

CLIMATE ADAPTATION PLAN

CLIMATE ADEPT CITY



Take Local Action: Be Part of the Solution



Published by:
Port Phillip City Council
Private Bag 3
PO St Kilda
VICTORIA 3182

© Port Phillip City Council, October 2010.

All rights reserved.

This publication is protected by copyright. Apart from any fair dealing for the purposes of private study, research, criticism or review, or otherwise permitted under Part III of the Copyright Act 1968, no part of these materials may be reproduced by any process without written permission from Port Phillip City Council.

Disclaimer

Parts of this document may contain estimates based on assumptions that may be subject to error. Although all care has been taken to verify such estimates readers must not alter their position or refrain from doing so in reliance on them.

Printed by Highlight Printing, Airport West, Victoria 3042

ISBN 978-0-9757763-7-7

Printed on 100% recycled paper using vegetable inks.

This publication is also available at www.enviroehub.com.au

WHO IS THIS PLAN FOR?

This Climate Adaptation Plan primarily targets Council operations and policy in the areas of built form, public space, coastal management and protection, drainage and flooding management, managing heat stress and heat island effects, and supporting local emergency management. It is a key plan to guide change in some vital Council operational areas, in order to progressively develop a more climate adept city.

The Plan does not currently cover the areas of local economic/business activity, or social impacts from a changing climate. This includes community health, wellbeing, liability and insurance costs.

Council's climate change response strategy focuses on both carbon abatement and climate adaptation – please see the diagram on page 8. For a perspective on the key Council action plans that assist in the delivery of this Plan, please see page 19.

The Climate Adaptation Plan will next be reviewed in 2014. Council aims to have implemented at least 90% of actions in the Plan by 2014, as well as complete comprehensive coastal hazards modelling to further prioritise key affected areas and identify solutions.

The Community Climate Action Plan

The Climate Adaptation Plan also contributes to the adaptation components of the Community Climate Action Plan. The Community Climate Action Plan provides community action plans for the key areas of:

- carbon abatement actions including sustainable buildings, sustainable transport, energy and fuel efficiency, and decentralised low carbon energy systems
- water conservation, reuse and cleaner water quality in stormwater runoff to the Bay
- waste minimisation, composting, recycling and reuse
- community resilience to a changing climate including managing temperature extremes, developing climate-resilient and flood proof buildings, and minimising the impacts of an emergency.

Where we live and our geography

- A highly altered and developed landscape over the last 150 years – reclaimed coastal swampland to the south, reclaimed land to the north. This has resulted in the City being prone to flooding and erosion
- Flat, sandy and low lying - much of the City is between 1-3 metres above sea level
- 80% impervious – our highly built environment means that less than one fifth of the City has absorbable surfaces.

Who we are

- A population of over 92,000 residents with over 60% in apartments, over 18,000 businesses, and 2.5-4 million visitors each year
- Over 45% of us rent, almost 50% of us live in single person households, almost 30% of us are low-income earners.

What we prize about our city

- Liveability & urban lifestyle – close to everything, convenient, vibrant cafés and lots to do
- Beach lifestyle and coastal activities on Port Phillip Bay
- Heritage buildings, foreshore icons, local art and our parks, gardens and reserves.

Visit www.enviroehub.com.au for more information about:

- what you can do to make your home and lifestyle more climate resilient
- Council's updates on actions in this Plan, such as further climate risks modelling
- state and national climate adaptation frameworks, updates and emerging changes to regulation and policy.



Image: Copyright © 2009 - Locals Into Victoria's Environment - live.org.au
Over 4000 people got together on St Kilda beach on 17th May 2009 to create the human climate change sign

EXECUTIVE SUMMARY

In early 2007, Port Phillip City Council published its report – [Climate Change in the City of Port Phillip – An Initial Perspective](#). The report showed that the city faces significant climate impacts in coming decades that will need to be managed.

Council has since continued actions to reduce its carbon emissions quickly, recognising that this is a critical step to reducing climate change. It has also been assessing what needs to be done to develop a city that is more resilient to a changing climate.

[Climate Adept City](#) is the climate adaptation action plan. It outlines five key actions for Council to begin to climate proof the city.

The final key action is to work with local communities to develop the [Community Climate Action Plan](#). Developed through community participation and input over 2010 and 2011, it will focus on practical local actions to build community resilience to a changing climate.

What is climate adaptation?

Adapt – acclimatise, adjust, alter, change, convert, modify, remodel

Climate adaptation is about adjusting the way we live, build our homes and cities or live on the coast, in order to cope with increasingly unpredictable and changing local climate conditions.

Humans have always adapted to local climate conditions. The difference is that until now, our global climate has been stable for most of the last 10,000 years. This has allowed the luxury of time to adapt lifestyles and cities for less favourable climate. This knowledge is some of the foundation of climate adaptation solutions emerging today. However, because we are now facing an increasingly uncertain and volatile climate, we will also have to find new solutions.



WHY ACT NOW ON A CHANGING CLIMATE?

The climate is changing, and it will affect the way we live and where we live, now and in the future.

The planet has already warmed by almost 1°C since 1900. The consensus amongst the world's climate scientists is that without action to cut greenhouse gas emissions, emissions levels in the atmosphere could reach 550-600 parts per million (ppm) before 2050. This could warm the planet to 3-4°C above pre-industrial global temperatures.

A global temperature increase of 2-2.5°C is estimated to seriously affect the capacity of oceans, glaciers and ice sheets, which could further intensify resulting climate change. At over 3°C, a catastrophic scale of climate change is reached that could profoundly and irreversibly affect all humankind and the ecosystems we depend on.

The current international aspiration is to limit global temperature rises to around 2°C above pre-industrial levels, and stabilise atmospheric CO₂-e (carbon dioxide equivalent) levels to 450ppm before 2050. This should prevent further global warming and avoid the worst impacts of a changing climate. This assumes achieving cuts in global carbon emissions to 85-95% of current levels by 2040.

Even stabilising at around 2°C above pre-industrial temperatures by 2050 will mean that sea levels continue to rise beyond 2100 and other climate regulators such as glaciers and oceans take decades to recover. This will continue to challenge and change where we live and how we build cities.

*The overall costs and risks of climate change without taking action will be equivalent to losing at least 5-20% of global gross domestic product each year – now and forever. In contrast, the cost of reducing emissions and building climate resilience **now** to avoid the worst impacts of climate change can be limited to around 1-2% global gross domestic product per year.*

Sir Nicholas Stern, January 2007
Author of the first global report on the economic impacts of climate change

THE CHANGING CLIMATE WHAT IT MEANS FOR OUR CITY AND COMMUNITY

Climate Projections and Estimated Level of Change	Potential Local Impacts
<p>Temperature rises</p> <p>+0.9°C in 2010 +1.5°C by 2025 +2.5-3.5°C by 2050 +4.5-6°C by 2100</p>	<p>Average summer and winter temperatures are increasing, as are extreme heat days and heat waves.</p> <p>Likely rise in hot summer days (Historical average: 4-6 days pa):</p> <p>2010: +14 days per year over 35°C 2025: +20 days per year over 35°C 2050: +30 days per year over 35°C 2100: +45-50 days per year over 35°C</p>
<p>Less rainfall & drier</p> <p>-10% in 2010 -15% by 2025 -20-25% by 2050 -25-40% by 2100</p>	<p>Drier conditions and increasing evaporation will further compound the effects of lower rainfall and extenuate drought conditions.</p>
<p>Extreme weather events <i>(Key variables – winds, sea level, surges, intense rainfall, temperatures)</i></p> <p>Increased storm intensity estimates for the city: +5% in 2010 +10-15% by 2025 +35-45% by 2050 +80-100% by 2050</p> <p>Storm surge estimates for the city with sea level rise: 1.65m surge (35cm rise) 2m surge (80cm rise) 2.3m surge (80cm rise + 10% wind-speed increase)</p>	<p>A changing climate will increase the magnitude (intensity and duration) of rainfall, wind, surge and storm events. This means we are likely to experience a 1 in 5 year or 1 in 100 year storm event more regularly. Strong winds often increase the magnitude of accompanying storm surges and intense rainfall.</p>
<p>Rising sea levels <i>(Key variables – local sea level and ocean depth, winds, waves, currents, temperature, rate of icesheet melt)</i></p> <p>+10-20cm by 2025 +40-55cm by 2050 +80-120cm by 2100</p>	<p>Sea level rises are currently tracking at the upper end of all projections. The observed and projected rises in sea level for the city are largely consistent with global projections. Middle Park, St Kilda and Elwood beaches are particularly susceptible to potential loss.</p>

What it might mean for you	
	<p>Impacts include:</p> <ul style="list-style-type: none"> • heat stress and decreased summer outdoor activities • hotter inner urban spaces (heat islands) and indoor spaces • need for more summer cooling, water and power use • need to modify buildings for higher thermal efficiency and shading • coping with more diseases and pests (such as jellyfish and mosquitoes) • roads and some building materials are sensitive to sustained high temperatures • reduced water quality • poor sleep/fatigue increase.
	<p>Impacts include:</p> <ul style="list-style-type: none"> • reduced water security and availability • higher water costs and restrictions • reduced water quality and higher stormwater contamination • significant impacts on parks, gardens, local flora and wildlife • more dust storms and air pollution.
	<p>Impacts include:</p> <ul style="list-style-type: none"> • more flooding • more beach erosion or loss of beaches • more storm damage to buildings, roads, powerlines, and recreational spaces • higher maintenance and insurance costs • more blackouts and lack of road access from extreme weather • reduced water quality in our bays and waterways • more risk of personal injury.
	<p>Impacts include:</p> <ul style="list-style-type: none"> • more beach erosion and loss of beaches • more silting toward northern beaches of city • more flooding • reduced water quality and higher stormwater contamination • progressively significant impacts on coastal properties and assets • impacts on the city's coastal recreational spaces, trails and paths • higher maintenance and insurance costs • progressive loss of some coastal properties in Port Phillip.



How climate risks for Port Phillip were assessed

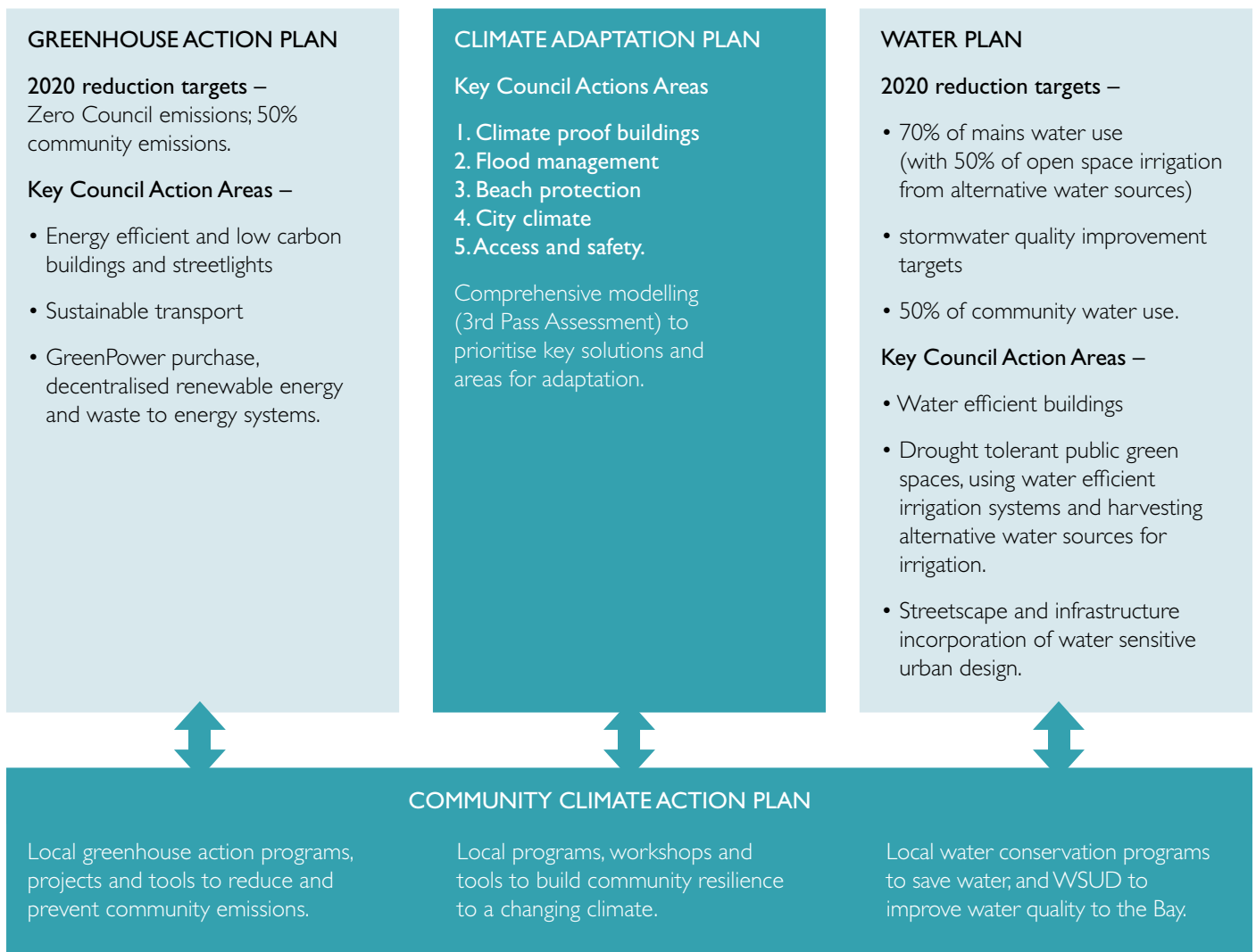
The local climate risks and impacts assessment was conducted in late 2006 with the NATCLIM research group (Earth Systems and Planning Research Centre, University of Sydney). Called [Planning for Climate Change – A Case Study](#), the assessment used approved CSIRO methodology, a variety of historical, current and projections data from sources including local records, CSIRO and Bureau of Meteorology. The risk assessment matrix combined the likelihood of an event with the impact (consequences) of that event to provide a risk score.

Council used this assessment as well as data from CSIRO and the Intergovernmental Panel on Climate Change to develop climate and greenhouse emissions scenarios and recommendations in its report, [Climate Change in the City of Port Phillip – An Initial Perspective](#). To view or download the assessment or the report, please visit www.portphillip.vic.gov.au/climateconversations

The local assessment data has since been updated to reflect the most recent climate assessments (Fourth IPCC Assessment Report 2007, Copenhagen Diagnosis 2009, CSIRO 2009). It demonstrates higher climate risks than previously anticipated, with all risks tracking at the upper end of projections.

Over 2011/12, Council will continue to conduct further comprehensive regional and local climate risks modelling and analysis. This assists Council to clarify and determine the extent of risks, and update design and policy requirements.

OUR ACTIONS, NOW AND INTO THE FUTURE



Our guiding principles for climate change action

The precautionary principle – To take a responsible, long term view to limit the effects of climate change; to become change and risk clever in finding new ways to prevent irreversible damage to the ecosystems and global resources that sustain and nourish our lives.

Inter and intra-generational equity – To work for equity between and within generations, current and future; to be responsible and efficient with resource use; to share the cost of unsustainable development, polluted environments and a changing climate.

ACTIONS TO CLIMATE PROOF THE CITY

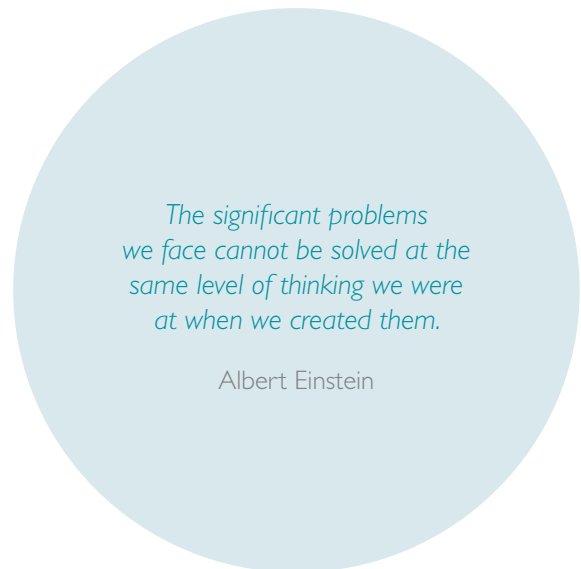
Introducing the climate adept city

Adept – able, accomplished, competent, deft, experienced, practised, skilful

A climate adept city is one that is resilient to changing climate and extreme weather. It works with water, nature and future local climate to build a clever city and community.

Homes and buildings use design and materials that mean they are less likely to be affected by flooding, extreme temperatures or weather. Available water resources are reused along with many smart ways to channel, retain and release stormwater and floodwater. Open spaces, coastline, kerbs, avenues and buildings use vegetation to create more favourable climate conditions whilst 'absorbing' some of the impacts of extreme weather. The city's coastline is carefully managed to better deal with rising seas and increased storm surges, whilst offering new opportunities to live and play by the sea.

Residents and businesses have climate smart lifestyles and practices. They use raingardens, harvest rainwater and grow some of their own vegies. Vertical and rooftop vegetation, stormwater calming devices and barriers on external openings reduce climate impacts on their homes and premises. They are weather smart in planning their daily activities. They also know how to manage themselves as well as assist others in need during extreme weather events.



Vertical vegie garden



OUR VISION

A climate clever and adaptive city that maintains healthy and productive communities, neighbourhoods and ecosystems while enhancing our resilience within a changing world.

CLIMATE RESILIENT BUILDINGS

Port Phillip is densely built and populated, and has less than 5% of land available for new developments. The proximity to inner Melbourne's many assets, coupled with growing housing demand mean that local buildings will continue to be redeveloped or renovated.

Objective

Our key objectives for this action area are to:

- foster adaptive building design and development across the city
- restrict coastal development that is assessed as vulnerable.

Adaptive buildings work with climate to create a structure that is more internally comfortable while being more resilient to climate impacts such as flooding, higher winds and extreme weather. Future possibilities include the potential to progressively manage our coastline to also contain 'floating buildings and open spaces' to harness new recreational, business and living potential.



Model of a flood and climate proof house

Challenges

The short term challenge is achieving updated and consistent climate vulnerability and adaptive planning and building requirements in state planning policy and regulations. The medium term challenge is gaining adequate local climate modelling to determine whether and which parts of our coastline may have to be retreated from or substantially altered in use.

Benefits

- less storm damage to local properties
- minimised building safety and liability issues during extreme weather events
- capacity to progressively climate proof property over time
- high potential for reduced energy and water use costs
- improved water quality
- flood calming potential in new developments.



Eco house in North Carlton



Eaves, shutters and green walls aid temperature control and ventilation



Flood proof house



The EcoCentre, St Kilda uses well positioned solar panels to provide summer 'eaves'



This house in Ross Street, Port Melbourne incorporates wide eaves and external blinds to reduce summer heat indoors

ACTIONS

Our actions centre on restricting coastal and flood prone development, and providing clear planning and building guidelines and requirements for climate resilience. Implementation will largely occur through the planning and building approvals process. It may take at least two decades to achieve significant levels of adaptive buildings across the city.

a. Restrict coastal and flood prone development and require updated climate resilience conditions on coastal and flood prone properties

- introduce enhanced climate resilience standards into local planning policy provisions
- develop updated flooding and special building overlay controls
- develop a Coastal Structure Plan addressing climate vulnerability assessment criteria and requirements on all coastal developments

b. Require development controls addressing climate and coastal vulnerability through

- updated development policy and controls, including design and development overlays, and heritage policy
- open space and place design criteria
- planning permit requirements on coastal developments
- planning and building permit conditions that address climate and coastal vulnerability.

c. Develop updated local planning and building policy to address climate vulnerability

Update the following policies and frameworks as required to consider adaptive building design and climate vulnerability considerations - including Municipal Strategic Statement, Local Planning Policy Framework, Structure Plans, and land use strategies.

For more information on how this action area is implemented, please see diagram on page 18

FLOOD MANAGEMENT

Many areas along the coast and canal from Elwood to Albert Park are low-lying and currently prone to flooding. Sea level rises coupled with increased storm surge and rainfall events mean that the city will have to progressively increase drainage capacity through new drainage design and infrastructure.

Objective

Our key objectives for this action area are to:

- realise an effective drainage network for an increasingly flood prone city
- ensure that this drainage network is integrated and properly blended with both coastal protection mechanisms and increasing inland freshwater reserves.

Well designed drainage also uses stormwater capture and flood calming devices, blends well into the existing character and assets of local streets and neighbourhoods, and could provide irrigation to nearby open spaces and recreational areas. Using such solutions in private properties can play a significant role in flood calming.

Benefits

- reduced damage from flooding events
- increased stormwater harvesting and flood calming opportunities
- reduced irrigation and water use costs
- higher water security for the city's parks, gardens, trees and recreational spaces
- improved water quality
- increased potential for use of flood calming devices in private properties.



A raingarden channels and cleans stormwater, and helps to reduce stormwater runoff. Image: Courtesy Melbourne Water



Huntingdale Road Wetland – wetlands are great at absorbing extra floodwater. Image: Courtesy Melbourne Water

Challenges

Our short term challenge is determining what an acceptable level of flood protection is, as drainage infrastructure is very long living. Our long term challenge will be dealing with a drainage system that becomes less effective as sea levels rise.



A flood proof building

ACTIONS

These centre on further flood modelling, piloting innovative drainage design and assessing which solutions work best for local conditions, and developing a Drainage Master Plan.

- a. **Complete updated flood modelling** to determine new drainage design parameters. This includes hydraulic and coastal inundation modelling to understand this city's total drainage needs and priorities.
- b. **Conduct drainage network analysis and map reduced capacity** under medium term (2025, 2045) and long term climate risk projections (2070, 2100) to determine total drainage capacity required. *Drainage is long term infrastructure and any upgrade or redesign needs to be capable of meeting needs for several decades rather than years.*
- c. **Develop a Drainage Strategy** that ensures integration between drainage strategies and the following three areas – coastal protection actions, water conservation and reuse actions in Council's Water Sensitive City and Open Space Water Management Plans, and maintaining and building local roads.
- d. **Consider alternative solutions to drainage design in priority areas**, with capacity to monitor and evaluate performance during flood events.
- e. **Increase the use of flood calming devices to reduce flood events** – water sensitive urban design applications, retention basins and systems.
- f. **Reduce pressures on the drainage network by introducing new development and building requirements** to reduce/prevent future flooding in properties. Likely requirements include increasing absorbent surfaces, stormwater storage and treatment and water sensitive urban design applications.

For more information on how this action area is implemented, please see diagram on page 18

For more information on stormwater reuse and improving water quality to the Bay, see the Water Plan

BEACH PROTECTION

The city's foreshore, beachside activities, iconic and historic beach venues are highly valued by the community, and attract between 2.5-4 million visitors each year. The beaches from Middle Park through to Elwood have been prone to increasing erosion for decades.

A changing climate both accelerates this process and increases the chances of storm surges or king tides that could completely wipe them out. Equally, this may increase silting (sand deposits) around Port Melbourne's coastline and decrease drainage capacity. Coupled with sea level rises, our coastline is set to significantly change in how it looks and what it enables us to do over the coming decades.

Our unique Port Phillip Bay location also means that action to protect and manage climate smart coastlines must be in collaboration with other cities and stakeholders around the Bay.

Objective

Our key objective for this action area is to create a beach protection strategy that fortifies and provides sea defences along our coastline. To be effective, it will need to:

- properly blend with both the city's expanding drainage network and an integrated bay-wide coastline protection strategy
- provide protection to inland water reserves and development
- enhance new and climate smart opportunities for uses and functions of our coastline.

Well-designed beach protection strategies work with local climate character and can introduce exciting new functional possibilities to our foreshore. Solutions could include extending coastlines to increase a combination of dunes and vegetation to protect from rising seas, while increasing recreational opportunities and wildlife habitat. Careful use of sand alternatives, groynes and sea walls that contain flood retention basins beside or below can further fortify the coastline while allowing for vibrant beachside activities and living options.



Coastal wetlands and a variety of coastal protection measures reduce the impact of storm surges and rising seas



Wallasea Island, UK demonstrates a new approach to managing coastal flooding and rising seas through a combination of recreated wetlands, mudflats and saltmarshes instead of seawalls. These soft engineering solutions are proving very effective in reducing the impacts of storm surges and rising seas.

ACTIONS

These centre on preparing a beach protection strategy that is well integrated into both a wider coastal management strategy for Port Phillip Bay, and the city's future drainage network.

- a. **Initiate and complete regional and local coastal vulnerability assessments** in collaboration with other cities around Port Phillip Bay to determine the extent of inundation and set the design parameters for any subsequent beach protection strategy.
- b. **Map solutions opportunities** to identified vulnerable areas along the city's coastline.
- c. **Develop a beach protection strategy for Port Phillip** that is integrated into a bay-wide coastal protection strategy (with key stakeholders around the bay) and properly blended with the city's expanding drainage strategy.
- d. **Develop a regional partnership with key stakeholders to trial and pilot various solutions** including capacity assessments of the various solutions trialled.
- e. **Develop updated foreshore/coastal strategies and policies** to address local climate vulnerability. This includes Council's Foreshore Management Plan and Coastal Action Plan.

For more information on how this action area is implemented, please see diagram on page 18



Benefits

- continued use of foreshore for recreational and cultural activities
- beachside assets better protected from coastal inundation and salinity creep
- effective drainage maintained
- inland water reserves better protected from contamination and seawater
- opportunities for future coastal icons and business activities with primary sea defence functions and secondary recreational functions
- potential for increased local wildlife habitats.

Challenges

Our short term challenges are gaining an effective coastal protection plan that is properly integrated with a wider bay-wide strategy, and making significant changes to the local function and character of our coastline. Our medium to long term challenge is determining whether and which parts of our coastline we may have to retreat from.

CITY CLIMATE

Hot temperatures, built up areas, reflective surfaces, greenery and summer shade all influence whether our city is pleasant to live in during summer. All the more so because over 60% of the city's residents live in apartments. Heat waves and higher night temperatures in summer are becoming more common and seriously affect comfort and amenity, both indoors and out. Less rainfall and extended dry periods can lead to poorer air quality, and our treasured street trees, parks, gardens, reserves and recreational spaces can look stressed and struggle to support regular use.

Objective

Our key objective for this action area is to realise new building, streetscape and public/green space design that influences local climate positively, increases thermal comfort and ventilation indoors, and reduces our power use.

Solutions to heat stress and urban heat island effects (warmer built up streets and spaces) include using more trees, rooftop gardens, vertical greening of buildings and reusing stormwater in water features. These solutions also help well-designed buildings to keep comfortable indoor temperatures all year and harvest stormwater. 'Greening' our neighbourhoods and streets in this way could significantly reduce urban heat island effects and increase amenity, recreational opportunities, and local wildlife habitat.

Benefits

- more liveable city, less heat stress
- greener, more beautiful city
- reduced energy costs and energy demand
- increased opportunities for private rainwater harvesting, reduced mains water costs
- better air quality
- better water quality
- reduced private building damage from extreme weather and temperatures
- increased habitat and food for migrating and local wildlife
- stormwater calming potential.



Challenges

Our short term challenge is gaining sufficient community and developer use of such solutions.

Image: Courtesy Melbourne Water

ACTIONS

These centre on development and implementation of an integrated strategy to deliver adaptive building and open/green space design. It may take at least two decades to achieve significant levels of adaptive 'greening' of our streets and neighbourhoods across the city.



- a. **Incorporate key heat island design and management principles** in to the Public Realm Framework for all new/ revised Structure Plans and into Development Controls – these include criteria and requirements for building thermal efficiencies, rooftop/vertical greening, tree canopy and open space treatments.
- b. **New design and planting provisions in new developments, redevelopments, activity centres and public spaces** to increase the innovative use of building design, tree canopies and rooftop/vertical greening to counter local heat island effects.
- c. **Map and incorporate tree canopy/rooftop greening potential in the city** to provide a clear perspective of where potential lies to reduce urban heat island effects and to what extent.
- d. **Work with our most vulnerable communities to provide city climate solutions** during extreme temperatures – these are currently heat stress management programs, insulation and energy efficiency projects, and additional assistance services on days over 35°C.
- e. **Updated beach and recreational spaces use** during extreme heat or weather events. This will focus on local signage about smart use during hot weather; increased use of drinking fountains, community education and adjusted summer community public activities to reduce incidences of heat stress and dehydration.
- f. **Develop a new Tree Management Strategy** that incorporates urban forest strategies.

For more information on how this action area is implemented, please see diagram on page 18



*Street trees in the Melbourne CBD under absorbent surfaces aid summer shade and survive dry conditions better.
Image: Courtesy Melbourne Water*

Left & Top: Patrick Le Blanc's vertical green walls are used on Paris' Musee Du Quai Branly

ACCESS AND SAFETY

Access and safety in a dense, vibrant and connected city like Port Phillip has always been considered essential by local communities, transport providers, emergency services agencies and Council. Equally, our inner urban location and lifestyles have insulated us from threats such as bushfire. A changing climate not only poses new flooding, power failure, extreme heat and storm risks, but introduces new public health risks and diseases such as jellyfish, mosquitoes or birds spreading plant diseases.

Objective

Our key objective for this action area is to maintain excellent health, access and safety standards and services whilst enhancing community capacity to respond during emergency and health risk/pest events, particularly through the Municipal Health Plan.

Solutions include community awareness and education, signage, early notification systems, and encouraging the development of neighbourhood and apartment block emergency response plans so communities know what to do in an emergency.



ACTIONS

These centre on updated city emergency response management, an updated Municipal Health Plan, and developing community notification and awareness strategies.

- a. **Update Council's response plans to emergency events and pests/diseases** in collaboration with key stakeholders.
- b. **Develop strategies for increasing community awareness and action during emergency events** – this includes scenario mapping and assessment of vulnerable communities to emergency scenarios.
- c. **Develop an information and early notification/prevention strategy** for key pests, diseases and health risks that are likely to be seasonal such as mosquitoes and jellyfish.
- d. **Adapt regional learning and results of peak oil trials to develop a Peak Oil Strategy** for the city to plan for this scenario in coming years.

For more information on how this action area is implemented, please see diagram on page 18

Challenges

Our short term challenge is gaining sufficient community and stakeholder engagement to develop relevant solutions.

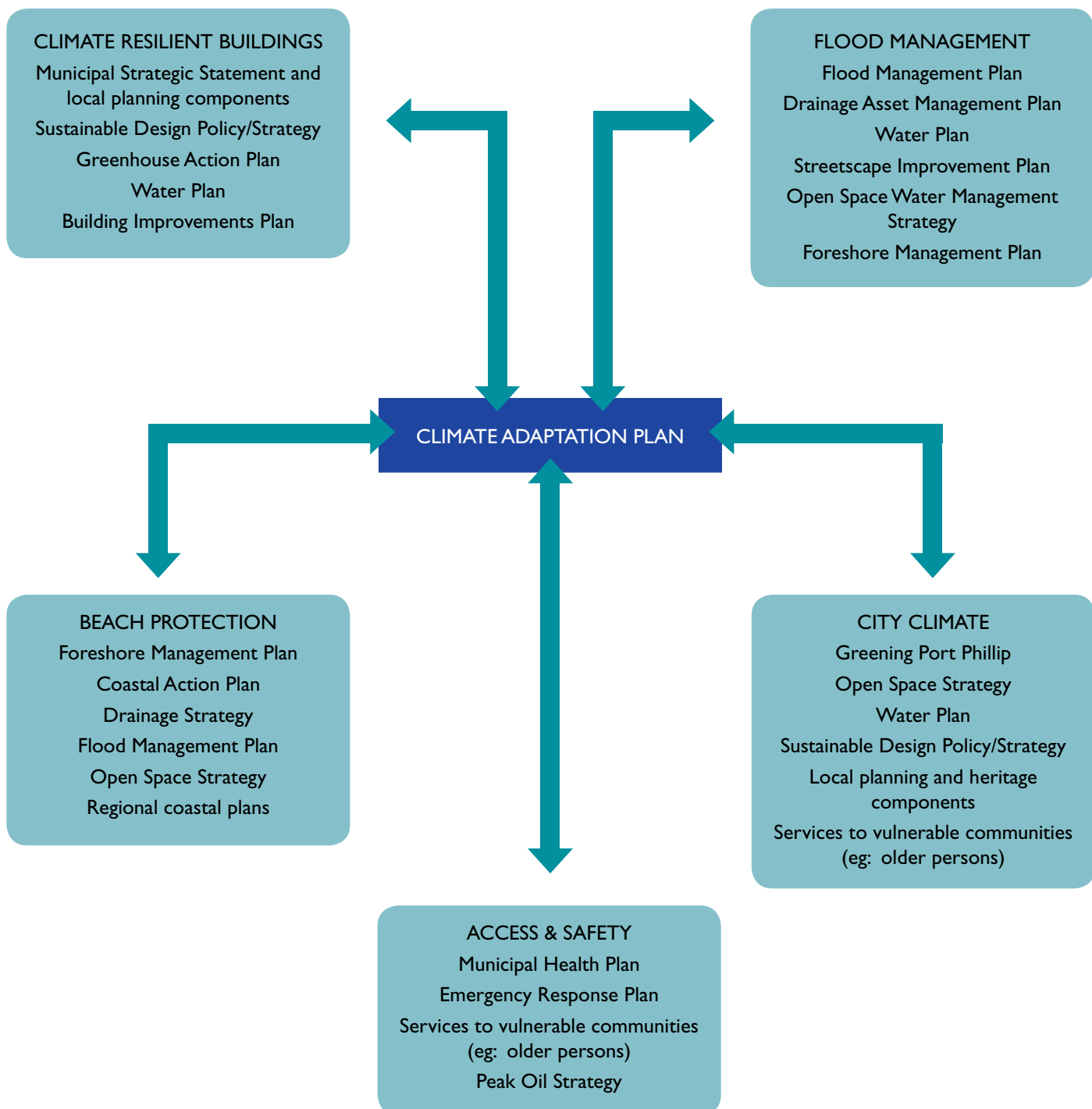
Benefits

- more liveable city
- better community self management and lower community risks during health alerts or emergency events
- more locally networked community.

DELIVERING THE PLAN – OTHER KEY COUNCIL PLANS

The Climate Adaptation Plan is delivered or assisted in its delivery through a number of other key Council actions plans, The Plan also has to be considered in relation to how some Council maintenance and service components are to ensure an integrated approach on climate adaptation across Council operations. Equally, some components of building community resilience are delivered through Council services targeting vulnerable groups.

The diagram below demonstrates the key action plans, policies and service areas that assist in the delivery of the Plan.





The Great Wall of St Kilda – a recent example of what can be achieved through community participation and action

COMMUNITY CLIMATE ACTION PLAN

A prepared and locally networked community plays the biggest role in minimising the local impacts from a changing climate. Current areas for action could include heat stress management, climate smart buildings and gardens, local food production, stormwater calming and cleaning, and responding wisely to emergencies such as flooding or blackouts.

Objective

Our key objective is to work WITH local communities to develop a locally relevant, community-based Community Climate Action Plan.

What it covers

The Community Climate Action Plan provides community action plans for the key areas of:

- carbon abatement including sustainable buildings, sustainable transport, energy and fuel efficiency, and decentralised low carbon energy systems
- water conservation, reuse, using raingardens and improving water quality to the Bay
- waste minimisation, composting, recycling and reuse
- community resilience to a changing climate including managing temperature extremes, developing climate and flood resilient buildings, and minimising the impacts of an emergency.

Your participation helps to develop and implement a Community Climate Action Plan that is more likely to work for your lifestyle and household, your street or apartment block, your community.

For more information or to get involved, visit www.envirohub.com.au

TAKING ACTION DEVELOPING A CLIMATE ADEPT CITY

Progressively developing a climate adept city will require everyone's involvement and effort. Council is interested in using your knowledge of your neighbourhood to identify issues and opportunities for becoming climate resilient. These will be used to help Council plan and consider both how to best assist community capacity building, as well as gain ideas on the short, medium and long term works required to create a climate adept city. **Share your ideas and issues through the discussion forum at www.envirohub.com.au**

Rooftop gardens and raingardens to capture, retain and clean rainwater and stormwater

More absorbable surfaces, courtyards and paths to reduce stormwater runoff

Using insulation, eaves, external blinds/shades and high performance glass to improve indoor comfort

Using more trees, vertical and rooftop gardens to reduce urban heat island and storm effects

Development or coastal works that impact on drainage and increase flooding

Developing neighbourhood-based or apartment block-based emergency response plans

Flood proofing your building

Thinking about your local area, can you identify any opportunities or issues that could benefit from climate adaptation?

Developing buildings and infrastructure that deal with increased erosion subsidence and coastal inundation



FACING THE CLIMATE CHALLENGES AHEAD

A changing climate poses new and unprecedented challenges – it also requires new ways of doing and thinking. Acting now to begin building a resilient, climate smart, liveable city is essential to ensuring that Port Phillip continues to be attractive, healthy and vibrant. But this is not without its significant challenges.

I don't pretend we have all the answers. But the questions are certainly worth thinking about.

Arthur C. Clarke

The Challenges Ahead

1. The science goalposts keep moving and all signs are that **climate change is accelerating** – this means we are planning and designing for an increasingly uncertain future.
2. **Integrated action** – some actions and their solutions such as beach protection must be designed with other stakeholders such as other cities, state and federal governments to ensure an outcome that will work. This can take a lot of time, resources and compromises before outcomes are achieved.
3. **Commensurate and consistent state/federal policy and regulations** – many of the overarching state/federal policy and regulations around building and development design and conditions have not been updated to reflect planning and building standards that meet the projected climate risks.
4. **Resourcing adaptation actions** – effective actions and new design requirements will mean new budget considerations for Council in the coming years, and some of this expenditure will be considerable for a long time. Equally, the cost of not acting is much greater.
5. **Managing a quick transition to a low carbon city and community** – without dramatically lowering carbon emissions within 10-20 years, we greatly risk increasing runaway climate change.

FROM CHALLENGES TO OPPORTUNITIES

How we approach our climate challenges will determine whether we design defensively for a future of increasing threats, or proactively for a future of new and exciting possibilities to sustain our lifestyles and a vibrant, productive city.

A proactive approach means planning for anticipated problems before they happen rather than trying to fix them afterward. Being proactive is also about looking for the opportunities offered within the challenges faced. One proactive approach to building local climate resilience is adaptive design.

Adaptive design works with nature rather than against it to gain climate clever solutions. Adaptive design seeks to create new ways of living well on the coast, with more flooding or hotter temperatures. It encourages design solutions that offer new living, business and recreational options. This builds our ability to seek solutions that manage problems in a positive and progressively effective way.

The Netherlands – A leader in adaptive design and climate positive possibilities

Taking the radical approach, climate vulnerable Netherlands has developed remarkable solutions to living positively with a changing climate.

Coastlines have been extended and 'restored' to mimic natural estuaries and dunes. This reduces inland salinity and gives the rising sea 'breathing space' whilst protecting inland development and water reserves. Some dykes and levees are being removed and replaced with coastal wetlands and floating roads to reduce some types of flooding. New coastal resorts and homes use 'floating houses' behind protective barriers of vegetated dunes. 'Floating greenhouses' have increased the country's horticultural output. Green roofs and underground tanks catch stormwater and offer recreational opportunities above. Plans to increase inland water reserves may even provide freshwater export opportunities to southern Europe.

(The Netherlands Delta Committee showcase of actions)



'Floating' houses behind protective vegetated dunes



A floating greenhouse



CH2 (Council House 2), Melbourne

Glossary

Low carbon	Buildings, infrastructure, assets, technology, fuels or systems that minimise/prevent greenhouse gas emissions by using alternative materials and energy sources.
Climate proof/Climate resilient	To modify physical assets, infrastructure, local places, and lifestyles or the way we live, so that there is much less risk of climate change impacts.
Flood calming	Physical storage devices that assist to divert and reduce the volume of stormwater. Examples include stormwater tanks and some types of raingardens.
Flood retention	Physical storage and diversion devices which retain the bulk of flood water for later use or slow release. This is usually achieved with large retention basins or an integrated wetland which can provide additional benefits such as pollution treatment, supporting biodiversity, and recreational opportunities.
Beach erosion	The wearing away of the coastline, beach or dunes by natural processes including wave action, tidal currents, wave currents, or drainage.
Sand additives	Materials added to beach sand, such as pebbles, to reduce the susceptibility of the beach to erosion.
Stormwater	Rainfall runoff from all types of surfaces. Stormwater is mostly generated in urban catchments from hard surfaces such as buildings, roads and pavements.
Water sensitive urban design (WSUD)	A broad term for achieving water efficiency, stormwater treatment to improve water quality, and the capture and reuse of alternative water sources such as rainwater, stormwater and wastewater.
Urban forest	A significant collection of trees and under-story growth in an urban area that contributes to moderating the local climate by providing wind protection and absorbing heat.
Urban heat island effect	The additional heating of the air over a metropolitan area as the result of the replacement of natural, vegetated surfaces with asphalt, concrete and rooftops.
Impervious	Non-absorbable or impermeable; does not allow water (rainwater, stormwater) to drain through. Impervious surfaces increase stormwater runoff.

FOR MORE INFORMATION

To learn more about climate adaptation, other Council environmental plans, or action you can take to make your lifestyle, home or business, and your neighbourhood more climate adept, visit www.enviroehub.com.au

This Plan uses local and overseas photos to provide examples of building climate resilience. Please contact Council's Sustainability Department to gain sources and acknowledgement of any photos used.

For more information, requests, questions and feedback or to have this document translated, please call ASSIST on (03) 9209 6777 or email assist@portphillip.vic.gov.au



This is printed on
100% recycled paper
with vegetable inks

Published 2010
Copyright of
City of Port Phillip