

# Dandenong

## STRATEGIC DIRECTIONS STATEMENT

SEPTEMBER 2018



Integrated Water  
Management Forums



Environment,  
Land, Water  
and Planning



**Integrated Water Management is a collaborative approach to water planning and management that brings together organisations with an interest in all aspects of the water cycle.**

It has the potential to provide greater value to our communities by identifying and leveraging opportunities to optimise outcomes.

# Contents

<b>Foreword</b>	<b>1</b>
<b>Acknowledgements</b>	<b>2</b>
<b>Chapter 1 The way forward</b>	<b>3</b>
Introduction	4
Overview	4
What is a Strategic Directions Statement?	4
Enduring collaboration	5
How we're working together	5
Recognising Aboriginal values in water planning and management	5
Guiding principles for collaboration	6
<b>Chapter 2 IWM in the region</b>	<b>7</b>
Regional context	8
Population	8
Climate change	10
Vision and strategic outcomes	11
Collaboration to develop the shared vision and strategic outcome areas	11
Strategic outcomes for IWM	12
The case for IWM in the Dandenong catchment	14
<b>Chapter 3 IWM opportunities</b>	<b>19</b>
Priority Portfolio	20
Impact of IWM opportunities on the Forum's strategic outcomes	21
IWM opportunities: An overview of projects and strategies	22
Priority Portfolio of IWM opportunities	28
Strategic enablers to put IWM into practice	41
Success stories	42
Continued success through collaboration	44
<b>Appendix</b>	<b>46</b>
Additional IWM opportunities in the Dandenong catchment	46
Glossary of terms	48

# Foreword

Water is essential to the prosperity of our catchment and the liveability of our communities.

The long term goal of the Dandenong Integrated Water Management Forum is to design and deliver effective solutions to address the combined challenges of population growth, rapid urban development and climate change in this unique region of Victoria.

The wealth of knowledge and experience that our Forum Partners bring to water planning and management will ensure that our catchment is protected and enhanced for future generations to succeed and thrive as we have.

As Chair of the inaugural Dandenong IWM Forum, I am pleased to present this Strategic Directions Statement as a demonstration of the passion, determination and innovation of our Forum Partners to collaborate, invest and implement IWM initiatives that will address the complexities facing our region and deliver the highest-quality IWM solutions for Victoria.

This is a dynamic document that reflects our experience and current priorities, and it will be continually assessed to ensure the Dandenong IWM Forum remains on track to further advance IWM in the region.

I would like to acknowledge the outstanding contribution of the Dandenong IWM Forum Partners who collaborated over many months to develop the shared vision and strategic objectives for the Dandenong catchment.

I thank you for your continued commitment to collaborate to progress the IWM opportunities included in this document, and your dedication to shaping the future of our catchment.



**Shaun Cox**

Chair of the Dandenong IWM Forum



# Acknowledgments

The inaugural Dandenong Integrated Water Management Forum was convened in December 2017 with subsequent Forums meeting throughout 2018 to discuss and prioritise integrated water planning and management in the Dandenong Forum Area.

The Forum Area includes catchments flowing into Port Phillip Bay from Port Melbourne to Point Nepean. The region covers some of Victoria's fastest urbanising areas and will be the site of substantial sub-metropolitan population growth and economic development in the coming years.

Situated in the foothills of the Dandenong Ranges and stretching to the coast of Port Phillip Bay, the Dandenong catchment contains a breadth of iconic Victorian landscapes ranging from cool temperate rainforests and wet heathlands to sandy bay beaches. Preservation and management of the catchment's landscapes will have a positive impact on the long term health and security of the region's waterways.

The Forum Area covers the traditional lands of the Wurundjeri people and the Bunurong people of the Kulin Nation. The region is abundant in Aboriginal cultural sites with a majority of these found near waterways and the coast. The Dandenong IWM Forum acknowledges these Traditional Owners as traditional custodians who have managed land and water sustainably over thousands of generations and maintain an active connection to Country.

The Dandenong Integrated Water Management Strategic Directions Statement has been developed by the Dandenong Integrated Water Management Forum. Members of this Forum include the Chief Executive Officers and Managing Directors of the following organisations:





# Chapter 1

# The way forward

An unprecedented opportunity to progress water cycle planning and management in Victoria through collaboration.

# Introduction

## Overview

The Dandenong catchment is a rich and varied geographic area encompassing coastal environments, natural forests, agricultural lands and densely populated urban areas. The extent of urban growth and development across Greater Metropolitan Melbourne, considered alongside challenges posed by global climate change, will further impact on the region's water cycle and the health of waterways entering both Port Phillip Bay and Western Port. Balancing the needs and function of the Dandenong catchment's water cycle with future growth and development is a complex challenge requiring careful management.

The region's water sector, local governments and Traditional Owners are working collaboratively to plan and deliver projects and strategies that will enhance the resilience and liveability of the Dandenong catchment and deliver enduring environmental, economic and social benefits to local communities. Through ongoing engagement with their communities, these organisations have heard that thriving waterways are inextricably linked to community identity, amenity, value and sustained economic benefit for the catchment.

The way in which land use and water planning occur will be fundamental to ensuring these aspirations are realised.

The urban water cycle in the Dandenong catchment is overseen and managed by several agencies. Enhanced communication and collaboration is required to ensure plans and investments are optimised to enable shared benefits and outcomes.

This approach is Integrated Water Management (IWM). The central premise of IWM is the overall acceptance that managing urban liveability and resilience is a shared responsibility.

The *Integrated Water Management Framework for Victoria 2017* is designed to help local governments, water corporations, catchment management authorities, Traditional Owners and other organisations work together to ensure that the water cycle efficiently contributes to the region's liveability, with communities at the centre of decision-making.

To assist organisations to deliver these long term benefits, IWM Forums have been established across Victoria to identify, prioritise and oversee the implementation of critical collaborative water opportunities.

## Integrated Water Management

IWM is a collaborative approach to water planning and management that brings together organisations with an interest in all aspects of the water cycle. It has the potential to provide greater value to our communities by identifying and leveraging opportunities to optimise outcomes.

## What is a Strategic Directions Statement?

This Strategic Directions Statement (SDS) articulates the regional context, shared vision and strategic water-related outcomes for the Dandenong catchment.

It includes a prioritised list of IWM opportunities developed in collaboration by the Dandenong IWM Forum partners.

Partners of the Dandenong IWM Forum are committing their best endeavours to:

- Ensure priority opportunities are progressed in line with the shared vision and strategic outcomes of the Dandenong catchment; and
- Support DELWP to progress priority strategic enablers for IWM in Victoria.

It is envisaged that the SDS will be a living document which will be updated to reflect the Dandenong IWM Forum's current priorities and opportunities.



# Enduring collaboration

## How we're working together

The Dandenong IWM Forum identifies, coordinates and prioritises areas that would most benefit from collaborative and place-based water management planning and projects.

The Forum brings together 21 organisations with an interest in water cycle management across the Dandenong catchment. These organisations include four water corporations, 13 local governments, the Port Phillip and Westernport Catchment Management Authority, representatives of Bunurong and Wurundjeri Traditional Owner interests, the Department of Environment, Land, Water and Planning (DELWP) and the Victorian Planning Authority.

To ensure IWM is successful and enduring across the region, the Dandenong IWM Forum partners have committed to the promotion of a collaborative and shared values culture within their own organisations and beyond through their work with key water cycle delivery partners and local communities.

The Dandenong IWM Forum is governed by an open and transparent IWM planning process.

This process assumes a holistic, whole-of-cycle approach to determine water cycle solutions, considering regulatory accountabilities and delivery responsibilities.

Each organisation has an important role to play in the decision-making and management of the catchment's water, resources and assets.

Collaboration across IWM Forum partners will ensure balanced consideration of the complex economic, environmental, cultural and community benefits and impacts associated with the range of proposed IWM projects and strategies. This collaborative process allows for integrated solutions that respond to individual organisations' needs, as well as the needs of the broader catchment.

The Dandenong IWM Forum partners will continue to work together to build inter-organisational trust and develop productive, enduring relationships to realise the shared vision for the Dandenong catchment.

Further information on the IWM Forum's governance and planning framework is outlined in the *Integrated Water Management Framework for Victoria 2017*, available on the internet at [www.delwp.vic.gov.au](http://www.delwp.vic.gov.au).

## Recognising Aboriginal values in water planning and management

The Dandenong IWM Forum is committed to working in partnership with Aboriginal Victorians across landscapes, communities and natural resources.

The Forum recognises that Traditional Owners throughout the metropolitan Melbourne catchments, including the Bunurong, Wurundjeri and Wadawurrung people of the Kulin Nation, are unique to Country and their involvement in IWM planning will be specific to each planning area.

Organisations involved in IWM have obligations to involve Traditional Owners and consider Aboriginal values in their organisational activities. The Forum will continue to work with Traditional Owner groups to determine the appropriate approach and level of involvement in the broader IWM planning process for each Forum Area.



Port Phillip Bay. Photographer: David Paul

## Guiding principles for collaboration

The purpose of the Dandenong IWM Forum is to provide a collaborative platform for overseeing, supporting and, where necessary, facilitating water's contribution to resilience and liveability in Victoria.

Applying an IWM approach, the Forum will:

- Consider the collective community needs in the regional context and develop an overall strategic direction accordingly.
- Complement and feed into existing water and land planning processes, collaborative networks, forums and associations.
- Commit best endeavours to facilitate multi-stakeholder initiatives, share organisational expertise and advance sectoral learnings.
- Respect Traditional Owner rights in water management planning.
- Ensure multiple benefits can be delivered to the community and the economy.
- Optimise investment in water management projects and strategies to deliver multiple benefits and best community value solutions.



### IWM Forum governance structure

Further information on IWM Forum collaboration and planning can be found in Chapter 3 of this SDS.



Port Phillip Bay wetlands. Photographer: David Paul





## Chapter 2

# IWM in the region

Understanding why an integrated approach to water planning and management is critical to achieving better economic, environmental, cultural and community outcomes for the Dandenong catchment.

# Regional context

The Dandenong IWM Forum Area encompasses some of Victoria's most iconic waterways and landscapes. The catchment covers an area of approximately 1,236 km<sup>2</sup>, extending in the northeast from the foothills of the Dandenong Ranges south to Mornington Peninsula on Port Phillip Bay. It includes regional catchments flowing into Port Phillip Bay from Port Melbourne to Point Nepean. The landscape of the Dandenong catchment varies from mountainous forested areas, wetlands and coastal beaches, to densely populated and expanding areas on Melbourne's fringe.

While the Forum Area includes several verdant national parks abundant in native vegetation and wildlife, less than one quarter of the Dandenong catchment is devoted to the natural environment and agriculture. Urban areas dominate land use here, with many of Melbourne's major sub-metropolitan growth centres marked for further development in the coming years.

The region sustains a range of recreational activities, including tourism, fishing, boating, cycling, walking and beach escapes. Commercial activities in the catchment include viticulture, horticulture and livestock production, as well as notable manufacturing, technology and education sectors.

The Dandenong catchment includes areas of significant value where Aboriginal people have lived for thousands of years. Archaeological evidence from the Dandenong Ranges shows Aboriginal people lived in this region over 35,000 years ago.

## Population

The Dandenong IWM Forum Area has an estimated population of 1.6 million people and is predicted to rise to 2 million by 2040. The region encompasses a major urban growth corridor and much of the greenfield residential development in southeast Melbourne will occur here over the next two decades. Significant densification is predicted for many suburbs across the region,

particularly those surrounding Dandenong, Cranbourne and Frankston. Large population increases are also anticipated in the Moorabbin, Cheltenham and Highett areas, as well as the suburbs of Caulfield and Murrumbeena. Protecting the region's distinctive character while maintaining and enhancing liveability and resiliency for its growing communities is a priority for the Dandenong catchment.



St Andrews Beach. Photographer: Ashley Dowle



### POPULATION GROWTH

**1,600,000** NOW (2018)

**2,000,000** BY 2040



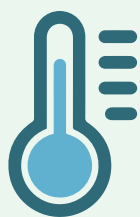
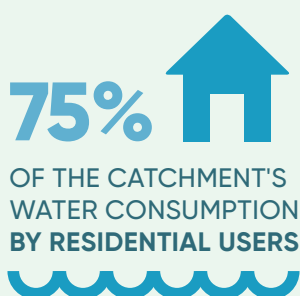
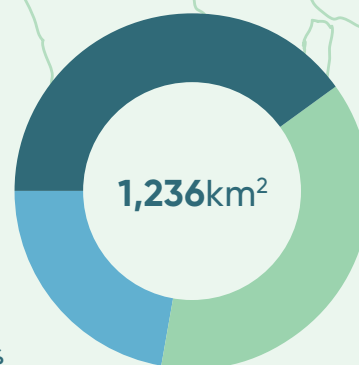
**25%  
INCREASE**



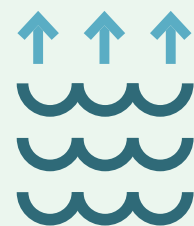
### THE REGION

**DANDENONG**  
**1,236 SQUARE KM<sup>2</sup>**

- URBAN AREAS **40%**
- INDUSTRIAL AND AGRICULTURE **38%**
- NATURAL VEGETATION **22%**



**TEMPERATURE**  
AN INCREASE OF  
**1.3°C**  
BY 2040



**SEA LEVEL  
RISE\* BY**  
**1m**  
IN THE NEXT  
80 YEARS

\*UNDER A MEDIUM CLIMATE CHANGE SCENARIO



## Climate change

By 2040, average temperatures across the Dandenong catchment are expected to rise by an average of 1.3°C under a medium climate change scenario. This will increase the impact of the urban heat island effect with higher density urban areas experiencing greater heat vulnerability than areas in the cooler, mountainous upper catchment.

The region is predicted to see more frequent and intense rainfall events that will increase the risk of flooding in areas such as the Dandenong Creek Valley, Elster Creek catchment and the Mornington Peninsula. Increased flows from heavy rainfall events will affect water quality, as well as the health of waterways and marine species from the upper reaches downstream to Port Phillip Bay.

Despite the predicted increase of rainfall events, the Dandenong catchment could experience a reduction in average annual rainfall by 2040. As a result, droughts will become more frequent and longer in duration, impacting the region's productive agriculture and viticulture industries. Less rainfall over the catchment, coupled with fast-growing urban populations and industrial demands, will place increased pressure on water services in the catchment.

Climate change will also pose a serious threat to the forested landscapes, creek environments and wetlands of the Dandenong catchment. Projections for Victoria's future climate indicate an increase in the frequency and intensity of bushfires for the Dandenong

To meet the challenge of climate change and prepare Victoria's water system for a range of possible climate futures, **climate change mitigation and adaptation actions will be embedded in all IWM Forum decisions.**

catchment and neighbouring regions in Australia's southeast. The increased risk of bushfire poses a serious threat to the catchment's communities, infrastructure and high-value native forests and ecosystems.



Blue ringed octopus, Port Phillip Bay. Photographer: Julian Finn

# Vision and strategic outcomes

By valuing water in its entirety, the Dandenong catchment is a well-planned, healthy, resilient and thriving environment for people and nature – now and into the future.

## Collaboration to develop the shared vision and strategic outcome areas

The IWM Forum demonstrates a robust and transparent process of collaboration amongst local governments and a range of stakeholders with an interest in water.

Central within this process are the community values, local interests and place-based opportunities represented by each Forum member organisation.

The IWM Forum recognises the valuable contribution of these many and diverse actors in supporting a transformative approach to the planning and management of our wider water cycle. Each of these organisations played a leading role in determining a shared vision for IWM unique to each of the five metropolitan Melbourne catchments.

The seven primary strategic outcome areas to achieve this vision, as well as the secondary outcome areas nested beneath each primary area, were developed collaboratively by the IWM Forum partners.




These outcomes acknowledge the breadth of water plans, environmental strategies and land use plans developed by each partner organisation.



Waterways Estate, Edithvale. Photographer: Christian Pearson.  
Courtesy Melbourne Water

# Strategic outcomes for IWM

The Dandenong Forum notes that the following strategic outcome areas are not listed in order of priority or importance.

Outcomes			
			
<b>Safe, secure and affordable water supplies in an uncertain future</b>	<b>Effective and affordable wastewater systems</b>	<b>Existing and future flood risks are managed to maximise outcomes for the community</b>	<b>Healthy and valued waterways and marine environments</b>
A diverse range of fit for purpose water supplies and resources are utilised	Meets public health and environmental standards	Appropriate levels of flood protection in urban areas	Impacts from urban, peri urban, industrial, business and transport activities are mitigated close to the source to protect our waterways and bays
Water quality meets regulatory standards and community expectations	Effective innovative, best practice sewerage systems for both septic and non-septic systems	Community and property resilient to local flood risk	Water quality at the bays supports active and passive recreation
Efficiently managed water and demand	Optimised and managed onsite domestic systems	Resilient urban and natural environments	Remnant higher stream values and habitats are rehabilitated and protected
Secure fit for purpose water supply for industry and economy	Waste-to-resource opportunities are maximised	Flooding is managed to support environmental values	Reduced nutrient and sediment discharges to aquifers, waterways and bays
Water available to maintain valued green community assets	A risk-based approach to sewerage and wastewater management adopted	Floodplains are managed to support aquatic ecosystems	Wetlands and other aquatic ecosystems are enhanced with sustainable populations of macroinvertebrates, iconic fish, bird and frog species, and platypus
			Traditional Owner and Aboriginal values, knowledge and practices are integrated and protected in waterway management and planning and embraced collectively
			The waterways, wetlands and floodplains provide a secure bio-link with a range of habitats resilient to changes in condition and climate

The Dandenong catchment is seeking to achieve seven strategic outcomes through IWM. Each of these will have a significant role in shaping the liveability, prosperity and resilience of Victoria's cities and towns. These outcome areas provide a guide to identify and assess the various IWM opportunities included in Chapter 3 of this SDS.



### Low-emission solutions

IWM opportunities that minimise the release of greenhouse gas (GHGs) emissions will be considered by the Forum as solutions are evaluated for implementation.



### Healthy and valued urban and rural landscapes

Aboriginal cultural values associated with urban landscapes and waterways are protected

Urban landscapes are supported by water to retain moisture for cooler, greener cities and towns

Waterways and coastal environments accessible as valuable open space

Active and passive recreation supported by fit for purpose water

The waterways, wetlands and floodplains are inviting places that are connected, accessible and interconnected for public enjoyment and amenity

Waterways form the basis for an interconnected network of natural spaces where biodiversity is connected and resilient, and people can connect with nature

Riparian zones and floodplains within the catchment continue to increase and expand the quality and connection of indigenous vegetation



### Community values are reflected in place-based planning

Diverse urban landscapes that enhance local conditions and add value to community liveability

Exemplary leadership enables informed, engaged and an empowered community who value water and connect with water environs

Local water related risks and issues understood and managed on a catchment scale

Empowered and engaged community who actively participate in collaborative decision-making

Place-based planning considers and integrates urban stormwater runoff and retention to protect waterways, enhance groundwater systems and support urban landscapes



### Diverse jobs, economic benefits and innovation

Jobs and economic growth supported by water

Innovative planning and operation

Strong governance, collaboration and performance

Empowered key industry groups to enable good water cycle management through improved business practices

Actions in *Water for Victoria 2017* with specific regard to Traditional Owner and Aboriginal consultation, engagement, employment and economic development have been comprehensively implemented

Improved business water practices provide new opportunities for jobs and economic growth



# The case for IWM in the Dandenong catchment

Over the coming years, significant change and growth in the Dandenong region will put pressure on the catchment's water cycle and resources, impacting urban and rural landscapes, as well as communities, marine and woodland environments and industries. Translating community objectives for water management into practice will involve working across organisational boundaries to achieve the following strategic outcomes for the Dandenong catchment. These outcomes are aligned with those reflected in the strategic plans and environmental strategies of the Forum's partner organisations.

## Ensuring alternative sources are fit for purpose

The use of recycled water and stormwater will help Victoria meet its growing needs for water over the long term.

The use of recycled water and stormwater needs to be 'fit for its purpose' – that is, an appropriate quality for the intended use. Appropriate opportunities for substitution of river and groundwater with treated recycled water or stormwater include non-drinking uses in households and industry, and for agriculture, irrigating open spaces and gardens.



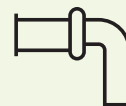
## Safe, secure and affordable water supplies in an uncertain future

Four water corporations oversee water supply for the Dandenong catchment. These include Melbourne Water, South East Water, Southern Rural Water and Yarra Valley Water. Rural water supplies are managed by Southern Rural Water, with South East Water and Yarra Valley Water servicing communities in urban and peri-urban areas.

Residential consumption remains the biggest proportion of the region's water use, comprising about 75 per cent of water usage in the catchment.

Changes to the water cycle driven by anticipated population growth and climate change mean more water will be needed across the catchment for urban, agricultural and environmental flow purposes. The catchment's residential population is expected to grow by 25 per cent over the next two decades, emphasising the need to diversify the water supply system.

There is an opportunity to plan for the provision of secure water sources to provide reliable and fit for purpose supplies to Dandenong's growing communities, industries and developing precincts.



## Effective and affordable wastewater systems

The majority of wastewater generated in the Dandenong catchment is treated at Melbourne Water's Eastern Treatment Plant, located in Bangholme, a southeast suburb of Melbourne. Nearly half of Melbourne's sewage is treated here. Wastewater is treated to a level high enough for re-use. Recycled water produced by the Eastern Treatment Plant is currently used to irrigate crops, parklands and sporting fields. Recycled water supplies are also distributed to housing estates in Cranbourne for a range of domestic uses, such as laundry, washing cars and watering the garden.

The provision and efficacy of wastewater management services vary across the catchment. More than 16,000 unsewered properties along the Mornington Peninsula between Rye and Portsea, as well as numerous rural properties in the upper Dandenong catchment, continue to rely on septic tank systems and on-site domestic treatment plants to manage household sewage. Many of these are poor-performing and have the potential to pollute waterways, impacting public and environmental health. To address this, water corporations are working with their communities to connect properties to a reticulated sewer system, discharging into local wastewater treatment plants.





### Existing and future flood risks are managed to maximise outcomes for the community

Flooding in the Dandenong catchment includes riverine flooding, which occurs near a river, creek or stream during periods of heavy and prolonged rainfall where water levels rise and overflow the banks of the waterbody.

Coastal flooding can occur in the southern reaches of the catchment, particularly along the Mornington Peninsula coastline. Approximately 40 per cent of this area is designated as flood prone. Climate change impacts to the frequency and intensity of rainfall events, coupled with the 1 m sea level rise expected for the region over the next 80 years under a medium climate change scenario, will place further pressure on coastal communities and industries to safely manage high storm surges and floodwaters.

Inland, the risk of flooding in the catchment's urban areas will continue to be a challenge as land use and development change the flow and volume of stormwater during heavy downpours. Several areas within the local government areas of Casey and Dandenong, in which the populous urban centres of Dandenong, Cranbourne and Narre Warren are located, are particularly prone to flooding. A series of floods in the past decade resulted in major road closures, public transport disruptions, damage to public and private

property and infrastructure, as well as restricted access to community services and facilities, such as hospitals and shopping centres.

Chronic flooding issues in numerous other low-lying parts of the catchment routinely impact communities, infrastructure and amenities. Public and private properties within the Elwood Canal/Elster Creek catchment extending from Elwood to Carnegie and Moorabbin to Caulfield North, are regularly affected by storm flood events.

There is a need to investigate improved stormwater storage capabilities across the catchment, particularly in areas where stormwater harvesting and management could reduce the risk and cost of major rainfall events and minimise impacts, such as pollution, to the bay's marine environments.



Superb fairy-wren.

Photographer: David Paul



## Healthy and valued waterways and marine environments

The Dandenong catchment contains an array of significant and biologically diverse waterways ranging from expansive rivers, small ephemeral creeks and the eastern shoreline of Victoria's iconic Port Phillip Bay. On the western boundary of the catchment, sandy bay beaches and rocky shores span the coast from St Kilda, 6 km southeast of Melbourne, to Portsea on the southern tip of the Mornington Peninsula.

Despite the 4 million people living near its 333km coastline, Port Phillip Bay is generally in good health, offering high water quality and an abundance of marine flora and fauna. Along the coast, water quality tends to be lower than in the protected marine parks within the bay, and this is largely related to urban and rural influences on stormwater runoff to the bay. The Dandenong catchment contributes approximately 4 per cent of nitrogen to Port Phillip Bay, considered among the greatest threat to the health of the bay and the marine species it supports.

Elsewhere in the Dandenong catchment, more than 97 per cent of waterways are in very poor condition, according to the 2016–2017 environmental report card for the catchment's waterways developed by the Environment

Protection Authority Victoria, Melbourne Water and DELWP under the *Yarra and Bay Action Plan (2012–2017)*. The majority of waterways in poor condition are found in urban areas of the catchment and show concentrations of nutrients and metals often present in water due to runoff from nearby roads and industrial areas. A notable exception is Dandenong Creek, which originates as a series of springs in the Doongalla Forest on the western edge of the

Dandenong Ranges National Park in the northeast of the catchment. Water quality in these headwaters remain in good condition, however, quality diminishes as the creek flows south into Mordialloc Creek and Patterson River, before eventually meeting Port Phillip Bay.

Many small creeks and waterways within the Dandenong catchment have been straightened or concrete lined, contributing to decreased water quality and loss of stream habitats in the region. There is an opportunity to revitalise some of these waterways, returning natural vegetation to improve water quality and instream habitats, as well as support the natural movement of marine and bird species. Councils and water corporations are working alongside their communities on several such projects, creating further opportunities to enhance the environmental, cultural and recreational value of the catchment's waterways and marine environments.

Since all waterways within the Dandenong catchment flow to Port Phillip Bay, the health and conservation of the region's inland rivers, creeks and streams is critical to the continued health of the bay and the species it supports. Within the catchment's coastal waters, ecologically important marine landscapes at Ricketts Point Marine Sanctuary in Beaumaris and the Ramsar-listed Edithvale–Seaford Wetlands are a haven for several species and communities of conservation significance.

At Ricketts Point, seagrass meadows, intertidal reefs and rockpools shelter small marine creatures, such as tiny brittle stars, crabs, shrimp and schools of fish, while large pods of dolphins, whales and the occasional Fairy Penguin can be observed further out at sea. Eleven threatened bird species can be found in the sanctuary, as well as several internationally important migrant bird populations.

Further south, the Edithvale–Seaford Wetlands represent the largest freshwater wetland in the Port Phillip and Western Port basins and the last remaining example of the once extensive Carrum Carrum Swamp, a shallow freshwater swamp drained in 1879. The Edithvale–Seaford Wetlands support a high diversity of waterbirds and vegetation communities, including many threatened species. The wetlands also perform an essential natural drainage function, controlling flood waters and naturally treating surface runoff before these waters drain to Port Phillip Bay. The wetlands and nearby coastline are a significant recreational resource, providing important open space that is highly valued by local communities.

Stormwater is one of the major sources of pollution to waterways within the Dandenong catchment. According to the *State of the Bays 2016*, 95 per cent of litter on Port Phillip Bay's beaches, including those along the western reaches of the Dandenong catchment, was transported from suburban streets through the stormwater system.

Increased sedimentation and nutrients from the stormwater discharges of nearby urban areas pose serious threats the health of these ecosystems, while climate change issues, such as extreme weather events, and existing risks from invasive marine species are likely to be exacerbated in future.

There is an opportunity to incorporate improved planning and waterway protection controls, as well as strategies to manage sediment and pollution, as the catchment continues to urbanise.



## Healthy and valued urban and rural landscapes

The landscape of the Dandenong catchment varies from expansive natural woodlands, temperate rainforests and sandy bay beaches, to densely populated urban areas expanding from the Port of Melbourne to metropolitan satellite cities on the urban fringe.

The catchment covers an area of approximately 1,236 km<sup>2</sup> and nearly 40 per cent of this land is zoned as residential. Much of the catchment's built environment has developed over floodplains and fertile soils due to its proximity to water. Less than one quarter of remaining land in the Dandenong catchment comprises agricultural land or native vegetation.

Dandenong Ranges National Park, located 35 km east of Melbourne, represents a key natural landscape within the catchment and offers enormous ecological and recreational value for the region. Renowned for

its soaring Mountain Ash trees and lush fern gullies, the Dandenongs contain a range of exotic, native and threatened plant species, including nearly 370 native flowering plant varieties and 50 species of ferns. Dozens of native mammals such as echidnas, wallabies and wombats, are at home through these cool mountain ranges. Over 200 bird species have been recorded in the park, including Kookaburras, Crimson and Eastern Rosellas, King Parrots, Yellow-tailed Black Cockatoos and the elusive Superb Lyrebird.

Linking the Dandenong Ranges to the Dandenong Valley, Churchill National Park and the adjoining Lysterfield Park offer further conservation and recreation value for the catchment. The parks are typical of the region's natural bush landscape region prior to settlement and provide a vital refuge for wildlife in an otherwise highly urbanised region.

Local governments, water corporations and communities continue to support a range of initiatives to enhance the remaining natural landscape in the Dandenong catchment. These include the creation of green corridors to better connect habitats, stabilise animal populations and alleviate the heat island effect in developed areas.

The Dandenong catchment will continue to address challenges on the water cycle from rapid urbanisation and intensive agricultural activities which impacts the health of its urban and rural landscapes. The high value associated with waterways, green wedges and woodlands in the Dandenong catchment has led to many councils prioritising the protection of these areas as environmental assets.



## Community values are reflected in place-based planning

The Dandenong catchment area holds a wide range of values for Victorians, including nature-based tourism, cultural heritage and recreation on and near the water's edge.

The catchment encompasses the Traditional lands of the Wurundjeri and Bunurong people of the Kulin Nation. More than 2,500 Aboriginal cultural sites have been recorded across the catchment, a majority of which are found close to a waterway. Land use patterns recorded in the region show

concentrations of Aboriginal people lived around the former Carrum Carrum Swamp, now the Edithvale-Seafood Wetlands, throughout the region's floodplain and in elevated areas along Dandenong Creek.

Maintaining liveability and enhancing the cultural, social, ecological and recreational values of regional waterways, parks and forests is a significant focus of planning in the Dandenong catchment as urban growth and development continue

over the next two decades. The region already encompasses some of the largest and fastest growing suburban populations in Australia, with communities in Cranbourne East and Greater Dandenong accommodating much of this population boom. Urban densification is also expected through Port Melbourne and Albert Park, as well as throughout St Kilda and the Caulfield to Murrumbeena regions.

*Continued...*

The catchment's local governments, communities and water industry partners are working together to improve connections between people and place during this period of development. There is an opportunity now to integrate water planning and management with incoming infill and greenfield development through the catchment. Examples include water-sensitive urban design in new residential estates, stormwater harvesting to irrigate parklands and sporting fields, the provision of community amenities with water features and the maintenance of open space and green wedges to support recreation and cooling in the landscape.

Other cross-government initiatives that seek to elevate community priorities and outcomes, as well as maintain a relationship with the Dandenong IWM Forum, include the Living Links initiative to connect communities, green spaces and ecosystems, and the Metropolitan Partnerships advisory groups. The Dandenong catchment is divided across the Southern Region and Inner South-East Region Metropolitan Partnerships, an initiative that brings together community and business representatives with state and local governments to identify priorities for jobs, services and infrastructure within the region. Among a range of priorities, the Partnerships provide advice to ensure ongoing environmental benefits and connections to the environment within each region.



**Edithvale-Seaford Wetlands.**  
**Photographer: Tony Proudfoot.**  
**Courtesy Melbourne Water**



## **Diverse jobs, economic benefits and innovation**

The Dandenong catchment covers a major growth corridor in southeast Victoria comprising several areas designated for population and economic growth. The Dandenong National Employment and Innovation Cluster (NEIC) currently employs more than 66,000 people through a range of international and domestic businesses spanning the manufacturing, health and education sectors, as well as wholesale trade, retail, transport, postal services and warehousing. The Dandenong NEIC is located to the south of the Dandenong Metropolitan Activity Centre, Victoria's second largest retail and commercial centre. The Monash NEIC is also partly within the Dandenong catchment and comprises Melbourne's largest concentration of jobs outside the central business district (CBD). That area currently supports 75,000 jobs

and contributes \$9.4 billion to the Victorian economy. Ongoing urban and economic development through the southeast growth corridor will support the Dandenong catchment's self-sufficiency by providing a range of new services and employment opportunities.

The Dandenong region contains state and nationally significant infrastructure and commercial industries, including the Port of Melbourne, the most important port in Victoria and the largest container and automotive port in Australia. Major roads and public transport networks span the catchment, including the Monash Freeway, the Princes Highway and the EastLink motorway. Several South State Significant Industrial Precincts (SSIP) are located within the catchment's Dandenong, Casey, Kingston

and Frankston local government boundaries. Manufacturing accounts for one-third of major industries in the South SSIP. The catchment's largest manufacturing centres, Kingston and Dandenong, provide 44 per cent of Victoria's total manufactured product.

Notable tourism and commercial activities occur throughout the catchment, particularly along the Mornington Peninsula where recreation and tourism to the region's coastal attractions and vineyards contributed an estimated \$700 million to the local economy.

Secure water supplies and adequate water management infrastructure for water, wastewater and stormwater to support the Dandenong catchment's key industries will be critical to its continued economic growth and success.





## Chapter 3

# IWM opportunities

A portfolio of priority IWM projects and strategies that the Dandenong catchment's collaborative partners have committed their best endeavours to progress.



# Priority Portfolio

The following portfolio of priority projects and strategies represents a suite of IWM opportunities for which the Dandenong IWM Forum's collaborative partners are committed to progress within the next 12 to 18 months.

The status of each IWM opportunity included in the Priority Portfolio reflects the phase of work to be undertaken in this time period.

Additional opportunities that require further assessment are included in the Appendix of this SDS.

In developing this portfolio, the collaborative governance of the Forum recognises the water cycle complexities of the region and considers the balance of outcomes, opportunities, roles and responsibilities for Forum Members and their communities.

A Forum Area (or catchment-wide) IWM Strategy is yet to be developed, however the Dandenong IWM Forum has agreed to initiate development of a strategy over the next 12-18 months.

The IWM opportunities listed within the Priority Portfolio have not been guided by an existing IWM Strategy, rather they were developed based on the experience and knowledge of the Forum Members, and in consideration of their potential to impact on the seven strategic outcomes for IWM sought for the Dandenong region. In addition, consideration was given to the urgency of taking

such actions, particularly where opportunities could be lost if no action was taken, as well as the level of commitment demonstrated by partner organisations to progress IWM initiatives over the next 12-18 months.

The projects and strategies within acknowledge a number of existing metropolitan-wide strategies and plans, such as the *Melbourne Water Systems Strategy* and the draft *Healthy Waterways Strategy 2018*, as well as the clear and measurable targets identified in the existing strategies. Targets may include alternative water use and stormwater harvesting and infiltration. Further, climate change mitigation goals, including low emission IWM solutions and those that support urban cooling and greening, will be considered by the Forum during the evaluation of projects and strategies.

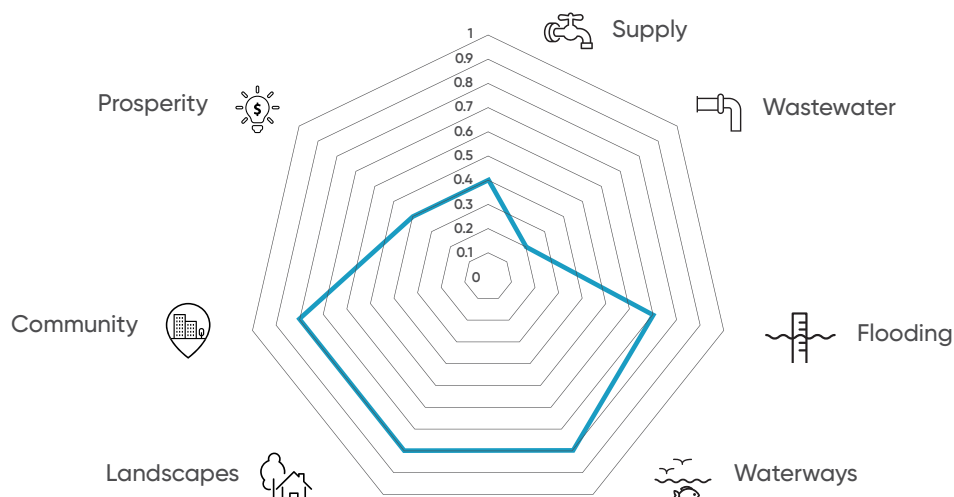
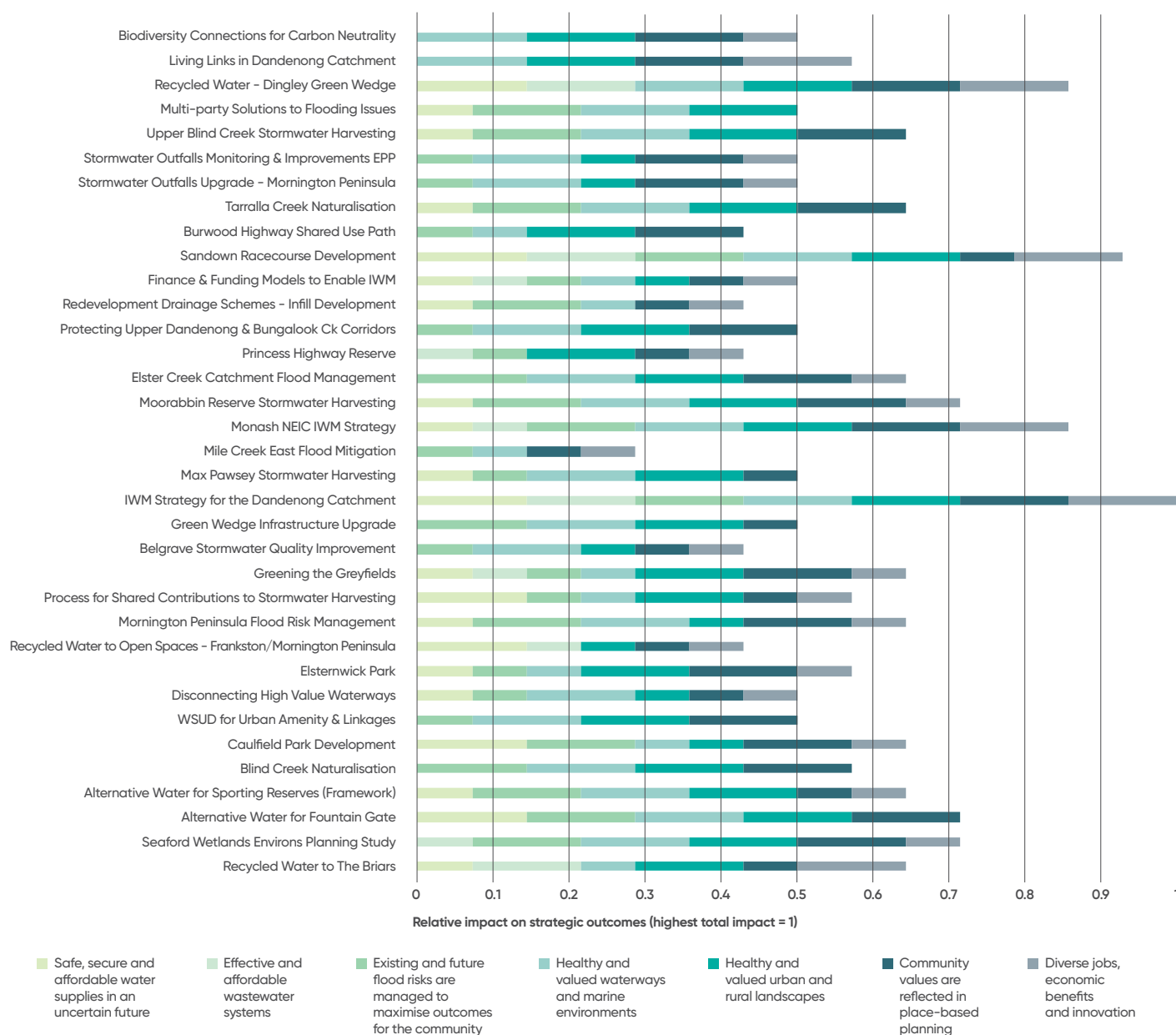
The IWM Forum recognises that the contribution of this Priority Portfolio to the seven strategic outcomes, including the targets identified in the existing metropolitan-wide strategies, has not yet been quantified. It is the intention of the Forum to consider a targeted evaluation of these IWM opportunities where the Forum agrees this is necessary. This work may occur in tandem with the development of a catchment-wide strategy.

The Forum acknowledges that this is a dynamic list of IWM opportunities and is subject to further assessment by the IWM Forum Members. The organisations listed as collaborative partners in the IWM Priority Portfolio have been identified by the Forum Members as important stakeholders to progress the individual initiative. For initiatives in initial stages of development, additional stakeholders may be included as the project progresses.










































































































By co-delivering a range of water planning and management initiatives, the Dandenong IWM Forum seeks to build on the strengths of the community, the water sector and governments to achieve better value and long-term shared benefits for the region.

The Dandenong IWM Forum presents an unparalleled opportunity for these organisations to build lasting partnerships across sectors and geographical boundaries to enhance, accelerate and generate greater visibility for water cycle initiatives that will improve Victoria's resilience and liveability.

# Impact of IWM opportunities on Forum's strategic outcomes

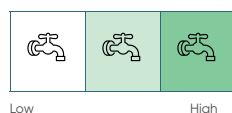


# IWM opportunities: An overview of projects and strategies

IWM opportunity	Strategic outcomes							Location	Spatial scale
Alternative Water for Fountain Gate – Narre Warren Metropolitan Activity Centre								Fountain Gate – Narre Warren Metropolitan Activity Centre	Urban renewal
Alternative Water Opportunities for Greening Sporting Reserves – Prioritisation Framework								Casey	Sub-catchment
Belgrave Stormwater Quality Improvement								Belgrave	Sub-catchment
Biodiversity Connections for Carbon-Neutrality								Dandenong catchment	Forum area
Blind Creek Naturalisation								Ferntree Gully	Sub-catchment
Burwood Highway Shared Use Path								Wantirna and Vermont South	Sub-catchment
Caufield Park Development								Caufield North	Urban renewal
Disconnecting High Value Waterways								Belgrave	Sub-catchment
Elster Creek Catchment Flood Management								Elster Creek catchment	Sub-catchment
Elsternwick Park								Elsternwick Park North	Sub-catchment
Finance and funding models to enable putting IWM into practice								Croydon	Inter-forum
Green Wedge Infrastructure Upgrades								City of Greater Dandenong	Green wedge
Greening the Greyfields								Maroondah	Urban renewal
IWM Plan for the Dandenong Catchment								Dandenong Forum area	Forum area
Living Links in the Dandenong Catchment								Dandenong catchment	Forum area

The status of each IWM opportunity included in the Priority Portfolio reflects the phase of work to be undertaken in this time period.

## Shade scale



Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.

Collaborative partners	Status
City of Casey, South East Water, Bunurong Land Council Aboriginal Corporation (LCAC), Southern Rural Water, Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation (L&CCHCAC)*	<div></div>
City of Casey, Melbourne Water, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*	<div></div>
Yarra Ranges Council, Knox City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
PPWCMA, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
Knox City Council, Melbourne Water, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
Whitehorse City Council, Knox City Council, Bunurong LCAC, Wurundjeri L&CCHCAC*, VicRoads	<div></div>
Glen Eira City Council, Melbourne Water, South East Water, Victorian Planning Authority (VPA), Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*	<div></div>
Melbourne Water, Knox City Council, Yarra Ranges Council, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
City of Port Phillip, Glen Eira City Council, City of Kingston, Bayside City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
Bayside City Council, City of Port Phillip, Glen Eira City Council, City of Kingston, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
Melbourne Water, Maroondah City Council, Knox City Council, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
City of Greater Dandenong, Melbourne Water, South East Water, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*	<div></div>
Maroondah City Council, Knox City Council City, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div></div>
Dandenong IWM Forum partner organisations	<div></div>
PPWCMA, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, Parks Victoria, South East Water, local councils, local community groups and networks	<div></div>

\*The Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation will remain informed of progress related to this IWM opportunity.










































































































#### Project opportunity status



#### Strategy opportunity status

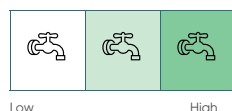


# IWM opportunities: An overview of projects and strategies

IWM opportunity	Strategic outcomes							Location	Spatial scale
<b>Max Pawsey Stormwater Harvesting</b>								Narre Warren	Sub-catchment
<b>Mile Creek East Flood Mitigation</b>								Mulgrave	Sub-catchment
<b>Monash National Employment and Innovation Cluster IWM Strategy</b>								Clayton	Urban renewal
<b>Moorabbin Reserve Stormwater Harvesting</b>								Moorabbin	Sub-catchment
<b>Mornington Peninsula Flood Risk Management</b>								Mornington Peninsula	Sub-catchment
<b>Multi-party Solutions to New and Legacy Flooding Issues</b>								Dandenong	Sub-catchment
<b>Princes Highway Reserve</b>								Huntingdale	Urban renewal
<b>Process to Support Shared Contributions to Stormwater Harvesting Projects</b>								Metro Melbourne	Inter-forum
<b>Protecting Upper Dandenong and Bungalook Creek Corridors</b>								Mooroolbark	Sub-catchment
<b>Recycled Water to The Briars, Mount Martha</b>								Mount Martha	Sub-catchment
<b>Recycled Water to the Dingley Green Wedge</b>								Dingley Green Wedge	Green wedge
<b>Recycled Water to open spaces in Frankston and Mornington</b>								Mornington Peninsula and Frankston	Urban renewal
<b>Redevelopment Drainage Schemes for Infill Development Areas</b>								City of Greater Dandenong	Urban renewal
<b>Sandown Racecourse Development</b>								Sandown	Urban renewal
<b>Seaford Wetlands Environs Planning Study</b>								Seaford	Sub-catchment

The status of each IWM opportunity included in the Priority Portfolio reflects the phase of work to be undertaken in this time period.

## Shade scale



Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.



Collaborative partners	Status
City of Casey, Melbourne Water, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*	
Monash City Council, Melbourne Water, VicRoads, Bunurong LCAC, Wurundjeri L&CCHCAC*	
South East Water, Victorian Planning Authority, City of Kingston, Monash City Council, Yarra Valley Water, City of Greater Dandenong, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, VPA	
City of Kingston, Melbourne Water, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*	
Mornington Peninsula Shire Council, Melbourne Water, Bunurong LCAC, Southern Rural Water	
City of Greater Dandenong, City of Kingston, Monash City Council, Bunurong LCAC, Wurundjeri L&CCHCAC*, Southern Rural Water, Melbourne Water, VPA	
Monash City Council, South East Water, Yarra Valley Water, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	
Yarra Valley Water, Melbourne Water, South East Water, City West Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, DELWP (Planning), Southern Rural Water	
Maroondah City Council, Whitehorse City Council, Knox City Council, Yarra Ranges Shire Council, Melbourne Water, VicRoads, Bunurong LCAC, Wurundjeri L&CCHCAC*	
Mornington Peninsula Shire Council, South East Water, Melbourne Water, Southern Rural Water	
South East Water, City of Kingston, VicRoads, Bunurong LCAC, Wurundjeri L&CCHCAC*, Southern Rural Water	
South East Water, Melbourne Water, Frankston City Council, Mornington Peninsula Shire, Bunurong LCAC	
City of Greater Dandenong, Melbourne Water, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, VPA	
City of Greater Dandenong, South East Water, VPA, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	
Frankston City Council, City of Kingston, Melbourne Water, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	

\*The Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation will remain informed of progress related to this IWM opportunity.




































#### Project opportunity status



#### Strategy opportunity status

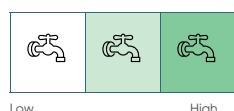


# IWM opportunities: An overview of projects and strategies

IWM Opportunity	Strategic Outcomes							Location	Spatial Scale
<b>Stormwater Outfalls Monitoring and Improvements – Eastern Port Phillip Bay</b>								Bayside, Frankston, Kingston and Port Phillip	Sub-catchment
<b>Stormwater Outfalls Upgrade – Mornington Peninsula</b>								Mornington Peninsula	Sub-catchment
<b>Tarralla Creek Naturalisation</b>								Croydon	Sub-catchment
<b>Upper Blind Creek Stormwater Infrastructure</b>								Sassafras	Sub-catchment
<b>Using WSUD to Create Urban Amenity and Linkages</b>								Fountain Gate – Narre Warren Activity Centre	Sub-catchment

The status of each IWM opportunity included in the Priority Portfolio reflects the phase of work to be undertaken in this time period.

## Shade scale



Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.

Collaborative Partners	Status
Bayside City Council, Frankston City Council, City of Kingston, City of Port Phillip, Melbourne Water, Environmental Protection Authority, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div><div></div><div></div></div>
Mornington Peninsula Shire Council, Melbourne Water, PPWCMA, Bunurong LCAC	<div><div></div><div></div><div></div></div>
Melbourne Water, Maroondah City Council, Yarra Valley Water, Dept. Health and Human Services, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*	<div><div></div></div>
Knox City Council, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div><div></div><div></div></div>
City of Casey, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div><div></div></div>

\*The Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation will remain informed of progress related to this IWM opportunity.

#### Project opportunity status



#### Strategy opportunity status



# Priority Portfolio of IWM opportunities

All the IWM opportunities included in the Priority Portfolio demonstrate value for the Dandenong catchment.

All these projects and strategies will be enhanced and accelerated by collaboration and visibility through the IWM Forum process. They will all benefit from additional resources and

support through the IWM Forum, and from generating new, or enhancing existing, cross-organisational collaboration.

Some projects and strategies in the Priority Portfolio offer unique additional values. These include the potential to generate important cross-organisational learnings and








capacity-building benefits for current and future IWM initiatives; the ability to be a mechanism for further IWM advocacy and policy innovation; and a contribution of substantial benefits to the region as a whole, or specifically to its iconic natural assets.

## ACTION 1

### Alternative Water for Fountain Gate – Narre Warren Metropolitan Activity Centre

The Fountain Gate–Narre Warren Central Business District (CBD) lies at the heart of the City of Casey. This activity centre includes Fountain Gate Shopping Centre, Bunjil Place Arts and Entertainment Precinct, Narre Warren Business Park and the Narre Warren Village, as well as several commercial and residential pockets. The site is projected to transition over the next twenty years with a strong focus on economic investment, job growth and high density residential growth. Stormwater management and drainage have been recognised as a key challenge for the precinct.

The aim of this project is to plan a staged approach for delivery of a third pipe stormwater supply network to Fountain Gate–Narre Warren CBD. The harvested stormwater can initially supply sporting ovals and the Casey Aquatic and Recreation Centre. In future, it can be extended to supply businesses and the wider Narre Warren community.

						
<b>Status</b>		<div><div></div></div>				
<b>Location</b>		Fountain Gate – Narre Warren Metropolitan Activity Centre				
<b>Collaborative Partners</b>		City of Casey, South East Water, Bunurong Land Council Aboriginal Corporation (LCAC), Southern Rural Water, Wurundjeri L&CCHCAC*				
<b>Spacial Scale</b>		Urban renewal				

## ACTION 2








### Alternative Water Opportunities for Greening Sporting Reserves – Prioritisation Framework

This project involves the development of a prioritisation tool to identify and prioritise recreational reserves that could be irrigated by alternative water.

The outcomes of this project will be coordinated with Council's capital works program and may enhance potential funding opportunities with collaborative partners to implement alternative water supply infrastructure at the prioritised sporting reserves.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives.

						
<b>Status</b>		<div><div></div><div></div><div></div><div></div><div></div></div>				
<b>Location</b>		Narre Warren				
<b>Collaborative Partners</b>		City of Casey, Melbourne Water, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*				
<b>Spacial Scale</b>		Sub-catchment				










## ACTION 3

### Max Pawsey Stormwater Harvesting

This project will collect stormwater runoff for treatment and reuse to irrigate Max Pawsey Reserve, one of the highest water-consuming reserves in the City of Casey.

Stormwater runoff generated in the local catchment contains significant pollutant loads, such as litter, oil, grease and nutrients. The proposed harvesting system will treat this water to best practice standards to use at the reserve, which flows into the Hallam Valley Floodplain before discharging to Port Phillip Bay. The proposed stormwater harvesting system will help reduce the impact of nutrients and pollutant discharge through the landscape to Port Phillip Bay. It will also supply treated water to the Casey Aquatic and Recreation Centre to refill swimming pools.

						
<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spacial Scale</b>						








## ACTION 4

### Moorabbin Reserve Stormwater Harvesting

Moorabbin Reserve is undergoing significant redevelopment works as St Kilda Football Club prepares to return to its 'spiritual home'. As part of the City of Kingston's Stormwater Master Planning, this reserve was identified as a potential location for a bio-retention system treating a 259 ha catchment and providing more than 4ML/yr of water for sports ground irrigation.

This project explores funding opportunities to enable detailed design and implementation. There is a keen interest to deliver this project as part of the current precinct redevelopment, rather than opening and sectioning off part of the reserve for construction at a later time.








Moorabbin Reserve will be a broadcast quality venue, hosting pre-season AFL matches and AFLW matches by 2020, giving potential exposure to this integrated water supply solution to thousands of visitors and spectators.

						
<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spacial Scale</b>						

## ACTION 5

### Recycled Water to Open Spaces in Frankston and Mornington Peninsula

During the Millennium Drought, many of the open spaces within Mornington Peninsula Shire and Frankston City Council areas were provided with recycled water. There are opportunities to extend the existing network to other open spaces. However, currently, these extensions do not stack up financially. This project explores obtaining support from collaborative partners to realise many of these opportunities to ensure secure water supplies to these open spaces.








						
<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spacial Scale</b>						

## ACTION 6

### Recycled Water to the Dingley Green Wedge

A unique opportunity exists to lay a recycled water pipeline, or 'purple pipe', in conjunction with the upcoming Mordialloc Freeway works to enable a strategic and cost-effective way to provide recycled water infrastructure to Kingston's Green Wedge. The area is home to market gardens, golf courses and parklands, with potential for open space in future to host the Hawthorn Football Club. Within the broader Green Wedge landscape, the Dingley Bypass Green Wedge will have a shared bicycle and footpath along the 6.4 km length of the road. The proposed purple pipe could be extended north into Clayton to meet the needs of the Monash NEIC and new Clayton Business Park residential development planned by the Victorian Planning Authority.

This project investigates the cost-effectiveness of different infrastructure options and the demand for recycled water in the area.

						
<b>Status</b>		<div><div></div></div>				
<b>Location</b>		Dingley Green Wedge				
<b>Collaborative Partners</b>		South East Water, City of Kingston, VicRoads, Bunurong LCAC, Wurundjeri L&CCHCAC*, Southern Rural Water				
<b>Spacial Scale</b>		Green wedge				

## ACTION 7








### Recycled Water to The Briars, Mount Martha

The Briars at Mount Martha is a water recycling demonstration site that will provide opportunities for research, training and trialling food crop irrigation using Class A recycled water.

This project aims to seek collaborative funding opportunities for capital budget allocation, a demonstration of crop types to be grown with recycled water, and agreement of the proposed master plan for The Briars site. The project will help position The Briars as an Innovation Hub for Sustainable Living on the Peninsula.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives. It may be a mechanism for further IWM advocacy and policy innovation for alternative water.

						
<b>Status</b>		<div><div></div></div>				
<b>Location</b>		Mount Martha				
<b>Collaborative Partners</b>		Mornington Peninsula Shire Council, South East Water, Melbourne Water, Bunurong LCAC, Southern Rural Water				
<b>Spacial Scale</b>		Sub-catchment				



Dandenong Creek at Jells Park. Photographer: Christian Pearson.  
Courtesy Melbourne Water

## ACTION 8

### Blind Creek Naturalisation

A collaboration between Melbourne Water, Knox City Council, South East Water and local community groups, this project will revitalise Blind Creek from Manuka Drive to Scoresby Road in Ferntree Gully through a process called 'daylighting'. By replacing the existing piped waterway with an open and flowing channel, Blind Creek will be restored to a more natural state. Revegetation of the surrounding creek area will improve the quality of green open space and encourage more connectivity and interaction with the creek.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives.

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

## ACTION 9

### Living Links in the Dandenong Catchment

Living Links is an urban nature project working to create a web of green spaces across Melbourne's southeast. By linking up the many parks, reserves and other natural places in the area, Living Links aims to create a world-class urban ecosystem.

This project focusses on creating a web of green spaces in Dandenong catchment. It builds on and extends the work undertaken in the existing Living Links project undertaken over the past 10 years. The aim is to improve tree canopy cover, as well as access to and along waterways and riparian corridors along Dandenong Creek and other tributaries in the catchment.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives.

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

## ACTION 10

### Tarralla Creek Naturalisation

This project uses the daylighting process to naturalise a section of Tarralla Creek in Croydon. There are also opportunities to harvest stormwater to irrigate local sportsgrounds. The project's benefits include place activation and beautification, improved recreational opportunities, urban greening and habitat corridor enhancement, waterway health and water quality improvements, community social cohesion and improved connectivity.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives.

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						








## ACTION 11

### Using WSUD to Create Urban Amenity and Linkages

The City of Casey is proposing to trial the concept of creating blue-green water sensitive urban design (WSUD) linkages at the Fountain Gate Activity Centre in Narre Warren's CBD. Using a series of WSUD vegetated streetscape treatment systems, the creation of blue-green linkages within the urban environment will support walkability, cooling and enhance amenity through the precinct.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives.

						
<b>Status</b>						
<b>Location</b>						
Fountain Gate – Narre Warren Activity Centre						
<b>Collaborative Partners</b>						
City of Casey, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Sub-catchment						

## ACTION 12

### Finance and Funding Models to Enable IWM








As agencies continue to work collaboratively to achieve multiple benefits through IWM, funding and financing barriers are commonly encountered. This project aims to explore funding and financing issues in the context of Dandenong catchment through two phases.

The first phase of the project will involve knowledge sharing of the significant work underway by Melbourne Water, the CRC for Water Sensitive Cities and others regarding barriers to the funding of IWM projects. The outcomes of this knowledge sharing work will be explored and validated with Dandenong catchment participants. Additional work may be undertaken to explore funding barriers for local government.

The second phase of the project will explore collaborative funding mechanisms, with the potential to apply agreed mechanisms to a case study site within the Dandenong catchment (e.g. Taralla Creek or Blind Creek naturalisation projects).

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives, may be a mechanism for further IWM advocacy and policy innovation for alternative water.

						
<b>Status</b>						
<b>Location</b>						
Croydon						
<b>Collaborative Partners</b>						
Melbourne Water, Maroondah City Council, Knox City Council, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Inter-forum						



Drainage improvement works, City of Frankston. Photographer: Christian Pearson.  
Courtesy Melbourne Water



## ACTION 13








### Process to Support Shared Contributions to Stormwater Harvesting Projects

Improved and coordinated management of stormwater has been identified as a key issue and barrier in the IWM Forum and by Forum partner organisations. For water businesses, there are some drivers for involvement in stormwater, such as waterway health, however, stormwater management is generally not core business for water retailers. Stormwater harvesting and stormwater use can potentially reduce potable demand as well as provide many other benefits.

This project aims to develop a system or process to support future stormwater harvesting projects by clearly understanding the value they bring to the catchment and articulating mechanisms for distribution of benefits. The approach could include working with water corporations to understand recent work valuing water in storage and how this could apply to stormwater harvesting. This project also aims to trial valuation techniques at two pilot sites in the Dandenong catchment, as well as develop recommendations for future funding mechanisms.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives in all Forum areas. It may be a mechanism for further IWM advocacy and policy innovation for stormwater management.

						
<b>Status</b>						
<b>Location</b>						
Metro Melbourne						
<b>Collaborative Partners</b>						
Yarra Valley Water, Melbourne Water, South East Water, City West Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, DELWP (Planning), Southern Rural Water						
<b>Spacial Scale</b>						
Inter-forum						

## ACTION 14

### IWM Strategy for the Dandenong Catchment








The Dandenong IWM Forum recognises that the current Priority Portfolio of IWM projects and strategies is based on the experience of Forum Members. The contribution of these opportunities to the Forum's strategic outcomes for IWM has not yet been quantified.

This project aims to address this limitation by developing a catchment-wide IWM Strategy. To negotiate the range of priorities and opportunities within the catchment, this project will first define an agreed plan for developing a catchment-scale strategy in collaboration with all IWM Forum partners. The plan will then be executed to develop a comprehensive IWM Strategy for the Dandenong IWM Forum Area. The strategy will be fully aligned with the Forum's vision and will identify IWM opportunities with the potential to provide substantial impact and benefits to the region.

Where feasible, the strategy will quantify the impact of catchment-wide IWM opportunities using agreed approaches and datasets. This will help the Forum best understand the level of achievement of the strategic outcomes for IWM, as well as the contribution of high-impact IWM opportunities to various targets currently in place for metropolitan Melbourne. These targets include potable water saving targets and stormwater infiltration/capture targets.

#### Unique value:

This project will contribute substantial benefits to the Dandenong region.

						
<b>Status</b>						
<b>Location</b>						
Dandenong Forum Area						
<b>Collaborative Partners</b>						
Dandenong IWM Forum partner organisations						
<b>Spacial Scale</b>						
Forum area						

## ACTION 15

### Burwood Highway Shared Use Path

The connectivity of shared use paths between Dandenong Creek and the EastLink motorway provides an invaluable link that will improve community amenity and liveability. This project will connect paths along Dandenong Creek to key community facilities in the cities of Whitehorse, Knox and beyond. Vital to metropolitan Melbourne's strategic cycling corridor, this path allows users, visitors and the community to enjoy and experience what Dandenong Creek has to offer.

Funding for the construction of a shared path has been secured. The path will run from the south side of Burwood Highway between EastLink and Morack Road and will include a new bridge over Dandenong Creek.

<b>Status</b> <div><div></div><div></div><div></div><div></div></div>						
<b>Location</b> Wantirna and Vermont South						
<b>Collaborative Partners</b> Whitehorse City Council, Knox City Council, Bunurong LCAC, Wurundjeri L&CCHCAC*, Vic Roads						
<b>Spacial Scale</b> Urban renewal						

## ACTION 16

### Princes Highway Reserve

Princess Highway Reserve is located in the Monash National Employment and Innovation Centre. The park and sportsground area is space-constrained with increasing demands on it from a number of uses. Whilst active space and place activation in the reserve is central for improved community amenity and security, sewer infrastructure and flood management functions in the reserve are also important.

The project develops a master plan for the area and delivers Stage 1 of that plan.

<b>Status</b> <div><div></div><div></div><div></div><div></div></div>						
<b>Location</b> Huntingdale						
<b>Collaborative Partners</b> Monash City Council, South East Water, Yarra Valley Water, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b> Urban renewal						

## ACTION 17

### Elster Creek Catchment Flood Management

The Elster Creek Catchment exhibits a disproportionate amount of flooding based on its relative size. Flooding events are disruptive to the local community and can cause significant infrastructure and property damage. The increased stormwater runoff passing through the catchment can also impact waterway health and the optimal function of the region's water cycle.

This project investigates opportunities to respond to flood risk at a catchment-scale, building a shared understanding of flooding in the Elster Creek Catchment and increasing community and water sector stakeholder awareness of flood risks and responses.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives. It may be a mechanism for further IWM advocacy and policy innovation for alternative water.

<b>Status</b> <div><div></div><div></div><div></div><div></div></div>						
<b>Location</b> Elster Creek catchment						
<b>Collaborative Partners</b> City of Port Phillip, Glen Eira City Council, City of Kingston, Bayside City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b> Sub-catchment						

## ACTION 18

### Multi-party Solutions to New and Legacy Flooding Issues

The legacy stormwater infrastructure within older established areas of Dandenong is designed to cope with low storm intensities. However, infill development in the area is now generating increased stormwater runoffs, leading to a surcharge of existing systems and flooding. It is now imperative that land development proposals incorporate multi-party solutions to accommodate increased runoffs from such developments.

This project investigates options for alternatives to flood retarding basins and other traditional approaches, such as large below ground storages for water harvesting. The project will identify major risk areas by taking a total catchment perspective, and in doing so, seeks opportunities to work together to enable catchment based solutions. This project will also investigate broader catchment-wide benefits of lot-scale rainwater tanks.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives in all Forum areas.

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

## ACTION 19

### Mile Creek East Flood Mitigation

Poor draining under the Monash Freeway has caused up to 80 residential properties near the road to be regularly inundated with storm and flood water, resulting in property damage and chronic flooding issues. Part of the challenge in the area near Brandon Park Drive is a lack of capacity in drains intended to carry excess water beneath the freeway to a downstream retarding basin. To address ongoing issues, Monash City Council has installed retarding basins near the flood-prone area and upgraded open spaces to accommodate flood storage. Still, problems persist.

Council has identified a need to achieve an agreed, functional and collaborative solution for managing parts of the water cycle in this flood-prone area. This project seeks opportunities to raise the profile of local flooding challenges with the relevant water cycle stakeholders, including Melbourne Water and VicRoads, and identify an agreed process whereby all parties can address and resolve the lingering flooding issues.

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

## ACTION 20

### Mornington Peninsula Flood Risk Management

This project aims to renew the Mornington Peninsula Shire Council's flood management and mitigation strategy. The renewal will provide a framework to investigate stormwater reduction and reuse opportunities.

As part of this strategy, flood models and maps used by the Mornington Peninsula Shire Council will be updated and priority mitigation options will be identified. Outcomes of this project will inform capital works for design and construction, as well as promote stormwater as a valuable resource for the Peninsula community.

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
<b>Spatial Scale</b>						

## ACTION 21

### Stormwater Outfalls Upgrade - Mornington Peninsula

The Mornington Peninsula's beach areas are a prime destination for locals, holidaymakers and visitors from near and far. Beach water quality has a significant impact on recreational use and the health of the marine environment. Improvements to water quality can improve waterway health and reduce the instance of beach closures during the peak summer months when seaside recreation is most popular.

In the Mornington Peninsula Shire Council area, there are more than 150 stormwater outlets that flow directly to Port Phillip Bay. Less than 15 per cent of these outlets contain litter traps to prevent litter entering the bay.

A recent review of all direct-to-bay stormwater outfalls was undertaken, assessing their health and safety, aesthetics, functionality and impact on the environment. A costed action plan has been developed to upgrade each outlet in order of priority.

This project aims to investigate and maximise collaborative opportunities to implement mediation works identified in the action plan and improve the quality of stormwater entering Port Phillip Bay.

<b>Status</b>						
<b>Location</b>						
Mornington Peninsula						
<b>Collaborative Partners</b>						
Mornington Peninsula Shire, Melbourne Water, PPWCMA, Bunurong LCAC						
<b>Spacial Scale</b>						
Sub-catchment						

## ACTION 22

### Stormwater Outfalls Monitoring and Improvements – Eastern Port Phillip Bay

The bayside beach areas of Port Phillip Bay are some of Victoria's most iconic, well-loved and well-used seaside destinations. However, stormwater outfalls discharging directly to the bay can carry litter and pollutants to the water, impacting on water quality, recreation and the health of this cherished marine environment.

This project aims to increase the frequency of water quality monitoring at stormwater discharge points to the bay. It will establish citizen science to monitor water quality. In doing so, this project also aims to raise community awareness of pollution arising from stormwater outfalls.

<b>Status</b>						
<b>Location</b>						
Bayside, Frankston, Kingston and Port Phillip						
<b>Collaborative Partners</b>						
Bayside City Council, Frankston City Council, City of Kingston, City of Port Phillip, Melbourne Water, Environmental Protection Authority, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Sub-catchment						

## ACTION 23

### Belgrave Stormwater Quality Improvement

Monbulk Creek is a valuable urban waterway in the Belgrave area. The creek is currently under threat from high volumes of stormwater generated from the rapidly growing communities nearby.

To protect the creek's ecosystems before they degrade entirely, this project will identify stormwater management measures in the Belgrave area that will consider the importance and sensitivity of the Monbulk Creek environment. The project aims to disconnect directly connected impervious surfaces in the upper Dandenong Creek catchment at Belgrave. The first stage envisions the management of stormwater quality and quantity discharging to creeks with an initial focus on Council property.

This project links to Action 35, Disconnecting High Value Waterways.

<b>Status</b>						
<b>Location</b>						
Belgrave						
<b>Collaborative Partners</b>						
Yarra Ranges Shire Council, Knox City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Sub-catchment						



## ACTION 24

### Protecting Upper Dandenong and Bungalook Creek Corridors

The Upper Dandenong and Bungalook Creek corridors provide valuable amenity benefits to the communities living in the upper reaches of the Dandenong Creek. Open space reserves along the creek corridors will likely be developed in future for arterial roadways as Melbourne's population and transport needs grow.

This project develops a concept plan to protect and enhance the environmental and social benefits of the Upper Dandenong and Bungalook Creek corridors where they align with the Healesville Freeway reservation.

<b>Status</b>						
<b>Location</b>						
Mooroolbark						
<b>Collaborative Partners</b>						
Maroondah City Council, Whitehorse City Council, Knox City Council, Yarra Ranges Shire Council, Melbourne Water, VicRoads, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spatial Scale</b>						
Sub-catchment						

## ACTION 25

### Seaford Wetlands Environs Planning Study

The Edithvale-Seaford Wetlands are internationally significant habitats for a diversity of birdlife, including several rare and endangered migratory water birds from as far afield as Siberia. Melbourne Water has recently completed a management plan for the area, listed as a Wetland of International Importance under the Ramsar Convention.

This project undertakes a follow-up investigation into stormwater impacts on the Seaford Wetlands reserve from the surrounding residential area with a view to implement measures to reduce the impact of urban development on this important Ramsar site.

Outputs of this project will inform new planning controls on urban developments in the surrounding area and capital improvement measures for the local drainage network.

<b>Status</b>						
<b>Location</b>						
Seaford						
<b>Collaborative Partners</b>						
Frankston City Council, City of Kingston, Melbourne Water, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spatial Scale</b>						
Sub-catchment						

## ACTION 26

### Upper Blind Creek Stormwater Infrastructure

Improving the quality of stormwater discharging into the upper reaches of Dandenong Creek is key to improving the health of waterways in the whole Dandenong catchment.

This strategy investigates the feasibility of building infrastructure for effective stormwater management in Blind Creek, which flows from the Dandenong Ranges National Park into Dandenong Creek. This investigation will include areas where land is owned and managed by other organisations, such as Parks Victoria.








<b>Status</b>						
<b>Location</b>						
Sassafras						
<b>Collaborative Partners</b>						
Knox City Council, Melbourne Water, Parks Victoria, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spatial Scale</b>						
Sub-catchment						

## ACTION 27

### Green Wedge Infrastructure Upgrade

The Greater Dandenong Green Wedge makes up 29 per cent of the total area of the City of Greater Dandenong and provides a green, spacious relief from surrounding urban development. The area supports a range of activities – agriculture, water treatment, recreation, education and rural living – that are carefully located and designed to respect the important environmental, cultural heritage, water management, landscape and amenity values, and functions of the region.

This project implements key actions from the *Greater Dandenong Green Wedge Plan 2017* and the *Greater Dandenong Sustainable Stormwater Strategy 2016*, which both contain proposals for infrastructure development within the Greater Dandenong Green Wedge.

						
<b>Status</b> <div><div></div><div></div><div></div><div></div></div>						
<b>Location</b> City of Greater Dandenong						
<b>Collaborative Partners</b> City of Greater Dandenong, Melbourne Water, South East Water, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b> Green wedge						








## ACTION 28

### Caulfield Park Development

The Victorian Planning Authority is leading the preparation of a structure plan for the Caulfield Station Precinct. Located 10 km southeast of Melbourne's CBD within the municipality of Glen Eira, the Caulfield Station Precinct is centred around Caulfield Train Station and the recreational area of Caulfield Park.

This project investigates the possibility of including water sensitive aspects in the redevelopment of Caulfield Park. Water sensitive features may include improvements to an ornamental lake that presently acts as part wetland and part irrigation storage pond. Other features may include water quality treatment with flood retention and stormwater harvesting to irrigate sports ovals, trees and garden beds within Caulfield Park.

There are a range of benefits to implementing water sensitive features in this area. These include flood mitigation, improvements to sports field drainage, enhancements to passive and active recreation, water quality treatments and stormwater harvesting for irrigation.








						
<b>Status</b> <div><div></div><div></div></div>						
<b>Location</b> Caulfield North						
<b>Collaborative Partners</b> Glen Eira City Council, Melbourne Water, South East Water, Victorian Planning Authority, Bunurong LCAC, Southern Rural Water, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b> Urban renewal						

## ACTION 29

### Elsternwick Park

The four Councils in the Elster Creek catchment, Bayside City Council, City of Port Phillip, City of Glen Eira and City of Kingston and Melbourne Water, have agreed to oversee the redevelopment of Elsternwick Park North in the context of the Elster Creek Catchment Action Plan. This Action Plan focusses on providing effective stormwater and flood management of the Elster Creek catchment. Bayside City Council has resolved to close the Elsternwick Golf Course and create a passive recreation/environmentally focused park, with an aim to improve flood mitigation and water quality in the Elster Creek catchment. This site also has the capacity to deliver community and environmental benefits including passive recreation and revegetation.

This project aims to explore water sensitive solutions for Elsternwick Park North by considering their impact of flooding within the Elwood area.

						
<b>Status</b> <div><div></div></div>						
<b>Location</b> Elsternwick Park North						
<b>Collaborative Partners</b> Bayside City Council, City of Port Phillip, Glen Eira City Council, City of Kingston, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b> Sub-catchment						








## ACTION 30

### Greening the Greyfields

This project explores approaches to sustainably revitalise aging suburbs in the City of Maroondah. The project envisions using redevelopment works in the Eastfield precinct as a pilot site to explore water sensitive approaches to upgrade existing residential areas and community public spaces.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives. It may be a mechanism for further IWM advocacy and policy innovation for urban design and land use planning in already developed areas.

						
<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
Maroondah City Council, Knox City Council City, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Urban renewal						








## ACTION 31

### Monash National Employment and Innovation Cluster IWM Strategy

Can the presence of water in the urban environment attract employment and jobs to an area? This project develops an IWM strategy at the Monash NEIC to determine how water can influence infill development (e.g. Clayton Business Park) to improve local liveability and prosperity, as well as environmental and economic outcomes for the precinct.

#### Unique value:

This project has the potential to generate cross-organisational learnings and capacity-building benefits for IWM initiatives. It may be a mechanism for further IWM advocacy and policy innovation for alternative water. This project will contribute substantial benefits to the Dandenong region.








						
<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
South East Water, Victorian Planning Authority, City of Kingston, Monash City Council, Yarra Valley Water, City of Greater Dandenong, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, VPA						
<b>Spacial Scale</b>						
Urban renewal						

## ACTION 32

### Redevelopment Drainage Schemes for Infill Development Areas

Dandenong's older established residential areas are serviced by under capacity stormwater infrastructure systems. High density development, including multi-storey residential development, is creating increased stormwater runoff that surcharges existing drainage infrastructure. Consequently, flood risks for properties and road infrastructure have increased considerably.

This strategy will investigate the formulation of redevelopment drainage schemes that local government authorities could implement to address stormwater related issues caused by infill development.

						
<b>Status</b>						
<b>Location</b>						
<b>Collaborative Partners</b>						
City of Greater Dandenong, Melbourne Water, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, VPA						
<b>Spacial Scale</b>						
Urban renewal						

## ACTION 33








### Sandown Racecourse Development

This project investigates IWM opportunities for Sandown Racecourse, located in south-eastern Melbourne between Dandenong and Springvale. The site is currently under consideration for redevelopment, with its current owner, Melbourne Racing Club, undertaking IWM planning investigations.

As the site contains major waterways of critical significance to the Monash NEIC, redevelopment will require careful consideration of waterway sensitivity and health.

IWM opportunities explored through this project include stormwater harvesting at Sandown Racecourse, naturalisation of Mile Creek and opportunities for coordination with other projects within the Monash NEIC.

South East Water will initiate work to develop an IWM Plan for the broader area covered by the Monash NEIC to complement the place-based IWM Plan under development for Sandown Racecourse.

						
<b>Status</b>						
<b>Location</b>						
Sandown						
<b>Collaborative Partners</b>						
South East Water, City of Greater Dandenong, VPA, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Urban renewal						








## ACTION 34

### Biodiversity Connections for Carbon-Neutrality

Victoria's water authorities are committed to becoming carbon neutral. Achieving this will require various actions to reduce carbon emissions. It will also likely require some offsetting of carbon emissions.

Work has been under way over the past two years between water authorities and catchment management authorities to develop and trial arrangements that see carbon offsets being achieved through revegetation whilst also providing other environmental and social benefits in local areas.

This collaborative project will trial a process for revegetation in priority areas of the Dandenong catchment that can contribute to carbon offsets. It will also assess the costs and benefits to enable improved decision-making regarding carbon offsets in the future.

						
<b>Status</b>						
<b>Location</b>						
Dandenong catchment						
<b>Collaborative Partners</b>						
PPWCMA, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Forum area						








## ACTION 35

### Disconnecting High Value Waterways

Protecting headwater streams is critical to ensure downstream waterway values are protected against the impacts of climate change and urbanisation.

This strategy seeks to share the learnings from prior catchment 'disconnection' initiatives and then develop a plan for stormwater management works, complemented by riparian and instream habitat works to protect platypus in the Monbulk Creek catchment. A novel aspect of this is testing the use of 'talking' tank technology to achieve waterway health, water supply and flood mitigation benefits.

This project is focused on Melbourne Water land and residential rain water tanks. It links to Action 23, Belgrave Stormwater Quality Improvement.

						
<b>Status</b>						
<b>Location</b>						
Belgrave						
<b>Collaborative Partners</b>						
Melbourne Water, Knox City Council, Yarra Ranges Council, South East Water, Bunurong LCAC, Wurundjeri L&CCHCAC*						
<b>Spacial Scale</b>						
Sub-catchment						



# Strategic enablers to put IWM into practice

The IWM Forums were established in Victoria to identify, coordinate and prioritise place-based and catchment-wide opportunities that would most benefit from collaborative water cycle planning and management.

Alongside these opportunities, the IWM Forum Members identified a range of barriers that could prevent effective implementation of IWM across metropolitan Melbourne and regional Victoria.

The DELWP Water and Catchments Group is responsible for addressing these barriers to implementation in a holistic manner alongside relevant government organisations involved in land use planning and land management.

Advisory groups drawing on industry and independent expertise support DELWP in the development and implementation of strategic initiatives to fill knowledge gaps and address issues identified through the IWM Forum process.

Barriers to IWM are reviewed, with local implications and potential state-wide resolutions, or strategic enablers, discussed. These discussions will help DELWP determine potential options for policy reform and associated areas of impact for industry sectors and organisations.

Advisory groups provide advice regarding areas where planning, water, local government and other arms of government need to work more collaboratively to maintain and enhance the liveability and resilience of Victoria's cities and towns.



Frankston Pier. Photographer: Nils Versemann

# Success stories

## Community collaboration to Enhance Dandenong Creek

Dandenong Creek holds significant historical, cultural and environmental value for communities in the Dandenong catchment. The creek is home to a variety of wildlife, trees and plants, and provides a well-loved area for passive and active recreation, such as bike riding, running and dog walking. It also provides an important drainage function for urban and residential developments, moving excess storm runoff to protect the region from flood. In line with best-practice engineering at the time, Dandenong Creek was straightened and channelised in the 1960s to improve its flood conveyance. The large concreted drainage channel served this purpose, but detracted from the natural beauty and amenity opportunities of the creek.

The Enhancing Our Dandenong Creek program is a five-year pilot of best practice sewerage management to provide cost-effective pollution management and enhance the creek and its natural surrounds for improved community amenity and accessibility. At the heart of the project was the need to improve stormwater quality and reduce pollutants entering the waterway.

Developed in partnership with Melbourne Water and local communities, businesses, Councils and the Environment Protection Authority, the project focused on community-led decision making to define and deliver a suite of measures to improve Dandenong Creek and welcome new community uses.

Taking a cost-effective and hands-on approach, Melbourne Water and its collaborative partners worked directly with residents and businesses to re-naturalise the concreted

creek environment, constructing new habitats for threatened fish species and revegetating areas along the water's edge. Improved recreational paths and facilities, including drinking fountains, seating and gym equipment, encouraged new recreational uses in the area. Additionally, informational signage promoted a connection with place, as well as environmental awareness about pollution prevention activities in the area.

The participatory-decision making approach proved that local residents and businesses were driven to lead environmental and recreational improvement projects to benefit their communities. Building community trust and capacity along the way, Melbourne Water and its collaborative partners successfully piloted the transformation of a concreted drainage channel into a well-loved natural and community asset.



Dandenong Creek construction. Courtesy Melbourne Water





Elster Creek, City of Bayside. Photographer: Christian Pearson.  
Courtesy Melbourne Water

### A whole-of-catchment partnership to manage flood risks in Elster Creek

Elster Creek is a tributary of Port Phillip Bay, stretching from Bentleigh to Elwood in Melbourne's southeast. The catchment covers an area of approximately 40 km<sup>2</sup>, flowing through the municipalities of Kingston, Glen Eira, Bayside and Port Phillip. Most of the catchment includes highly modified waterways. Elwood Canal, as the stream is known in its lower reaches, runs directly into Port Phillip Bay.

The catchment area is highly prone to flooding, and in recent years, infill development and increased stormwater generation has further raised the risk of flood and damage to property and infrastructure in the region. To better manage complex flooding challenges in the Elster Creek catchment area, the City of Port Phillip, Bayside City Council,

City of Glen Eira, City of Kingston and Melbourne Water came together to form the Elster Creek Catchment Working Group, a collaborative partnership that takes a whole-of-catchment approach to deliver flooding solutions and better develop the community's resilience to flooding.

From the highest levels of involvement at Council to community-level working groups, the collaborative partners worked to devise an Action Plan to minimise flood risk across the catchment through innovation, research and collaboration in planning and design.

The result of this collaborative arrangement is an endorsed Action Plan which identifies 18 actions to mitigate flood risks in Elster Creek. Responsibility for delivering on these actions is shared through the partnership, crossing municipal and governance boundaries and enabling a more holistic and effective approach to address shared challenges.

The actions include the identification of inter-organisational opportunities to influence IWM and drainage projects, so that these projects include flood risk reduction objectives. The delivery of a tailored community flood awareness program focused on education and response measures is a further action.

Without the commitment from senior representatives of each organisation to overcome common barriers, this 'one catchment, one plan' response could not have been achieved. This collaborative approach provided each Council with greater certainty to progress flood mitigation works together, sharing best practice knowledge and skills to meet the needs of multiple communities in Elster Creek.

# Continued success through collaboration

IWM is an evolving process that seeks to coordinate and balance many views and interests in the water sector around common goals and agreed outcomes.

IWM Forums collaborate and oversee ongoing IWM planning. The IWM Forum cycle is summarised at right.

Phase One of the IWM Forum cycle has established an enabling environment for Victoria's water sector stakeholders to develop shared IWM objectives and overcome sectoral, institutional and geographic boundaries through collaboration. This phase was guided by the experience and knowledge of the Forum Members.

Phase Two of the IWM Forum cycle will assume a more strategic approach to successful IWM implementation and planning for the Forum Area. This phase will include the development of catchment-wide IWM strategy to inform IWM investments.

Phase Two will also provide an opportunity for IWM Forum Members to update relevant organisational policies, plans and strategies to reflect the outcomes of the IWM Forum.

It is anticipated that the IWM Forum collaborative partners will continue use their best endeavours to advance priority IWM initiatives through regular meetings and future Forums.







Forum Members will also assess the feasibility of additional IWM opportunities identified in Phase One (refer to Appendix).

Phase Two will create an opportunity to evaluate and share learnings from Phase One. It will also optimise resources and explore the development of innovative tools and approaches that plan for, and respond to, water supply and demand in the future.

Phase Three prepares the Forum to refresh the Strategic Directions Statement and review the progress of strategic enablers for IWM.



Red-capped plover. Photographer: David Paul

	Outcomes	Participants	
Phase I			
	<b>Establish</b>  Organisational leaders come together in collaborative IWM Forums and Working Groups to discuss integrated water management challenges, opportunities and priorities for each region	Preliminary work on regional characterisation and collaborative governance  Agree vision, objectives and goals  Agree criteria for selection and prioritisation of IWM opportunities  IWM opportunities identified and prioritised  Collaboratively develop and endorse Strategic Directions Statement for each region	Local governments  Catchment Management Authorities  Water corporations  Traditional Owners  Department of Environment, Land, Water and Planning  Chair  Others as relevant
↓			
Phase II			
	<b>Planning</b>  Cultivate a collaborative culture to progress IWM opportunities	Co-design and agree on Terms of Reference, governance structure, stakeholder engagement and/or community participatory planning guidance for IWM project/strategy	Collaborative partners  Community representatives  Others as relevant
↓			
	<b>Progress</b>  Forum Members use best endeavours to progress IWM opportunities to next stage	IWM Project Groups initiate work as per identified project/strategy status, including: feasibility assessment; technical and economic analysis; cost allocation; business case development  Strategic enablers for IWM progressed by DELWP with support from Forum Members  IWM Project Groups report progress to IWM Forums	Collaborative partners  Individual organisations who have committed to a project/strategy  Community representatives  Relevant stakeholders
↓			
	<b>Incorporate</b>  Collaborative Partner organisations incorporate relevant elements of IWM in their own plans, guidelines or frameworks	IWM Project Groups to take IWM commitments (projects and strategies) to their Board or Councils for investment endorsement  IWM Project Groups incorporate elements into their own organisational planning systems, e.g. Council and corporate plans, Construction Guidelines, etc.  Report back to IWM Forum	Individual organisations who have committed to deliver a project/strategy
↓			
	<b>Realise</b>  IWM benefits are realised following implementation of project/strategy	Application of practical IWM tools and innovative approaches  Additional community value added through participatory planning  Monitoring and evaluation of key measures and outcomes  Economic savings through shared resources, costs, etc.  Improved resilience and liveability of cities and towns	Collaborative partners  Individual organisations who have committed to a project/strategy  Community representatives  Others as relevant
↓			
Phase III			
	<b>Prepare</b>  IWM Forums prepare to refresh the Strategic Directions Statement	Collaborative partners prepare for next round of IWM Forums  IWM Forums collaboratively review key learnings and outcomes from Phase I & II, including catchment-scale IWM Strategy and progress on strategic enablers  Next round of IWM opportunity identification and prioritisation	Collaborative partners

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







































































































**Next 12-18 months**

The feasibility of IWM opportunities will be continually reviewed and assessed in Phase II to confirm the need for specific IWM projects/strategies



# Appendix

## Additional IWM opportunities in the Dandenong catchment

Action	Project	Lead sponsor(s)	Strategic outcome areas							
36	Balcombe Estuary Sedimentation	Mornington Peninsula Shire Council								
37	Catchment-scale Study to Apply Distributed Storages	Melbourne Water								
38	Ballam Park Stormwater Treatment and Harvesting	Frankston City Council								
39	Beauty and Frankston Park Stormwater Treatment and Harvesting	Frankston City Council								
40	Caulfield Racecourse Development	Glen Eira City Council								
41	Environment Account for Dandenong IWM Forum Area	Port Phillip and Westernport CMA								
42	Harvesting Stormwater for Irrigating Pink Reserve	Yarra Ranges Council, Melbourne Water								
43	Improving Discharges from Aged Septic Tank Systems into Stormwater System and Waterways	Yarra Ranges Council, South East Water, Yarra Valley Water								
44	Mapping Special Building Overlays (SBOs) 1 and 2	Melbourne Water, City of Greater Dandenong, Knox City Council, Maroondah City Council								
45	Mile Creek Naturalisation	Monash City Council								
46	Monitoring Water Mains using Network Intelligence, Smart Technologies and Data Sharing to Prevent Infiltration into Stormwater Drains	Whitehorse City Council								
47	Monterey Recycled Water Scheme	Frankston City Council								
48	Naturalisation of Hallam Valley Drain	City of Casey								
49	Re-evaluation of the Purple Pipe Extension	SEW								
50	Testing the 60Ha Rule – Dandenong Case Study	Melbourne Water, VPA								

The following list of additional IWM opportunities was identified by the Dandenong IWM Forum in the first phase of the IWM Forum cycle. The list captures potential future priorities for the Dandenong IWM Forum.

Further assessment will be required by the collaborative partners to progress these opportunities through the IWM Forum.

**Shade scale**

Low High

Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.

Action	Project	Lead sponsor(s)	Strategic outcome areas						
51	Water Quality Monitoring Hampton Park	City of Casey							
52	East Village Development	Glen Eira City Council, VPA							
53	Kingston Green Wedge Wetlands	City of Kingston							
54	Precinct-scale Brownfield Development	MW, VPA							
55	Dandenong National Employment and Innovation Cluster IWM Plan	VPA, SEW							



Mansons Reserve, City of Knox. Courtesy Melbourne Water

# Glossary of terms

## Aboriginal Victorians

An Aboriginal Victorian is a person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the Victorian Aboriginal community in which he or she lives.

## Algal blooms

A rapid increase in the population of algae that can occur in waterways, often caused by excess nutrients (particularly phosphorus and nitrogen).

## Allocation

Water that is actually available to use or trade in any given year, including new allocations and carryover.

## Assets

Assets are resources that provide benefit. This includes, for example, infrastructure such as treatment plants, pipes and pumps, water assets such as dams, bores and wetlands, and community assets such as sporting facilities, public gardens and street trees. Natural assets are assets of the natural environment, for example waterways and vegetation, also known as natural capital.

## Aquifer

An underground layer of rock or sediment that holds water and allows water to flow through it.

## Biodiversity

The numbers and variety of plants, animals and other living beings, including micro-organisms, across our land, rivers and oceans. It includes the diversity of their genetic information, the habitats and ecosystems in which they live and their connections with other life forms.

## Catchment

An area where water falling as rain is collected by the landscape, eventually flowing to a body of water such as a creek, river, dam, lake or ocean; or into a groundwater system.

## Catchment management authorities (CMAs)

The *Catchment and Land Protection Act 1994* established 10 catchment and land protection regions, each with a catchment management authority responsible for the integrated planning and coordination of land, water and biodiversity management.

## Central business district (CBD)

Melbourne's original 'Hoddle Grid' street layout bounded by the Yarra River, Spring Street, La Trobe Street and Spencer Street, as well as the triangular area to the north bounded by Victoria, Peel and La Trobe streets.

## Climate change

A long-term change of the earth's temperature and weather patterns, generally attributed directly or indirectly to human activities such as fossil fuel combustion and vegetation clearing and burning.

## Climate change mitigation

Actions that prevent or reduce emissions of greenhouse gases that contribute to climate change.

## Coastal flooding

Inundation along the coastline mainly due to flooding from the sea associated with storm surge. It may also include additional flooding caused by heavy rainfall.

## Community

Includes individuals, public and private landholders, community groups and business owners.

## Connectivity

Connections between natural habitats, such as a river channel and adjacent wetland areas. Connectivity is a measure or indicator of whether a waterbody (river, wetland, floodplain) has water connections or flow connections to another body.

## Department of Environment, Land, Water and Planning (DELWP)

Supports Victoria's natural and built environment to ensure economic growth and liveable, sustainable and inclusive communities. The department assists the minister, develops and implements state policies and programs, and oversees the administration of organisations including catchment management authorities.

## Ecosystem

A dynamic complex of plant, animal, fungal and microorganism communities and the associated non-living environment interacting as an ecological unit.

## Entitlement (or water entitlement)

Authorisation to take water issued in accordance with the *Water Act 1989*. It includes bulk entitlements, environmental entitlements, water shares, and surface water and groundwater licences (also known as take and use licences).

### **Environmental water**

Water to support environmental values and ecological processes.

### **Fit for purpose (water quality)**

Water of a quality that is appropriate for its intended use.

### **Flash flooding**

Sudden and unexpected flooding caused by sudden local heavy rainfall or rainfall in another area. Often defined as flooding which occurs within six (6) hours of the rainfall event.

### **Floodplain**

Low-lying land adjacent to a river or stream with unique ecosystems dependent on inundation from flood events.

### **Flow**

Movement of water – the rate of water discharged from a source, given in volume with respect to time.

### **Gigalitre**

One billion (1,000,000,000) litres. One gigalitre is the equivalent of approximately 400 Olympic size swimming pools.

### **Green-blue infrastructure**

Green infrastructure refers to key vegetation features such as street trees, parklands, grassed sports fields and vegetated walls. Blue infrastructure refers to key waterways, wetlands, recreational lakes, stormwater retarding basins, or other water body features. Green-blue infrastructure brings these assets together through integrated approaches to deliver community benefits.

### **Greenfield land**

Undeveloped land identified for residential or industrial/commercial development, generally on the fringe of metropolitan Melbourne.

### **Groundwater**

All subsurface water, generally occupying the pores and crevices of rock and soil.

### **Growth areas**

Locations on the fringe of metropolitan Melbourne designated in planning schemes for large-scale transformation, over many years, from rural to urban use.

### **Heritage River Area**

Land in particular parts of rivers and river catchment areas in Victoria which have significant nature conservation, recreation, scenic or cultural heritage values. These areas are identified and protected under the *Heritage Rivers Act 1992*. There are 18 Heritage River Areas in Victoria.

### **Infill**

Development of unused or underutilised land in existing urban areas.

### **Infrastructure**

Basic facilities and networks needed for the functioning of a local community or broader society.

### **Irrigation district**

An area declared under the *Water Act 1989* that is supplied with water by channels and pipelines used mainly for irrigation purposes.

### **Impervious area**

A surface or area within a catchment that significantly restricts the infiltration of water. Impervious surfaces can include concrete, road surfaces, roofs and saturated ground such as a lake or pond.

### **Integrated water management (IWM)**

A collaborative approach to planning that brings together all elements of the water cycle including sewage management, water supply, stormwater management and water treatment, considering environmental, economic and social benefits.

### **Integrated Water Management Forum**

A meeting of urban water management organisations to identify, prioritise and commit to the investigation of integrated water management opportunities.

### **Integrated water management opportunity**

A servicing need that has the potential to leverage broader benefits when undertaken collaboratively, using an integrated water management approach.

### **Liveability**

A measure of a city's residents' quality of life, used to benchmark cities around the world. It includes socioeconomic, environmental, transport and recreational measures.

### **Megalitre (ML)**

One million (1,000,000) litres.

### **Metropolitan Melbourne**

The 31 municipalities that make up metropolitan Melbourne, plus part of Mitchell Shire within the urban growth boundary.

### **National employment and innovation clusters (NEIC)**

Designated concentrations of employment distinguished by a strong core of nationally significant knowledge sector businesses and institutions that make a major contribution to the national economy and Melbourne's positioning in the global economy.

### **Open space**

Includes land reserved for natural landscape, parklands, recreation and active sports, as well as waterways and bays.

### **Potable**

Water of suitable quality for drinking.

### **Productivity**

The economic value produced for an hour of work or a dollar of investment. Increasing productivity is a key source of economic growth and competitiveness.

### **Project**

A planned set of interrelated tasks or activities to be executed over a defined period and within certain cost and other considerations, to achieve a goal.

### **Rainwater**

Water that has fallen as rain or has been collected from rainfall.

### **Ramsar Convention**

Defined by section 4 of the *Commonwealth Water Act 2007* as the Convention on Wetlands of International Importance especially as Waterfowl Habitat done at Ramsar, Iran, on 2 February 1971.

### **Ramsar wetlands**

Wetlands of international importance, designated under the Ramsar Convention.

### **Recreational water or recreational benefits**

The objectives and benefits that recreational users and community members associate with the use of water, reservoirs and waterways for recreational activities. These objectives and benefits include wellbeing and enjoyment, derived from social interaction, physical activity and relaxation associated with activities including sporting events, fishing, water skiing and rowing, camping, walking and gathering with friends and family. It also includes flow-on economic benefits to local communities from visitors to regional areas to make the most of these opportunities.

### **Recycled water**

Water derived from sewerage systems or industry processes that is treated to a standard appropriate for its intended use.

### **Regional Victoria**

Includes all municipalities outside metropolitan Melbourne (except part of Mitchell Shire within the urban growth boundary).

### **Reservoir**

Natural or artificial dam or lake used for the storage and regulation of water.

### **Resilience**

The capacity of individuals, communities, institutions, businesses, systems and infrastructure to survive, adapt and grow, no matter what chronic stresses or shocks they encounter.

### **Riparian**

Refers to land or vegetation that adjoins a river, creek, estuary, lake or wetland.

### **Riverine flooding**

Inundation of normally dry land occurring when water overflows the natural or artificial banks of a creek or river. Also called main channel flooding.

### **Runoff**

The portion of rainfall which actually ends up as streamflow, also known as rainfall excess.

### **Sewage**

Wastewater produced from households and industry.

### **Sewerage**

The pipes and plants that collect, remove, treat and dispose of liquid urban waste.

### **State-significant industrial precincts (SSIP)**

Strategically located land available for major industrial development linked to the Principal Freight Network and transport gateways.



## Stormwater

Runoff from urban areas. The net increase in runoff and decrease in groundwater recharge resulting from the introduction of impervious surfaces such as roofs and roads within urban development.

## Stormwater flooding

Inundation by local runoff. Stormwater flooding can be caused by local runoff exceeding the capacity of an urban stormwater drainage system or by the backwater effects of mainstream flooding causing the urban stormwater drainage system to overflow.

## Strategy

A high-level direction designed to achieve an outcome or a set of outcomes related to IWM, over a defined time period for a defined geographic location.

## Traditional Owners

People who, through membership of a descent group or clan, are responsible for caring for Country. Aboriginal people with knowledge about traditions, observances, customs or beliefs associated with a particular area. A Traditional Owner is authorised to speak for Country and its heritage.

## Urban greening

Growing plants wherever possible in cities to contribute to urban vegetation coverage, and providing a connection to nature.

## Urban heat-island effect

When the built environment absorbs, traps, and in some cases directly emits heat, causing urban areas to be significantly warmer than surrounding non-urban areas.

## Urban renewal

The process of planning and redeveloping underutilised medium and large-scale urban areas, precincts or sites for mixed land-use purposes.

## Urban water cycle

The cycle of water through urban environments. Distinguished from the natural urban water cycle by the transfer of water through built infrastructure and the high runoff rates generated by impervious surfaces.

## Use (water use)

The volume of water diverted from a stream or groundwater bore. It is not the same as 'use' by the end consumer of the water.

## Wastewater

Water that has had its quality affected by human influence, deriving from industrial, domestic, agricultural or commercial activities.

## Water corporations

Victorian Government organisations charged with supplying water to urban and rural water users. They administer the diversion of water from waterways and the extraction of groundwater. Formerly known as water authorities.

## Water infrastructure

Facilities, services and installations needed for the functioning of a water system.

## Water sector

Organisations involved in water management, including water corporations, local government and catchment management authorities.

## Water sensitive urban design (WSUD)

Integrating the urban water cycle into urban design to minimise environmental damage and improve recreational and aesthetic outcomes.

## Waterways

Rivers and streams, their associated estuaries and floodplains (including floodplain wetlands) and non-riverine wetlands.

## Waterway condition/ waterway health

Waterway condition (or waterway health) is an umbrella term for the overall state of key features and processes that underpin functioning waterway ecosystems (such as species and communities, habitat, connectivity, water quality, riparian vegetation, physical form, and ecosystem processes such as nutrient cycling and carbon storage).

## Wetlands

Areas, whether natural, modified or artificial, subject to permanent or temporary inundation, that hold static or very slow-moving water and develop, or have the potential to develop, biota adapted to inundation and the aquatic environment. Wetlands may be fresh or saline.

