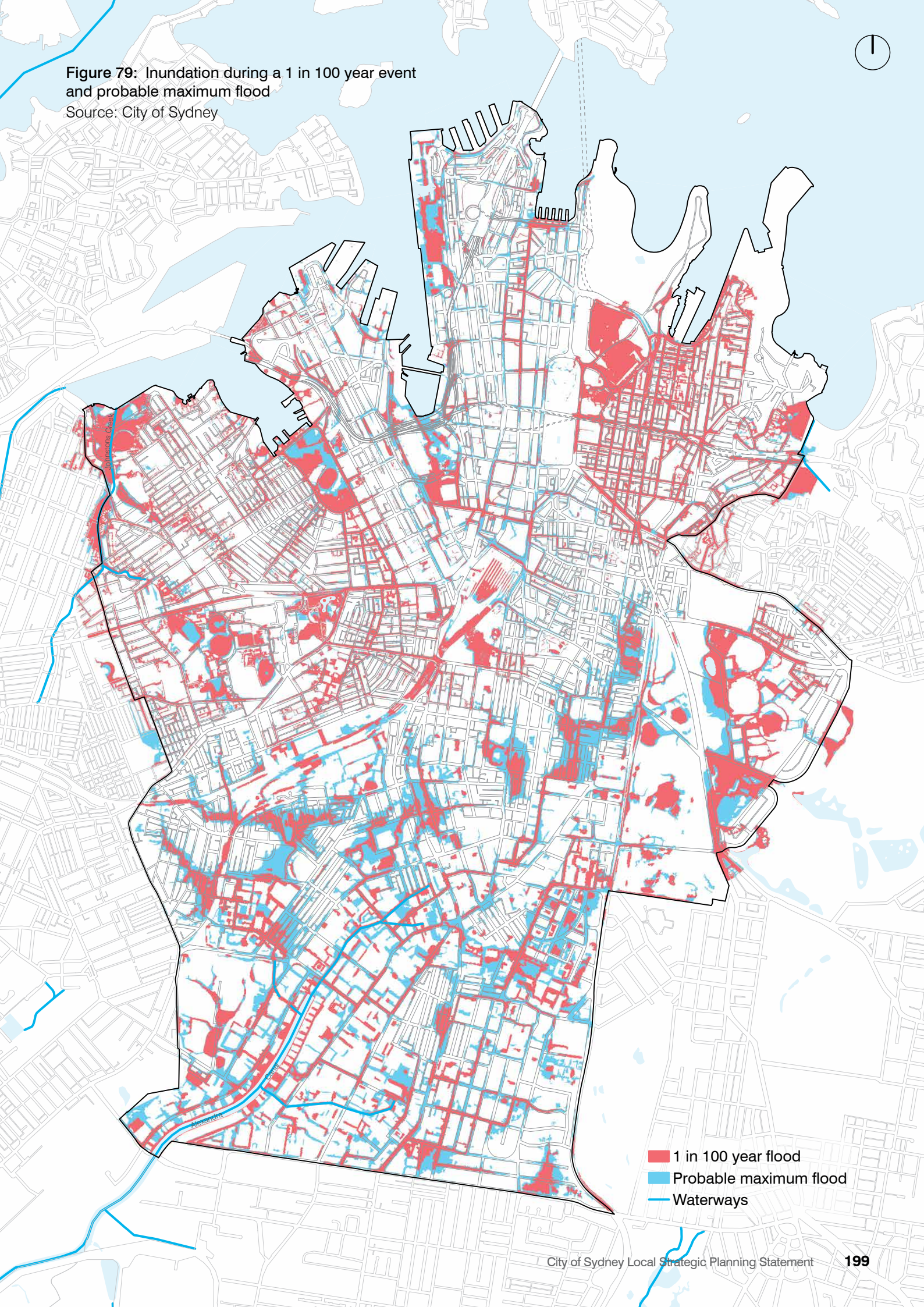


Figure 78: Vulnerability to heatwaves at 2016

- Least vulnerable
- Most vulnerable

Source: Australian Bureau of Statistics (ABS)

Figure 79: Inundation during a 1 in 100 year event and probable maximum flood
Source: City of Sydney



- 1 in 100 year flood
- Probable maximum flood
- Waterways

Changing climate could increase the strain on the city's infrastructure and services. Existing infrastructure, such as stormwater management systems, will need to respond to potential increases in natural hazards. Other infrastructure will be impacted by increased demand, such as energy infrastructure, which will be under pressure during heatwaves. The health system, will also see higher demand for services during heatwaves and from poor air quality, particularly from bushfires in the region.

Urban hazards

The health of the community is impacted by air pollution caused by vehicles, industrial uses and smoke from bushfires. Hospitalisations due to air pollution are expected to increase by at least 200 per cent by 2051, from a 1996–2005 baseline. To help reduce air pollution, the city is investigating opportunities for more efficient buildings, more sustainable transport and additional vegetation, which capture pollutants such as fine particles. Given air pollution is generated across and affects the wider Sydney area, a regional approach should be taken address the issue. This includes the NSW Government monitoring air pollution at street level. The City will investigate opportunities to reduce the impact of air pollution through planning controls.

Noise impacts occur in the city from traffic and conflicts between residential, night-time and productivity-related uses. The DCP contains controls for noise to ensure an appropriate level of amenity is maintained and to protect people from adverse health effects. The City is also planning to implement new noise planning controls to manage noise more fairly from performance venues by applying the agent of change principal. The City will also advocate to the NSW Government for the revision of the NSW Road Noise Policy, to ensure appropriate action is taken to maintain amenity when there is an increase in road noise.

The City continues to address water pollution by reducing litter, sediments, nutrients and heavy metals entering the waterways from stormwater run-off. This is through better waste management, street cleaning, stormwater treatment systems and through the separation and upgrade of combined sewerage and stormwater systems. Planning contributes to reducing water pollution through stormwater quality development controls.

Appropriate management of stormwater on development sites will reduce the volume of and pollution in stormwater run-off. This will improve the health of the waterways that receive stormwater and people's ability to safely use them for recreational activities such as swimming and fishing.

The city contains contaminated land due to historical land uses. For example, there are some soils in the inner city that may contain lead. There is some risk of contaminants being released through flooding and erosion, as well as through the vaporisation of volatile organic compounds during extreme heat events. The release of contaminants can impact the health of people and waterways. The risk is generally mitigated through the removal and/or capping of contaminated soil, as required by State Environmental Planning Policy (SEPP) 55 – Remediation of Land. The City is also exploring the development of a contamination policy to further manage risk associated with new development.

Figure 80: Natural and urban hazards



Actions

When will it happen?

S3.1

Resilience to natural and urban (including environmental) hazards is increased by:

Ongoing

- a) addressing climate change in planning through the assessment of risks and implementation of mitigation and adaptation measures
- b) managing risks and vulnerabilities associated with new developments, including impacted surrounding buildings, places and infrastructure
- c) investigating opportunities to reduce the impact of air pollution through controls
- d) advocating to the NSW Government to take a regional approach to address air pollution, including preparing a regional strategy and monitoring air pollution
- e) investigating controls to reduce the impact from heatwaves and the urban heat island effect
- f) updating floodplain management planning controls to manage risk and achieve good urban design outcomes
- g) developing an approach to address long-term sea level rise and flooding, including seeking NSW Government leadership to implement a consistent approach across affected areas
- h) improving noise controls to better manage noise, including from cumulative impact, to protect amenity and health while supporting activity
- i) advocating to the NSW Government for consistent local government approaches to natural and urban hazards.
- j) investigating the development of a contamination policy to manage risk associated with new development.