

Maribyrnong

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

Foreword	1
Acknowledgements	2
Chapter 1 The way forward	3
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
Chapter 2 IWM in the region	7
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 Maribyrnong catchment	14
Chapter 3 IWM opportunities	19
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	26
Strategic enablers to put IWM into practice	37
Success stories	38
Continued success through collaboration	40
Appendix	42
Additional IWM opportunities in the Maribyrnong catchment	42
Glossary of terms	43

Foreword

We are witnessing an historic transformation of the Maribyrnong catchment as more people choose to live, work and visit this vibrant and beautiful region of Victoria.

With urban and regional development moving swiftly to accommodate population growth, we too must move swiftly to work together to protect and enhance the natural character of the region, most notably the treasured Maribyrnong River, a unique environment and resource with strong natural and cultural heritage significance that provides benefits to Melbourne's growing western and northern suburbs, as well as rural areas of the upper catchment.

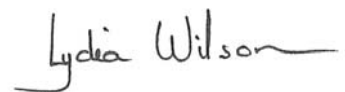
The Maribyrnong Integrated Water Management Forum brings together many dedicated and forward-looking water industry stakeholders, Traditional Owners and Local Government representatives to ensure our opportunities for continued prosperity don't come at a cost to our iconic natural environments.

Integrated water management is not a straightforward process of change, but the benefits derived from our collective efforts far outweigh the challenges.

Together we have reflected on, reviewed and committed to a breadth of opportunities in water and land use planning, each of which position water at the heart of community health and wellbeing. As we learn to adapt to a changing climate, these collaborative endeavours will help our communities sustainably grow and thrive for a more prosperous future.

I am delighted to present the inaugural Strategic Directions Statement for the Maribyrnong IWM Forum, the culmination of exceptional commitment and hard work of our Forum Members to plan, manage and deliver water services across this diverse region in a more efficient and innovative way than we've ever done before.

As we look forward to beginning the next phase of this transformational work, I want to sincerely thank the Forum Members and their organisations for contributing their considerable experience, skill and time to the development of this major blueprint for change in the Maribyrnong catchment.



Lydia Wilson

Chair of the Maribyrnong IWM Forum

Acknowledgements

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

The Forum Area encompasses some of Victoria's most significant urban renewal precincts and greenfield growth areas currently under development. Preservation and management of the region's remaining native 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 Kulin Nation, including the Wurundjeri people. The Forum Area is abundant in Aboriginal cultural sites with a majority of these found near waterways. The Maribyrnong

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 Maribyrnong Integrated Water Management Strategic Directions Statement has been developed by the Maribyrnong 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 Maribyrnong catchment encompasses fertile agricultural lands, natural grasslands and woodlands and densely populated urban areas. The extent and density of urban development across Greater Metropolitan Melbourne is impacting on the health of waterways entering the Maribyrnong River and Port Phillip Bay. Balancing the needs and function of the water cycle as urban development increases 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 Maribyrnong 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 Maribyrnong catchment.

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

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

This approach is Integrated Water Management (IWM). A central premise of IWM is the overall acceptance that achieving 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 with this, IWM Forums have been established across the state 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 water-related outcomes for the Maribyrnong catchment.

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

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

- Ensure priority opportunities are progressed in line with the shared vision and strategic outcomes of the Maribyrnong 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 Maribyrnong IWM Forum's current priorities and opportunities.

Enduring collaboration

How we're working together

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

The Forum brings together 17 organisations with an interest in water cycle management. These organisations include five water corporations, nine local governments, the Port Phillip and Westernport Catchment Management Authority, representatives of 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 Maribyrnong IWM Forum partners commit to promote a collaborative and shared values culture within their own organisations and through their work with local communities and water cycle delivery partners.

The Maribyrnong 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 service 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 opportunities. This collaborative process allows for integrated solutions that respond to individual business needs, as well as the needs of the broader catchment.

The Maribyrnong IWM Forum partners will continue to work together to build inter-organisational trust and develop productive, enduring relationships to realise the shared vision for integrated water management and delivery in the Maribyrnong catchment.

Further information on IWM Forum Governance is outlined in the *Integrated Water Management Framework for Victoria 2017*, available on the internet at www.delwp.vic.gov.au.

Recognising Aboriginal values in water planning and management

The Maribyrnong 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 Wurundjeri, Bunurong 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.



A view of the Macedon Ranges. Courtesy: Creative Commons

Guiding principles for collaboration

The purpose of the Maribyrnong 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.



Pipemakers Park. Photographer: Dani De Rose



Chapter 2

IWM in the region

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

Regional context

The Maribyrnong IWM Forum Area encompasses some of metropolitan Melbourne's most iconic waterways and landscapes. The catchment covers an area of approximately 1,580 km², extending from the southern slopes of the Great Dividing Range at Mount Macedon, south to where the Maribyrnong and Yarra Rivers meet upstream from Port Phillip Bay. The Forum Area includes the Moonee Ponds Creek catchment, Organ Pipes National Park and essential transport and business hubs, such as Melbourne Airport and the northern banks of the Port of Melbourne.

The landscape of the Maribyrnong catchment varies from agricultural areas, parks and natural woodlands and grasslands, to densely populated inner urban areas on Melbourne's fringe. While much of the region is presently devoted to agriculture, rapid population growth and urban development will continue to occur across the catchment in the coming years.

The region sustains a range of recreational and commercial activities. These include tourism, fishing and agriculture to manufacturing and heavy industries associated with the Port of Melbourne in the catchment's south.

The Maribyrnong catchment includes areas of significant value where Aboriginal people have lived for thousands of years. Archaeological evidence in the Maribyrnong River Valley demonstrates that Aboriginal people lived in this region for at least 17,000 years. The region is home to one of Australia's most important archaeological sites, the Sunbury Earth Rings, an area of Aboriginal cultural and ceremonial significance.

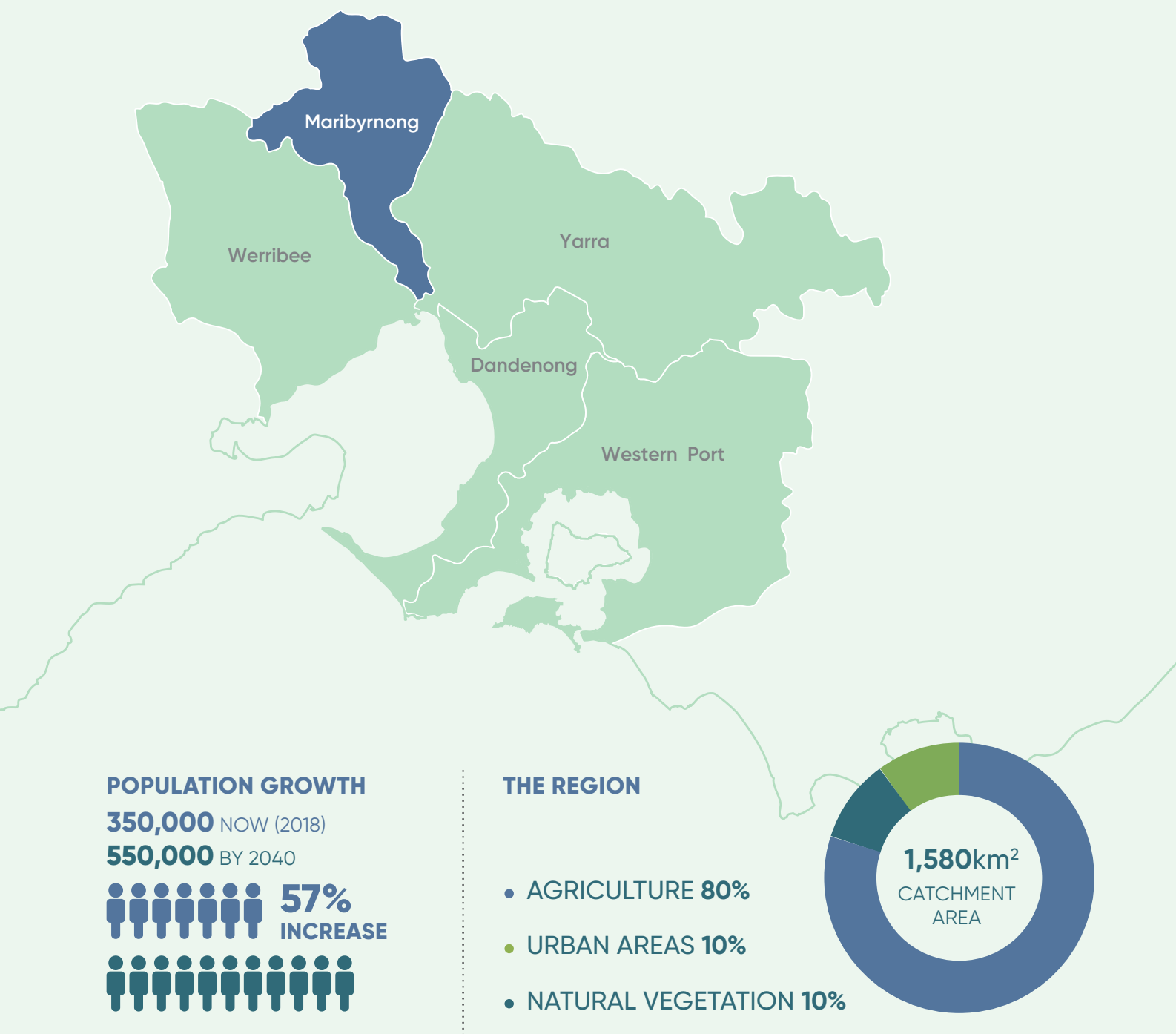
Population

The Maribyrnong IWM Forum Area has an estimated population of more than 350,000 people and is predicted to grow to 550,000 by 2040. The catchment contains several areas designated as urban and economic growth precincts. Township populations are expected to rise in the coming years as greenfield areas are developed. Suburbs in the middle region of the Maribyrnong catchment such as Hillside and Sunbury South will experience much of this change from rural to urban.

Significant densification is predicted across inner urban areas in the catchment's south over the next two decades. Large population increases are anticipated in the suburbs of Maribyrnong, Footscray, Sunshine, Greenvale and Arden Macaulay. The rate of urban growth and development in the region will increase the amount of impervious surface area, such as roads, roofs and footpaths, generating 25 per cent more stormwater runoff by 2050 and impacting the health of the catchment's waterways and landscapes.



Maribyrnong, Victoria. Courtesy: Creative Commons



CHANGE IN AVERAGE ANNUAL RAINFALL

2.4% DECREASE BY 2040



TEMPERATURE
 AN INCREASE OF
1.3°C
 BY 2040



STORMWATER RUNOFF
25%
 INCREASE BY 2050

Source: Department of Environment, Land, Water and Planning
 Healthy Waterways Strategy 2013/14–2017/18, Melbourne Water
 Victoria in future 2016
 Strategies for Managing Sports Surfaces in a Drier Climate, July 2007, GHD
 Guidelines for Assessing the Impact of Climate Change on Water Supplies in Victoria,
 Department of Environment, Land, Water and Planning, December 2016

Climate Change

By 2040, average temperatures across the Maribyrnong 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 and those with low tree canopy coverage experiencing greater heat vulnerability than more rural areas.

Whilst the region is predicted to see more frequent, intense rainfall events that will increase the risk of flooding, the Maribyrnong catchment could experience a reduction in average annual rainfall by 2040, under a medium climate change scenario, according to the Victorian Government's *Guidelines for Assessing the Impact of Climate Change on*

Water Supplies in Victoria 2016.

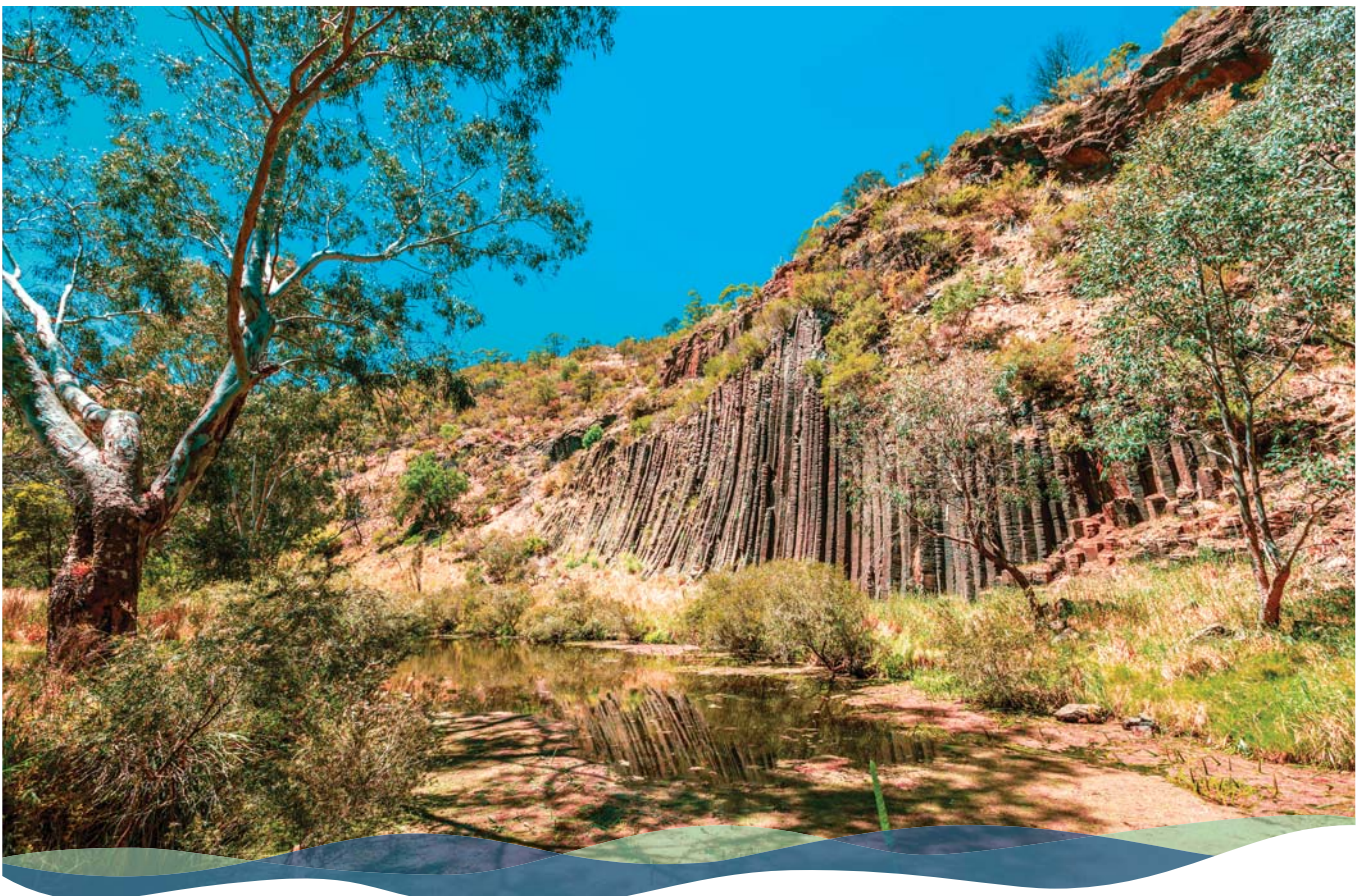
Below average rainfall recently recorded by the Bureau of Meteorology found that in 2016, there were just three days of rainfall exceeding 20 mm.

Less rainfall over the catchment's naturally dry landscape, combined with fast-growing urban populations and agricultural demands, will place increased pressure on water services in the catchment.

Climate change will pose a serious threat to the wetlands and riverside landscapes of the Maribyrnong catchment. Greater intensity of rainfall events will increase riverbank erosion, stream degradation and flood risks, affecting public and private property and the health and habitats of plant and animal species.

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.**

Water quality will also be impacted by climate change. Extreme dry conditions will reduce the quality of local water supplies, emphasising the need to plan for and deliver alternative, fit for purpose sources.



Organ Pipes National Park. Photographer: Greg Brave

Vision and strategic outcomes

The community and environment of the Maribyrnong catchment are healthy, thriving and resilient, and the catchment's unique characteristics are valued and celebrated.

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.



Maribyrnong River. Courtesy: Creative Commons

IWM strategic outcomes

Outcomes



Safe, secure and affordable supplies in an uncertain future

A secure, climate resilient water supply for community and environment

Fit for purpose use of a diverse range of water supplies and resources for human consumption, ecological, cultural purposes, recreational amenity, and peri urban agriculture

Water supply and network delivery considers current and future affordability

Water quality meets regulatory standards and community expectation

Water supply meets demand with an efficient balance, including recognition and promotion of water conservation by the residential, commercial and industrial community



Effective and affordable wastewater systems

Manages public health and environmental expectations

Effectively managed sewerage system achieves best whole-of-community outcomes and minimises or avoids long term costs (operational and environmental)

Optimised and effectively managed onsite domestic system

Waste-to-resource opportunities are maximised

Asset planning considers effective renewal planning, including affordability and life cycle costs and responsibilities



Opportunities are optimised to manage existing and future flood risks and impacts

Community and property are resilient to local flood risk (including consideration of specific vulnerable groups)

Flood protection of natural and built assets in urban areas meets community expectations and standards with respect to cost and impact risk

Development in the Maribyrnong catchment recognises and mitigates exacerbated downstream flooding risks

Planning and project design consider climate change in developing impact scenarios for extreme events



Healthy and valued waterways and marine environments

Management of the catchment is integrated and includes the whole water cycle

Impacts from urban, peri urban, commercial, industrial and agricultural activities are mitigated to protect our waterways, groundwater and the bay

Waterways across the catchment are managed for their health and the health of coastal and marine ecosystems in Port Phillip Bay

Improve health through reduced nutrient, sediment and flow discharges to waterways and Port Phillip Bay

Waterways across the catchment are managed for long term ecological resilience, balancing the impact of climate change and needs for regional flood mitigation, agriculture, industry and urbanisation

Waterways are critical corridors for the movement of flora and fauna, and for human recreation and well being

Environmental flows for waterway health are a key management goal

Traditional Owner and Aboriginal values, knowledge and practices are integrated and protected in waterway management and planning

The Maribyrnong 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 prioritise 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 landscapes

Active and passive recreation is supported by water

Linear water related assets are multipurposed to enhance community connectivity

Urban landscapes retain moisture for cooler, greener cities and towns in a changing climate

Waterways and coastal environments are accessible as valuable open space

Landscapes are recognised and managed for their contribution to ecological habitat corridors

Diverse and abundant native animals and plants are supported through connected habitats within and along waterways and across landscapes.

Urban development recognises and protects the unique geomorphology of the Maribyrnong and its tributaries

Agricultural and rural landscapes are recognised as part of the catchment system



Community and Traditional Owner values are reflected in place-based planning

Diverse urban landscapes that reflect local conditions and history

Forum partners have raised the engagement and water literacy of the community, empowering them to understand and influence planning processes

Local water-related risks and issues are understood by the existing and growing community

Projects incorporate Aboriginal Values from the earliest stages

Cultural, social, ecological and other aspirations that the community have communicated to IWM partners have been incorporated into the project objectives

Water cycle decision making for place based projects provide a positive long-lasting legacy for the community



Jobs, economic benefit and innovation

Jobs and economic growth (including sustainable economic benefit) are supported by water

IWM Forum delivered projects leverage innovative planning and operation

Agricultural production is supported so that green wedge and hinterland areas are financially sustainable and remain or return to viability

IWM investments (resourcing and/or funding) are understood for the benefits they are achieving, not only seen for cost

Traditional Owner and Aboriginal Victorian consultation, engagement, employment and economic development has been implemented (*Water for Victoria 2016*)

The case for IWM in the Maribyrnong catchment

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



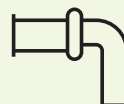
Safe, secure and affordable supplies in an uncertain future

Five water corporations oversee water supply for the Maribyrnong catchment. These include Melbourne Water, Western Water, City West Water, Southern Rural Water and Yarra Valley Water.

The catchment's Rosslynne Reservoir, located on Jacksons Creek, provides drinking water to the Macedon Ranges, Gisborne and Sunbury, as well as water for irrigation to agricultural lands, including the Keilor Market Gardens. The Greenvale Reservoir supplies water from the Melbourne water supply system to the north and western suburbs of the Maribyrnong catchment.

Supply and demand modelling for townships in the north of the catchment indicate the risk of a water supply shortfall in the future.

Changes to the water cycle driven by projected population growth and climate change means more water will be needed across the catchment for urban, agricultural and environmental flow purposes. There is an opportunity now to plan for the provision of secure water supplies for communities and industries into the future.



Effective and affordable wastewater systems

Much of the Maribyrnong catchment's urban wastewater is treated at the Western Treatment Plant, operated by Melbourne Water and located in Werribee.

Wastewater generated by the large outer townships through the catchment flow to recycled water treatment plants operated by Western Water. These include facilities in Gisborne, Riddells Creek, Romsey and Sunbury which is the largest recycled water plant in the region. These plants operate to limits set by Victoria's Environment Protection Authority (EPA). Significant upgrades to the Sunbury plant are underway to provide improved recycled water quality and increase treatment capacity by more than 50 per cent to accommodate the population growth anticipated for the region. There is an opportunity to enhance the management of recycled water to mitigate impacts of increased volumes discharged to waterways.

The provision and efficacy of wastewater management services vary across the catchment. In some rural townships, such as Bulla and Macedon, unsewered development poses a threat to the environment. Poor-performing on-site domestic wastewater systems have the potential to pollute waterways, impacting public and environmental health.



Opportunities are optimised to manage existing and future flood risks and impacts

Parts of the catchment are prone to riverine flooding during periods of heavy rain, particularly areas nearest the Maribyrnong River, such as the suburbs of Maribyrnong and Moonee Valley. Flash flooding can also occur in parts of the catchment. The suburb of Arden Macaulay, just north of Melbourne's CBD, also sits in low-lying land subject to inundation. Flood risk management strategies for areas prone to inundation are central to the catchment's current and future planning and development.

The Maribyrnong River collects water from its tributaries in the higher reaches of the catchment and channels it downstream toward Port Phillip Bay, where flatter terrain can cause the river to overflow its banks. Residential, industrial and commercial properties are located along the

Maribyrnong River floodplain where disruptive floods occur on average every 10 to 20 years. Low lying areas, including Moonee Ponds and Seddon, are particularly susceptible to floodwater damage to property and infrastructure.

Urban drainage systems predating the high-density development characteristic of the lower catchment

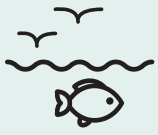
today cannot always cope with the increased capacity during large rainfall events.

There is a need to investigate improved floodwater storage capabilities in the Maribyrnong catchment, particularly in developing urban centres in Brimbank, Hume and the Macedon Ranges, where stormwater harvesting and management could reduce the risk and costs of intense rainfall events.

A holistic, whole-of-catchment approach to flood planning in the Maribyrnong region will help mitigate the impact of upstream flood events in downstream areas of the catchment.



Homes along the Maribyrnong River. Courtesy: Creative Commons



Healthy and valued waterways and marine environments

The Maribyrnong catchment contains an array of significant and biologically diverse waterways and wetlands ranging from expansive rivers with variable flows to small ephemeral creeks and streams.

The Maribyrnong River is the largest waterway in the catchment and the second major river in metropolitan Melbourne. It originates in the Macedon Ranges and flows for 40 km to Port Phillip Bay. Other notable waterways in the Maribyrnong catchment include Stony Creek, Moonee Ponds Creek, Steeles Creek, as well as Deep Creek, Jacksons Creek, Riddells Creek and Emu Creek.

The Maribyrnong River estuary connects to the Yarra River before entering Port Phillip Bay. Most of the catchment's water quality is fair, with better conditions generally found in the upper reaches away from dense urban areas and heavy industries. Highly elevated salinity, phosphorus and turbidity levels are consistent in the mid and lower reaches of the catchment's waterways. Chemical pollutants have been noted in some of the Maribyrnong catchment's marine species, including bream, eel and other finfish, prompting recommended consumption limitations by the Victorian Chief Health Officer.

Combined with the drying out of the catchment, declining water quality and changes in stream flows will continue to impact the health of waterways and the ecosystems they support.

Notable animal species at home in the catchment's forested waterways include the Yarra pygmy perch, crabs and populations of platypus. Wetland habitats throughout the Maribyrnong catchment also support various water birds and frog species,

including the Black Swan, Australian Darter, herons, cormorants and the Growling Grass Frog, which is presently threatened by a range of issues, including long periods of drought, poor water quality and pollution. Returning locally extinct and vulnerable species to the environment will be a significant challenge across the catchment.

The predicted increase in the frequency and intensity of rain events, combined with greater urban stormwater generation and disruption to overland flow paths from urban and infill development, will impact on water quality and the ecological health of waterways in the region.

The increased frequency of intense rain events predicted for the region, combined with greater urban stormwater generation and disruption to overland flow paths from urban and infill development, has impacted water quality and ecological health.

Urban stormwater represents one of the most significant threats to the health of the Maribyrnong River, where nutrients and metals from industrial inputs have impacted vegetation and aquatic species. Stormwater discharge to Taylors Creek in the catchment's north has altered the nature of that waterway and contributed to the defoliation of native River Red Gums along the water's edge.

Highly erodible riverbanks and escarpments in the valleys of the Maribyrnong catchment risk further damage from increased stormwater runoff and other climate change challenges, endangering the ecological health and quality of environments across the entire region.

There is an opportunity to incorporate improved planning and waterway protection controls as the catchment continues to urbanise.



Small crustaceans, such as crabs, live in the Maribyrnong River.
Courtesy: Creative Commons



Healthy and valued landscapes

The landscape of the Maribyrnong catchment varies greatly from agricultural areas, escarpment shrublands and natural woodlands and grasslands, to densely populated and expanding urban areas accounting for around 10 per cent of the region.

The catchment covers an area of approximately 1,580 km², and the majority of this, 80 per cent, is devoted to farming and grazing land. A further 10 per cent of the region has retained its natural vegetation. Some of Victoria's last remaining areas of native grassland are found here.

River Red Gums and Melbourne Yellow Gum trees are present in much of the catchment. In lower reaches, large urban parks including

Pipemakers Park on the banks of the Maribyrnong River and the Woodlands Historical Park, located in the upper Moonee Ponds Creek catchment, provide important recreational and ecological value for the region, linking creeks and rivers with natural reserves.

An increase in native vegetation is sought at the catchment scale, with efforts to reverse post-development die back in developed areas where high heat vulnerability is a challenge. These efforts include rehabilitating wetlands, establishing green corridors through the catchment's densely populated urban areas and reclaiming underused arid parklands for passive recreation.

The management of weeds along waterways is a priority area of improvement in the Maribyrnong catchment. An estimated 10,000 hectares of agricultural land in the catchment is affected by the Serrated Tussock, one of Australia's worst invasive plant species.

The Maribyrnong catchment continues to address challenges on the water cycle from increased pollution due to stormwater flows and rapid urbanisation and agricultural activities which impacts the health of its urban and rural landscapes.

In parts of the catchment harvested stormwater and recycled water is used to improve landscape values through irrigating recreational and commercial sites, including parks and sporting fields.



Community and Traditional Owner values are reflected in place-based planning

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

The Maribyrnong River supports many recreational activities and water sports, including rowing and kayaking, and riverside parks, walking tracks and cycling paths are well used and loved by local communities and visitors alike.

The catchment encompasses the Traditional lands of the Kulin Nation,

including the Wurundjeri people who have lived in the Maribyrnong River valley for at least 40,000 years. More than 5,800 Aboriginal cultural sites have been recorded in the Maribyrnong catchment, with a majority of these found near waterways. The Sunbury Rings Cultural Landscape along Jacksons Creek is one of Australia's most important archaeological areas. The region contains several significant and rare cultural, heritage and environmental features, including the Sunbury Earth Rings. The area is characterised by three shallow,

circular earth structures believed to be the site of Aboriginal ceremonial activities.

In recent decades, extensive land clearing for development along waterways and rural areas has reduced the beneficial cooling effects provided by native vegetation in the catchment. The increase of impervious surface area has led to a higher risk of flood damage during periods of heavy rainfall.

Continued...

Local governments are working alongside their communities to mitigate flood risk and reduce the urban heat island effect through the creation of green and connected corridors. There is an opportunity to integrate planning for parks, playgrounds and wetlands with incoming development, particularly in key growth areas, including the Maribyrnong Defence Site, which will create approximately 3,000 new homes over an area of 127 hectares.

Communities and advocacy groups concerned with water cycle outcomes include the Friends of the Maribyrnong Valley, Friends of Steeles Creek, Friends of Moonee Ponds Creek and Friends of Stony Creek. The Jacksons Creek Eco-Network, a volunteer network of several Landcare and Friends Groups, is active in the

upper reaches of the catchment, caring for the environment along the Jacksons Creek and its tributaries, including Riddells Creek. The Upper Deep Creek Landcare Network perform a similar role in this tributary of the Maribyrnong catchment. Each of these groups are active in riparian planting and land management, waterway protection and community education and advocacy for healthy and thriving waterways.

The Moonee Ponds Creek Collaboration Project seeks to integrate planning and management of the Moonee Ponds Creek catchment, a sub-catchment within the wider Maribyrnong catchment and one of Melbourne's most urbanised and modified creek systems. Co-ordinated by Melbourne Water, the project brings together

representatives from local and state government, community groups, not-for-profits, businesses and research organisations to improve the Moonee Ponds Creek area through a range of initiatives.

Other cross-government initiatives that seek to elevate community priorities and outcomes, as well as maintain a relationship with the Maribyrnong IWM Forum initiatives, include Greening the West and the Metropolitan Partnerships. The Maribyrnong catchment is divided across the Western, Northern and Inner 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.



Jobs, economic benefit and innovation

The Maribyrnong catchment covers a major growth corridor in Victoria comprising several areas designated for significant population and economic growth. Key urban renewal precincts include Footscray, Maribyrnong and Arden Macaulay. The Sunbury Growth Corridor is anticipated to see up to 35,000 new dwellings constructed, bringing as many as 22,000 new jobs to the region. Populations in these growing areas will place greater pressure on the catchment's water systems and the security of supply to homes and businesses.

The region contains state and nationally significant infrastructure and commercial industries, including Melbourne's Essendon and Tullamarine airports, major road transport links and the Port of Melbourne's international and domestic shipping industries.

To the west of the Maribyrnong catchment, planning for the Western Irrigation Network (WIN) is underway to provide an alternative water scheme for the Werribee catchment's agricultural region, with benefits extending across the two catchments. Excess recycled water generated in the both Werribee and Maribyrnong catchments will be available for re-use to support high value agriculture in the Werribee catchment. Led by Western Water, the WIN will support future recycled water customer supply to enable economic growth and liveability in the west.

Notable tourism and commercial activities at the Melbourne Showgrounds, Moonee Valley Racecourse and Flemington Racecourse are significant for the catchment. Australia's most famous horse race, the Melbourne Cup, takes place here annually. Manufacturing

in the south and agriculture in the north are contributing economies for the Maribyrnong catchment. In the coming years, the Sunshine National Employment and Innovation Cluster (NEIC) and the Moonee Valley Racecourse area will undergo major infrastructure investment, resulting in further job creation and economic benefit at the catchment scale.

As urban infill increases, managing the impacts of historical industrial and port activities that have contaminated waterways and nearby land in the catchment remains a challenge.

Secure water supplies, adequate water management infrastructure including water, wastewater and stormwater to support the Maribyrnong 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 Maribyrnong 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 Maribyrnong IWM Forum's collaborative partners are committed to progressing 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 Maribyrnong IWM Forum has agreed to initiate development of a strategy over the next 12-18 months.

The projects and strategies 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 Maribyrnong 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 opportunities 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.

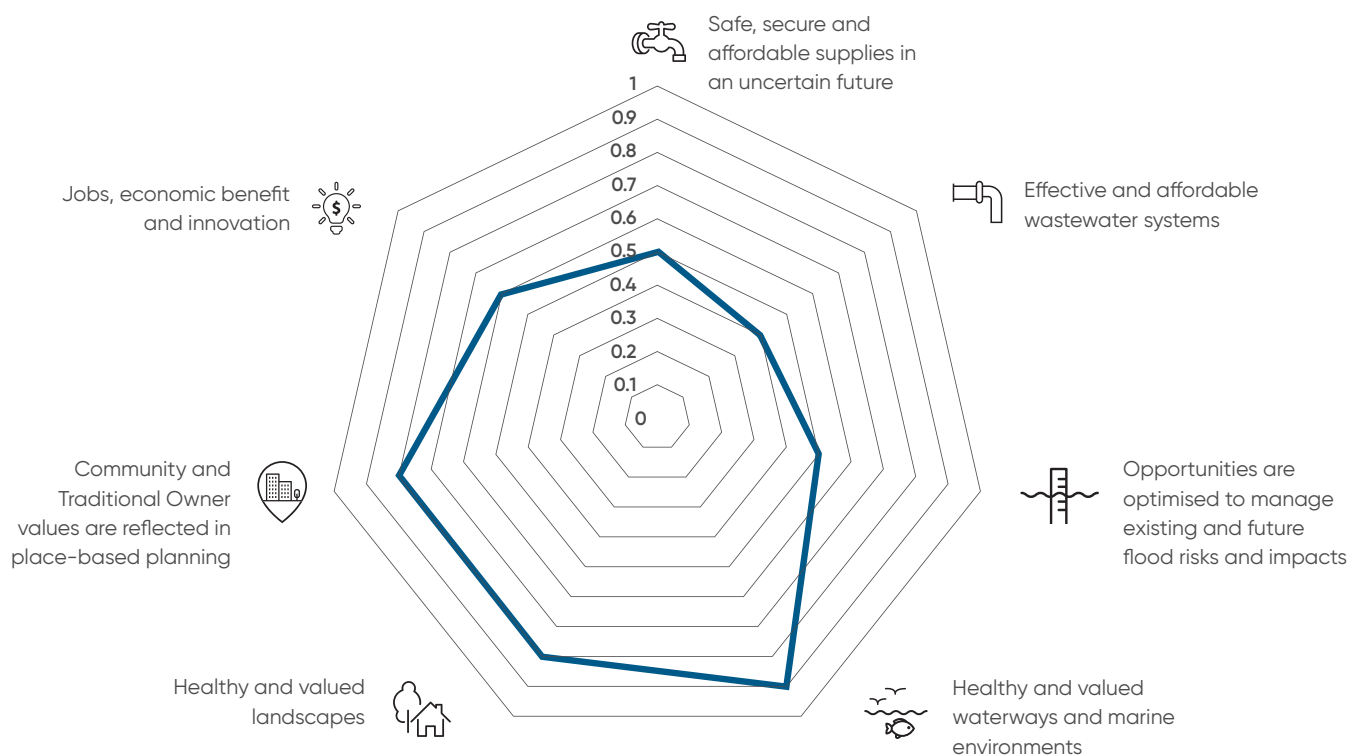
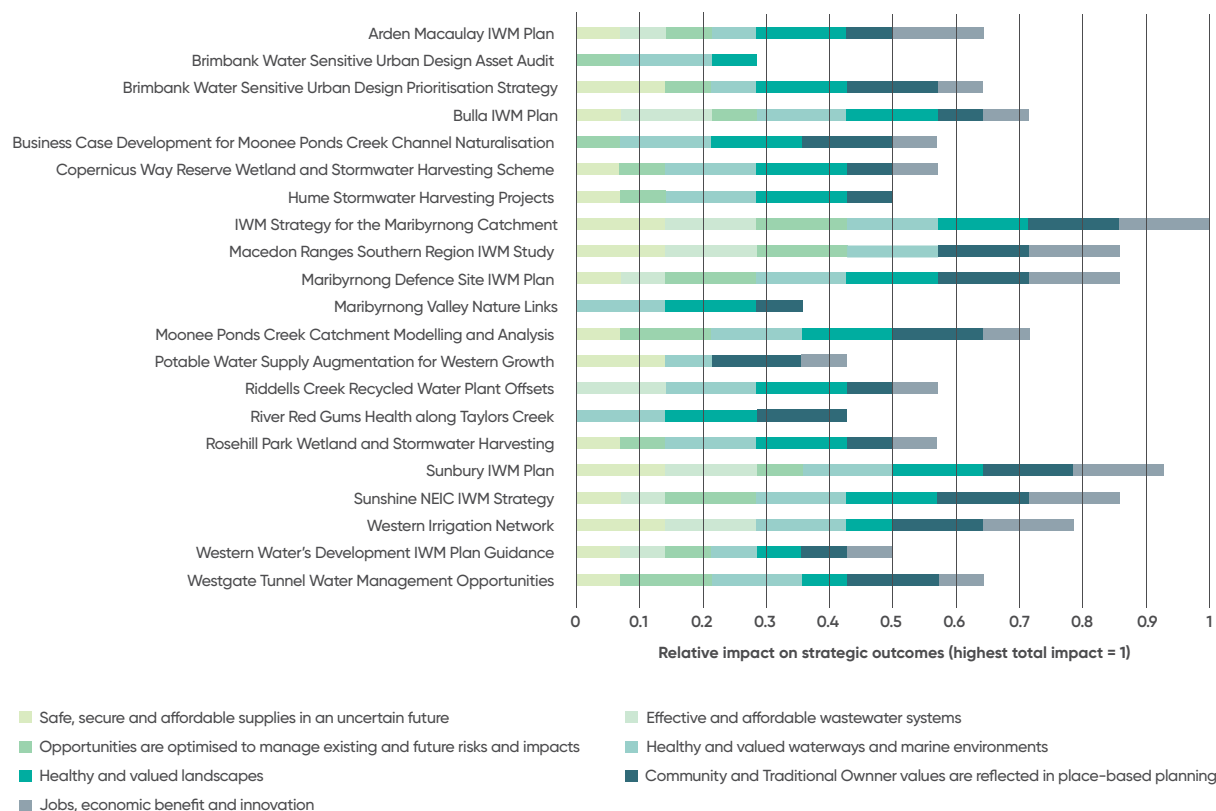
The IWM Forum recognises that the contribution of this Priority Portfolio to the seven strategic outcomes, including the targets identified in the existing metropolitan-wide strategies, has not yet been quantified. It is the intention of the Forum to consider a targeted evaluation of these IWM opportunities 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 Maribyrnong 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 Maribyrnong 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 the Forum's strategic outcomes

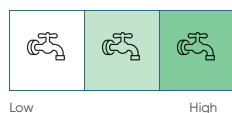


IWM opportunities: An overview of projects and strategies

IWM opportunity	Strategic outcomes							Location	Spatial scale
Arden Macaulay IWM Plan								Arden Macaulay	Urban renewal
Brimbank Water Sensitive Urban Design Asset Audit								Brimbank City Council	Sub-catchment
Brimbank WSUD Prioritisation Strategy								Brimbank City Council	Sub-catchment
Bulla IWM Plan								Bulla	Sub-catchment
Business Case Development for Moonee Ponds Creek Channel Naturalisation								Strathmore North	Sub-catchment
Copernicus Way Reserve Wetland and Stormwater Harvesting Scheme								Keilor Downs	Sub-catchment
Hume Stormwater Harvesting Projects								Hume City Council	Sub-catchment
IWM Strategy for the Maribyrnong Catchment								Maribyrnong Forum Area	Forum area
Macedon Ranges Southern Region IWM Study								Gisborne, Riddells Creek, Romsey	Sub-catchment
Maribyrnong Defence Site IWM Plan								Maribyrnong	Urban renewal
Maribyrnong Valley Nature Links								Maribyrnong catchment	Sub-catchment
Moonee Ponds Creek Catchment Modelling and Analysis								Moonee Ponds Catchment	Sub-catchment
Potable Water Supply Augmentation for Western Growth								Western Water Service Region	Inter-forum
Riddells Creek Recycled Water Plant Offsets								Jacksons Creek	Sub-catchment
River Red Gums Health along Taylors Creek								Taylors Creek	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 West Water, Melbourne City Council, Melbourne Water, South East Water, Bunurong Land Council Aboriginal Corporation (LCAC), Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation (L&CCHCAC)*, Victorian Planning Authority (VPA)	
Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Bunurong LCAC	
Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Bunurong LCAC	
Hume City Council, Melbourne Water, Western Water, Wurundjeri L&CCHCAC*	
Melbourne Water, Moonee Valley City Council, Moreland City Council, Wurundjeri L&CCHCAC*, VPA, Friends of Moonee Ponds Creek and support from members of the Moonee Ponds Catchment Collaboration	
Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*	
Hume City Council, Melbourne Water, Wurundjeri L&CCHCAC	
Maribyrnong Forum partner organisations	
Macedon Ranges Shire Council, Melbourne Water, Western Water, Wurundjeri L&CCHCAC*, VPA	
City West Water, Maribyrnong City Council, Melbourne Water, Wurundjeri L&CCHCAC*, VPA	
Port Phillip and Westernport CMA, Melbourne Water, City West Water, Western Water, Parks Victoria, Councils, Bunurong LCAC, Wurundjeri L&CCHCAC*, Conservation Volunteers Australia, Lead West, Melbourne Airport, Landcare and Friends of Groups	
Melbourne Water, Cities of Melbourne, Moreland, Moonee Valley, Hume and other members of the Moonee Ponds Catchment Collaboration, Wurundjeri L&CCHCAC*, VPA	
Western Water, Melbourne Water, Southern Rural Water, Bunurong LCAC, Wadawurrung, Wurundjeri L&CCHCAC*	
Western Water, Port Phillip and Westernport CMA, Macedon Ranges Shire Council, Melbourne Water, Wurundjeri L&CCHCAC*, VPA	
Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Hume City Council	

*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
Rosehill Park Wetland and Stormwater Harvesting								East Keilor	Sub-catchment
Sunbury IWM Plan								Sunbury Growth Area	Growth area
Sunshine NEIC IWM Strategy								Albion, Sunshine and St Albans	Urban renewal
Western Irrigation Network								Gisborne, Sunbury, Melton, Bacchus Marsh	Inter-forum
Western Water's Development IWM Plan Guidance								Western Water Service Region	Greenfield Subdivision
Westgate Tunnel Water Management Opportunities								Maribyrnong	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



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.



Collaborative Partners	Status
Moonee Valley City Council, Melbourne Water, City West Water, Wurundjeri L&CCHCAC*	<div><div></div><div></div><div></div></div>
Western Water, Melbourne Water, Hume City Council, VPA, Southern Rural Water (advisory), Wurundjeri L&CCHCAC	<div><div></div><div></div></div>
City West Water, Brimbank City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, VPA	<div><div></div></div>
Western Water, Moorabool Shire Council, Melton City Council, Hume City Council, City West Water, Southern Rural Water (advisory), Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div><div></div><div></div></div>
Western Water, Moorabool Shire Council, Melton City Council, Hume City Council, Macedon Ranges Shire Council, Melbourne Water, VPA, Bunurong LCAC, Wurundjeri L&CCHCAC*	<div><div></div><div></div><div></div><div></div></div>
City West Water, Maribyrnong City Council, City of Melbourne, Melbourne Water, VPA, 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



Wild Starlings fly over wheat crops, Sunbury. Photographer: Nicole Patience

Priority Portfolio of IWM opportunities

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

All projects and strategies demonstrate the potential to generate important cross-organisational learnings and capacity-building benefits for current and future IWM initiatives. All of these projects and strategies will be enhanced by

collaboration and visibility through the IWM Forum process and will contribute substantial benefits to the Maribyrnong region as a whole, or specifically to its iconic natural assets, including the Maribyrnong River and its tributaries, and Port Phillip Bay. Further, all of these IWM opportunities will benefit from additional resources and support through the IWM Forum.

Some projects and strategies in the Priority Portfolio offer unique additional values. These include the potential to be accelerated by collaboration and visibility through the IWM Forum process; the potential to generate new, or enhance existing, cross-organisational collaboration; and the ability to be a mechanism for further IWM advocacy and policy innovation. Unique values are indicated in the project description.

ACTION 1

Arden Macaulay IWM Plan

Located in the City of Melbourne, the Arden Macaulay area will undergo significant urban renewal to accommodate population and economic growth over the next 30 years. Supported by the development of a new train station and public open space, thousands of new residents and employment opportunities are anticipated for the area. This project will explore urban renewal options using IWM approaches to identify how urban water management can be best achieved in this precinct. The project will focus on flood management, supporting liveability and the provision of open space and amenity along the Moonee Ponds Creek.

Unique value:

This strategy will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

Status <div><div></div><div></div><div></div></div>						
Location		Arden Macaulay				
Collaborative Partners		City West Water, Melbourne City Council, Melbourne Water, South East Water, Bunurong Land Council Aboriginal Corporation (LCAC), Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation (L&CCHCAC)*, Victorian Planning Authority (VPA)				
Spatial scale		Urban renewal				

ACTION 2

Brimbank Water Sensitive Urban Design Asset Audit

Brimbank City Council will conduct an audit of WSUD assets, including wetlands, to ensure they are performing as per design intent. This includes both physical and structural asset elements. Maintenance schedules informed by audit results will be developed and may assist other Councils in ensuring their assets are performing at their optimum.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

Status <div><div></div></div>						
Location		Brimbank City Council				
Collaborative Partners		Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Bunurong LCAC				
Spatial scale		Sub-catchment				









ACTION 3

Brimbank Water Sensitive Urban Design Prioritisation Strategy

Brimbank, Hobsons Bay and Hume City Councils undertook a pilot study to develop a methodology and develop a multi-criteria framework to prioritise locations for stormwater interventions. Brimbank has subsequently undertaken designs for three stormwater harvesting installations and has expanded the assessment to include the Sunshine NEIC. Brimbank proposes to build on this work to undertake assessment of all sub-catchments within the municipality to develop a prioritised list of projects for construction, subject to a budget being available. There is potential for this work to be expanded across the Maribyrnong catchment.

Unique value:

This strategy will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

						
Status						
						
Location		City of Brimbank				
Collaborative Partners		Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Bunurong LCAC				
Spatial scale		Sub-catchment				









ACTION 4

Bulla IWM Plan

The township of Bulla abuts a section of Deep Creek which is in relatively good condition and supports platypus and growling grass frog populations. But the health of Deep Creek is under threat from pollution from domestic wastewater systems and Bulla's main stormwater drain. Localised flooding issues from this main stormwater drain also threaten Deep Creek. An IWM plan could identify opportunities to address water cycle issues in Bulla in a holistic way that would reduce the need for multiple infrastructure projects and interventions, ultimately providing value to the community, such as improved amenity, better ecological condition of the creek and reduced risk from flood.

Unique value:

This strategy may be a mechanism for further IWM advocacy and policy innovation.

						
Status						
						
Location		Bulla				
Collaborative Partners		Hume City Council, Melbourne Water, Western Water, Wurundjeri L&CCHCAC*				
Spatial scale		Sub-catchment				



Brimbank Park. Photographer: Christian Pearson

ACTION 5

Business Case Development for Moonee Ponds Creek Channel Naturalisation

This project was identified by the Moonee Ponds Catchment Collaboration as an opportunity to return the northernmost part of the Moonee Ponds Creek concrete channel to a natural land form. The naturalised channel is envisaged to facilitate more pedestrian access points, connectivity and recreational facilities, as well as increase community use of a linear park along the creek. This project would include complementary work on permeable pavement in streets and other water sensitive urban design interventions. It will improve biodiversity and habitat creation and include citizen science and education opportunities. The first phase of the project is to develop a business case.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

Status						
Location						
Strathmore North						
Collaborative Partners						
Melbourne Water, Moonee Valley City Council, Moreland City Council, Wurundjeri L&CCHCAC*, VPA, Friends of Moonee Ponds Creek and support from members of the Moonee Ponds Catchment Collaboration						
Spatial scale						
Sub-catchment						

ACTION 6

Copernicus Way Reserve Wetland and Stormwater Harvesting Scheme

The Copernicus Way Reserve Wetland and Stormwater Harvesting Scheme aims to improve the sustainability, resilience and liveability of a key Brimbank suburban park. An integrated park and playground with a wetland will be created. The wetland will support biodiversity and provide treated stormwater for parkland irrigation. The design includes a playground, footpath and picnic facilities, plus a large grassed area terracing down to the wetland, providing opportunities to explore the water's edge. This new water sensitive parkland will boost liveability and wellbeing within the local community.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration.

Status						
Location						
Keilor Downs						
Collaborative Partners						
Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*						
Spatial scale						
Sub-catchment						

ACTION 7

Hume Stormwater Harvesting Projects

This project will investigate the suitability of several potential stormwater harvesting sites across the Hume City Council area, including the Jacana Wetland. Melbourne Water will work with Hume City Council to explore whether stormwater harvesting can address a post-development die back in remnant River Red Gums encountered in Malcolm Creek caused by excess stormwater inflows into the creek. Key findings may also apply to other parts of the Maribyrnong catchment, such as the Lindum Vale development and Taylors Creek. Over the next 12 months, forum partners will conduct master planning to prioritise opportunities and refine concept plans.

Unique value:

This project demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration.

Status						
Location						
Hume City Council						
Collaborative Partners						
Hume City Council, Melbourne Water, Wurundjeri L&CCHCAC						
Spatial scale						
Sub-catchment						



Wild Eastern Grey Kangaroo drinking from dam, Sunbury. Photographer: Nicole Patience









ACTION 8

IWM Strategy for the Maribyrnong Catchment

An IWM Strategy at the catchment-scale will guide the Maribyrnong Forum Members to effectively contribute to achieving the Forum's vision and strategic outcomes. The Forum will first define a plan to deliver an IWM strategy in collaboration with all Maribyrnong IWM Forum Members and Working Group members. The plan will be executed by the Forum and supported by agreed governance.

Unique value:

This strategy will be accelerated by collaboration and visibility through the IWM Forum process. It also demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration.

						
Status						
						
Location						
Maribyrnong Forum Area						
Collaborative Partners						
Maribyrnong Forum partner organisations						
Spatial scale						
Forum area						

ACTION 9









Macedon Ranges Southern Region IWM Study

Preserving the health of the upper Maribyrnong River tributaries is essential for the health of the entire Maribyrnong River system. These upper tributaries are home to a range of flora and fauna and hold unique Traditional Owner and recreational values. Protecting these values is critical, particularly in the context of climate change and population growth.

Developed in collaboration with the community, this study will define the scale of the challenge in the upper Maribyrnong River system and outline a suite of water cycle management solutions to address these challenges. The outcome of this study will generate IWM infrastructure recommendations and will be used to inform Development IWM Plans.

Unique value:

This project demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may be a mechanism for further IWM advocacy and policy innovation.

						
Status						
						
Location						
Gisborne, Riddells Creek, Romsey						
Collaborative Partners						
Macedon Ranges Shire Council, Melbourne Water, Western Water, Wurundjeri L&CCHCAC*, VPA						
Spatial scale						
Sub-catchment						



Macedon Ranges. Photographer: Greg Brave









ACTION 10

Maribyrnong Defence Site IWM Plan

The Maribyrnong Defence Site, a 127-hectare parcel of federal land with Maribyrnong River frontage, will be redeveloped into a high density residential and mixed-use community that will include approximately 3,000 dwellings, 30,000 square metres of non-residential floor space and new public open space. This project will use an IWM approach to explore the use of alternative supplies and provide a basis to maximise the benefit of infrastructure decisions that will deliver an improved waterway service, cost savings, increased resilience, and maximise community value from water cycle servicing.

Unique value:

This strategy demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

						
Status						
						
Location		Maribyrnong				
Collaborative Partners		City West Water, Maribyrnong City Council, Melbourne Water, Wurundjeri L&CCHCAC*, VPA				
Spatial scale		Urban renewal				









ACTION 11

Maribyrnong Valley Nature Links

This project will use the model of the Grow West project that has undertaken major revegetation action over the past 12 years with several community and funding partners to rejuvenate degraded landscapes around Bacchus Marsh. Grow West has demonstrated that many landholders will participate in landscape improvement and revegetation programs that, over time, can create significant new vegetation corridors (Nature Links) across the landscapes. This project will continue landscape improvement works to develop broad Nature Links along the length of the Maribyrnong River and its tributaries. These natural vegetation links will support the movement of native animal species, control invasive weeds, stabilise soils and help reduce sediment and nutrient inputs to the region's waterways and Port Phillip Bay.

Unique value:

This project demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

						
Status						
						
Location		Maribyrnong catchment				
Collaborative Partners		Port Phillip and Westernport CMA, Melbourne Water, City West Water, Western Water, Parks Victoria, Councils, Bunurong LCAC, Wurundjeri L&CCHCAC*, Conservation Volunteers Australia, Lead West, Melbourne Airport, Landcare and Friends of Groups				
Spatial scale		Sub-catchment				



Jacksons Creek. Courtesy: Creative Commons








ACTION 12

Moonee Ponds Creek Catchment Modelling and Analysis

The Moonee Ponds Creek sub-catchment will benefit from up-to-date modelling incorporating comprehensive climate change scenarios. The data will enable thorough analysis of options for stream modifications of the stream, including the removal a concrete channel in favour of a more natural creek environment. The data will also help determine and prioritise the best options to detain water higher in the catchment.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may be a mechanism for further IWM advocacy and policy innovation.

						
Status <div></div>						
Location Moonee Ponds Creek catchment						
Collaborative Partners Melbourne Water, Cities of Melbourne, Moreland, Moonee Valley, Hume and other members of the Moonee Ponds Catchment Collaboration, Wurundjeri L&CCHCAC*, VPA						
Spatial scale Sub-catchment						








ACTION 13

Potable Water Supply Augmentation for Western Growth

The significant population growth projected for the Western Water service region, in combination with low inflows to local reservoirs, is placing pressure on the region's potable water supplies. As a result, Western Water is becoming increasingly reliant on the Melbourne Water supply system. However, its current entitlements will likely be insufficient to meet growing demand. This strategy involves exploring potable water supply augmentations using an IWM approach. Options include further optimising local supplies, creating new local supplies, extending the water grid to access supplies from outside the region and trading water allocations.

Unique value:

This strategy demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may be a mechanism for further IWM advocacy and policy innovation.

						
Status <div></div>						
Location Western Water Service Area						
Collaborative Partners Western Water, Melbourne Water, Southern Rural Water, Bunurong LCAC, Wadawurrung, Wurundjeri L&CCHCAC*						
Spatial scale Inter-forum						








ACTION 14

Riddells Creek Recycled Water Plant Offsets

This project aims to offset environmental impacts associated with recycled water discharged from Riddells Creek Recycled Water Plant to Jacksons Creek, a major tributary of the Maribyrnong River. This project will investigate the potential to revegetate areas within the Jacksons Creek waterway corridor to improve environmental outcomes for Jacksons Creek and the entire Maribyrnong River system.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It also demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may be a mechanism for further IWM advocacy and policy innovation.

						
Status <div></div>						
Location Jacksons Creek						
Collaborative Partners Western Water, Port Phillip and Westernport CMA, Macedon Ranges Shire Council, Melbourne Water, Wurundjeri L&CCHCAC*, VPA						
Spatial scale Sub-catchment						



Old Bluestone Rail Bridge, Riddells Creek. Photographer: Nicole Patience

ACTION 15

River Red Gums Health along Taylors Creek

Significant defoliation is currently impacting the River Red Gum (*Eucalyptus Camaldulensis*) population along Taylors Creek. Changes to the hydrology, primarily as a result of stormwater discharges, has altered the natures of Taylors Creek in this location. An investigation has been undertaken to understand stresses and conditions that are impacting the health of the River Red Gum population. An investigation into possible interventions is now required to aid population recovery. The learnings from this investigation may inform design and response measures where Red Gums are stressed along the Maribyrnong River or in other catchments.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

Status		<div></div>				
Location		Taylors Creek				
Collaborative Partners		Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Hume City Council				
Spatial scale		Sub-catchment				

ACTION 16

Rosehill Park Wetland and Stormwater Harvesting

This project involves the construction of a wetland and stormwater harvesting facility to irrigate 12 hectares of parkland for passive recreation. The project will help reduce pollutants to Steeles Creek and the Maribyrnong River, and has the potential to reduce downstream flooding.

Unique value:

This project demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration.

Status		<div></div>				
Location		East Keilor				
Collaborative Partners		Moonee Valley City Council, Melbourne Water, City West Water, Wurundjeri L&CCHCAC*				
Spatial scale		Sub-catchment				



Riparian vegetation. Courtesy: Department of Environment, Land, Water and Planning








ACTION 17

Sunbury IWM Plan

The plan will explore options to address the challenges of growth and climate change in the Sunbury area. Key priorities include waterway health and water supply. The plan will involve regional scale harvesting of stormwater to reduce pressure on potable water supplies and protect the ecological values within Jacksons Creek and Emu Creek from the impacts of excess urban stormwater.

Unique value:

This strategy may be a mechanism for further IWM advocacy and policy innovation.

						
Status						
Location						
Sunbury Growth Area						
Collaborative Partners						
Western Water, Melbourne Water, Hume City Council, VPA, Southern Rural Water (advisory), Wurundjeri L&CCHCAC						
Spatial scale						
Growth area						








ACTION 18

Sunshine NEIC IWM Strategy

The Sunshine National Employment and Innovation Cluster (NEIC) is a strategic urban renewal area. It covers an area of 2,100 hectares of mixed residential and non-residential developments. This project will develop an IWM Plan to provide a basis to maximise the benefit of infrastructure decisions that will deliver an improved waterway service, cost savings and increased resilience for the region. It will identify stormwater treatment options specific to the Sunshine NEIC and deliver options to achieve sustainable stormwater targets.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It also demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may be a mechanism for further IWM advocacy and policy innovation.

						
Status						
Location						
Albion, Sunshine and St Albans						
Collaborative Partners						
City West Water, Brimbank City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*, VPA						
Spatial scale						
Urban renewal						








ACTION 19

Western Irrigation Network

The significant population growth taking place through the Sunbury and Melton Growth Areas will create an excess volume of recycled water, which will need to be managed to minimise impact on the environment. The Western Irrigation Network is exploring the use of this recycled water to create a new agricultural irrigation district. The utilisation of the recycled water in this way will not only protect the environment and keep customer bills low, but will also add to the local economy and improve the agricultural productivity of the region.

Unique value:

This project may be a mechanism for further IWM advocacy and policy innovation.

						
Status						
Location						
Gisborne, Sunbury, Melton, Bacchus Marsh						
Collaborative Partners						
Western Water, Moorabool Shire Council, Melton City Council, Hume City Council, City West Water, Southern Rural Water (advisory), Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC**						
Spatial scale						
Inter-forum						








ACTION 20

Western Water's Development IWM Plan Guidance

Western Water has issued guidance for land developers across their service region to put together IWM Plans at the development scale. Development IWM Plans facilitate a more holistic approach to urban water management that enables development and management of increased demand for water services. Development IWM Plans also help mitigate environmental degradation and the effects of climate change. The plans aim to ensure best value infrastructure is provided for customers and services support thriving, liveable communities.

Unique value:

This strategy will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

						
Status <div><div></div><div></div><div></div><div></div></div>						
Location Western Water Service Region						
Collaborative Partners Western Water, Moorabool Shire Council, Melton City Council, Hume City Council, Macedon Ranges Shire Council, Melbourne Water, VPA, Bunurong LCAC, Wurundjeri L&CCHCAC*						
Spatial scale Greenfield subdivision						








ACTION 21

Westgate Tunnel Water Management Opportunities

This project seeks to identify and progress IWM opportunities associated with the West Gate Tunnel Project to maximise community value from sewer works, drainage features and interfaces with waterways and open space. The West Gate Tunnel Project is a major transportation infrastructure project to deliver a second transport crossing over the Maribyrnong River. It will also create areas of new open space and a wetland retarding basin which could be enhanced by using an IWM approach.

Unique value:

This project will be accelerated by collaboration and visibility through the IWM Forum process. It demonstrates the potential to generate new, or enhance existing, cross-organisational collaboration. It may also be a mechanism for further IWM advocacy and policy innovation.

						
Status <div><div></div></div>						
Location Maribyrnong						
Collaborative Partners City West Water, Maribyrnong City Council, City of Melbourne, Melbourne Water, VPA, Bunurong LCAC, Wurundjeri L&CCHCAC*						
Spatial scale 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 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.



Moonee Ponds Creek. Photographer: Tony Proudfoot

Success Stories

An IWM approach to enhance Greenvale Recreation Reserve

Greenvale Recreation Reserve is the largest and most diverse sporting and recreation open space area servicing the Greenvale community. Sporting facilities include three sports ovals, cricket practice nets, a turf practice wicket area, nine tennis courts, three equestrian sand arenas and an equestrian cross-country course. Other facilities include a community hall, a playground and two pavilion/clubroom buildings. Grassy woodland areas, much of which are protected conservation areas, make up the balance of the reserve. It is anticipated that with further development there will be increased passive recreation opportunities, including walking and cycling through the reserve.

The reserve is situated approximately 1 km west of the main residential area of Greenvale and as such did not have sufficient water, wastewater and drainage services to meet the needs of the reserve. This drove the implementation of several IWM initiatives including: an on-site sewage treatment plant that produces Class B recycled water for irrigation; stormwater harvesting from an on-site dam; a water efficient sports field that captures and reuses irrigation run-off and; WSUD features in the car park.

Hume City Council is collaborating with Melbourne Water to augment the existing dam to capture and treat stormwater generated by future greenfield development. This will increase the stormwater harvesting capacity and improve water quality so that all irrigation demands can be met with alternative water.

This IWM approach at Greenvale Recreation Reserve will ensure a reliable alternative water supply for sports field irrigation and improved stormwater treatment, as well as reduced discharge to local waterways and a more efficient use of water resources and available infrastructure.



Courtesy: Hume City Council

Moonee Ponds Creek Catchment collaboration

The Moonee Ponds catchment starts north of the Melbourne Airport and extends to the harbour in the Docklands. Although it flows into the Yarra River, it is considered to face similar issues as rivers in the Maribyrnong catchment. As such, it is regarded as a sub-catchment of the Maribyrnong for the Integrated Water Management Forums and Healthy Waterways Strategy.

Over the last decades a number of visionary management plans have been developed for the catchment, however none have been effective at harnessing the collective energy from all stakeholders to bring the more ambitious projects and visions to life. Upon initiation by City of Melbourne and Melbourne Water, 60 stakeholders came together in February 2017 to talk about collaboration in the Moonee Ponds Creek catchment. One long term community campaigner reflected that this was the largest number of people ever brought together to discuss the creek. This began the start of the Moonee Ponds Catchment Collaboration group consisting of 17 core members and 10 supporting groups.

The group's goal is to address the "I" in IWM – that is, to showcase how groups can work across boundaries and in a coordinated manner on catchment-scale initiatives. Given the many interests and diversity of stakeholders, the group is collaborating to address the problem of how to transform Moonee Ponds Creek into an iconic waterway for Melbourne with high social and environmental outcomes. Together with all contributing partners, the Moonee Ponds Creek Collaboration has created a forum to share information, ensure coordinated action, leverage investment into the catchment and build a stronger reputation for the creek.



Moonee Ponds Creek, concreted section. Courtesy: Melbourne Water

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.



Kayakers, Maribyrnong River.
Courtesy: Department of Environment, Land, Water and Planning

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

←

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

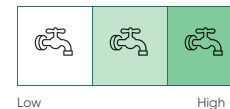
Appendix

Additional IWM opportunities in the Maribyrnong catchment

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

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

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.

IWM opportunity	Collaborative partners	Strategic outcome areas							
Stony Creek Directions Plan Implementation	Maribyrnong City Council, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHCAC*								
Moonee Ponds Catchment IWM Demonstration	18 members of the Moonee Ponds Catchment Collaboration								
Brimbank Habitat Connectivity Measures	Brimbank City Council, Hume City Council, Melbourne Water, Wurundjeri L&CCHCAC*, Bunurong LCAC								
Improving Soil and Land Management to Protect Waterways of the Middle and Upper Maribyrnong Catchment	Port Phillip and Westernport CMA, Brimbank City Council, Hume City Council, Macedon Ranges Shire Council, Wurundjeri L&CCHCAC*, Equiculture P/L, Melbourne Water, Melbourne Polytechnic, Landcare Networks								
AJ Davis Reserve Stormwater Harvesting Project	Moonee Valley City Council, Melbourne Water, City West Water, Wurundjeri L&CCHCAC*								
Moonee Valley Racecourse Redevelopment – Stormwater Harvesting Expansion Opportunities	Moonee Valley City Council, Melbourne Water, City West Water, Wurundjeri L&CCHCAC*								
Romsey Groundwater Supply and Lancefield Drinking Water Supply	Western Water, Macedon Ranges Shire Council, Melbourne Water, Southern Rural Water, Wurundjeri L&CCHCAC*								
Macedon Ranges Shire Water Sensitive Urban Design Audit	Macedon Ranges Shire Council, Brimbank City Council, Melbourne Water, Wurundjeri L&CCHCAC*								
Recycled Water Supply to Melbourne Airport	Western Water, Melbourne Airport, Melbourne Water, Hume City Council, City West Water, Wurundjeri L&CCHCAC*								
IWM Servicing Scheme for Moonee Ponds Creek	Yarra Valley Water, City West Water, Hume City Council, Melbourne Water, Wurundjeri L&CCHCAC*								
Environmental Accounts for Maribyrnong	Port Phillip and Westernport CMA, Commissioner for Environmental Sustainability, Melbourne Water, Parks Victoria, local Councils, Wurundjeri L&CCHCAC*, Bunurong LCAC, Wentworth Group								

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

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.

Aquifer Storage and Recovery (ASR)

The recharge of an aquifer via a well for subsequent recovery from the same well.

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.

Managed Aquifer Recharge (MAR)

The intentional recharge of water into an aquifer either by injection or infiltration and recovery by planned extraction.

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.



Pipemakers Park wetlands. Photographer: Chris Pearson. Courtesy Melbourne Water

