

City of Joondalup

DRAFT CLIMATE CHANGE PLAN

2023-2033

DRAFT

Acknowledgement of Country

Joondalup-ak ngala kaditj Noongar moort nidja Wadjak boodjar-ak kalyakool moondang-akkaaradj-midi. Ngala Noongar Moort wer baalabang moorditj kaadidjiny koota-djinanginy. Ngala Noongar wer Torres Strait Moort-al dandjoo koorliny kwaba-djinanginy. Koora, yeyi wer kalyakool, ngalak Noongar wer Torres Strait Birdiyawer moortkoota-djinanginy.

English translation

The City of Joondalup acknowledges the Traditional Custodians of this land, the Whadjuk people of the Noongar nation. We recognise the culture of the Noongar people and the unique contribution they make to the Joondalup region and Australia. We pay our respects to Elders past, present and emerging and all Aboriginal and Torres Strait Islander peoples.

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Acronyms

BOM	Bureau of Meteorology
CBD	Central Business District
CFCs	Chlorofluorocarbons
CO ₂	Carbon Dioxide
CO ₂ -e	Carbon dioxide equivalent
COJ	City of Joondalup
DWER	Department of Water and Environmental Regulation
EEP	Environmental Education Program
GHG	Greenhouse Gas
GIS	Geographic Information System
GJ	Gigajoules
GL	Gigalitres
IPCC	Intergovernmental Panel on Climate Change
KFA	Key Focus Area
kL	kilolitres
km	kilometres
kWh	Kilowatt hours
LED	Light emitting diode
LPG	Liquefied Petroleum Gas
LPS	Local Planning Strategy
MWh	Mega watt hours
NCOS	National Carbon Offset Standard
ppm	Parts per million
ppb	Parts per billion
PV	Photovoltaic
RCPs	Representative Concentration Pathways
SLR	Sea level rise
t	Tonnes
WALGA	Western Australian Local Government Association
YICM	Yellagonga Integrated Catchment Management

Executive Summary

Climate change is an important issue for local government. Climate change affects a number of areas that local government is responsible for including infrastructure, assets, health services, water management, emergency management, urban forest and the natural environment.

In 2090, it is expected that the City of Joondalup will be hotter and drier with less rainfall in winter and spring, however there is likely to be increased intensity of heavy rainfall events. There is likely to be more frequent hot days with the number of days over 35°C more than doubling as compared to 1981 - 2010.

Responding effectively to climate change involves preventing and reducing greenhouse gas emissions (mitigation) and adapting to climate change impacts as they occur (adaptation).

The Climate Change Plan 2023 - 2033 will provide guidance to the City's climate change activities over the next ten years and builds upon the achievements from the Climate Change Strategy 2014 - 2019.

The City's *Climate Change Plan 2023-2033* provides direction for the City's climate change mitigation and adaptation activities. The integration of climate change mitigation and adaptation into the one Plan will create efficiencies and opportunities for the City's climate change management activities. The Plan will have both a corporate and community focus.

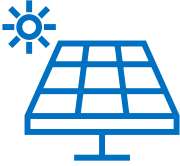

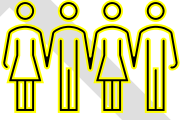
The Plan covers five key focus areas:

- infrastructure and assets
- public open space
- natural environment
- corporate responsibility and good governance
- community wellbeing.

In developing the Plan the City conducted a review of its energy use and emissions profile, assessed the risks posed to the City from climate change and developed climate change projects for each of the key focus areas.

To enable the City to monitor and measure its progress towards achieving the objectives of the Plan a number of targets have been set. Annual reporting against the targets will ensure both transparency and accountability to the community in the delivery of outcomes.

Implementation of this Plan demonstrates the City's commitment to further progressing its climate change adaptation and mitigation activities.

Corporate targets	
Reduce greenhouse gas emissions by 80 per cent below 2021/22 emissions by 2030/31	
Achieve net zero emissions by 2050.	
Community target	
Implement a minimum of two community mitigation initiatives per year.	

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PART 1- INTRODUCTION

1.1 CLIMATE CHANGE PLAN

Planning for the future impacts of climate change is an important issue for local government. Climate change affects a number of areas that local government is responsible for managing including infrastructure, assets, health services, water management, emergency management, urban forest and the natural environment.

Whilst local government plays a key role in addressing climate change, as the closest level of government to the community, there is a shared responsibility from state and federal government, industry, research institutions and the community. Continuing to reduce greenhouse gas emissions to mitigate the effects of climate change is an essential part of local government's role in managing the environment.

The effects of climate change will vary in scale and nature across the globe but will impact on various elements such as temperature, rainfall, intensity and frequency of extreme weather events, sea levels and ocean temperatures. Predicting the exact scale and nature of climate change at a local level and the resulting impacts is challenging and will depend on the response of local climate systems and the level of future greenhouse gas emissions.

The City of Joondalup is situated within the South West corner of Western Australia, a global biodiversity hotspot and an area particularly vulnerable to climate change. A considerable amount of climate-related research has focused on the South West of WA and some key findings include:

- There is projected to be a decrease in winter rainfall by up to 15 per cent by 2030 under all emission scenarios.
- Mean temperatures have increased by about 1.1°C since 1910, with the rate of warming higher since 1960.
- There will be an increase in the temperature and frequency of very hot days and heatwaves will get longer and more intense.
- There has been a distinct drying trend in the South West since 1970, particularly in autumn and early winter.
- There will be decreases in soil moisture and runoff because of increased water loss from plants and soils due to drier and hotter conditions.
- Sea levels will continue to rise.
- Coastal waters will continue to warm and oceans will become more acidic.¹

Expected climate change impacts within the region include (but are not limited to):

- coastal inundation and erosion as a result of sea level rise
- reduced water availability

¹ Department of Water and Environmental Regulation (2021)

- increased bushfire risk
- increased threats to habitats of flora and fauna
- increased damage to infrastructure
- health impacts particularly for those considered vulnerable.

Impacts from climate change will significantly affect the City’s operations, infrastructure, activities and services as well as its environment and community. The development and implementation of a Climate Change Plan will assist the City to minimise and prepare for these impacts whilst increasing community resilience.






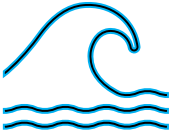
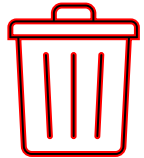



1.1.1 Purpose





The Climate Change Plan 2023-2033 will provide guidance to the City’s climate change activities over the next ten years. The Plan has a dual purpose:

- *Mitigation* – to continue to prevent or reduce greenhouse gas emissions to minimise the severity of climate change.
- *Adaptation* – to implement strategies to ensure the City can adapt to current and future impacts of climate change.

The City has identified a number of overarching objectives to guide implementation of the Plan, as shown in Table 1.

Table 1: Overarching objectives of the Climate Change Plan

Mitigation		Adaptation	
Reduce carbon emissions		Protect and enhance biodiversity	
Increase renewable energy		Increase canopy cover	
Environmentally sustainable design		Coastal hazard adaptation	
Minimise waste		Support community adaptation	
Increase resource recovery		Encourage sustainable behaviour change	

Mitigation	Adaptation
Sustainable living education 	Waterwise community 
Collaboration and advocacy 	Build resilience 

1.1.2 Scope

Climate change is a global, national and local issue. Climate change adaptation and mitigation is the responsibility of all spheres of government as well as businesses, the community and individuals. While the City recognises that local government has an important role in both mitigation and adaptation, it is also important to recognise that many strategies for mitigation and adaptation are outside of the statutory responsibility or influence of local government.

The scope of this Plan is limited firstly to the geographical boundary of the City, and secondly to the roles and responsibilities of the City as a local government authority.

In regard to mitigation, the City's responsibilities relate to reducing its own emissions and encouraging and supporting the community to reduce their emissions through education, behaviour change programs and planning and development processes. A more detailed summary of the City's role in climate change mitigation is provided in Table 2.

Table 2: City's Mitigation Scope

WITHIN SCOPE (Direct Influence)	
City facilities	The City aims to integrate principles of environmental sustainability into the design and construction of City owned buildings through the application of the <i>Environmentally Sustainable Design for City Buildings Policy</i> .
Energy use in City buildings	The City is responsible for and has direct control over the amount and source of energy used within its buildings. The City has entered a Power Purchase Agreement to purchase renewable energy for a percentage of the City's contestable energy sites, commencing on 1 July 2022.
City's fleet system	The City is responsible for and has direct control over the size and type of vehicles that comprise its vehicle fleet as well as the fuel sources used.
Urban Planning	The City has a limited direct regulatory role through the City's local planning framework, including the Local Planning Scheme, local planning policies and structure plans. The planning framework includes standards for development, which may influence energy use within the community. A review of Local Planning Scheme No. 3 is planned to commence in 2024.
Public Open Space and Streetscapes	Identifying areas for increased tree planting and irrigation reduction.
Local Coastal Vulnerability Assessment	The City has direct control over the identification of risks along the City managed areas of the coast and undertakes monitoring to determine the vulnerability of infrastructure and the natural environment within this zone.

WITHIN SCOPE (Direct Influence)	
Lighting within Public Open Spaces	The City has direct control (i.e. design, installation, maintenance) over some public lighting within City owned or managed land such as in parks, recreations reserves, specific street lighting locations and along paths.
Waste Management	The City is responsible for collecting and managing corporate waste and waste produced by households. Effective waste management i.e. recycling and diversion from landfill can reduce greenhouse emissions.
WITHIN SCOPE (Indirect Influence)	
Western Power owned Street lighting	As of 2020-21, approximately 85% of the City's street lighting emissions are from Western Power owned street lighting. While the City pays for the electricity to power the street lights the street light assets are owned by Western Power and therefore the City has limited ability to influence street lighting technology or maintenance schedules. The City's main role is likely to be an advocacy or partnership role.
Household energy use	The City can encourage energy efficiency, renewable energy, and use of sustainable transport by individuals and households but cannot directly control it.
Building and development	The City can encourage and support energy efficient and climate sensitive building and development but cannot directly control it. Minimum energy requirements are set out by the Building Code of Australia.
Waste production	The City can support and encourage the community to reduce their waste production but cannot directly control it.
OUTSIDE SCOPE	
Carbon Pricing	Responsibility of the Federal Government.
Energy Regulation and Supply	Responsibility of the State Government.
Public Transport	Responsibility of the State Government.
Metropolitan Planning	Responsibility of the State Government.

In regard to adaptation the City's responsibilities relate to preparing and adapting its own infrastructure, assets, operations and services for the impacts of climate change as well as managing the local environment. The City also has an indirect role in encouraging and supporting its community in becoming more resilient to the impacts of climate change.

There are a number of areas where local government and State Government have a shared role and/or overlapping responsibilities. This is particularly true for urban planning, where the planning framework is increasingly obligated to conform with State Government requirements and approvals. Planning decisions made by local government can be subject to review by the State Administrative Tribunal. There is also uncertainty in the extent to which local government or State Government could be held responsible for planning and development decisions that are later impacted by climate change. The City's adaptation scope is outlined in Table 3.

Table 3: City's Adaptation Scope

WITHIN SCOPE (Direct Influence)	
City infrastructure and assets	Identifying risks to the City's infrastructure and assets as a result of climate change and planning for the protection and/or adaptation of these infrastructure and assets.

WITHIN SCOPE (Direct Influence)	
City owned land	Identifying vulnerable City owned or managed land (particularly along the coast) and planning for its protection and/or adaptation.
Natural Areas	The City's environmental management activities in City owned and managed natural areas should be based on adaptive management principles to ensure its environmental management approach is protective and responsive to a changing climate.
City's water use	Reducing the City's water use in preparation for a drying climate through effective water management, reduced consumption and use of alternative water sources.
Increased use in services and facilities	Ensuring the City has adequate planning and resources in place for increased use of facilities and service levels.
Stormwater management	Ensuring the City's stormwater management systems are adequate for future climate scenarios.
Urban Planning	Identifying where the City's planning framework can respond to future climate change impacts.
WITHIN SCOPE (Indirect Influence)	
Preparing individuals and communities for climate change impacts	The health and wellbeing of individuals may be affected by climate change. The City can support and encourage residents to become more resilient to climate change impacts.
Adaptation of private property	The City has a limited indirect role in advising individuals and communities about climate change risk and adaptation for private property.
Emergency Management	The City partners with the State Government in the delivery of emergency management services.
Natural Areas	The natural environment (landscapes, habitats, flora and fauna) will respond and adapt to a changing climate. The City through its environmental management and adaptation activities may be able to indirectly support or facilitate this response of the natural environment.
OUTSIDE SCOPE	
Climate science research	There are many international, national and state based organisations that undertake climate science research.
Large scale coastal modelling	The Federal Government has undertaken some modelling of climate change impacts along Australia's coast. However gaps still remain in the availability of state wide coastal modelling data.
Adaptation of private property	Individuals are ultimately responsible for preparing and adapting their property for climate change.
Adaptation of State owned infrastructure and land	Responsibility of State Government.

1.1.3 Climate Change Plan Benefits

The Climate Change Plan has a number of benefits for the City, including:

- Providing an informed and strategic direction for the City's climate change management activities.
- Building upon and continuing the City's achievements in reducing greenhouse gas emissions.
- The City, its environment and its community will be more resilient, better prepared and better able to adapt to future climatic conditions.
- Early investment in preparation and adaptation planning will help the City avoid or minimise climate change impacts and reduce the costs of adaptation and impacts when they occur.
- Climate change mitigation and adaptation activities can create opportunities and provide benefits for the City not directly related to climate change i.e. reduced costs.
- Development and implementation of the Plan will enable the City to continue to demonstrate leadership in local government climate change mitigation and adaptation.

1.1.4 City of Joondalup Climate Change Actions

The City has been undertaking significant actions to address climate change since 2000, as shown in Figure 1.

The Climate Change Strategy 2014 - 2019 included a corporate mitigation target to reduce net greenhouse gas emissions by 5% per capita below 2012-13 emissions by 2018-19. Net greenhouse gas emissions for 2018-19 reduced by 16.1% per capita in comparison to the 2012-13 baseline year. The City's total greenhouse gas emission in 2018-19 decreased by 6,914 tCO₂-e or 30.2% from 2012-2013 emissions.

The City's total annual corporate emissions have remained consistent in recent years. The City's total net GHG emissions in 2021/22 were 13,313 tonnes CO₂-e (equivalent). The City's total annual corporate greenhouse gas emissions and per capita emissions from 2012/13 to 2021/22 are outlined in Section 2.2.2. The Climate Change Strategy 2014 – 2019 continued to be implemented until the new Climate Change Plan was developed in 2023.

A key example of where the City has undertaken a targeted and effective energy reduction program is the City's flagship recreation facility, Craigie Leisure Centre. Craigie Leisure Centre includes two indoor swimming pools, an outdoor swimming pool, gymnasium, court facilities and meeting rooms. See Figure 2 for information on how energy consumption and greenhouse gas emissions have been reduced at Craigie Leisure Centre.

CRAIGIE LEISURE CENTRE

The City has significantly reduced the amount of energy consumption and greenhouse gas emissions at Craigie Leisure Centre: the City's largest community recreation facility. Key initiatives include:

- Installation of a geothermal heating system to heat the swimming pools which saves approximately 933 tonnes of greenhouse gas emissions annually.
- Installation of solar hot water system and 39.96 kW solar photovoltaic system.
- Monitors have been installed at the Centre to enable Solar PV energy production to be tracked on an hourly, daily, weekly, monthly or annual basis.
- Regular energy audits and energy efficiency improvements.
- Installation of pool blankets on external pools to reduce water heating costs.
- Staff awareness and behaviour change programs.

Craigie Leisure Centre has been part of the Waterwise Business Program since 2012, was endorsed as a Waterwise Aquatic Centre in 2014 and has retained endorsement to the present. Craigie Leisure Centre achieved endorsement as a Gold Waterwise Aquatic Centre in 2021/22 and 2021/22 for demonstrating best practice water management in an Aquatic Centre.



Figure 2: Case Study – Craigie Leisure Centre

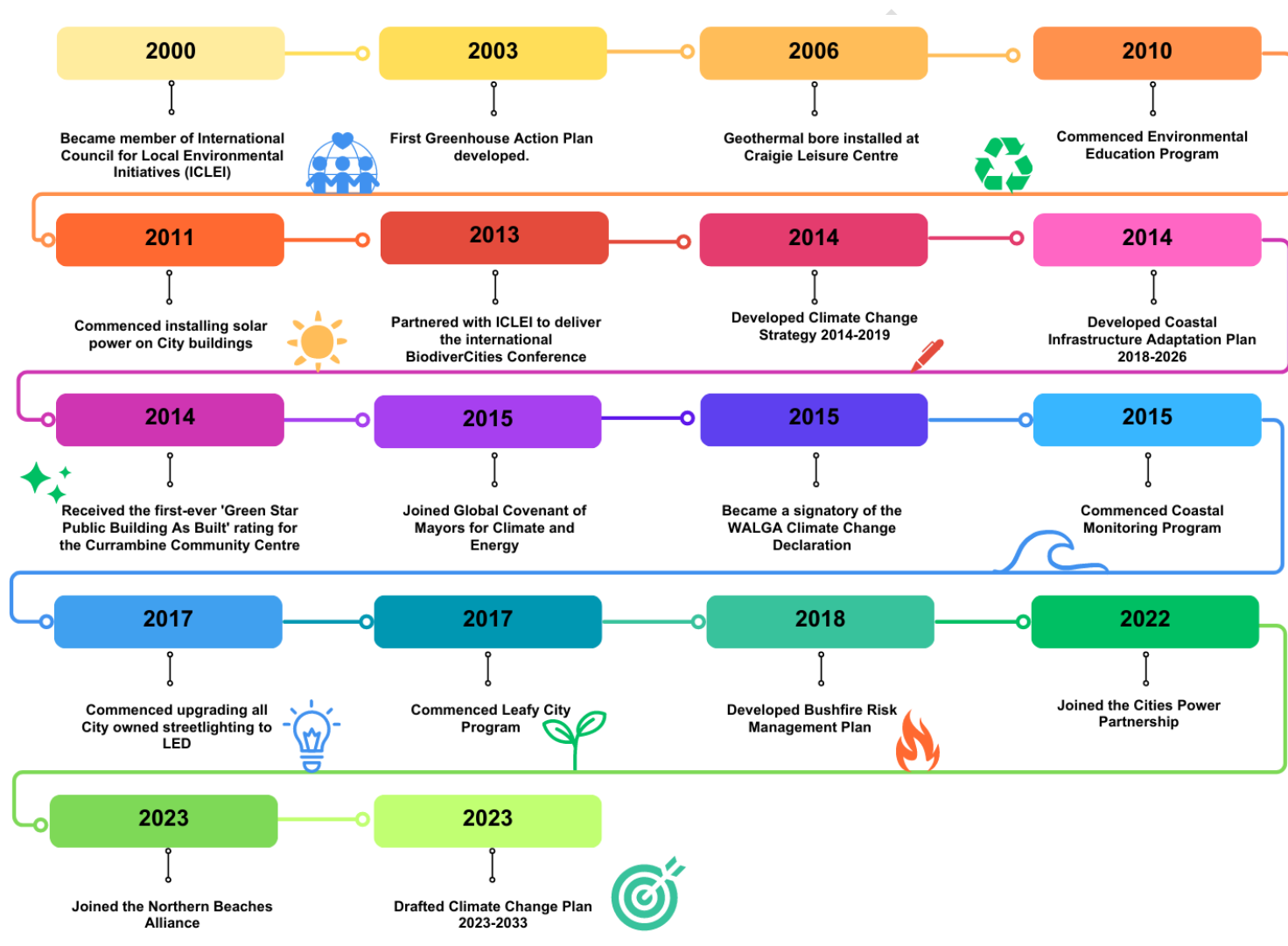


Figure 1: City of Joondalup Climate Change Actions Timeline

1.1.5 Our City

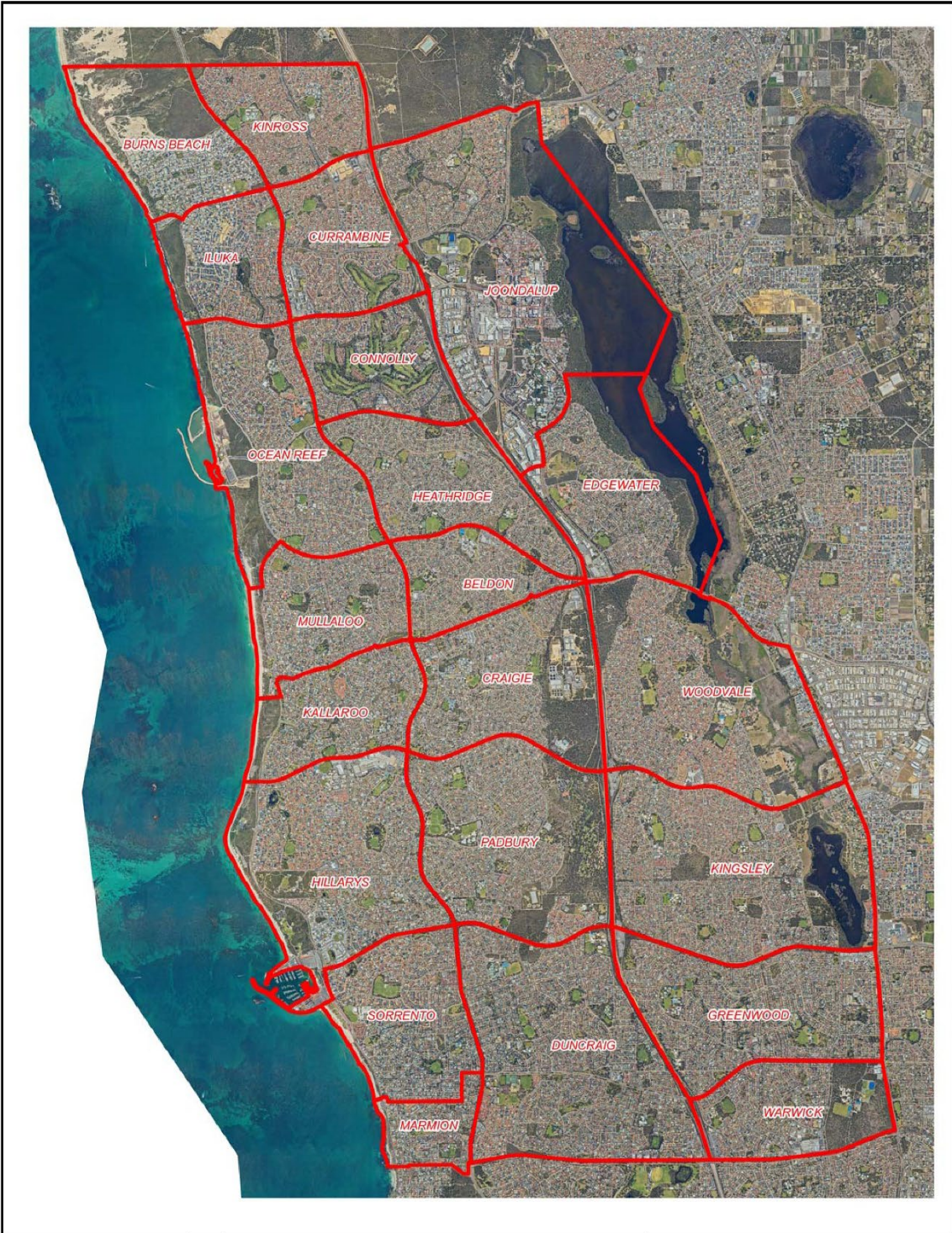
Located 26 kilometres north of Perth's central business district, the City is the third largest local government in Western Australia by population with 165,075 living in the City in 2021. The City covers an area of 96 square kilometres which encompasses a diverse range of natural areas including 17 kilometres of coastal foreshore from Marmion to Burns Beach, a chain of wetlands and a variety of bushland ecosystems. An aerial map of the City is shown in Figure 3.

Joondalup, derives its name from the Whadjuk people, the original inhabitants of the area from the family group of Yellagonga, a prominent Aboriginal elder highly regarded in Noongar culture. The Noongar word for Joondalup is *Doondalup*, meaning 'the lake that glistens.'

Joondalup is situated in Mooro country, which incorporates land as far as Moore River, Ellenbrook in the east, the sea to the west and the Swan River to the south. Prior to colonisation, Lake Joondalup and Goollelal provided a rich supply of food including a hunting ground for water birds and turtles and inspiration for Noongar spiritual and ritual beliefs and practices.

Climate change threatens cultural heritage and Aboriginal Australian's ongoing connection to Country. Traditional Environmental Knowledge has significant capacity to make Australia more resilient to the climate crisis. Engaging with Aboriginal people regarding climate change and connection to Country is important to not only prepare for our future, but to support the overall goal of reconciliation.²

² Williamson (2022)




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Figure 3: Aerial map of the City of Joondalup

1.2 MITIGATION AND ADAPTATION

This Plan has the dual purpose of mitigation and adaptation. Combining mitigation and adaptation within the same Plan is considered to be best-practice and will enable the City to:

- Demonstrate to the community that the City is committed to both climate change mitigation and adaptation;
- Identify projects that will have benefits for both mitigation and adaptation; and
- Maximise funding opportunities.

Climate change mitigation, climate change adaptation and the relationship between the two is described in more detail below.

1.2.1 Mitigation

Climate change is occurring on a global scale as a result of increasing concentrations of greenhouse gases in the atmosphere. This increased concentration of greenhouse gases has resulted in a warming of the atmosphere which has and will continue to have a wide ranging effect on weather patterns and climate systems.³

It is stated in the IPCC's Sixth Assessment Report (2023) that:

“Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1 °C above 1850-1900 in 2011-2020. Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals.”⁴

Climate change mitigation refers to direct action to reduce emissions of greenhouse gases and decrease the severity of climate change. The more greenhouse gases that are emitted (both presently and in the future) the greater the scale of future climate change and the associated impacts.

1.2.2 Adaptation

The concentration of carbon dioxide (one of the key greenhouse gases) in the atmosphere has increased by 50% since the beginning of the industrial revolution². This level of concentration is such that even if all emissions were to cease now, some climate change would still occur due to the level of past emissions.

The realisation that the world will be subject to a certain amount of unavoidable climate change has led to a focus on climate change adaptation. Climate change adaptation refers to changes in human or natural systems in response to actual or expected climate changes in order to minimise impacts or increase beneficial opportunities. Adaptation can be reactive or proactive.

³ World Economic Forum (2021)

⁴ IPCC (2023)

The greater the degree of proactive adaptation that occurs in expectation of specific climate changes, the less impact that climate change will have on human and/ or natural systems i.e. the expected climate change will still occur but the impact from it may be less⁵.

1.2.3 Relationship between Mitigation and Adaptation

While mitigation addresses the causes of climate change, adaptation addresses the effects of climate change. Mitigation and adaptation are inter-related. The more mitigation that occurs i.e. reduction of emissions, the less severe the climate change and the less adaptation will be required. Therefore, the City needs to adapt for unavoidable climate change while doing its part to reduce emissions to minimise the severity of climate change.

While adaptation and mitigation have two distinct purposes, single strategies can address both mitigation and adaptation. For example, the installation of photovoltaic cells on City buildings is relevant for both mitigation and adaptation. The photovoltaic cells generate solar energy which does not emit greenhouse gases contributing to a reduction in the City's greenhouse gas emissions (i.e. mitigation). This also contributes to making the City more resilient to future energy price increases as the City is required to purchase less mains electricity for the building (i.e. adaptation).

1.3 STRATEGIC CONTEXT

The City acknowledges that the Climate Change Plan does not operate in isolation. Therefore the ten year Plan has been developed to align with the local, state and federal planning context.

1.3.1 Local

Integrated Planning Framework

The City operates under an *Integrated Planning Framework*; this Framework ensures that the City's strategic priorities align to its planned activities and resourcing requirements. The Framework also builds in reporting requirements to ensure transparency and the demonstration of planned achievements.

The nature of climate change mitigation and adaptation, and the wide scope of impacts expected from a changing climate, means that effective climate change management will need to be incorporated across the *Integrated Planning Framework* as shown in see Figure 4.

⁵ IPCC (2007)

Integrated Planning and Reporting Framework

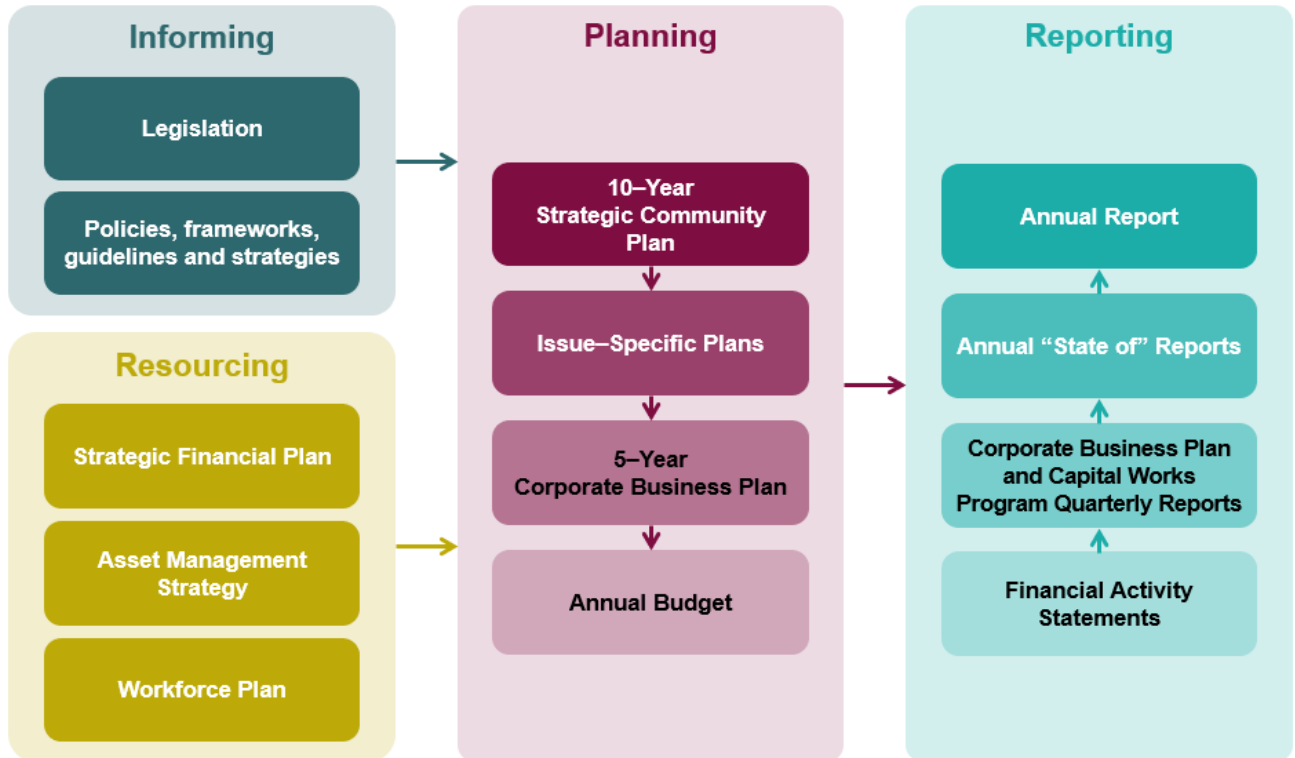


Figure 4: The City’s Integrated Planning Framework

Joondalup 2032: Strategic Community Plan 2022-2032

The Strategic Community Plan, *Joondalup 2032*, sets out our strategic direction for the City for the next 10 years. The Plan focuses on five key themes to guide a shared vision for the future of the City. The Environment theme includes the following goal:

We have a beautiful natural environment which we care for and protect. We demonstrate best-practice in sustainability and environmental management. Our community is actively involved in conservation and sustainability initiatives and we share responsibility for preserving our natural assets for future generations.

Joondalup 2032 also includes the following outcomes related to climate change:

- 2-1 Managed and protected - You value and enjoy the biodiversity in local bushland, wetland and coastal areas.
- 2-2 Clean and sustainable - You are supported to minimise waste and live sustainably in a clean environment.

- 2-3 Responsible and efficient - You benefit from a responsible and efficient use of natural resources.
- 2-4 Resilient and prepared - You understand and are prepared for the impacts of climate change and natural disasters.

Strategic Environmental Framework

The City's Climate Change Plan is connected to other environmental plans and strategies that help address the City's climate risks and emission reduction priorities, as outlined in Figure 5 below.



Figure 5: The City's Strategic Environmental Framework

The Environment Plan 2014 – 2019 is key to the strategic environmental framework and is the primary strategic environmental plan for the City. The Environment Plan provides strategic direction for broad environmental management across the City. The objective of the Environment Plan is:

To provide ongoing leadership in adaptive environmental management to ensure the sustainable use of natural resources and the conservation and enhancement of the City's natural assets for future generations.

Beneath the Environment Plan are a number of issue specific Strategies and Plans, including the City's Climate Change Plan. The City is currently developing a new Environment Strategy which is aimed to be finalised in 2023.

1.3.2 Regional – Western Australian Local Government Association

The Western Australian Local Government Association (WALGA) develops climate change policy and projects, liaises with local governments to ascertain key climate change concerns and priorities and advocates to other spheres of government on behalf of the Local Government sector.

WALGA Climate Change Policy

WALGA has developed a series of projects to assist local governments to mitigate greenhouse gas emissions and prepare for the impacts of climate change. The City of Joondalup is involved in a number of these projects including the WALGA Climate Change Declaration.

At the September 2013 City of Joondalup Council Meeting, Council endorsed the City becoming a signatory to the WALGA Climate Change Declaration.

The WALGA Climate Change Declaration recognises that a collaborative approach is required to adapt to the impacts of climate change. The declaration strengthens local government's advocacy position by articulating a shared political commitment across the sector. As of April 2023, 51 Western Australian local governments are signatories to the WALGA Climate Change Declaration.

Signing the Declaration demonstrates the City's political commitment to climate change management and acknowledges the impacts of climate change and the importance of developing locally appropriate climate change management strategies.

The development of this *Climate Change Plan* will ensure that the City continues to meet its commitments under the WALGA Climate Change Declaration.

1.3.3 State

In November 2020, the Western Australian Government released the *Western Australian Climate Policy*, setting out a plan to reduce greenhouse gas emissions and build climate-resilient communities. The Policy includes a net zero by 2050 target for government operations. In June 2022, a whole of government target of an 80% reduction in emissions below 2020 levels by 2030 was adopted. The Policy recognises the need to work with local governments to help communities adapt to the impacts of climate change. A core commitment of the WA Climate Policy is the development of Sectoral Emissions Reduction Strategies (SERS) which are being developed in 2023 to provide emissions pathways for WA with tangible actions for reducing emissions consistent with the State Government's target of net zero emissions by 2050. The SERS are likely to have implications and may provide opportunities for the City as they address all major sources of emissions from electricity, industry, transport, buildings, agriculture, waste and land use.

In December 2022, the State Government released its directions paper, 'Climate Resilient WA: Directions for the State's Climate Adaptation Strategy', followed by a 'Climate Adaptation Strategy' in 2023. The State Government is also planning on delivering a Sector Adaptation Plan Program for WA to identify sector-specific climate impacts and priority adaptation actions.

The State Government also released a State Electric Vehicle Strategy for WA in 2020 to prepare for the transition to low and zero emission electric vehicles and maximise benefits to WA.

1.3.4 National

At the national level, the Australian Government's National Climate Resilience and Adaptation Strategy, released in 2021, sets out how government, business and communities can work together to prepare, manage and adapt to the impacts of climate change.

In September 2022, the *Climate Change Act 2022* was legislated, bringing into effect a net zero by 2050 target and a 2030 target to reduce greenhouse gas emissions by 43% below 2005 levels.

The Australian Government also launched the Powering Australia Plan in 2022 that focuses on job creation, cutting power bills and emission reductions through boosting renewable energy.

A focus on electric vehicles in the national Electric Vehicle Strategy 2023 supports further emissions reductions by increasing the supply, infrastructure and uptake of electric vehicles nationally. One of the key objectives of this strategy is to reduce the cost to Australians of purchasing and running their vehicles. To achieve this, the government passed the Electric Car Discount Bill 2022 which will significantly reduce the cost of electric cars by exempting some vehicles from import charges and fringe benefits taxes.

1.3.5 International

At the international level, the United Nations Framework Convention on Climate Change (UNFCCC) was established in 1992 to support the global response to the threat of climate change. The UNFCCC has 198 member countries and its main objective is to stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a timeframe which allows ecosystems to adapt naturally and enables sustainable development.

The UNFCCC is the overarching treaty governing the 2015 Paris Agreement and the 1997 Kyoto Protocol.

In 2015, Australia and 195 other Parties signed the Paris Agreement, a legally binding international treaty on climate change that has a goal of limiting global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels. To reach this goal, countries submit a greenhouse gas emission reduction commitment, known as nationally determined contributions (NDCs). The Australian Government set an NDC to reduce its emissions to 43% below 2005 levels by 2030.

The Kyoto Protocol is an international agreement adopted under the UNFCCC that expired in 2020 and included binding national targets for developed countries and flexible market mechanisms, based on the trade of emissions permits.

By establishing targets, the City can monitor and measure progress towards achieving the objectives of the Climate Change Plan. It also ensures both transparency and accountability in demonstrating the delivery outcomes.

1.4 COMMUNITY CONSULTATION

Climate Change Survey







The City conducted a Climate Change Survey in June and July 2021 to consult with the community about the key expectations around the City's role in responding to the impacts of climate change and inform the development of the Climate Change Plan. The Survey collected 1,267 responses, 95% of which reside within the City. The consultation process provided an

opportunity for community members to provide feedback and guide the direction of the City's actions to address climate change.




What the community said:

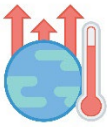


When asked "How important is the issue of climate change to you personally?", a total of 49% of participants said that the issue of climate change is extremely important to them.

When asked "What sort of greenhouse gas emissions reduction target do you think the City of Joondalup should pursue?", a total of 66% of the participants supported an ambitious emissions reduction target, highlighting the importance to the community of strong climate action. The tables below highlight other community responses to questions in the Climate Change Survey.

How concerned are you about the impacts of climate change?		
 <p>36% of participants are extremely concerned about rising sea levels and coastal erosion</p>	 <p>37% of participants are extremely concerned about more hot days and heatwaves.</p>	 <p>47% of participants are extremely concerned about reduced rainfall potentially leading to water shortages and more droughts</p>
 <p>38% of participants are extremely concerned about more frequent and extreme weather events (e.g. severe storms and floods).</p>	 <p>45% of participants are extremely concerned about harsher and longer fire seasons/bushfires</p>	 <p>54% of participants are extremely concerned about biodiversity loss (e.g. native trees, plants and animals).</p>

How much are you doing personally to reduce greenhouse gas emissions?		
 <p>56% of participants said they are using solar panels or solar hot water.</p>	 <p>40% of participants said they are using active travel methods such as bike riding, walking and public transport rather than driving.</p>	 <p>32% of participants said they were recycling.</p>

What should the City do to mitigate climate change?		
 <p>51% of participants think the City should install renewable energy devices on City owned facilities and buildings (e.g. solar panels).</p>	 <p>40% of participants think the City should increase energy efficiency of City owned facilities, building and lighting.</p>	 <p>34% of participants think the City should provide funding/incentives to support the community to reduce their greenhouse gas emissions.</p>

What should the City do to adapt to climate change?		
 <p>69% of participants think the City should plant trees in urban areas to reduce the urban heat island effect.</p>	 <p>64% of participants think that the City should conserve bushland areas to maintain biodiversity within a drying climate.</p>	 <p>33% of participants think that the City should encourage landowners to retain trees on private properties.</p>

Strategic Community Reference Group

The City's Strategic Community Reference Group meets an average of four times per year and consists of a maximum of two community member representatives from each of the six wards, two youth representatives, a maximum of four Elected Members nominated by Council and one Elected Member nominated as Presiding Member.

The City's Strategic Community Reference Group met in August 2021 to consider the strategic approach to climate change and identify opportunities to inform the review of the *Climate Change Strategy 2014 – 2019*. Participants agreed that the climate change discussion had evolved over the last five years and the concept of climate change was no longer debatable with most participants supportive of the City setting an ambitious carbon emissions reduction target and wanting the City to demonstrate leadership and action in climate change mitigation and adaptation.

Participants indicated that the top three initiatives that they would like the City to upon and prioritise over the next 10 years with the following being voted highest:

- Monitor and report on community emissions and implement initiatives to encourage emission reductions.
- Set an ambitious emission reduction target (i.e. net zero by 2050) as well as setting an interim emission reduction target for 2030 that aligns.

- Include environmentally responsible criteria in the City's procurement practices and governance.

1.5 CORPORATE EMISSION TARGETS

Corporate mitigation target

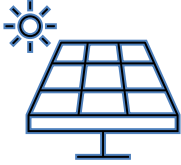


The City's corporate mitigation targets aligns with the State government emissions targets and have been developed through a review of the City's energy use and emissions profile and giving consideration to the City's scope to make energy efficiency and energy reduction improvements (see Table 4). The City has already achieved a 17% reduction in emissions in 2021/22, as compared to 2012/13, and many of the more easily achieved improvements have already been made. Whilst there is still scope for improvement, these initiatives are more challenging and often have larger budgets associated with implementation.

Under the Climate Change Plan a Corporate mitigation target of an 80% per cent reduction in greenhouse gas emission has been established by 2030. The City's most recent energy consumption data of 2021/22 will be used as the baseline year. The final implementation year of the Climate Change Plan, 2030/31, is the target year. The target relates to net emissions rather than total emissions and therefore includes any offsets or renewable energy that the City purchases (see sections 2.3.4 and 2.3.5 for a more detailed discussion of renewable energy, net emissions, offsets). The City's net greenhouse gas emissions in 2021/22 were 13,313t CO_{2-e}. The City will need to reduce its emissions by 1,664t CO_{2-e} per year to reach this target by 2030.

Community mitigation target

The City and the community have a shared responsibility to address climate change and the City can raise awareness and support the community in regard to energy conservation and energy efficiency. There is limited energy and greenhouse gas data available for the community, therefore the City's community mitigation target is based on implementing a minimum number of community mitigation projects / events per year (see Table 4).

Table 4: Corporate and community mitigation targets

Corporate targets	
Reduce greenhouse gas emissions by 80 per cent below 2021/22 emissions by 2030/31	
Achieve net zero emissions by 2050.	
Community target	
Implement a minimum of two community mitigation initiatives per year.	

DRAFT

PART 2 - MITIGATION

2.1 GREENHOUSE EMISSIONS

Greenhouse gases occur naturally in the atmosphere where they absorb some of the sun's energy and re-radiate it back into the atmosphere (the remainder of the sun's energy is reflected back into space). This process keeps the earth at a temperature suitable for human life and is called the greenhouse effect. Greenhouse gases include water vapour, carbon dioxide (CO₂), methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs). The enhanced greenhouse effect is where increasing concentrations of greenhouse gases in the atmosphere result in an increased warming of the atmosphere.

Scientific research has established that this increased concentration of greenhouse gases is a result of human activities. The most recent report from the International Panel for Climate Change (IPCC) states '*Human induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability.*'⁶

The activities that contribute the most greenhouse gas emissions are:

- burning fossil fuels - such as coal, oil and natural gas in manufacturing processes and to create the energy to run homes, cars, business, industry etc.
- cement manufacturing
- large scale agriculture – which creates methane
- land clearing – which releases the carbon dioxide stored in the trees and vegetation.

The main contributor to climate change is CO₂, and accounts for about two thirds of greenhouse gases produced by human activities. Methane is not as abundant as CO₂, but is 21 times more effective at trapping heat making it an important greenhouse gas.

2.1.1 Emission Scenarios

The extent of future climate change is dependent upon the amount of greenhouse gases that continue to be emitted into the atmosphere. Government policy, technological development and population increases can all affect the amount of future greenhouse gas emissions. In order to account for this, emission scenarios are used to outline likely levels of greenhouse gas emissions under different assumptions of driving forces i.e. demographic and socioeconomic development, and technological change. These greenhouse concentrations are then used in climate modelling to predict different climate scenarios.

Human induced warming reached approximately 1°C above pre-industrial levels (1850-1900) in 2017, increasing at 0.2 °C per decade.⁷ These temperature rises have already resulted in

⁶ IPCC (2022a)

⁷ IPCC (2022a)

'profound alterations to human and natural systems, including increases in droughts, floods and some other types of extreme weather; sea level risk; and biodiversity loss.'⁷

For the Fifth Assessment Report of IPCC, the scientific community has defined a set of four new emission scenarios, called Representative Concentration Pathways (RCP). They include one mitigation scenario where 'aggressive' action has been taken to reduce emissions, two different scenarios where some action is taken to reduce emissions, and one scenario where no extra action is taken to reduce emissions and emissions continue to rise at current rates. The use of emission scenarios clearly demonstrates the impact that not mitigating future greenhouse emissions will have on temperature and sea level rise.

2.1.2 Reducing Greenhouse Emissions

It is widely agreed that if global temperatures were to rise by more than 1.5°C above pre-industrial levels the risks will be unacceptably high. Limiting global warming to '1.5°C or less is expected to substantially reduce the probability of extreme drought, precipitation deficits, and risks associated with water availability.'⁸ If emissions continue to track at the top of the IPCC scenarios, Western Australia's temperatures could rise by around 2°C by 2050.⁹ If global temperature rise is to be stabilised, substantial and sustained reductions in global carbon emissions will be required. The longer the delay in cutting emissions the greater the scale of change will be¹⁰.

The IPCC reports with *high confidence* that global greenhouse gas emissions are projected to peak between 2020 and at the latest before 2025 in global modelled pathways that limit warming to 1.5°C with no or limited overshoot and in those that limit warming to 2°C and assume immediate action. In both the 1.5°C and 2°C modelled pathways, rapid and deep greenhouse gas emissions follow throughout 2030, 2040 and 2050. Without a strengthening of policies beyond those that are implemented by the end of 2020, greenhouse gas emissions are projected to rise beyond 2025, leading to a median global warming of 3.2°C.¹¹

Substantial and sustained reductions will require broad-based action across many sectors of the global economy. There is no single answer to reducing emissions; rather emissions need to be reduced from a variety of sources in a variety of ways. This may include:

- Using renewable energy (solar, wave and wind).
- Increasing energy efficiency in industry and manufacturing processes.
- Using alternative fuels for lower emission transport, including electric vehicles.
- Improving agricultural practices for lower emissions.
- Decreasing deforestation.

⁸ IPCC (2022a)

⁹ Department of Water and Environmental Regulation (2021)

¹⁰ Climate Council (2013)

¹¹ IPCC (2022b)

- Removing emissions from the atmosphere through carbon sinks – this is mostly through reforestation as trees absorb carbon dioxide from the atmosphere through the photosynthesis process.

Substantial and sustained reductions will require all spheres of government, business and individuals to contribute to mitigation. Local government alone will not be able to mitigate climate change; however, it is important that local government takes action in mitigating its own emissions and supports its residents to mitigate their emissions.

2.2 CORPORATE ENERGY USE AND EMISSIONS PROFILE

The City uses energy to power its buildings, community facilities, street lights, public open space lighting, and light and heavy fleet vehicles.

The City uses traditional energy sources which produce greenhouse emissions such as electricity and natural gas, and petrol, and diesel in its fleet vehicles. The City also uses energy from renewable sources (photovoltaic cells, solar hot water systems and geothermal heating) which produce no greenhouse emissions, as well as purchasing renewable energy.

It is important for the City to monitor and understand its energy use and greenhouse gas emissions in order to manage and minimise the impact. The City currently monitors its energy use and greenhouse emissions through a subscription to Azility. Azility collects energy use data from the City's utility providers and uses it to provide the City with quarterly and annual reports. Reports are provided on greenhouse gas emissions, street lighting, fleet and energy (gas and electricity). Azility also provides individual property reports for the City's buildings. Data obtained through the program informs the delivery of the City's Capital Works Program and is utilised in the City's Annual Report and State of the Environment Report to inform the community on the City's environmental performance.

A summary of the City's energy use and greenhouse gas emissions is provided below.

2.2.1 Energy Use by Sector

The City's total annual corporate energy use in 2021/22 was 70,397 GJ. This energy was used across four main sectors:

- Electricity (Facilities) - Electricity is used to power the City's buildings and facilities as well as other items such as public open space lighting, water pumps etc.
- Electricity (Street lights) - Electricity is used to power the City's street lights. Although the City purchases the electricity to power the street lights the infrastructure is owned and operated by Western Power which means the City has limited opportunity to reduce or create efficiencies in the energy use of the street lights.
- Natural Gas - Is generally used in City buildings for hot water supply and space heating.
- Fuel (Fleet) - Is used to operate the City's heavy and light vehicle fleet. The City fleet uses a variety of fuel sources: diesel 93% and unleaded petrol 7%.

The City's energy use has remained relatively consistent since 2016/17. Electricity (Facilities) is the largest energy user followed by Electricity (Street lighting), Fleet and then Natural Gas.

Energy use from Electricity (Facilities) has fluctuated slightly each year, which can be attributed to the implementation of energy efficiency initiatives and usage of the facilities with a dip in usage during COVID. Electricity used for street lighting is calculated from the number of street lights, type of street light, and hours of operation. Gas has remained consistent and fleet has reduced with LPG use being discontinued as a council fuel source in 2018/19.

2.2.2 Greenhouse Emissions by Sector

Various sources of energy produce different amounts of greenhouse gases therefore it is important to also look at greenhouse emissions by sector. Electricity has the highest emissions intensity and is also the City's largest source of emissions and therefore is an important focus for reducing energy consumption and increasing efficiency. Electricity used within City facilities is likely to offer the most opportunity to reduce emissions. Electricity (Street lighting) is likely to be more difficult to reduce or change as the infrastructure is owned by Western Power; however opportunities for improving efficiency and reducing emissions in this sector will be investigated. Corporate greenhouse gas emissions percentages by sector are shown in Figure 6.

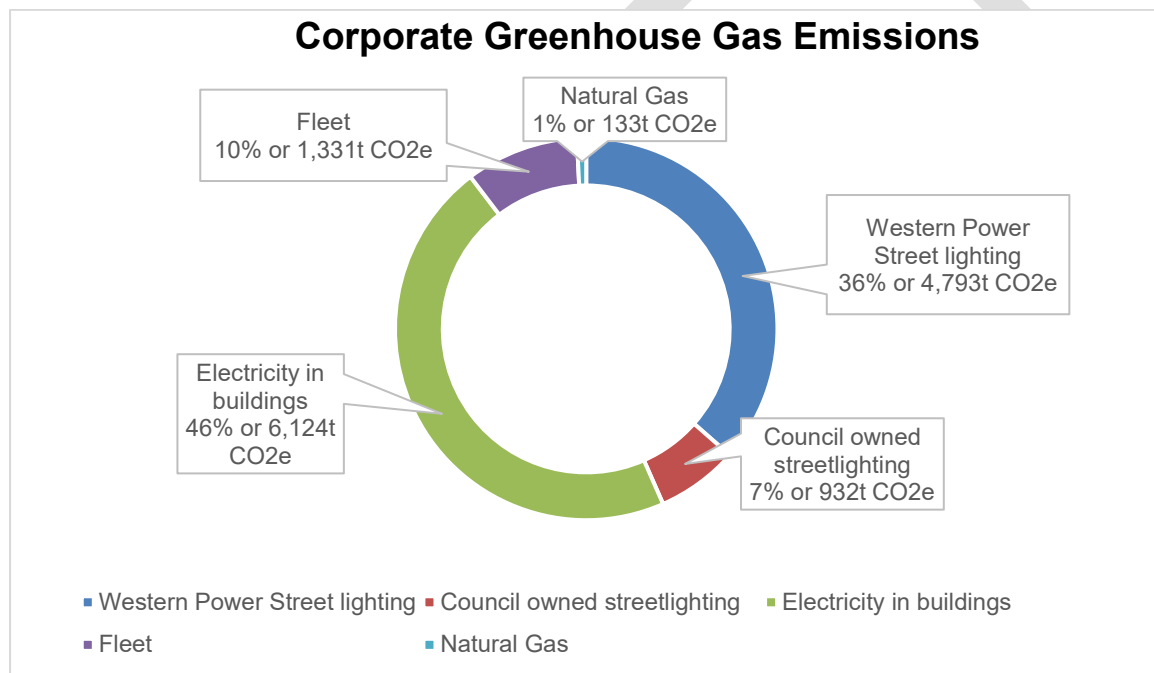


Figure 6: Percentage of corporate greenhouse gas emissions by sector in 2021/22

The City's total annual corporate emissions have remained consistent in recent years. The City's most recent emissions data 2021/22 will be used as the base year for future reporting and comparison of data for future years. The City's total net GHG emissions in 2021/22 were 13,313 tonnes CO₂-e (equivalent).

In 2014, the City set an emissions reduction target to reduce greenhouse gas emissions by 5% per capita below 2012/13 emissions by 2018/19. By 2018/19 the City had reduced its net greenhouse gas emissions by 10.85% per capita below the 2012/13 baseline. The City's net emissions are determined by taking the emissions offset from the total emissions produced by the City's organisational emissions. The City's total annual net corporate greenhouse gas

emissions since 2012/13 are shown in Figure 7. The City's projected emissions from 2021/22 to 2050/51 to meet corporate emissions targets are shown in Figure 8.

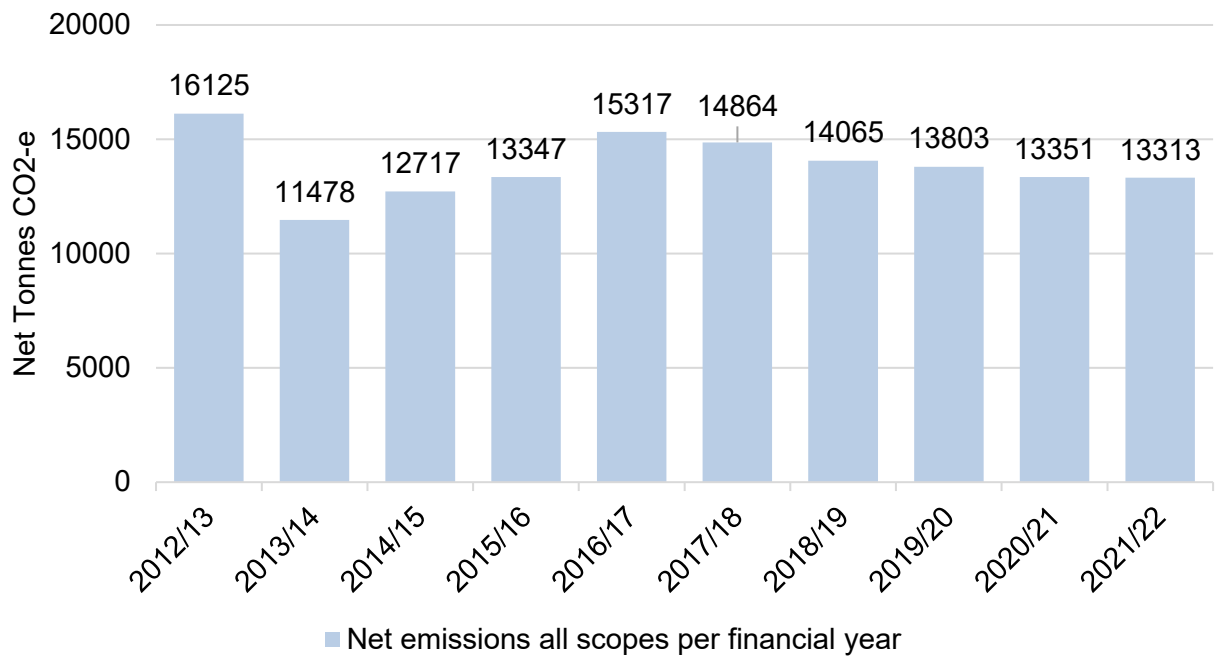


Figure 7: City of Joondalup total annual net corporate greenhouse gas emissions since 2012/13

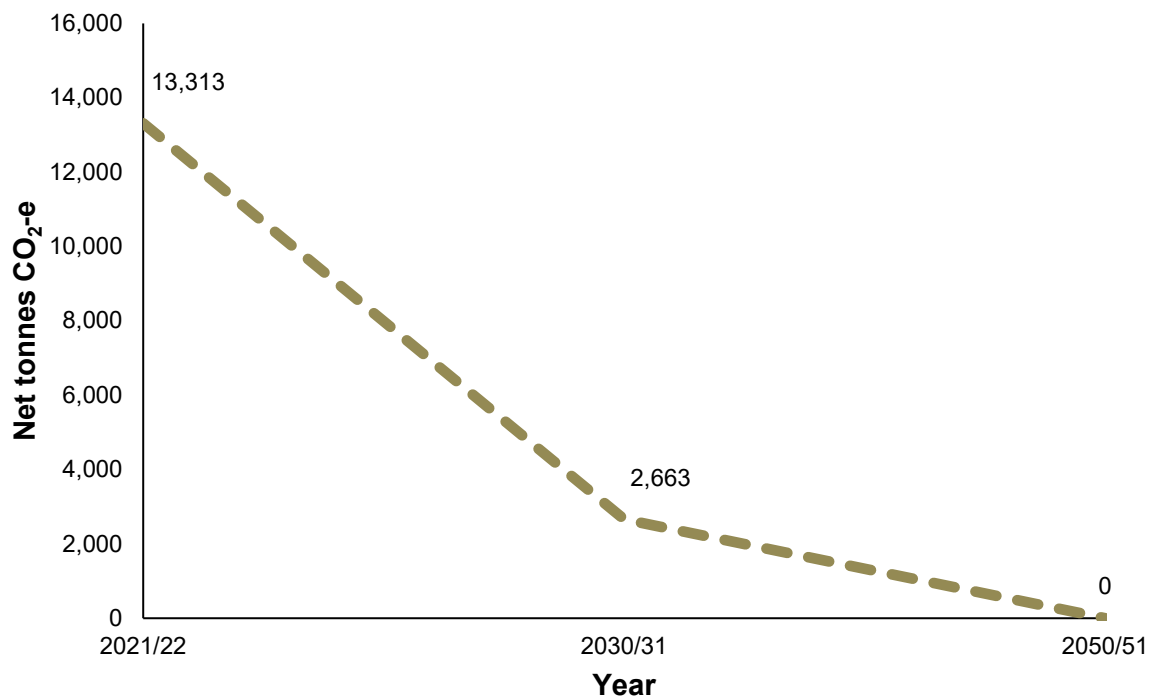


Figure 8: City of Joondalup projected net corporate greenhouse gas emissions from 2021/22 to 2050/51

2.2.3 Renewable Energy

Since 2011, the City has been increasing the amount of renewable energy production through the installation of solar panel systems on 18 City buildings and battery storage systems on 2 City buildings through the Renewable Energy Project. Between 2012/13 and 2021/22, the project has saved the City approximately 1,563 tonnes of CO₂-e. The City's total energy produced from renewable solar energy sources from 2017/18 to 2021/22 is shown in Figure 9.

In June 2022, the City joined 50 WA local governments to procure renewable energy through a Power Purchase Agreement (PPA). Over the next 3 years the City will purchase renewable energy covering 25% of the City's contestable electricity supply in year 2 of the contract and 50% in year 3. The PPA has the potential to reduce the City's total carbon emissions by over 4,000 tonnes of CO₂-e.

The majority of the City's emissions come from street lighting which accounts for 43% of the City's total emissions. Western Power owns and operates the major share of the City's street lights, making up 36% of the emissions from street lighting.

Greenhouse gas emissions are categorised by organisations into 3 categories, or scopes, to identify where the emissions are produced and to set an organisational boundary around which emissions sources are included and excluded.

The City currently uses three types of renewable energy: solar energy, solar hot water and geothermal heating. While the total energy created from renewable energy accounts for a small proportion of the City's overall corporate energy consumption (6.6%) renewable energy produces minimal greenhouse emissions and provides important public demonstration opportunities.

Solar Energy – The City has installed 25 photovoltaic renewable energy systems on 17 of its community facilities. In 2021/22 the systems produced in total 1,024GJ (or 284,512kWh) of electricity (note not all were online for the entire year). This is equivalent to powering around 53 average City of Joondalup households for an entire year.¹²

Solar Hot Water – In 2012/13 the City installed a solar hot water system at Craigie Leisure Centre to provide hot water for the shower facilities at the Centre's pool. Estimated average daily production from this system is calculated to be 89.4kWh equating to 117GJ annually; providing approximately 33% of the hot water demand with the remainder supplied by natural gas. In 2023, the City now has a total of 22 solar hot water systems across 12 different locations.

Geothermal Heating - A geothermal bore and heat exchange pump is used to heat the pools at Craigie Leisure Centre. The energy provided per annum by this heat pump is calculated to

¹² Based on an average daily consumption of 14.69 kWh per day over 365 days for City of Joondalup residents.

be 3537GJ. An estimated 38,000 tonnes of CO₂-e will be saved over the 30 year life expectancy of the system or 933 tonnes of CO₂-e per year.

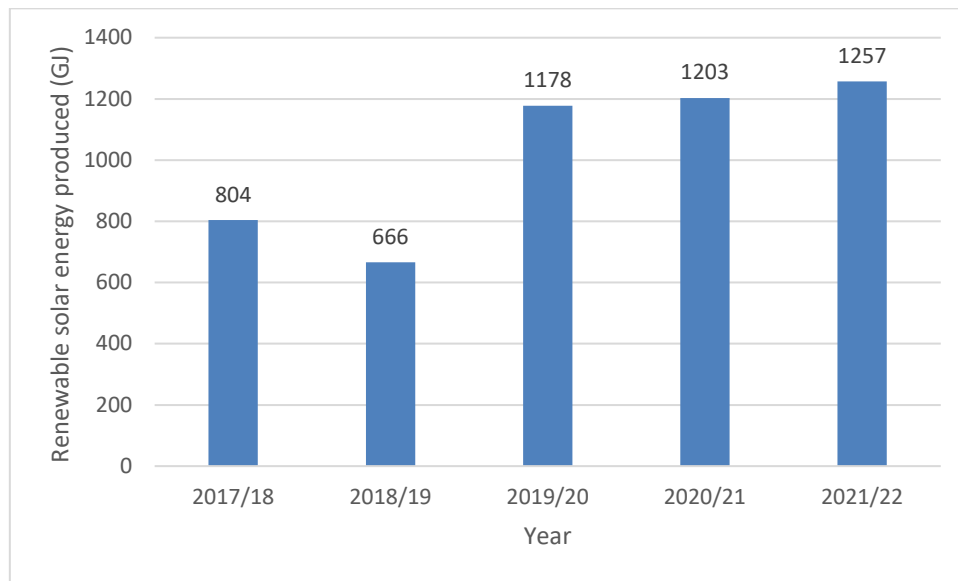


Figure 9: Renewable solar energy produced 2017/18 to 2021/22

2.2.4 Carbon Offsets and Net Emissions

The purchase of carbon offsets is an effective mitigation strategy and will reduce the City's net emissions. Carbon offsets are credits for reductions in greenhouse gas emissions made at another location either through carbon sequestration or renewable energy projects. For carbon sequestration this usually involves the planting of trees or other methods that absorb emissions from the atmosphere. For renewable energy projects this involves the funding of renewable energy projects at another location such as wind farms which create renewable energy and reduce the need for fossil-fuel powered energy.

Using offsets does not mean the City is reducing its total emissions as those emissions are still being produced; however it does reduce the City's net emissions as it mitigates the effect of the emissions that are unavoidable by reducing emissions elsewhere. It also has the added benefit of either supporting re-forestation projects or supporting the renewable energy industry.

The City currently purchases offsets for 100% of its vehicle fleet emissions. This purchase of offsets makes a contribution to reducing the City's net emissions. The City purchased 1,399 tonnes of carbon offsets in 2021/22 to offset 100% of the City's fleet emissions.

2.2.5 Waste Emissions

The City collects residential waste for the community which can create greenhouse emissions as a result of waste decomposing in landfill. The more waste that is diverted from landfill, through reuse and recycling, the fewer the greenhouse emissions are emitted. The City does not currently monitor waste emissions and will investigate including them in emissions reporting in future years.

The City manages household waste to recover and recycle usable materials, this occurs through a number of methods and facilities:

- Materials Recovery – items from the yellow lidded bins are recycled at the Materials Recovery Facility.
- Greens recycling –green waste (i.e. tree prunings etc) that is collected through the residential three bin system, bulk verge greens collection or taken to the greens recycling facility are recycled into mulch products.
- Landfill – the residual waste that the City is unable to recycle or recover is sent to landfill.

As waste decomposes in landfill it produces greenhouse gas emissions. These emissions are captured via a gas extraction system, that processes the gas and turns it into electricity. The generated electricity feeds into the power grid and is redistributed to neighbouring properties. The City's contribution to the gas production is approximately 25% of the total, which equates to 8MWh of supplied power per year. Whilst this offset is a worthy capture it is important that the amount of waste going to landfill is minimised. The Waste Authority has a target for WA to increase material recovery to 70% by 2025 and 75% by 2030.¹³ The amount of waste diverted from landfill from the red lidded waste bins increased from 52.6% in 2020/21 to 61% in 2021/22. However, landfill diversion reduced to 43% in 2022/23 as a result of the Resource Recovery Facility's closure and the diversion of the red lidded bins contents being sent directly to landfill.

As a medium-long term target, the City is aiming to divert its residual waste to a Waste to Energy facility. This will provide an improved method of disposal over landfilling, and will achieve the State Government target to "Recover energy only from residual waste".

2.3 COMMUNITY EMISSIONS PROFILE

Developing a community emissions profile for the City of Joondalup is an important first step to identify the main emission sources across households, businesses and industrial processes. By understanding the contribution of different sectors to the City's emissions, it allows us to understand the scale of the impact of our council and identify the most effective measures to reduce our emissions.

The community profile provides insight into the contributions of households, businesses and industry to overall emissions. The 2021 Census reported that the City accommodates 160,003 residents, within 57,522 occupied private dwellings. The City also occupies 12,644 registered businesses. In terms of industry sectors, construction is the highest recorded business industry in the local government area, followed by professional, scientific and technical services.

¹³ Waste Authority (2019)

In 2020-21, the total annual carbon emissions produced by the Joondalup community (businesses, residents and households) was 1.058 million tonnes of CO₂e. The majority of these emissions (51%) come from stationary electricity, produced using fossil fuels such as coal and gas, to power commercial and residential buildings. The other main sources of carbon emissions are from transport (28%), Industrial Processes and Product Use from industrial processes and refrigerant use (8%) and gas (6%) and waste from landfill and wastewater (6%). The City's community carbon emissions for 2020-21 are shown in Figure 10.

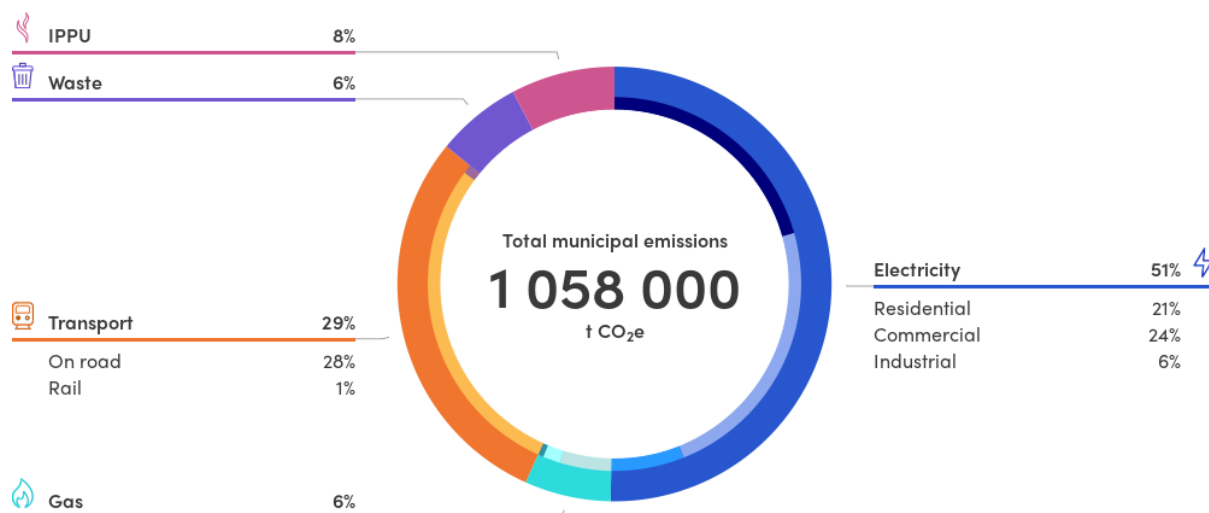


Figure 10: City of Joondalup's community carbon emissions 2020-21¹⁴

2.4 AN APPROACH FOR CONTINUED MITIGATION

The City has been undertaking energy reduction and efficiency improvements for some time and has made significant progress in reducing corporate energy consumption and greenhouse gas emissions. This means that many of the 'easier' low-cost energy management options have already been implemented.

However there are still significant opportunities for the City to continue to undertake effective energy management actions and continue to contribute to the mitigation of climate change. A Climate Change Mitigation Framework has been developed to provide direction for the City's climate change mitigation activities to ensure a strategic, cost effective approach is taken that achieves the maximum amount of emission reduction.

2.4.1 Climate Change Mitigation Hierarchy

The Climate Change Mitigation Hierarchy outlines three approaches for reducing emissions: reducing energy use, using lower emission energy sources and purchasing offsets or renewable energy. The Hierarchy is outlined in Table 5. For each approach a number of

¹⁴ Snapshot (2023)

priorities have been identified based on an assessment of the City’s corporate energy use profile.

Table 5: City of Joondalup Climate Change Mitigation Hierarchy

Approach	Description	Priorities
Reducing Energy Use	Reducing energy use through energy efficiency and energy reduction activities.	<ul style="list-style-type: none"> Target electricity use as it has the highest emission intensity. Target highest energy using buildings. Retrofit energy efficient technologies. Reduce standby power and overnight electricity use. Improve staff energy use behaviours.
Using Lower Emission Energy Sources	Using lower emission energy sources preferably renewable energy.	<ul style="list-style-type: none"> Use of renewable energy within community buildings and facilities to maximise education and awareness raising opportunities. Transition light fleet vehicles to electric vehicles. Sustainable lighting (lighting that creates lower emissions i.e. LED, solar etc.).
Purchasing Offsets or Renewable Energy	Offsetting the City’s emissions through the purchase of carbon offsets or purchase of renewable energy.	<ul style="list-style-type: none"> Purchase offsets or renewable energy to reduce net emissions when 1st tier and 2nd tier options are not viable.

This Framework formalises the City’s existing approach to mitigation and will also provide guidance when planning the City’s future mitigation activities. Benefits and disadvantages of each approach are summarised in Table 6 below.

Table 6: Benefits and disadvantages of three climate change mitigation approaches

Approach	Benefits	Disadvantages
Reducing Energy Use	<ul style="list-style-type: none"> Can have lower upfront costs Reduces energy consumption and ongoing energy costs. 	<ul style="list-style-type: none"> May only result in smaller emission reductions.
Using Lower Emission Energy Sources	<ul style="list-style-type: none"> Reduces consumption from mains electricity and ongoing energy costs. Protects the City against rising energy costs. 	<ul style="list-style-type: none"> Higher upfront costs. Not financially viable for all buildings.
Purchasing Offsets or Renewable Energy	<ul style="list-style-type: none"> Can provide large reductions in net emissions. 	<ul style="list-style-type: none"> Purchasing offsets does not reduce energy consumption or energy costs. Costs to purchase offsets or renewable energy can be significant and need to be purchased annually.

While a combination of all three approaches is likely to result in the greatest emission reductions, where possible the City should consider reductions initially through reducing energy use, as this is the most cost effective approach.

PART 3 – ADAPTATION

In order to minimise the risk to the City from climate change the City must first understand how the City's climate is likely to change and second how that change will impact on the City's infrastructure, operations activities and services as well as its environment and community.

3.1 A CHANGING CLIMATE

Climate change science and research is a constantly evolving field with ongoing improvements in climate change modelling and projections. Research is being conducted on a local, national and international level. Local scale research is the most relevant for informing and guiding the City's climate change management activities. However, the City still needs to be cognisant of global scale research as the nature of climate change means that global changes may still impact at the local level. The Intergovernmental Panel on Climate Change (IPCC) is the leading international research body for the assessment of climate change. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change.

Climate change research has largely been focused on four different themes: current climate change, current climate change impacts, future climate change, and future climate change impacts.

3.1.1 Current Climate Change

It is clear that the climate is already changing. Understanding current climate change will help the City to prepare for future climate change and will also provide examples of best management practice in adaptation planning and implementation.

The IPCC states that *'Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. Some development and adaptation efforts have reduced vulnerability. Across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt'* (IPCC, 2022)¹⁵.

At a global scale the IPCC report¹⁶ found:

- Global mean surface temperature has increased by approximately 1°C above pre-industrial values between 2006-2017.

¹⁵ IPCC (2022a)

¹⁶ IPCC (2022b)

- There is very *high confidence* that there has been an overall decrease in the number of cold days and nights and an overall increase in the number of warm days and nights at the global scale on land.
- There are *likely* more land regions where the frequency, intensity and/or amount of heavy precipitation events has increased than where it has decreased.
- There is *high confidence* that there have been significant increases in the frequency of marine heatwaves.
- There is *high confidence* that heatwaves are increasing in frequency in large parts of Europe, Asia and Australia.
- Summer sea ice in the Arctic has been retreating rapidly with the monthly mean sea ice for September (summer) decreasing by an average of 130,000km² annually between 1997-2014.
- Over the period 1993-2014, global mean sea level rose between 2.6 and 2.9mm as a result of thermal expansion, glacier and ice-sheet mass loss, and freshwater storage on land.

At a local scale, the Western Australian Government has released climate change projections for the State, including the South Western Flatlands region of Western Australia, which includes the City of Joondalup. These changes include higher average temperatures, more frequent hot days, increase in sea levels, decrease in rainfall, more intense rainfall events, increased drought duration, harsher fire weather, warmer and more acidic oceans and increased evaporation and reduced soil moisture.¹⁷

3.1.2 Current Climate Change Impacts

Climate change is already impacting on the environment, communities and government practices. The impacts being experienced are varied but the most significant current impacts for the South West of WA (including the City) include

- higher temperatures and more frequent hot days
- reduced rainfall and increased drought
- increased intensity of storm events
- harsher fire weather climate
- sea level rise and more frequent sea level extremes
- warmer and more acidic oceans.¹⁸

Reduced rainfall and increased drought

Climate change is dramatically decreasing rainfall and water availability in Perth. Reduced rainfall has resulted in a significant decrease in the annual stream flow into Perth dams. Between 1911 and 2021 the average annual stream inflow into Perth's dams was 317

¹⁷ Department of Water and Environmental Regulation (2021)

¹⁸ Department of Water and Environmental Regulation (2021)

Gigalitres (GL); between 2000 and 2021 it was only 113.9 GL, representing an approximately 64% decrease.

Reduced stream inflow affects water availability for the Perth Metropolitan Area and increases pressure on groundwater resources. The resulting reliance on groundwater extraction has resulted in more stringent management and monitoring of groundwater use by the State Government which has meant large users such as the local government sector have had to adapt and significantly reduce groundwater use.

In June 2022, the Department of Water and Environmental Regulation released the Gnangara Groundwater Allocation Plan that sets out how Perth's largest natural water resource will be managed and water will be allocated in the context of reduced rainfall. Under the Gnangara Groundwater Allocation Plan local governments will need to reduce the amount of groundwater that is used for irrigation purposes by 10% by 2032, with the reductions starting in 2028. An example of a City initiative to reduce groundwater by implementing a central smart control irrigation system is shown in Figure 11.

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Central Smart Control Groundwater Irrigation System

Between 2020 and 2022, the City upgraded and installed more than 200 irrigation controllers in parks and public open spaces as a waterwise project to reduce groundwater use. These irrigation controllers link to a web-based central smart control irrigation system.

Key objectives and benefits of the irrigation systems include:

- Efficient use of water, resulting in a reduction in groundwater consumption
- Implementation of sustainable and affordable software to improve water efficiency
- Sensor inputs which allow for tank monitoring, dosing pumps, flow and pressure monitoring and soil moisture monitoring
- Weather station integration for more responsive and sustainable water usage
- Smart energy operations with the installation of solar panels, supporting the City to adapt to the changing climate in the future

The City's entire irrigation network is being managed under the central smart control irrigation system which allows officers to monitor, adjust and maintain irrigation operations. The use of this innovative technology has enabled the City to efficiently conserve water and engage in sustainable water management practices. The system saved 86,000kL in groundwater use between 2019/20 and 2020/21, which is 14% below the City's allocated groundwater usage.

In May 2022 the City was named WA's Platinum Waterwise Council of the Year – the highest accolade a WA Local Government can attain for water conservation as a result of the irrigation system, and many other waterwise projects. The Central Smart Control Groundwater Irrigation System is an example of the City adapting its water management approach to the changing weather conditions from climate change.

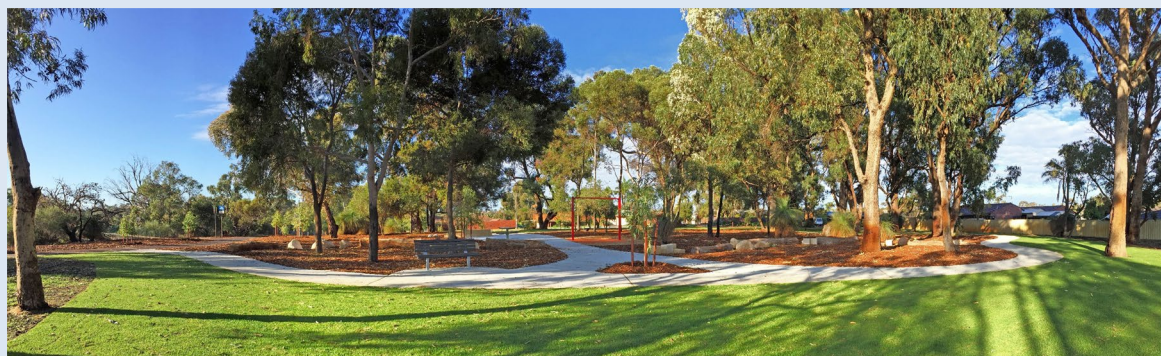


Figure 11: Case study – Central Smart Control Groundwater Irrigation System

Impacts on Biodiversity

The South West of Western Australia is Australia's only international biodiversity hotspot and has the highest concentration of rare and endangered species on the continent. The concentration of endemic species is particularly high¹⁹.

Climate change is a key threat to biodiversity including plants, animals and environments and is already reducing the number of plants and animals as well as places where they occur. In addition, climate change is driving changes in species distribution and the composition and functioning of ecological communities adding to the impacts from other pressures such as invasive species and habitat fragmentation.²⁰ The City of Joondalup contains several Threatened Ecological Communities as well as threatened and priority flora and fauna species.

There is evidence that biodiversity in the South West of Western Australia is already responding to climate change.²¹ Bird migration is an example of an impact on biodiversity as it is cued by temperature change, amongst other factors. In the South West of Western Australia the arrival and departure times of certain migratory birds has significantly altered in a manner that is consistent with current climatic changes.²²

Carnaby's Black Cockatoos are an endangered species endemic to the South West of Western Australia that has undergone a rapid decline over the last century, largely due to habitat destruction and land clearing. Over the past 10 years, numbers of the black cockatoo have reduced by half, and they continue to decline due to the changing climate and the loss of habitat.²³ There are opportunities for the City and the community to support Carnaby's Black Cockatoos by increasing their habitat through natural areas revegetation, urban planting programs and garden plantings. An example of a native seed collection initiative conducted by the City to build environmental resilience is shown in Figure 12.

¹⁹ Conservation International (2013)

²⁰ DAWE (2021)

²¹ Climate Commission (2011)

²² Chambers LE (2008)

²³ South Coast Natural Resource Management (2023)

Native Seed Collection Initiative

The City encourages biodiversity while improving local amenity and creating cool local communities through seed collection practices at the City's nursery.

City staff collect seeds and plant cuttings from natural areas and propagate them in the City's nursery. These propagated plants are then replanted by the City and Friends Groups into the same areas that they were collected from.

Key objectives and benefits of the City's seed collection initiative include:

- The retention of genetic purity of our locally native species.
- Savings of around 30-40% in plant purchasing costs each year.
- Increased plant survival rate by growing the seedlings with limited and local water in a pathogen-free environment.
- Waterwise and native greening of the City's natural areas.
- Improved local water quality and improved community health and well-being.
- Replanting seedlings back into the areas they came from helps to develop natural environmental resilience and ensures that the seedlings are suited to the local soil and climate conditions.

The City's seed collection, storage and propagation practices result in high propagation rates for native species, and the increased biodiversity and greening of natural areas. Up to 10,000 local native plants are successfully propagated and provided to Friends Groups each year as a result of this program. The seed collection initiative is an example of the City adapting to climate change, encouraging biodiversity and building environmental resilience to mitigate the effects of climate change in the future.



Figure 12: Case Study – Native Seed Collection

Coastal Erosion and Inundation

Coastal erosion and inundation can occur along a coastline due to increased sea levels as a result of mean sea level rise.²⁴ Severe storm events have the potential to cause increased erosion to a shoreline, through the combination of higher, steeper waves generated by sustained strong winds, and increased water levels. Coastal erosion affects not just sandy areas but also dunal vegetation and infrastructure such as fencing and paths.

The City has drafted a Coastal Hazard Risk Management and Adaptation Plan and the aim of the Plan is to identify current and future coastal hazard risks and provide a framework for adapting to coastal hazards over a 100-year timeframe.

3.1.3 Future Climate Change

The scientific community has undertaken extensive research to predict how the climate will change on a global, national and local scale. The extent of change is dependent on both the amount of greenhouse gases that continue to be emitted and how the environment responds to changing temperatures.

Keeping global temperatures below 1.5°C requires strong mitigation action from government, businesses and households. Under the Representative Concentration Pathway (RCP) developed by the IPCC adopting a 'strong mitigation' (RCP 4.5) or 'aggressive mitigation' (RCP 2.6) approach would more likely than not keep warming below 2°C. In the RCP 4.5 scenario, emissions would stabilise at half the 2021 levels by 2080 and in the RCP 2.6 scenario emissions would be halved by 2050.

For the purposes of the City's Climate Change Plan, and to aid future planning, the City has adopted the most likely climate change scenario-based on the best available science and a number of assumptions regarding future levels of greenhouse gases and responses on a global and local scale.

It can be expected that in the future the City will have hotter and drier summers with the number of days over 35°C increasing from 28 days per year in 2021 to 63 days per year in 2090 (125% increase) under a high emissions scenario (RCP8.5).²⁵ Winters will be drier and warmer with increased intensity of heavy rainfall events. Figure 13 provides details about the future climate projections for Perth.

²⁴ Department of Climate Change (2009)

²⁵ Department of Water and Environmental Regulation (2021)

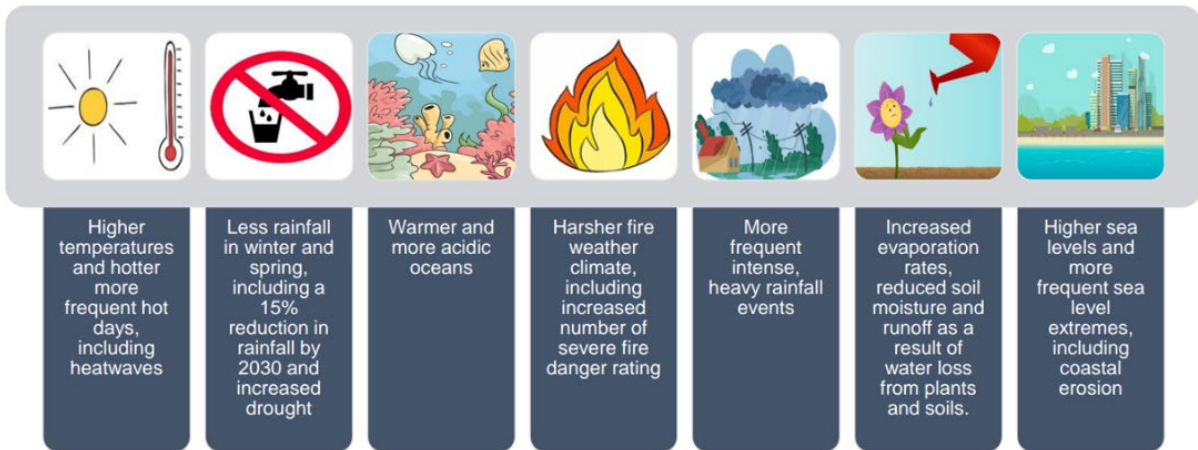


Figure 13: Climate Projections for Perth²⁵

3.1.4 Future climate change impacts

Identifying future climate change impacts is an important area of research being undertaken by a variety of organisations and includes topics such as bushfire risk, coastal erosion and vulnerability, impacts on biodiversity and the natural environment, impacts on buildings and infrastructure, and impact on community health and wellbeing. Outcomes of the research can provide the City with useful tools for managing climate change activities and adaptation planning.

As a result of the climatic changes described above, a number of climate change impacts can be expected. These include rising sea levels and increased storm inundation, increased numbers and intensity of bushfires, and increased number of drought months and reduced water availability.

The expected climate change impacts will affect key areas of local government operations and responsibilities including infrastructure and assets, public open space, natural environment and community wellbeing. Specific risks for the City of Joondalup, identified through a risk assessment process are outlined in section 3.3.

3.2 RISK ASSESSMENT

Due to the complexity and uncertainty in predicting the extent of climate change, a risk assessment approach is considered best practice for climate change adaptation planning. A risk assessment is a systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking. Undertaking a risk assessment enables the City to:

- identify and assess the risks that climate change poses to the City's assets, operations and services.
- prioritise risks that require further action as a basis for decision-making and planning.
- invest early in preparation and adaptation planning to help avoid or minimise climate change impacts and reduce the costs of adaptation and impacts when they occur.

The City's risk assessment approach is based on the risk assessment methodology outlined by the Climate Risk Ready NSW Guide.²⁶

The City has identified 10 overarching climate risks. For each of these risks a Risk Priority has been assigned as well as an assessment of the City's level of influence to mitigate or manage the risk. The Risk Priority was generated taking into account both the likelihood of the risk occurring and the consequence. The level of influence is considered to be either direct or indirect; direct means that the City has direct control over the outcomes rather than only able to influence or encourage certain outcomes. The overarching climate risks have been used to inform the development of Climate Change Plan projects, as shown in Table 7.

Table 7: Overarching risks of climate change for the City of Joondalup

Risk No.	Risk Description	Risk Priority	Level of Influence
RISK 1	Increased damage to or loss of City buildings, infrastructure and assets due to climate change hazards (sea level rise, storm level surge, increased intensity of rainfall events, harsher fire weather, extreme winds etc).	High	Direct
RISK 2	Future climatic changes may make it difficult to maintain the amenity of and service level to the City's parks, reserves, leisure facilities and landscaped areas due to climate hazards such as reduced rainfall, increased evaporation rates, harsher fire weather and sea level rise.	High	Direct
RISK 3	The City's natural landscapes, habitats and biodiversity may become under increasing pressure from climate change impacts (reduced rainfall, increased temperatures, sea level rise, harsher fire weather etc).	High	Indirect
RISK 4	The health and safety of residents and communities may be at risk from more intense extreme weather events, vector diseases, bushfire occurrences, food safety and water availability.	Extreme	Indirect
RISK 5	The City's design, maintenance and replacement practices for City buildings, infrastructure and assets may not be suitable for future climatic conditions.	High	Direct
RISK 6	The City may not have the necessary knowledge, planning or resources in place to adequately respond to future climate change impacts.	High	Indirect
RISK 7	Future climate changes such as increased temperatures and harsher fire weather may result in a decrease in the wellbeing, safety and productivity of City of Joondalup staff.	High	Direct
RISK 8	Future climate changes such as increased temperatures and more frequent hot days may lead to an increased need for service delivery as well as an increased cost to deliver services (in particular cost of utilities such as electricity, resources and waste management).	High	Indirect

²⁶ Department of Planning, Industry and Environment (2020)

Risk No.	Risk Description	Risk Priority	Level of Influence
RISK 9	The wellbeing of residents and communities may decrease due to increased cost of living, more uncomfortable climates and a lack of readiness and resilience to adapt to future climatic conditions.	High	Indirect
RISK 10	The expected or legislated role of local government in climate change adaption may be unclear or may change leading to increased regulatory and compliance requirements and increased potential for liability.	High	Indirect

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PART 4 - CLIMATE CHANGE ACTION PLAN

4.1 CLIMATE CHANGE PLAN PROJECTS

In order to achieve the objectives of the *Climate Change Plan 2023 – 2033* projects have been identified within Key Focus Areas. These projects will be implemented over the life of the Plan and will be subject to regular monitoring and review. A list of the projects is provided in Table 8. A full description of each of the projects is provided in Appendix A.

Table 8: List of Climate Change Plan Projects

Key Focus Area: INFRASTRUCTURE AND ASSETS					
Project No	Title	Mitigation	Adaptation	Related Risk	Key Objective
1.1	Coastal Adaptation Planning and Implementation Project		✓	R1, R2, R3, R5	Coastal hazard adaptation
1.2	Asset Management Framework	✓	✓	R1, R5	Environmentally Sustainable Design
1.3	Renewable Energy Program	✓	✓	R8	Increase renewable energy
1.4	Energy Efficient Hot Water System Project	✓		R8	Increase renewable energy
1.5	Electric Vehicle Fleet Transition Project	✓		R8	Reduce carbon emissions
1.6	Street Lighting Efficiency Project	✓		R8, R10	Reduce carbon emissions
1.7	Integrated Transport Strategy	✓		R8, R9	Reduce carbon emissions
1.8	Bike Plan	✓		R8, R9	Reduce carbon emissions
Key Focus Area: PUBLIC OPEN SPACE					
Project No	Title	Mitigation	Adaptation	Related Risk	Key Objective
3.1	Waterwise Council Action Plan		✓	R2, R8	Waterwise community
3.2	Park Revitalisation and Upgrades		✓	R2	Waterwise community
3.3	Urban Planting Program	✓	✓	R2, R3	Increase canopy cover

Key Focus Area: NATURAL ENVIRONMENT					
Project No	Title	Mitigation	Adaptation	Related Risk	Key Objective
4.1	Yellagonga Integrated Catchment Management Plan		✓	R3	Protect and enhance biodiversity
4.2	Natural Area Management Plans		✓	R3	Protect and enhance biodiversity
4.3	Bushfire Risk Management Plan		✓	R3, R4	Build resilience
4.4	Local Government Waste Plan	✓		R8	Minimise waste
Key Focus Area: CORPORATE RESPONSIBILITY AND GOOD GOVERNANCE					
Project No	Title	Mitigation	Adaptation	Related Risk	Key Objective
5.1	Workforce Plan		✓	R6, R8	Build resilience
5.2	Renewable Energy Procurement and Carbon Offset Program	✓		R8	Reduce carbon emissions
5.3	Think Green Office Program	✓		R6, R7, R8	Sustainable living education
5.4	Strategic Partnerships		✓	R2, R3, R8	Collaboration and advocacy
Key Focus Area: COMMUNITY WELLBEING					
Project No	Title	Mitigation	Adaptation	Related Risk	Key Objective
6.1	Environmental Education Program	✓	✓	R9	Encourage sustainable behaviour change

4.2 IMPLEMENTATION

Effective and coordinated implementation of the Climate Change Plan is critical to achieving the objectives of the Plan. Implementation of the Plan will be coordinated by setting up processes for monitoring and review, improving knowledge and understanding and training and development.

4.2.1 Monitoring and Reporting

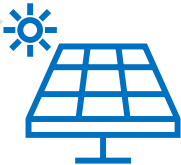

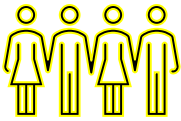
Monitoring

In line with the City's Project Management Framework, the Climate Change Plan 2023 – 2033 will be reviewed on an annual basis. The review will include an:

- Assessment of the progress and status of each climate change management project
- Assessment of progress towards the City's climate targets and performance measures
- Identification of any implementation issues or significant lack in progress.

Climate Targets

Climate targets have been developed to allow for appropriate reporting and evaluation of the Climate Change Plan 2023-2033.

Corporate targets	
Reduce greenhouse gas emissions by 80 per cent below 2021/22 emissions by 2030/31	
Achieve net zero emissions by 2050.	
Community target	
Implement a minimum of two community mitigation initiatives per year.	

Performance Measures

The following climate performance measures will be reported annually:

- Net greenhouse gas emissions generated by the City
- Percentage increase/decrease in net greenhouse gas emissions generated by the City

- Amount of renewable energy generated by the City
- Amount of carbon offsets purchased to offset 100% of City's fleet emissions.

Reporting

The outcomes of the Climate Change Plan review including climate targets and performance measures will be reported annually in the Annual Report and State of the Environment Report.

4.2.2 Improving Climate Change Knowledge and Understanding

Climate change science, research, policy and regulation are constantly evolving fields with ongoing improvements in climate change modelling and projections and evolving responses from both science and government. To ensure the City's climate change management activities continue to be best practice it is important that the City remains abreast of the latest developments in this field. In particular the City should monitor the below topics:

- Climate change science and research
- Climate change legislation, policy and regulation
- Local government exposure to liability.

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Appendix A – Project Descriptions

Key Focus Area Infrastructure and Assets

Objective 1: To protect and/or adapt the City's existing infrastructure and assets against future climate change impacts.

Objective 2: To design and construct future buildings and facilities to ensure suitability for future climates.

Objective 3: Reduce energy use and greenhouse gases emitted from the City's infrastructure and assets.

Project 1.1 Coastal Adaptation Planning and Implementation Project
Project Status Existing Project
Mitigation Adaptation ✓ Risks addressed R1, R2, R3, R5
Project Description <p>The Coastal Adaptation Planning and Implementation Project aims to ensure that the City plans for the future impacts of climate change and integrates climate adaptation into City policies, planning and maintenance schedules and capital works programs where relevant.</p> <p>The City has developed a <i>Coastal Infrastructure Adaptation Plan 2018 – 2026</i> to ensure the City is adequately prepared to adapt to current and future coastal hazards and risk to City's infrastructure and assets is minimised. The City is also developing a Coastal Hazard Risk Management and Adaptation Plan to identify current and future coastal hazard risks and provide a framework for adapting to coastal hazards over a 100 year timeframe.</p> <p>The City implements State Coastal Planning Policy 2.6 (SPP 2.6) which provides guidance for decision-making within the coastal zone including managing development and land use change; establishment of foreshore reserves; and to protect, conserve and enhance coastal values. The City has also developed and implements a Coastal Local Planning Policy in compliance with SPP 2.6 to ensure that the City advises current and future landowners of applicable coastal hazard risk and requires coastal hazard risk management and adaptation planning to be undertaken where required.</p>
Project Objectives <ul style="list-style-type: none"> ▪ To ensure that the outcomes of scientific research and studies inform the City's approach to coastal adaptation activities. ▪ To ensure future coastal vulnerability is taken into account when planning and developing new coastal infrastructure and land use planning decisions within the coastal zone.
Deliverables <ul style="list-style-type: none"> ▪ Finalise and implement the City's Draft Coastal Hazard Risk Management and Adaptation Plan to build the resilience of the City's coastline to the impacts of sea level rise and coastal erosion. ▪ Continue to implement the City's <i>Coastal Infrastructure Adaptation Plan 2018 – 2026</i> to ensure the City is adequately prepared to adapt to current and future coastal hazards and risk to City's infrastructure and assets in minimised. ▪ Continue to implement State Coastal Planning Policy 2.6 and the City's Coastal Local Planning Policy to manage and plan for coastal hazard risk.

Project 1.2 Asset Management Framework

Project Status

Existing Project

Mitigation ✓

Adaptation ✓

Risks addressed R1, R5

Project Description

The City implements an *Asset Management Strategy 2014 - 2024* to provide context from which to guide a whole-of-organisation approach to asset management which includes short, medium and long term objectives. The *Asset Management Strategy 2014 – 2024* includes asset class demand forecasts to understand the current and future needs and expectations of the community, in relation to its assets, to inform changes in service levels which includes climate change as a forecasting demand factor as well as incorporating climate change into a risk analysis.

Transitioning buildings to be fully electric powered by renewable energy, rather than using gas, reduces climate change impacts. There is an opportunity for the City to transition to fully electric buildings and reduce carbon emissions.

The City implements an *Environmentally Sustainable Design for City Buildings Policy* to facilitate the integration of environmentally sustainable design principles into the siting, design and construction of new City-owned or City-managed buildings, renovation projects and retro-fitting. The Policy could be updated to include the principle of transitioning from gas to electricity in City buildings.

There are also opportunities to reduce carbon emissions associated with the use of asphalt in roads including the potential reuse of asphalt, use of recycled materials and use of temperature-reduced asphalt. The City's use of asphalt in 2021/22 produced over 30,000 tonnes of CO₂ equivalent, more than twice the City's total amount of reported net greenhouse gas emissions in 2021/22.

Project Objectives

- To ensure the City's Asset Management Framework takes into account future climate change impacts through adaptation and mitigation.

Deliverables

- Future climate change impacts and risk incorporated into the City's Asset Management Strategy for infrastructure assets.
- Update the *Environmentally Sustainable Design for City Buildings Policy* to include the principle of transitioning from gas to electricity in City buildings.
- Investigate opportunities to reduce carbon emissions associated with the use of asphalt in roads.
- Investigate the feasibility of constructing an environmentally sustainable designed City building with consideration of aspects such as recycled or sustainable materials, embodied energy and life cycle assessment.

Project 1.3 Renewable Energy Program

Project Status

Existing project

Mitigation ✓

Adaptation ✓

Risks addressed R8

Project Description

The City has demonstrated its commitment to renewable energy technology through the implementation of the Renewable Energy Program. The Program has included the purchase and installation of solar PV (photovoltaic) systems at community facilities, as well as an extensive community education program to promote renewable energy and its benefits to the wider community. To date the City has installed 18 PV systems and 2 battery storage systems at community facilities.

In order to reduce reliance on traditional forms of energy and to reduce greenhouse gas emissions, the Renewable Energy Project should be continued where funding opportunities arise and as part of new or significant redevelopments of the City's community facilities. Consideration where appropriate should also be given to other forms of renewable energy (i.e. wind power). The installation of renewable energy systems will help the City reduce its greenhouse gas emissions and will also enable the City (and any community groups using the community facilities) to become more resilient to increasing energy costs.

Community batteries can assist residents to maximise their use of renewable energy produced. Community batteries integrate bulk solar battery storage into the existing electricity grid, while also providing residents with virtual storage for their excess solar energy.

Project Objectives

- To reduce greenhouse gas emissions and increase the City's resilience to rising energy costs, through the generation of renewable energy.
- To raise community awareness of renewable sources of energy through the promotion of the City's renewable energy technologies.

Deliverables

- Expand the installation of renewable energy and battery storage systems across the City's building portfolio.
- Continuation of community awareness initiatives to promote renewable energy.
- Advocate to Western Power and Synergy to install community batteries and assist residents to maximise their use of renewable energy produced.

Project 1.4 Energy Efficient Hot Water System Project

Project Status

Existing project

Mitigation ✓

Adaptation

Risks addressed R8

Project Description

The use of renewable energy for heating purposes can reduce energy use and greenhouse gas emissions within City facilities. The City has a total of 22 solar hot water systems across 12 different locations, including at Craigie Leisure Centre which provides a portion of the heating required to heat the water used in the pool's showers.

The City could also consider the installation of heat pump hot water systems which use a refrigeration cycle to extract heat from the surrounding air and a heat exchanger to heat water. Heat pumps typically use around 60%-75% less electricity than a conventional electric hot water system.

The Energy Efficient Hot Water System project will be continued as funding opportunities arise and as part of new or significant redevelopments of the City's community facilities.

Project Objectives

- To reduce energy use and greenhouse gas emissions associated with City facilities.
- To increase the City's resilience to rising energy costs.

Deliverables

- Expand the installation of solar hot water systems or heat pumps within City buildings and facilities.

Project 1.5 Electric Vehicle Fleet Transition Project

Project Status

New Project

Mitigation ✓

Adaptation

Risks addressed R8

Project Description

The City's fleet uses a variety of fuel sources including diesel (93%) and unleaded petrol (7%). The City's fleet consists of turf maintenance machines, trailers, loaders, weed sprayers, sweepers, water pumps, passenger sedans, light commercial vehicles and a variety of trucks.

The City has taken a number of steps to reduce the emissions from its fleet vehicles including purchasing hybrid vehicles and where possible replacing larger vehicles with four cylinder vehicles. The City also offsets its vehicle emissions through the Carbon Neutral program. Carbon Neutral undertakes biodiverse conservation plantings to offset greenhouse emissions. The City purchases carbon offsets annually to offset its annual vehicle emissions.

The State Electric Vehicle Strategy for Western Australia includes a target to achieve a minimum of 25% electric vehicles for all new light and small passenger, and small and medium SUV government fleet vehicles by 2025/26.

The City could transition the fleet to electric vehicles, investigate alternative fuels and further downsize the size of vehicles where possible. Electric vehicles can be powered by renewable energy and reduce carbon emissions.

Project Objectives

- Transition the City's fleet to electric vehicles that can be powered by renewable energy.
- Reduce the net greenhouse gas emissions associated with the City's fleet.

Deliverables

- Transition the City's fleet to electric vehicles and ensure there is sufficient charging infrastructure.

Project 1.6 Street Lighting Efficiency Project

Project Status

Existing Project

Mitigation ✓

Adaptation

Risks addressed R8

Project Description

The majority of the City's emissions come from street lighting which accounts for 43% of the City's total emissions. However, Western Power owns and operates the major share of the City's street lights, making up 36% of the emissions from street lighting.

The City has been implementing the Joondalup City Centre Street Lighting program on City owned street lights to replace inefficient street lighting with multi-function light poles that incorporate energy efficient, programmable LED luminaires which are monitored and controlled by the City's wireless lighting control system. Increasing the efficiency of street lighting will make a significant contribution to decreasing the City's greenhouse gas emissions.

However there are a number of challenges to improving the City's street lighting network:

- Much of the street lighting infrastructure is owned by Western Power rather than the City of Joondalup.
- Much of the infrastructure is ageing and large scale replacement of existing infrastructure with newer technologies is costly.
- Availability of alternative technologies is still evolving i.e. LED's are now more widely available but solar lighting is still in development.

Research is required to identify opportunities for improving street lighting efficiency and the availability of alternative technologies, given the current challenges. Opportunities to increase efficiencies through changing current operations and practices will also be investigated.

The City will undertake advocacy to State government and seek opportunities to partner with stakeholders including Western Power and the Western Australian Local Government Association (WALGA) in investigating options for increased efficiency in street lighting.

Project Objectives

- To advocate for the City to take ownership of Western Power owned street lighting and improving lighting infrastructure efficiency and reducing associated greenhouse gas emissions.
- To partner with stakeholders to improve street lighting efficiency and reduce associated greenhouse gas emissions.

Deliverables

- Advocate to State government and WALGA in regard to the City taking ownership of Western Power owned street lighting to improve efficiency and reduce the amount of associated greenhouse emissions.
- Liaise with Western Power in regard to the possible transfer of ownership of Western Power owned street lighting to the City to enable energy efficiency upgrades and reduced carbon emissions.
- Identification of opportunities to reduce the amount of greenhouse emissions resulting from City managed street lighting.
- Identification of technologies to improve the City's street lighting network including any changes to City practices or policy that may be required.

Project 1.7 Integrated Transport Strategy

Project Status

New Project

Mitigation ✓

Adaptation

Risks addressed R8, R10

Project Description

Integrated transport planning aims to ensure that there is a suitable, safe and interconnected transport infrastructure for different transport modes such as private vehicles, public transport, walking and cycling, which results in improving the community's accessibility to jobs, services, recreation and other daily activities.

Within a local government context, transport services and responsibilities extend mainly to the consideration of roads, public transport, road safety and path networks. These responsibilities are also shared across a variety of stakeholders, including Main Roads WA, the Department of Transport, the Public Transport Authority, Department of Planning, Lands and Heritage and Transperth.

The City recognises the need to develop a strategic approach to the planning, construction and maintenance of transport related infrastructure and acknowledges that partnerships with State government agencies and other stakeholders have the potential to improve the efficiency and reduce expenditure for the delivery of transport infrastructure. Improved public transport, cycling and walking facilities can also lead to a reduction in the use of private vehicles resulting in a decrease in greenhouse gas emissions.

The City is developing an Integrated Transport Strategy to guide multi-modal transport planning and inform strategic policy, advocacy and infrastructure decisions in the City over the next 10 years.

Electric scooters can be powered by renewable energy and provide a form of transport with reduced carbon emissions as opposed to using vehicles. The City can encourage community members to adopt electric scooters as a form of transport through conducting an electric scooter hire trial.

Project Objectives

- To reduce transport related greenhouse gas emissions through improvements in public transport, walking and cycling within the City.
- To align the City's transport related activities with the priorities outlined in State government plans and strategies.
- To identify and address shortcomings across the City's current transport network; and determine future drivers and targets for modal shifts.
- To identify opportunities for funding for the planning, construction and maintenance of transport related infrastructure.

Deliverables

- Finalisation and implementation of an Integrated Transport Strategy in 2024.
- Investigate the feasibility of an electric scooter hire trial in an area highly used by cyclists and pedestrians to encourage a sustainable form of transport.

Project 1.8 Bike Plan
Project Status Existing Project
Mitigation ✓ Adaptation Risks addressed R8, R10
Project Description Creating environments that encourage people to choose active travel is a way to foster more sustainable, healthier and safer communities. Cycling is an enjoyable, convenient and healthy mode of travel and also assists to reduce greenhouse gas emissions. The City's <i>Bike Plan 2016 - 2021</i> was developed to guide how the City promotes, celebrates and supports bike riding so the City can achieve its vision of a bike friendly city. The Plan recommends the implementation of cycling infrastructure such as pathways, bike parking and signage within the City and also includes initiatives to raise the awareness of cycling and its benefits within the community. In order to ensure alignment with State Government objectives for cycling within Western Australia, a major review of the Bike Plan will be undertaken once the Integrated Transport Strategy is finalised, with a new Bike Plan being developed at this time. A new Bike Plan will provide the long-term vision, strategic framework and projects we will implement to make bike riding a part of everyday life and move us towards becoming a bike-friendly city.
Project Objectives <ul style="list-style-type: none"> ▪ To improve cycling infrastructure and facilities within the City. ▪ To promote the benefits of cycling to the community ▪ To increase the provision of cycling information to the community.
Deliverables <ul style="list-style-type: none"> ▪ Development and implementation of a new Bike Plan after the Integrated Transport Strategy is finalised.

Key Focus Area Public Open Space

Objective 1: To reduce water consumption at the City's parks and reserves.

Objective 2: To ensure that the amenity, useability and safety of the City's parks and reserves are maintained in future climates.

Project 3.1 Waterwise Council Action Plan
Project Status Existing project
Mitigation Adaptation ✓ Risks addressed R2, R8
Project Description <p>The <i>Waterwise Council Action Plan 2021 – 2026</i> outlines the City's waterwise vision and provides strategic direction for the City's water management goals and actions over the next five years. The Plan addresses both corporate and community water management goals and actions as aspects of a waterwise city.</p> <p>Through the Waterwise Council Action Plan the City has committed to the following water management goals:</p> <ul style="list-style-type: none">▪ Maintain corporate potable water use 5% below 57,000 kL for the next 5 years.▪ Maintain Craigie Leisure Centre water use 5% below 0.017 kL/person for the next 5 years.▪ Maintain groundwater abstraction below groundwater allocation levels for the next 5 years.▪ Maintain community per capita water use below 115kL per annum for the next 5 years.▪ Undertake a minimum of two water efficiency and/or water quality projects that encourage community awareness and promote partnerships by 2025-2026. <p>In addition to the City's Waterwise Council Action Plan, the Government of Western Australia developed a Gngangara Groundwater Allocation Plan which includes a requirement for a 10 per cent reduction in the City's groundwater usage from 2028. The City will be required to reduce groundwater abstraction and comply with the revised groundwater allocation through reducing irrigation in parks and public open spaces.</p> <p>Impermeable surfaces result in stormwater being diverted to local waterways rather than being absorbed into the ground. Permeable paving allows for water infiltration to the ground below, reducing pressure on stormwater systems, and can be used for paths, roads and carparks.</p>
Project Objectives <ul style="list-style-type: none">▪ To improve water management outcomes for the City.
Deliverables <ul style="list-style-type: none">▪ Implement the Waterwise Council Action Plan to improve water management outcomes.▪ Manage the City's groundwater usage as per DWER's groundwater licence allocation.▪ Investigate opportunities to implement permeable paving for City assets to allow for water infiltration and reduce pressure on stormwater systems.

Project 3.2 Park Revitalisation and Upgrades

Project Status

Existing project

Mitigation

Adaptation ✓

Risks addressed R2

Project Description

Irrigation accounts for a large proportion of the City's water use the efficient use of irrigation systems is vital to ensuring the long term conservation of groundwater resources. As part of the implementation of the City's Landscape Master Plan the City is implementing a program of hydrozoning and ecozoning, and redesigning irrigation systems, to reduce groundwater use within parks and open space areas.

Hydrozoning relates to water delivery and is the practice of establishing separate areas or zones to receive different amounts of irrigation water. Ecozoning relates to the vegetation that can best accommodate a given watering regime and is usually a grouping of plants with similar water requirements.

As part of the project, amenity is also being improved to ensure community expectations are balanced with sustainable water management. To date the project has been successful in reducing groundwater use by up to 50 per cent in some City parks.

Project Objectives

- Implement hydrozoning and ecozoning principles to reduce groundwater use in City parks.
- Increase the amenity and diversity of parks in the City.

Deliverables

- Development and implementation of detailed landscaping and irrigation design for identified parks to reduce irrigated areas and therefore water use including site preparation, irrigation removal and reconnection, turf removal, landscaping, installation of hard surfaces, mulching and provision of signage, at a rate of 1-5 parks per year.

Project 3.3 Urban Planting Program

Project Status

Existing project

Mitigation ✓

Adaptation ✓

Risks addressed R2, R3

Project Description

The reduction of vegetation within urban areas, coupled with the increase in built surfaces has contributed to the urban heat island effect. With projected increases in temperature expected due to the impacts of climate change, the warming of urban areas may impact the amenity and useability of urban environments. The impact of the urban heat island effect can be significantly reduced by increasing the amount of vegetation cover within these areas.

The City's Leafy City Program provides increased urban canopy cover by planting trees within the City's suburban streetscapes, to create cooler, inviting green urban spaces for residents and mitigate the increasing heat-island effect. The Leafy City Program launched in 2017 and over 4,500 new trees have been added to the urban canopy among the City's neighbourhoods, as of 2023.

The City supports the greening of verges by implementing a Winter Planting Program and supplying and planting trees on residential verges free of charge, at the request of the property owner. Residents may apply to have one or more trees planted by the City on the verge adjacent to their property. Trees are planted during the winter period.

The City also undertakes annual tree planting on the City's public open space, verges and medians to provide more shade and reduce the effects of the urban heat island effect through the City Centre Streetscape Renewal and Arterial Road Streetscapes project.

Project Objectives

- Continue to plant trees on residential verges, residential medians and Public Open Space to increase urban forest and canopy cover.
- Provide increased shade to reduce the impacts of the urban heat island effect within urban environments of the City of Joondalup.
- Increase the amenity and diversity of parks and open spaces in the City.

Deliverables

- Continue to plant trees on residential verges, residential medians and Public Open Space to increase canopy cover and reduce the urban heat island effect.
- Continue to plant trees in the City Centre and on Arterial roads to increase canopy cover and reduce the urban heat island effect at a rate of two projects per year.

Key Focus Area Natural Environment

Objective 1: To ensure the City's integrated catchment management planning for the Yellagonga wetlands takes into account future climates.

Objective 2: To ensure the City's management of natural areas and waste takes into account the impacts of future climates.

Project 4.1 Yellagonga Integrated Catchment Management Plan 2021 - 2026
Project Status Existing project
Mitigation Adaptation ✓ Risks addressed R3
Project Description <p>The Yellagonga Regional Park is located on the Swan Coastal Plain within the City of Joondalup and the City of Wanneroo and is comprised of a chain of linear wetlands extending from Lake Joondalup in the north, through Beenyup Swamp and Walluburnup Swamp, to Lake Goollelal in the South. The Yellagonga Regional Park is an area of high ecological significance including being a Bush Forever site, having Conservation Category Wetlands and Lake Joondalup is also a Class 'A' Reserve. The Yellagonga Regional Park consists of a number of different tenures and is managed in partnership between the City of Joondalup, City of Wanneroo and Department of Biodiversity, Conservation and Attractions (DBCA).</p> <p>The Yellagonga wetlands are one of the City's most valued environmental assets, providing important habitat for flora and fauna as well as providing valued recreation and tourism opportunities. Improving the health and viability of the Yellagonga catchment and wetlands will increase its resilience to future climate changes.</p> <p>The impacts of climate change on the Yellagonga wetlands are likely to be numerous and varied, and may include:</p> <ul style="list-style-type: none">▪ Reduced groundwater and surface water availability.▪ Reduced water quality due to declining water levels and potential mobilisation of heavy metals.▪ Increase in potential and actual acid sulphate soils.▪ Increased threat from weeds, predators and fire.▪ Change in the abundance, distribution and diversity of aquatic biota.▪ Changing and restricted habitats for fauna and flora. <p>The Yellagonga Integrated Catchment Management Plan (YICM) 2021 - 2026 was developed to provide a holistic and long-term strategic plan to improve catchment health and protect the diverse values of the Park. The implementation of the YICM Plan will ensure the long term protection of the Yellagonga Wetlands with a focus on addressing the current and future impacts of climate change.</p>
Project Objectives <ul style="list-style-type: none">▪ To maintain the health and viability of the Yellagonga Regional Park and to increase its resilience to climate change impacts.
Deliverables <ul style="list-style-type: none">▪ The implementation of the <i>Yellagonga Integrated Catchment Management Plan 2021 - 2026</i>.

Project 4.2 **Natural Area Management Plans****Project Status**

Existing project

Mitigation**Adaptation** ✓**Risks addressed** R3**Project Description**

Climate change will have significant impact on the health and viability of the City's natural areas. Reduced rainfalls will result in lower groundwater levels and drying out of the lakes and consequently less water being available for flora and fauna. Changes in temperatures can also alter breeding and habitat patterns. Threats from weeds and fire are also likely to increase and coastal natural areas will be increasingly affected by storm surge and coastal erosion.

The City develops and implements Natural Area Management Plans to build resilience in native vegetation and ecosystems to a changing climate. The City's conservation works in natural areas are prioritised to protect and enhance biodiversity and include revegetation, fire mitigation works and integrated weed management.

Natural Areas Management Plans identify information on changes in vegetation condition in natural areas and identify environmental threats that pose a risk to biodiversity values within the natural area.

Project Objectives

- To increase resilience of the City's natural environment through the development and implementation of Natural Area Management Plans.

Deliverables

- Natural Area Management Plans that incorporate climate change risk and management recommendations to address the threats to biodiversity associated with climate change.

Project 4.3 Bushfire Risk Management Plan 2018 - 2023

Project Status

Existing project

Mitigation

Adaptation ✓

Risks addressed R3, R4

Project Description

Bushfires are one of the key environmental threats to natural areas in the City of Joondalup. Bushfires can significantly degrade natural areas, destroy habitats, reduce flora and fauna numbers and create opportunities for weed and predator establishment. In addition bushfires can threaten and impact on nearby properties and communities.

Climate change is likely to result in a hotter and drier climate which is likely to result in an increase in both the intensity and frequency of bushfires in most regions. The City has developed a *Bushfire Risk Management Plan 2018 – 2023* to provide an ongoing strategic approach to the management of natural areas in order to reduce the incidence of fire in the City which recognises the future impacts of climate change.

The Bushfire Risk Management Plan also gives consideration to the role of planning processes and approvals in providing an appropriate level of protection to private property from bushfires.

Project Objectives

- To improve the health and resilience of the City's natural areas to climate change.

Deliverables

- Development and implementation of a new Bushfire Risk Management Plan that considers future climate change impacts.

Project 4.4 Local Government Waste Plan

Project Status

Existing project

Mitigation ✓

Adaptation

Risks addressed R8

Project Description

The City's Local Government Waste Plan leads our waste management practices which align with the objectives of the State Waste Avoidance and Resource Recovery Strategy 2030. The Plan focuses on improving our practices and providing the groundwork to inform the long-term planning for waste. Waste management plans are a requirement of all local governments under the *Waste Avoidance and Resource Recovery Act 2007*.

Waste that is sent to landfill decomposes and produces greenhouse gases. Therefore the diversion of waste from landfill through waste minimisation, recycling or reusing methods can reduce the City's greenhouse emissions. The City doesn't currently monitor greenhouse gas emissions produced by waste operations.

The City is responsible for the collection of residential waste and manages household waste through a number of methods and facilities:

- Materials Recovery Facility – items from the yellow lidded bins are recycled at the resource recovery facility, contaminated items are sent to landfill.
- Greens recycling –green waste (i.e. tree prunings etc) that is collected through residential three bin system, the bulk verge greens collection or taken to the greens recycling facility is recycled into mulch products.
- Landfill – the residual waste that the City is unable to recycle or recover is sent to landfill.

The City plans to commence implementation of a new Food Organics Garden Organics (FOGO) bin service in 2024/25.

Project Objectives

- To increase efficiency of waste services and reduce waste to landfill and greenhouse gas emissions through sustainable waste management practices which incorporate increased re-use and recycling.

Deliverables

- Implementation of the Local Government Waste Plan that provides strategic guidance to the City's waste management practices.
- Commencement of FOGO in 2024/25 to reduce organic waste going to landfill and associated carbon emissions.
- Increased collection of data to measure and monitor greenhouse gas emissions produced by the City's waste operations.

Key Focus Area Corporate Responsibility and Good Governance

Objective 1: To demonstrate shared responsibility, leadership and governance practices in the City's climate change management activities.

Objective 2: To incorporate climate change management into the City's strategic and corporate planning.

Project 5.1 Workforce Plan
Project Status Existing project
Mitigation Adaptation ✓ Risks addressed R6, R8
Project Description <p>The <i>Workforce Plan 2018-2022</i> is one of three major informing documents within the City's Integrated Planning Framework. Its purpose is to determine the workforce requirements necessary to resource and deliver the organisation's <i>Corporate Business Plan 2018-2023</i> and in doing so, contribute to the achievement of strategic objectives contained within <i>Joondalup 2022</i>. The Workforce Plan takes into consideration the workforce requirements of projects, actions and services committed to within the City's current Integrated Planning Framework.</p> <p>The Workforce Plan recognises external drivers for workforce planning including skills shortage, the changing employment landscape, changing technology, local government reform, population changes and legislative changes. The Workforce Plan could also take into consideration the impacts of climate change on staff and resourcing requirements.</p>
Project Objectives <ul style="list-style-type: none">▪ Ensure that the City is adequately resourced and staffed to respond to impacts that climate change will have on City operations, activities and services.
Deliverables <ul style="list-style-type: none">▪ An updated Workforce Plan that recognises climate change as a potential external driver for workforce planning.

Project 5.2 Renewable Energy Procurement and Carbon Offset Program

Project Status

Existing project

Mitigation ✓

Adaptation

Risks addressed R8

Project Description

In June 2022, the City joined 50 WA local governments to procure renewable energy through a Power Purchase Agreement (PPA). Over the next 3 years the City will purchase renewable energy covering 25% of the City's contestable electricity supply in year 2 of the contract and 50% in year 3. The PPA has the potential to reduce the City's total carbon emissions by over 4,000 tonnes of CO₂-e.

The City has offset 100% of emissions from its vehicle fleet since 2007. The offsets are purchased through Carbon Neutral who undertake biodiverse native plantings to absorb the equivalent amount of emissions from the atmosphere. This purchase of offsets makes a contribution to reducing the City's net emissions. The City purchased 1,399 tonnes of carbon offsets in 2021/22 to offset 100% of the City's fleet emissions.

The City should continue to purchase offsets and procure renewable energy as it makes a considerable contribution to reducing impact of the City's greenhouse gas emissions.

Project Objectives

- To reduce the impact of the City's greenhouse gas emissions through the purchase of offsets and procurement of renewable energy.

Deliverables

- Continue offsetting 100% of emissions related to the City's vehicle fleet annually.
- Continue to procure renewable energy through a Power Purchase Agreement increasing to 100% purchase of renewable energy for the City's contestable electricity supply in 2025/26.

Project 5.3 Think Green Office Program**Project Status**

Existing Project

Mitigation ✓**Adaptation****Risks addressed** R6, R7, R8**Project Description**

Staff education and awareness-raising is important in encouraging sustainable behaviour across the organisation. The Think Green Office Program is a cultural change program targeting City staff to promote more sustainable behaviours and attitudes within their everyday work life. This Program commenced in February 2010 with an aim to encourage staff to be more sustainable, minimise impacts of their daily activities regarding energy, water, waste and travel and incorporate climate adaptation into their work. "Think Green" is branded and ongoing, to stimulate consistent change rather than ad hoc staff awareness.

The Program is focused on increasing sustainable actions by City staff and fostering behaviour change. The Program has previously included:

- Implementation of a Green Office Guide - to inform, engage and encourage staff to address energy, water, waste, and transport issues within the workplace.
- Staff initiatives to raise awareness of climate change related issues and encourage behaviour change.
- TravelSmart Workplace initiatives – Pool bikes, electric bike and SmartRiders.

Project Objectives

- Raise awareness of the importance of climate change adaptation and mitigation actions amongst City employees.
- Ensure that staff incorporate climate change mitigation and adaptation into work activities.
- Facilitate sustainability behaviour change in staff at home and in the office.

Deliverables

- Delivery of staff initiatives to encourage climate change adaptation and mitigation actions.

Project 5.4 Strategic Partnerships

Project Status

Existing project

Mitigation ✓

Adaptation ✓

Risks addressed R2, R3, R8

Project Description

Keeping up to date with developments in the area of climate change management will ensure that the City is implementing best practice approaches to climate mitigation and adaptation. There are a number of government and non government groups and educational and research organisations locally, nationally and internationally that focus on building the capacity of local government to effectively mitigate climate change and increase resilience to impacts.

The City should continue to investigate opportunities to partner with stakeholders, industry groups and research institutions to enable the City to build capacity and gain information relating to best practice approaches climate change mitigation and adaptation.

Project Objectives

- To ensure that the City is well informed of developments in climate change management by actively participating in research projects and working groups as opportunities arise.

Deliverables

- Increased support for the City in implementing climate mitigation and adaptation activities.
- Increased knowledge of best practice approaches to climate change management.

Key Focus Area Community Wellbeing

Objective 1: To increase awareness in the community about climate change and its impacts and encourage related behaviour change.

Objective 2: To assist the City's residents and communities to become more resilient to the impacts of climate change

Project 6.1 Environmental Education Program
Project Status Existing project
Mitigation ✓ Adaptation ✓ Risks addressed R10
Project Description <p>The City has developed a coordinated program of environmental education activities through its Environmental Education Program (EEP) which commenced in 2010. Community education is vital in influencing behaviour change and fostering sustainability in the community.</p> <p>The EEP includes workshops, events, initiatives, communication campaigns and provides information to encourage community members, schools and businesses to adapt to and mitigate climate change. Examples of previous EEP initiatives related to climate change include:</p> <ul style="list-style-type: none">• Think Green Energy Program• Eco home, school and business audit program• Waterwise Verge Rebate Program• Solar Battery Storage workshop. <p>There are opportunities to collaborate with other local governments in regard to climate change education and initiatives to encourage behaviour change in the community, schools and to businesses.</p> <p>The use of the Strategic Community Reference Group with community members could facilitate knowledge sharing, consultation and delivery of community identified projects related to climate adaptation and mitigation.</p>
Project Objectives <ul style="list-style-type: none">▪ Raise awareness, advocate for and support behaviour change in the community, schools and to businesses regarding future climates and the importance of adapting to and mitigating climate change.
Deliverables <ul style="list-style-type: none">▪ Delivery of education initiatives, behaviour change projects and communications campaigns to encourage the community, schools and businesses to adapt to and mitigate climate change.▪ Investigate opportunities to collaborate with other local governments in regard to climate change education and encouraging behaviour change for the community, schools and businesses.▪ Investigate funding opportunities to provide rebates to the community, schools and businesses to assist with climate adaptation and mitigation.