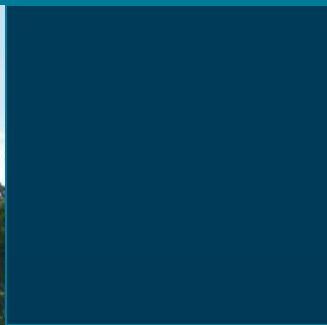




WHITEHORSE

# Integrated Water Management Strategy 2022–2042



This strategy was also funded by:



**Melbourne  
Water**

Enhancing Life and Liveability



# Acknowledgement of Country

**Whitehorse City Council acknowledges the Wurundjeri Woi-wurrung people of the Kulin Nation as the traditional owners of the land. We pay our respects to their Elders past, present and emerging.**

# Acknowledgements

Thank you to those community members who made the time to participate and share their views. We also thank the many partner organisations that contributed to the development of the IWMS.

## **Project Working Group**

This group included Council Officers from Parks and Natural Environment, Leisure and Recreation Services, Engineering and Investment, City Services and City Planning and Development. These teams met regularly throughout the project and provided valuable feedback to assist in setting the direction for the Strategy.

## **Project Reference Group**

Council officers from the following departments were involved in reviewing the Draft Strategy and attended workshops to provide input into the Strategy.

Parks and Natural Environment, City Planning and Development, Engineering and Investment, Leisure and Recreation Services, City Services, Project Delivery and Assets, Community Engagement and Development, Major Projects, Health and Family Services.

The Project Reference Group also included representatives from Melbourne Water and Yarra Valley Water.

## **Funding Grant**

This Project has been assisted by the Victorian Government through Melbourne Water Corporation as part of the Living Rivers Stormwater Program.

## **Consultants**

The Strategy was prepared by



JAMIE COMLEY ENVIRONMENTAL CONSULTING

in association with



MORPHUM ENVIRONMENTAL LTD

The Strategy was ADOPTED BY COUNCIL 12 September 2022.

# Executive Summary

Water has an important role in the City of Whitehorse. It provides for the day-to-day needs of our residents and businesses. Council uses water to sustain our parks and gardens, to service our aquatic centres and to support many other Council operations and facilities. We manage water through our drainage system to reduce flooding and reduce pollution. We support our community to care for waterways and we set stormwater management requirements for new developments.

However, we recognise that we can better manage water. This is especially important in our changing climate and as our population grows. We will continue to experience drought, flood and heatwaves. Integrated Water Management (IWM) considers all aspects of the water cycle in the way we plan our cities and helps to improve our resilience into the future.

Traditionally, the focus of stormwater management in our municipality has focussed on drainage and reducing local flooding with the aim of removing stormwater from our landscape as quickly as possible. However, we now understand that by keeping some water in the landscape we can better support green space, decrease pollution and protect the ecological function of waterways. We are very aware that drinking water is a precious resource and we need to make the most of other water sources like rainwater, stormwater and wastewater where they can be used as an alternative. We also need to reduce the negative impacts of stormwater and wastewater discharges on receiving waterways and bays.

We are pleased to have developed this Integrated Water Management Strategy that will support our vision for water:

*Whitehorse is a resilient and thriving city, where water is valued as a precious resource and managed to support a healthy environment and prosperous communities. Council leads by example and supports community actions to become a water sensitive city.*

Through delivery of this strategy over the next 20 years, Whitehorse City Council will achieve the following outcomes:

- All water is valued as a resource
- Healthy landscapes and waterways
- Flood risk is reduced.

The strategy includes targets to measure our performance against each of these outcome areas as well as a 5-year implementation plan that sets out clear initial actions towards achieving our vision. Targets and implementation plans will be reviewed regularly to reflect climate change impacts and any relevant changes in the water sector. A key focus for Whitehorse City Council will be to work closely with our community and other organisations with a role in water management. This strategy also aligns with the Dandenong and Yarra Catchment Integrated Water Management Plans and Whitehorse City Council will continue to participate in key regional partnerships including the Department of Environment Land and Water Planning (DELWP) Integrated Water Management Forums to deliver IWM outcomes for our environment and community.

This strategy is supported by a detailed technical analysis that is set out in the accompanying Integrated Water Management Strategy Technical Report 2021.

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# 1. Introduction

Integrated water management (IWM) considers all elements of the water cycle in the way we plan our cities to deliver environmental, cultural, social and economic benefits to our community. This includes management of waterways, wastewater, groundwater, rainwater (from roofs), stormwater drainage and the supply of drinking water. In the past, these elements were often managed separately in response to isolated service delivery functions by different organisations.

Whitehorse City Council has been actively involved over many years in the design and implementation of many forms of water management such as wetlands construction, stormwater harvesting and installation of raingardens. These have typically been standalone projects rather than strategically planned and coordinated improvements designed to achieve a holistic outcome. As our awareness has grown around the combined challenges of urban development, population growth and climate change – and the long-term adverse impacts on receiving environments, water supply and liveability – the need for an integrated approach to water management has become increasingly apparent.

## 1.1. Our urban water problem

Prior to the 1750's, Whitehorse was completely covered in bushland. Today, only two percent of this original landscape remains (Whitehorse City Council, 2014). As urban development progressed, ecologically important reaches of waterways across the municipality have been piped or channelised to provide a drainage function at the expense of the intermittent and ephemeral habitats they once supported. This includes major waterways that Melbourne Water manages, and the tributaries that feed into these streams and are part of the Council managed stormwater system.

Increasing urbanisation has also meant:

- Increased demand for potable water and increased generation of wastewater.
- Increased impervious area – where water had previously infiltrated into soils and the water table, it now runs off the hard surfaces (e.g. roofs and roads) as stormwater, collecting pollutants on its way.
- More frequent and larger instances of flooding from overland flows.
- Less evapotranspiration, causing increased urban heat.

Figure 1 shows the impact of development on the urban water cycle.

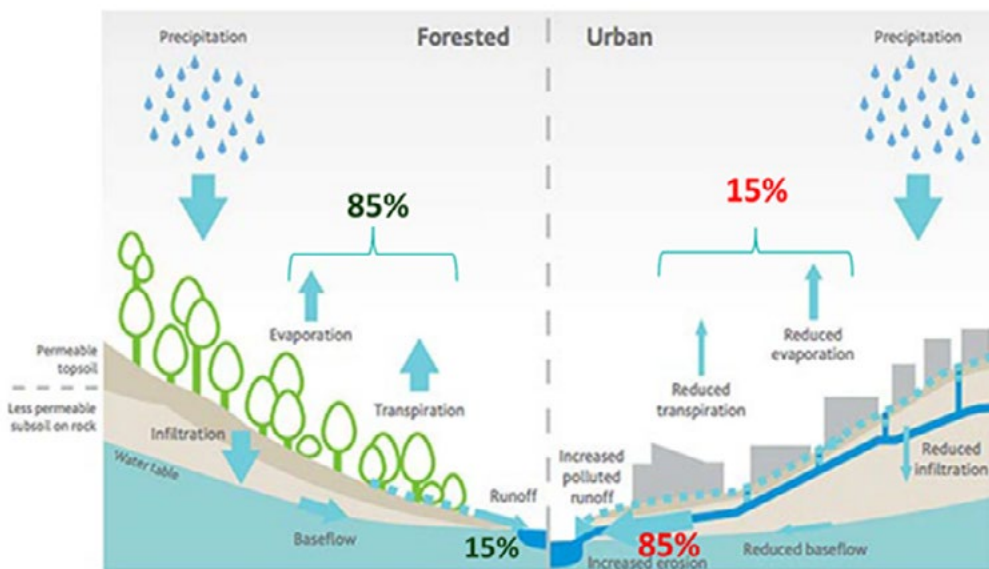


Figure 1: Impact of development on the urban water cycle (DELWP, 2018a)

Urbanisation causes significant alteration of the natural flow regime, in terms of the quantity, frequency and quality of flows entering natural waterways (Figure 1). In urban environments, there is typically too little ‘constant’ baseflow in streams, and too frequent ‘flashy’ flows from small rain events running off hard surfaces via stormwater drains into waterways. Stormwater runoff is also polluted with nutrients, litter, sediment, heavy metals, toxicants and hydrocarbons. These impacts affect stream ecology and the plants and animals that depend on these waterways, placing these important ecosystems at risk.

## 1.2. Climate change impacts on the water cycle

The impacts of urbanisation and population growth are exacerbated by our changing climate. Within the timeframe of this strategy, we can expect to be experiencing considerable climate change impacts. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report confirms that heatwaves, droughts, floods, heavy downpours and other extreme events are getting worse (Climate Council, 2021).

We can expect:

- An increase in the number of unusually hot days and heatwaves;
- A decline in cool season rainfall; and
- An increase in the extreme, short duration rainfall events.

This has impacts for our water cycle, our landscapes and our community.

### 1.2.1. Reduced streamflow

Streamflow over the past decade have been the lowest on record. This not only affects water availability but also has ecological impacts. The species that live in and around our waterways rely on well-established flow patterns for successful feeding, breeding and movement through the landscape. Reduced streamflow can also influence water quality in waterways, and combined with warmer temperatures can cause blue-green algae outbreaks.



## 1.2.2. Decreasing water security

Melbourne's water storages have received below historic average inflow in 18 of the last 20 years (DELWP, 2020). While supply of water to drinking water catchments is decreasing, demand is increasing. Victoria is the fastest growing state in Australia with the population of Greater Melbourne projected to increase from five million in 2018 to nine million by 2056 (DELWP, 2019). Demand for water is expected to grow as the temperature rises, including during heatwaves. With higher demands and high climate change impacts, the state has enough water until around 2028, even taking into account our current desalination plant. The water sector recognises that we need to take action now to ensure that Greater Melbourne has enough water into the future.

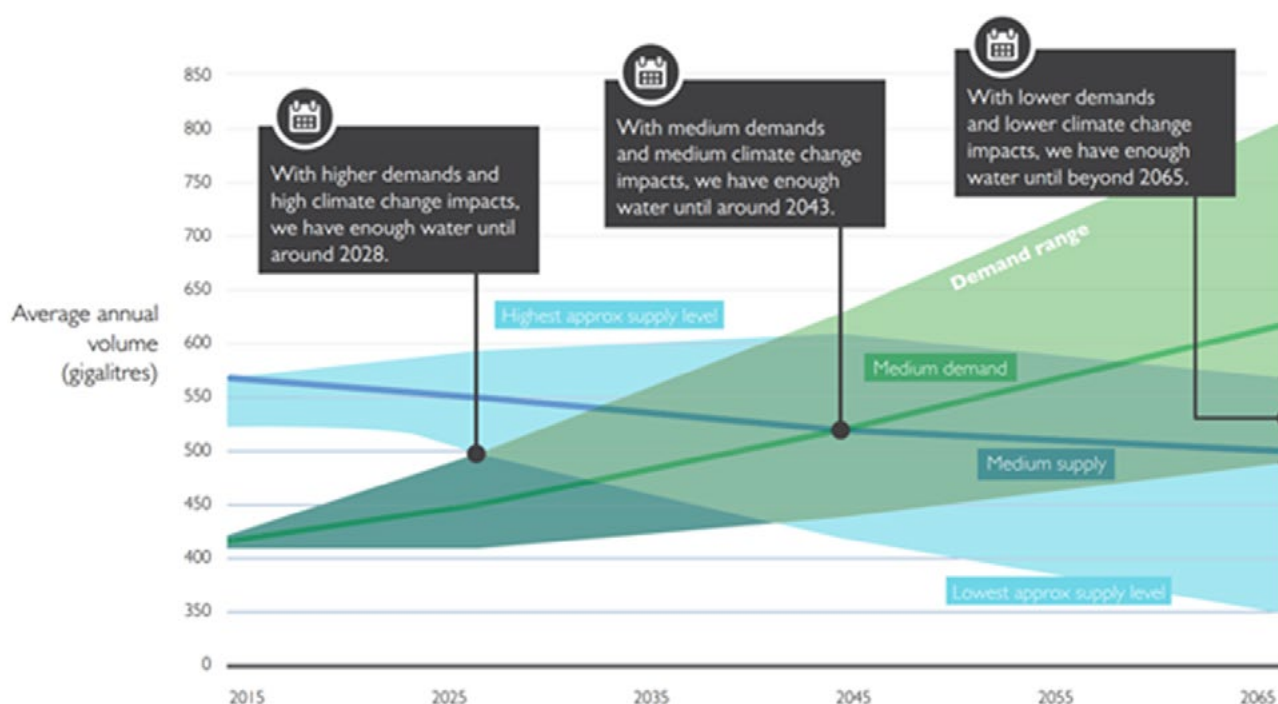


Figure 2: Supply and demand scenarios in Melbourne (source City West Water, South East Water, Yarra Valley Water and Melbourne Water, 2017)

## 1.2.3. Flood

More intense rainfall events as a result of climate change will mean our drainage infrastructure (which in most cases is not designed for the future and in some instances, current climate) will be less able to cope. We are likely to see increased flash flooding where these assets do not have sufficient capacity to manage high rainfall events, and increased risk and disruption to our community as a result.

## 1.3. Integrated Water Management as the solution

Action needs to be taken now to protect and enhance natural systems and liveability in the face of climate change, urbanisation and increasing rates of species extinction. Specifically, we need to increase green infrastructure, protect waterways and adapt our city

to the stresses of a changing climate and further urbanisation. State water policy and a considerable body of research promotes IWM as a solution to address these risks and enhance our city's environment and liveability.

This approach is shared by Melbourne Water, water retailers and other government agencies across Victoria. These organisations recognise that collaboration is critical to deliver IWM. Whitehorse City Council participates in catchment based Integrated Water Management Forums to work closely with stakeholders to deliver IWM across the Dandenong and Yarra River Catchments.

Whitehorse City Council delivers many services that rely on water and benefit from being proactive in our approach to water management. Having a resilient and diverse water supply will be particularly important in maintaining our recreation and community facilities as well as delivering on canopy and greening objectives in our Urban Forest Strategy. We recognise that we have the opportunity to embed IWM across our operations.

This will include:

- Making the best use of all water sources. Harvested rainwater, treated stormwater and recycled wastewater have the potential to replace drinking water for non-drinking purposes such as flushing toilets and irrigating sportsgrounds and parks. Using these alternative water sources also benefits our environment by reducing the impact of stormwater and wastewater discharges on receiving waterways.
- Keeping water in the landscape to support healthy soils, retain baseflows in streams and provide cooler, greener urban places.
- Incorporating Water Sensitive Urban Design (WSUD) to reduce damaging stormwater flows and pollution entering our waterways.

Through delivering and promoting IWM, we can achieve our vision:

*Whitehorse is a resilient and thriving city where water is valued as a precious resource and managed to support a healthy environment and prosperous communities. Council leads by example and supports community actions to become a water sensitive city.*



A water sensitive city is one where water and urban planning are managed together to facilitate better liveability and biodiversity outcomes. It is a city that manages water in a way that protects the health of receiving waters, mitigates flood risk and creates green public spaces that also harvest and recycle water. Infrastructure, technology and urban design are flexible, recognising the link between society and technology. The community is actively engaged with water, through recreational enjoyment of irrigated green spaces throughout the city, and have opportunities for more active involvement in the water system (Brown et.al, 2016).

This Strategy outlines what IWM will look like for the City of Whitehorse. It sets a vision for 2042 and targets that aim to drive action and deliver on outcomes that are important to our community including healthy parks and waterways, flood mitigation, urban cooling and increased biodiversity. We will work with other organisations that influence elements of the water cycle in the City of Whitehorse to deliver benefits to our community and our environment.

## **1.4. Traditional Owner Engagement**

The Wurundjeri Woi-wurrung people of the Kulin nation are the traditional owners of the land on which the City of Whitehorse is located. Historically, Aboriginal people would camp along the banks of the many creeks that flow through the City and named parts of the local area Namerarren or Nunawading. We recognise that we have much to learn from the traditional owners in the way land and water has been managed for over 60,000 years. A key priority of this strategy is to work with the local Aboriginal community to identify opportunities for genuine engagement and outcomes related to water and ensure that future planning is founded on locally specific indigenous knowledge where appropriate.

## 2. Strategic Context

By its very nature, IWM needs to be considered alongside many other elements of Council planning. It requires delivery across public and private land, working with a multitude of stakeholders from all levels of government as well as other water sector organisations.

### 2.1. Delivering on Whitehorse 2040

The Whitehorse Integrated Water Management Strategy will guide the direction of water management until 2042, and in doing so will support the delivery of Whitehorse 2040 community vision. The Strategy fits within Council's Integrated Planning Framework (Figure 3). Over the next 20 years, IWM priorities will be reflected in the Council Plan and Municipal Public Health and Wellbeing Plan. Significant investment will be required and planned for within the Financial and Asset Plans and Council will be able to support delivery of IWM on private land through the Whitehorse Planning Scheme.

Importantly, Integrated Water Management will enable the delivery of other Council commitments. Implementation plans for this Strategy will be developed every five years and will consider how IWM can support delivery of other strategies including the Urban Forest Strategy and Flood Management Plan.

<b>Whitehorse 2040 Community Vision</b>						
Whitehorse is a resilient community where everyone belongs. We are active citizens who value our natural environment, history and diversity. We embrace sustainability and innovation. We are dynamic. We learn grow and thrive.						
<b>Community Vision themes to be supported by IWM action</b>						
Diverse and Inclusive	Movement and Public Spaces	Innovation and Creativity	Employment, Education and Skill Development	Sustainable Climate and Environmental Care	Whitehorse is an Empowered Collaborative Community	Health and Wellbeing
<b>Statutory Structures that will enable delivery of IWM</b>						
Council Plan 2021-2025	Municipal Public Health and Wellbeing Plan 2021-2025	Financial Plan 2021-2031	Asset Plan 2021-2031	Whitehorse Planning Scheme		
<b>Whitehorse Integrated Water Management Strategy 2022-2042</b>						
<b>Strategies and plans that will benefit from delivery of IWM</b>						
Urban Forest Strategy	Flood Management Plan	Open Space Strategy	Sustainability Strategy	Climate Response Plan		

### *Figure 3: Role of an Integrated Water Management Strategy within Whitehorse City Council's Integrated Planning Framework*

The following Whitehorse 2040 priorities will be a focus of this strategy:

- Focus on understanding and celebrating First Nations Peoples, including acknowledgment of history and culture (Priority 1.4).
- Facilitate opportunities for the community to interact and immerse with natural and built environments (Priority 2.4).
- Take a leadership role in tackling climate change (Priority 5.1).
- Focus on the environment whilst also balancing the social and economic needs of Whitehorse (Priority 5.2).
- Consider our natural environment when making decisions including creeks, wetlands, lakes, bushlands, flora and fauna (Priority 5.3).
- Encourage everyone to feel engaged with, and involved in, the Whitehorse community (Priority 6.2).

## **2.2. Community consultation**

Whitehorse City Council recognises that we need to take action now to enable future generations to have continued access to drinking water, healthy waterways and a highly liveable city. This Integrated Water Management Strategy is a key step in delivering on our vision for water, in supporting these outcomes.

Through community consultation, we have learnt that waterways in Whitehorse are special to people as they provide a range of environmental, community health and wellbeing benefits. They provide habitat to support biodiversity and attract wildlife, as well as an important trail network for walking and riding, and a place to relax and enjoy (which is especially valuable during times of stress or disruption, such as through the lockdowns experienced during the COVID-19 pandemic).

Our community have expressed concerns about the impact of pollution on their local waterways. They would like to see stormwater being diverted into parks and to irrigate street trees as well as a reduction in hard infrastructure to improve soils and to help in mitigating flooding impacts. Future drought is on many people's minds, especially when it comes to making sure there is enough water for healthy trees and vegetation.

## **2.3. Regulatory framework**

Whitehorse City Council has a range of responsibilities under various legislation and regulation related to water management. These are outlined in Table 1.

*Table 1: Key policy and guidelines associated with the regulatory framework, relevant to water management in City of Whitehorse*

Policy	Relevance to Whitehorse City Council
<b>Environment Protection Amendment Act 2017 – general environmental duty (GED)</b>	Commencing on 1 July 2021, this Act sees State Environment Protection Policies (SEPP) dissolved. Instead, a general environmental duty (GED) will apply to all Victorians (including local government), requiring the reduction of harm from activities to human health and the environment.
<b>Urban stormwater management guidance (EPA, 2021)</b>	This guide is provided for developers who create new impervious surfaces, such as roads, subdivisions and other developments. It is also relevant to those who inform infrastructure planning and design, including technical consultants. It supports these parties to minimise the risks to human health and the environment from their design, planning and development activities, as the general environmental duty (GED) requires. It also supports those involved in the assessment of urban stormwater treatment proposals. This guideline complements and adds to the Urban Stormwater Best Practice Environmental Guidelines, providing flow volume objectives.
<b>Urban Stormwater Best Practice Environmental Management Guidelines (BPEM)</b>	Developed by CSIRO in 1999, these guidelines set environmental performance objectives and water quality standards for managing urban stormwater. Council applies BPEM in the design of Water Sensitive Urban Design assets and is required to ensure they are met in the planning application assessment process.
<b>Whitehorse Planning Scheme VC154 – Integrated Water Management</b>	Amendment VC154 (gazetted October 2018) introduced into all Victorian Planning Schemes new stormwater management provisions for urban development requiring them to meet BPEM objectives. The Whitehorse Planning Scheme also requires this within local policy (Clause 22.10).
<b>Municipal Urban Stormwater Institutional Arrangements (MUSIA) Review</b>	Once the review is complete and the Minister approves recommendations, MUSIA will outline arrangements between Melbourne Water and local councils to clarify stormwater and flood risk management roles and responsibilities in the Greater Melbourne area.

## 2.4. Stakeholders and partnerships

To deliver IWM, we need to work closely with other organisations that have a role in water management (refer Table 2). City of Whitehorse has endorsed a number of regional strategies that recognise the importance of catchment based water cycle management. We have identified where we have shared priorities with other organisations and will look for opportunities to partner on specific projects. We also seek to work more closely with other major infrastructure stakeholders including Department of Transport and VicRoads.

Within our community, there are number of groups, businesses and residents who are already active in achieving the outcomes we are striving for through delivery of this strategy. "Friends of" and advisory groups in particular have been actively improving our waterway corridors and advocating for improved stormwater management.

Table 2: Stakeholders who work with Whitehorse City Council to deliver IWM

Organisation	Responsibility	Shared priorities
<b>Traditional owner groups</b>	Cultural and heritage approvals Communicating indigenous water values	Meaningful engagement around defining cultural values/aspirations, IWM
<b>Department of Environment, Land, Water and Planning (DELWP)</b>	State water policy Facilitates IWM forums Planning authority	Catchment Scale Integrated Water Management Plans – Yarra and Dandenong Catchments
<b>Melbourne Water</b>	Waterway management Drainage and stormwater management (for larger catchments)	Healthy Waterways Strategy 2018 – 2028 Flood Management Strategy Port Phillip and Westernport 2021-2031 Whitehorse Flood Management Plan
<b>Yarra Valley Water</b>	Water retailer	Community water programs Collaborative placed-based IWM planning
<b>EPA</b>	Administering and enforcing the Environment Protection Act	Enforcement of environmental regulations Community education
<b>KooyongKoot Alliance</b>	Collaboration of community groups and strategic alliances, supporting development of a management plan and improved holistic strategic planning for KooyongKoot (Gardiners Creek)	Improved holistic strategic planning for KooyongKoot, to enhance environmental and community benefits Community education and activation
<b>Waterways 'friends of' and advisory groups</b>	Facilitating community participation in revegetation and environmental projects Advising Council	Improving the ecological health of waterways and open spaces

Organisation	Responsibility	Shared priorities
Parks Victoria	Management of Parks Victoria Land	Improving the ecological health of waterways and open spaces
Council Alliance for a Sustainability Built Environment (CASBE)	Sustainability in planning Elevating Environmental Sustainable Design Targets	Policy on proprietary WSUD projects Improved guidelines and resources





## 3. Water in the City of Whitehorse

The information in this section is based on a detailed IWM and catchment analysis undertaken to inform the strategy, as presented in the Integrated Water Management Strategy Technical Report 2021.

### 3.1. Water and pollutant balance

A water balance provides a snapshot of the hydrology of the municipality. At a very high level, it can demonstrate the potential of alternative water sources to meet non-potable demands currently served by mains drinking water, and the potential for Water Sensitive Urban Design to reduce pollution entering waterways and manage stormwater runoff volumes.

Table 3 shows that, typically, around 48,887 ML/yr of rainfall falls in the City of Whitehorse. A large proportion (17,852 ML/yr) enters the atmosphere through evapotranspiration which is critical in keeping our city cool, mitigating the urban heat island effect, and avoiding excessive runoff to waterways. A small amount (3,041 ML/yr) currently infiltrates into the ground, helping replenish the baseflow of waterways. The majority of annual rainfall (27,355 ML/yr) enters our waterways as stormwater runoff, carrying with it pollution it has collected on its way. Pollutants include sediment from roads, which can carry heavy metals as well as excess nitrogen and phosphorus (Table 4). Nitrogen is the single biggest threat to the health of Port Phillip Bay, potentially causing algal blooms and adverse environmental outcomes.

Around 13,058 ML/yr of the water currently used in City of Whitehorse for household, businesses and Council operations comes from potable sources (i.e. mains water supply). A small proportion (611 ML/yr) of water use comes from alternative sources including household rainwater tanks.

Table 3: City of Whitehorse Water Balance 2019/2020

Rainfall	Evapo-transpiration	Infiltration (to base flow)	Stormwater Runoff	Potable Water Use	Alter-native Reuse	Waste-water Generated
ML/yr	ML/yr	ML/yr	ML/yr	ML/yr	ML/yr	ML/yr
48,887	17,852	3,041	27,355	13,058	611	10,446

Table 4: City of Whitehorse Pollutant Balance 2019/2020 – pollutant discharges to waterways

Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)
kg/yr	kg/yr	kg/yr
5,864,757	11,495	73,541

### 3.2. Potable water use

Residents in the City of Whitehorse currently use an average of 162 litres of water per person per day. While the residential sector makes up a large proportion of potable water use (Table 5), it is still important to consider how potable water use can be reduced by businesses, community groups, schools and Council.

Table 5: City of Whitehorse Breakdown of Potable Water Use 2019/2020

Residential	Non Residential	Council
ML/yr	ML/yr	ML/yr
9,581	3,240	237

Whitehorse City Council recognises its role in leading by example and has completed a detailed analysis of how water is used. More than half of the potable water used by Council is for the irrigation of sports fields and open space (Figure 4). Stormwater is currently used to irrigate two open space areas within the municipality (refer Figure 5), with high potential to introduce other stormwater harvesting systems in the future.

#### Council Water Use (kL) 2019-20

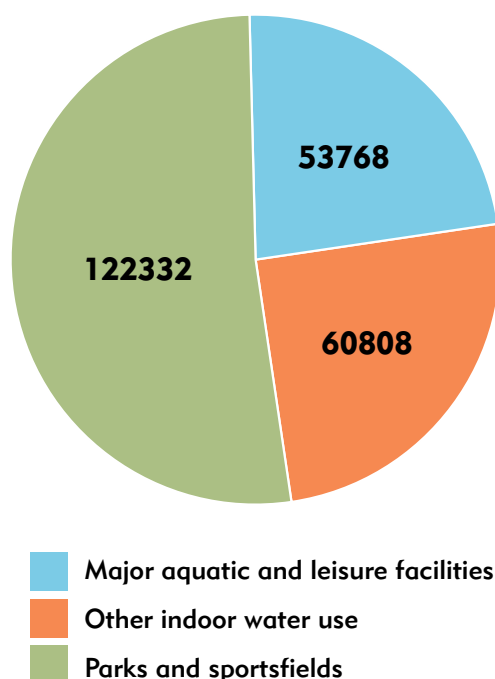


Figure 4: Breakdown of Council 2019/20 water use

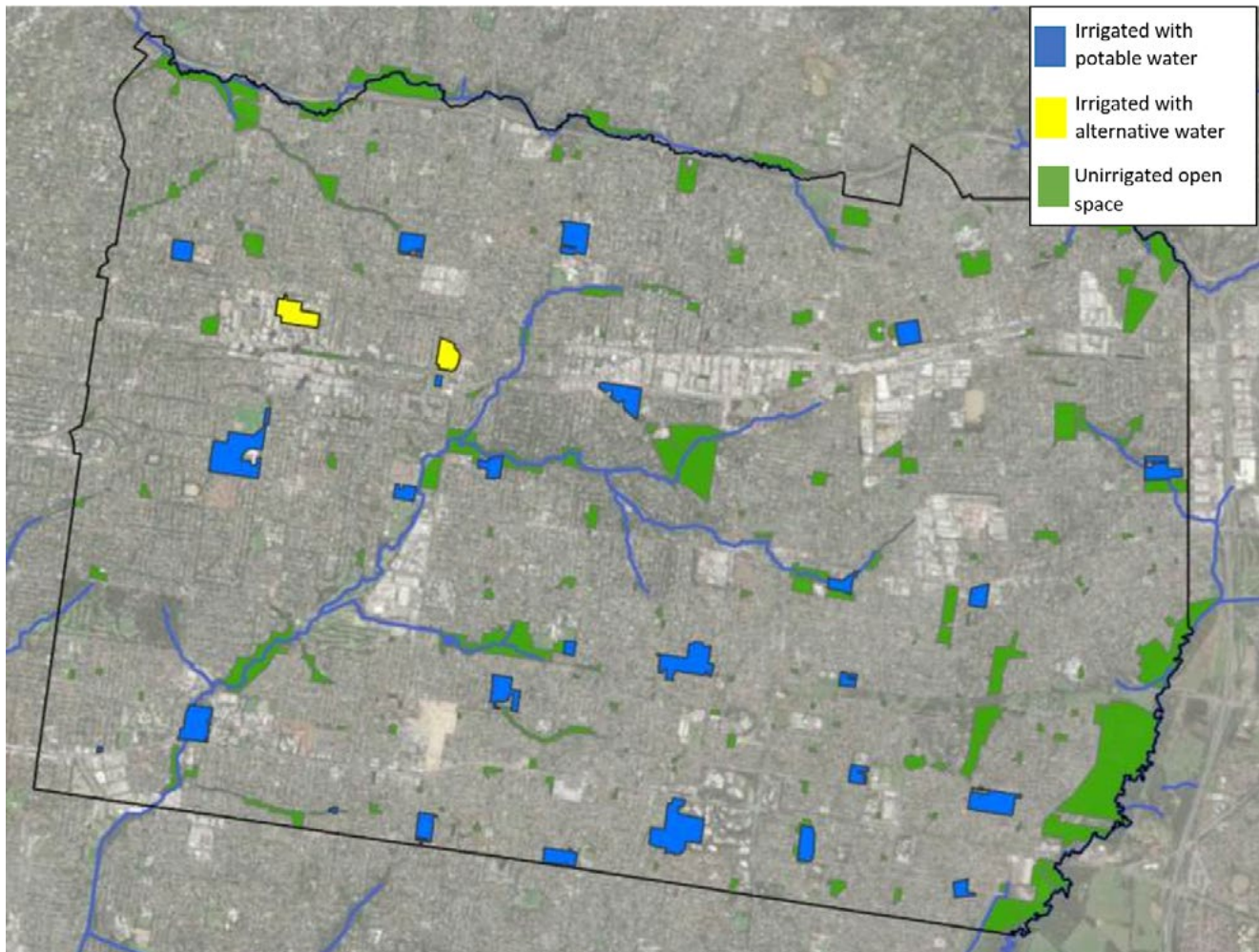


Figure 5: Irrigation sources for Council-owned open space

### 3.3. Flooding

The undulating landscape of the City of Whitehorse, now largely covered with impervious surfaces (such as roofs and roads), results in some areas being susceptible to flooding from overland flow and concentrated flooding following moderate to large rainfall events. As we experience higher rainfall intensity resulting from climate change, we are seeing more severe rainfall events, increasing the occurrence and extent of flooding.

### 3.4. Urban heat

On average, the City of Whitehorse is almost 8 degrees Celsius hotter than non-urban areas (Sun et al., 2018). Figure 6 is based on mapping produced by the Victorian Government that shows the urban heat index across the municipality. The coolest areas are those alongside waterways and where there is more canopy and vegetation. Box Hill North, Burwood East, Blackburn South and Vermont South are more impacted by the urban heat island effect. This effect will be exacerbated by climate change, where we will see an increasing number of unusually hot days and heatwaves.

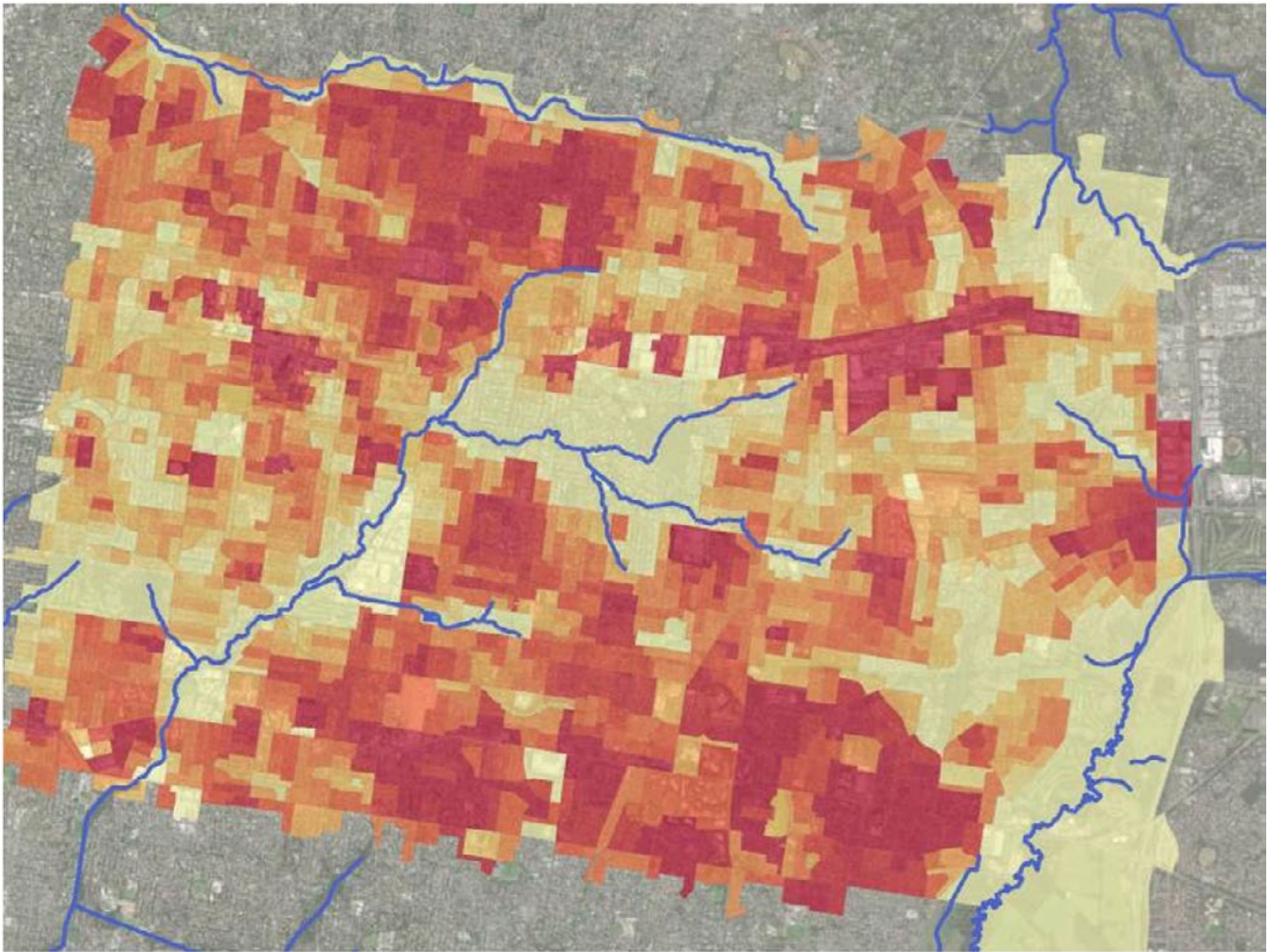


Figure 6: Mean Urban Heat Islands (UHI) 2015 to 2016 summer, where UHI is the difference in Land Surface Temperature from a non-urban baseline (DELWP, 2018b)

### 3.5. Catchments

A catchment is an area of land which is bounded by natural features such as hills or ridgelines from which all runoff water flows to a low point. Due to gravity, all rain and stormwater runoff in a catchment runs downhill (either across land or via piped infrastructure) where it naturally collects in creeks, rivers, lakes or oceans. Stormwater runoff from catchments reflects the characteristics of land use and land cover in terms of water quality and water quantity. There are four main stormwater catchments in the City of Whitehorse, defined by their receiving waterway, as shown in Figure 7 and outlined below.

#### 3.5.1. Kooyong Koot (Gardiners Creek)

The Kooyong Koot catchment is the largest catchment in the City of Whitehorse. Nunawading, Blackburn and Forest Hill are the headwaters for Kooyong Koot which flows through Box Hill and Burwood and includes the popular Gardiners Creek trail. Blackburn Lake Sanctuary and Blackburn Creeklands are all located on the upper tributary referred to as Blackburn Creek by Melbourne Water (Whitehorse City Council, 2007). The catchment is largely residential but also includes considerable areas of retail,

commercial and industrial uses, as well as several educational institutions. Seventy per cent of the catchment is impervious generating significant stormwater flow. There are IWM assets within the catchment including a stormwater harvesting system at Box Hill City Oval (Bolton Park) which is designed to reduce pollutants entering the waterway. The Melbourne Water owned Wurundjeri Wetlands are also located within this catchment, providing a great example of constructed wetlands within a functional retarding basin.

The KooyongKoot Alliance is an active collaboration of over 17 community groups and strategic alliances. Their aims include acting as a catalyst in the development of a management plan for KooyongKoot, and to overcome the lack of holistic strategic planning for KooyongKoot's management quickly and positively for the benefit of all (Yarra Riverkeeper Association, 2020).

### 3.5.2. Dandenong Creek

The Dandenong Creek catchment, located in the east of the municipality includes parts of Mitcham, Vermont and Vermont South. The catchment is largely residential with pockets of open space. Heatherdale Creek Parklands, which includes Simpson Park, Heatherdale Reserve and Somers Trail, are located along Heatherdale Creek, which flows into the Dandenong Creek on the south eastern boundary of the municipality. Away from the waterway corridors and linear parkland, most of the catchment is significantly impacted by urban heat issues, particularly in the south.

### 3.5.3. Koonung Creek

The Koonung Creek catchment is located in the north and northwest of the municipality and includes the suburbs of Mont Albert North, Box Hill North, Blackburn North and the northern part of Nunawading. Around 890 metres of open drainage channel form the upper extent of a tributary to Koonung Creek. Bushy Creek forms a tributary to Koonung Creek and, with the associated parklands and trail, runs through Box Hill North for approximately 2km. In the north and east of Bushy Creek, urban heat issues significantly affect the catchment. The catchment has the highest proportion of pollutant loads.

### 3.5.4. Mullum Mullum Creek

The smallest catchment in the City of Whitehorse is the Mullum Mullum Creek catchment, located in the northeast of the municipality and includes parts of the suburb of Mitcham. It has the highest proportion of open space. Mullum Mullum Creek is

recognised for its ecological values.

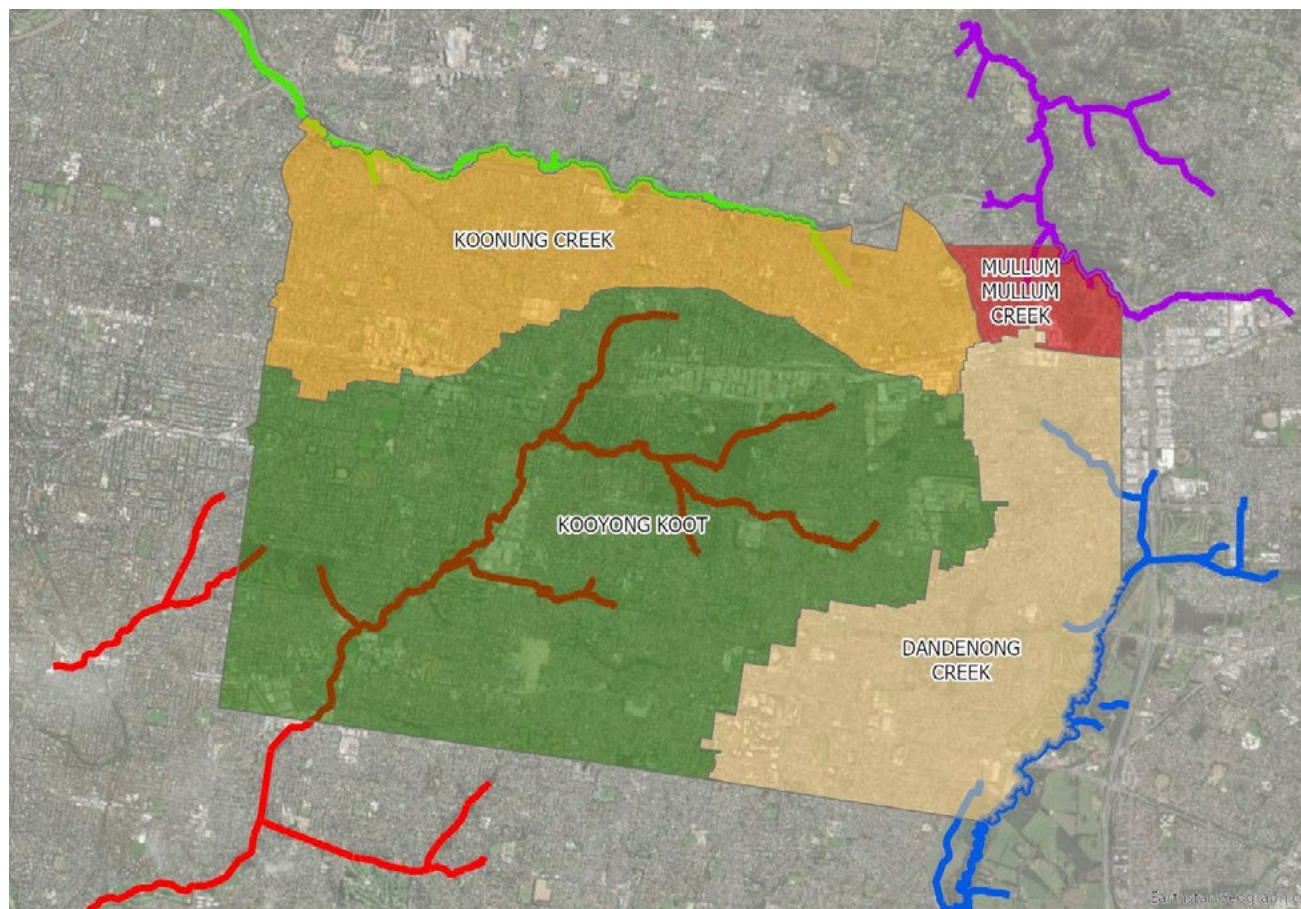


Figure 7: Waterway catchments within City of Whitehorse

The Koonung Creek, Kooyong Koot and Mullum Mullum Creek catchments are part of the broader Yarra catchment and the Yarra IWM Forum. The Dandenong Creek catchment is part of the broader Dandenong IWM Forum.



# 4. Our Strategic Planning Framework for Integrated Water Management

## 4.1. Vision

This Strategy sets the following vision for IWM:

*Whitehorse is a resilient and thriving city where water is valued as a precious resource and managed to support a healthy environment and prosperous communities. Council leads by example and supports community actions to become a water sensitive city.*

## 4.2. Outcomes

Through delivering IWM, Whitehorse City Council is seeking to achieve the following outcomes.



### 4.2.1. All water is valued as a resource

Whether it comes from a tap or runs off a local road, all water in the City of Whitehorse is valued. Our organisation and community recognise that water is not an endless resource and it needs to be managed holistically. We are finding practical ways to reduce dependence on drinking water and make good use of stormwater and wastewater wherever possible. That water infrastructure is delivered and maintained to provide ongoing benefits.



### 4.2.2. Healthy landscapes and waterways

Water supports biodiversity, urban greening and healthy people. We use water in the landscape to support green infrastructure and reduce our impact on local waterways – Kooyong Koot (Gardiners Creek), Dandenong Creek, Koonung Creek, Mullum Mullum Creek and their tributaries. We deliver projects that help protect and enhance the ecological and social values of our waterways, by helping naturalise streamflows (including baseflows and during rainfall), reduce pollution and mitigate erosion. We apply our IWM leadership, recognising that Whitehorse is in a unique position within the broader Yarra River catchment, being at the headwaters of Kooyong Koot and the upper reaches of Mullum Mullum and Koonung Creek, to help facilitate further ecological and social improvement of waterways downstream.



### 4.2.3. Flood risk is reduced




Integrated Water Management solutions are part of the drainage system supporting infiltration and building additional capacity within the system to help mitigate flood impacts. Integrated Water Management plays an important role to reduce the impacts of minor and nuisance flooding events.

## 4.3. Targets

The Integrated Water Strategy adopts the following 10-year targets (Table 6) to be achieved by 2030. These targets are aligned with the recently endorsed Yarra and Dandenong Catchment Scale IWM Plans.

The MERI Framework (Section 7 and Appendix 1) provides additional detail regarding the approach to monitoring and reporting. The targets are to be reviewed in 2030, with an expectation to increase the trajectory of achievement in the following 10 years and beyond.

Table 6: Integrated Water Management targets for 2030

Outcome	2030 Target
<b>All water is valued as a resource</b> 	10 % decrease in Council's potable water use (vs 2019/20 baseline)
	15 % of Council water use to be sourced from alternative water
	Aspiration – Support the community to reduce its potable water use to 140 litres/person/day (l/p/d)
<b>Healthy landscapes and waterways</b> 	500 kg/yr of nitrogen* removed from stormwater through Council projects
	60 ML/yr reduction in stormwater discharged to waterways through Council projects
<b>Reduced flood risk</b> 	100% of projects cross consider IWM and flood mitigation as part of design

\* Total Nitrogen (TN) has been selected as a surrogate measure for water quality parameters, including TSS and TP.





## 5. Implementing Integrated Water Management

Integrated Water Management can deliver multiple environmental and community benefits. In taking an IWM approach, Council will need to prioritise and consider investment in a range of implementation opportunities at various locations within the municipality, and across various outcomes on offer.

Understanding where water flows and how it is used is the first step in delivering successful IWM projects. It is also important to understand, using the best available data, what the priority is for a given area and the extent to which desired outcomes can, over time, be achieved: e.g. is it important to reduce pollution or flows entering waterway, irrigate open space or mitigate flooding.

This strategy has a 20-year timeframe and our approach will evolve as we gain experience and increase community capacity. We envisage the following phases in our overarching approach to strategy implementation.

### **Short term (0 to 5 years) – Setting up processes and demonstration projects**

In the short term (0-5 years), we will focus on setting up robust processes to enable delivery of projects. This will include delivery of high-quality demonstration projects for WSUD and improving outcomes through planning controls. We will also commence engagement with Traditional Owners around water and develop engagement programs for our broader community. We will continue to participate in regional water partnerships and work across the Yarra River and Dandenong Creek catchments to support and advocate for the best outcomes within the City of Whitehorse and catchment-wide.

### **Medium term (5 to 10 years) – structured place-based implementation**

A new implementation plan will be developed for years 5 to 10 of this strategy. This next implementation plan will take a more place-based approach, with investment centered on a more structured and evolved prioritisation of outcomes and asset locations.

### **Longer term (10 to 20 years and beyond) – IWM is ‘business as usual’**

In the longer term, we are aiming for IWM to be ‘business as usual’, being delivered across multiple scales (Figure 8). It is in this timeframe that we anticipate the impacts of climate change will be felt more acutely and the need to continue our best practice approach in IWM across all aspects of our operations will be evident, and will drive further investment.

Scoping and prioritising IWM opportunities is a key task that Council needs to undertake as part of implementation. In time, as our prioritisation approach matures, the identified IWM options and priorities can be documented in a place-based Integrated Water Management Plan, forming the basis for future capital investment.

There are a broad range of IWM opportunities that Council may consider based on specific needs at various locations across the municipality including:

- **Distributed stormwater treatment and passive irrigation**  
Water Sensitive Urban Design systems such as raingardens, street tree pits, infiltration systems help reduce pollutants from stormwater, naturalise flow regimes and support urban greening.
- **Large-scale stormwater harvesting systems for parks, sports fields and reserves**  
These systems offer an alternative water source to reduce potable consumption, whilst also reducing excess stormwater flows and pollutants, that both damage receiving waterways. In this regard, these systems can provide environmental and liveability benefits as well as potential financial savings. In addition to irrigating parks, reserves and sports fields, stormwater harvesting can provide an alternative water source to standpipes for filling of Council water trucks for use further afield. Council can also consider partnerships with other water users such as local businesses and industry to improve the business case for stormwater harvesting systems.
- **Targeted large-scale assets to improve waterway health and amenity**  
There are opportunities to target large-scale assets which support specific waterway health and amenity outcomes, that are worthy of further exploration. These include opportunities for infiltration and baseflow recharge (e.g. in riparian parkland), daylighting of underground drains, and partnering with Melbourne Water to achieve multiple benefits, such as install stormwater treatment (e.g. wetlands, bioretention) and improve public access in existing retarding basins.
- **Gross pollutant traps (GPTs) to reduce discharge of litter to waterways**  
These are an asset-based solution to reduce the amount of litter entering waterways, primarily to reduce impacts on amenity and wildlife. They work effectively when appropriately sited and maintained, although do not significantly reduce stormwater flows or other pollutants.
- **Point-source pollution investigation**  
There is potential to work with external agencies and partners to investigate specific pollution sources that significantly affect water quality within waterways. Once identified, Council and/or partners can undertake educational, enforcement or partnership initiatives to address the pollution source.
- **Improved water-sensitive outcomes in new development and major projects**  
The significant urban development in Whitehorse presents both a threat and an opportunity. Increased imperviousness and population growth is ultimately detrimental to the urban water cycle, but development also offers the opportunity to implement improved stormwater management and efficiency measures to reduce potable consumption and wastewater discharge. Consider working closely with larger infrastructure projects (such as new freeway and public transport projects) and developments for enhanced outcomes.

- **Community engagement/education initiatives**

Initiatives to engage the Whitehorse community, including residents, businesses and/or community groups, can positively change behaviours, attitudes and awareness around water and waterways and help drive community support for Council investment in IWM. Community groups and partnerships can provide valuable contributions to initiating, planning and delivering appropriate IWM projects.

Some further detail and high-level considerations associated with these IWM opportunities are provided in Appendix 2.

Figure 8 shows examples of how IWM can be applied across various scales from individual houses and buildings, to streets, parks and precinct or municipal wide projects.

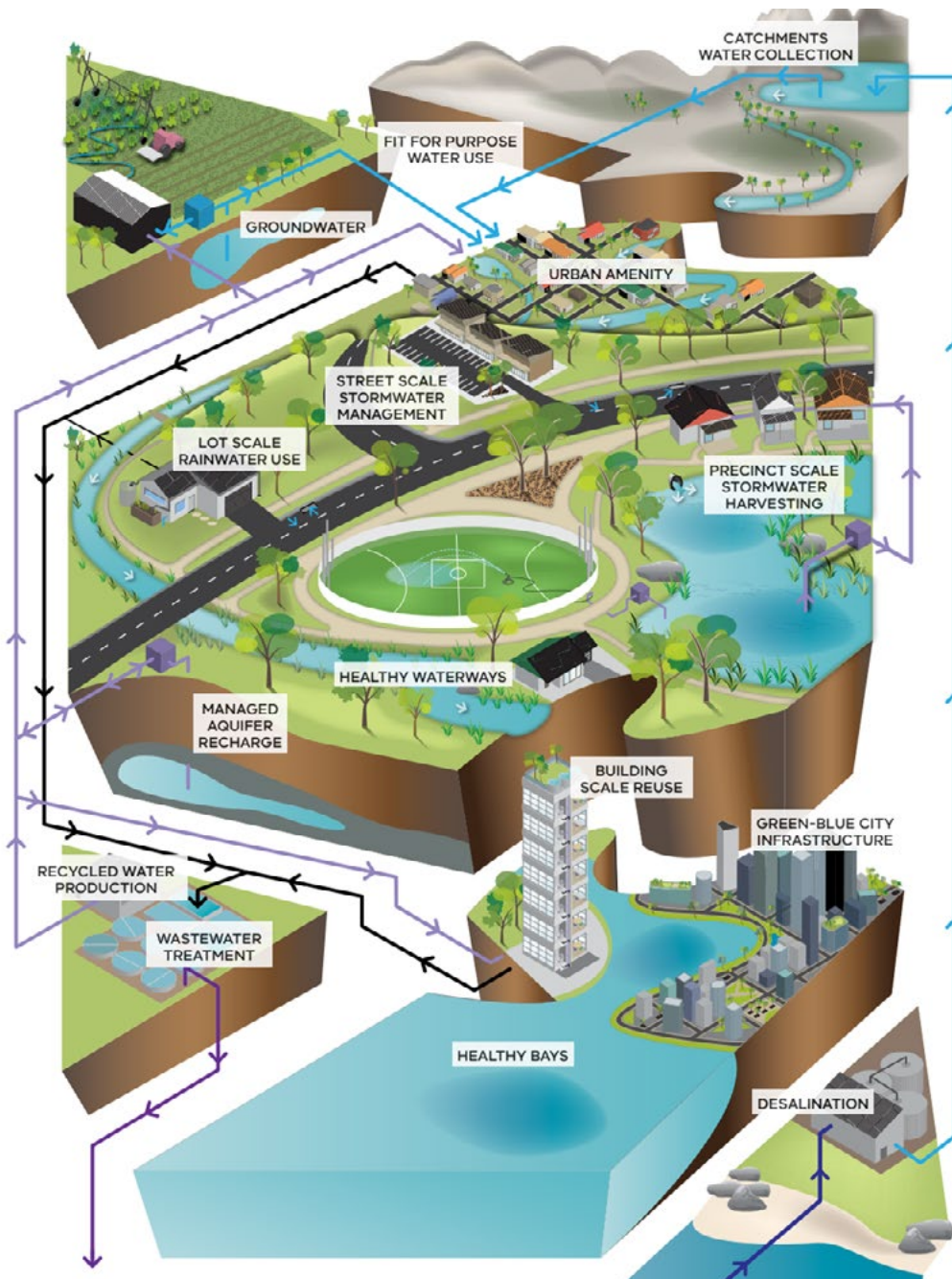


Figure 8: Examples of options and outcomes from applying IWM in the Urban Environment (source: Integrated Water Management Framework for Victoria, DELWP, 2017)

## 6. Implementation plan

Whitehorse City Council has developed an implementation plan to support delivery of the targets outlined in the strategy. Our main focus is actions that can be undertaken in the next five years. An indicative budget for actions has been provided. Where possible, Council will seek external funding and/or partnering with other stakeholders. Any Council budget amounts indicated will need to be prioritised against all other budget needs on an annual basis. Some of these actions may form part of a specific redevelopment project and be implemented as part of that project.

*Table 7: Implementation Plan for Whitehorse Integrated Water Management Strategy.*

*(see next page)*

Action	Timing	Indicative budget*	Lead Department & Officer	Support
<b>Project identification and planning</b>				
<p>1. Undertake high level feasibility assessment of stormwater harvesting and large scale WSUD. Consider projects that:</p> <ul style="list-style-type: none"> <li>▪ Provide additional water security for Council</li> <li>▪ Improve the quality of headwaters</li> <li>▪ Enable greening in areas experiencing high urban heat island effect</li> <li>▪ Enable future daylighting of waterways</li> </ul>	2023/24	\$50,000  (Consultant Budget)  <i>New business initiative via the annual budget and capital works program.</i>	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Project Delivery and Assets (Design and Construction), City Services, City Planning and Development, Community Engagement and Development, Engineering Approvals  <i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water, Department of Environment, Land, Water and Planning (DELWP), Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation
<p>2. Undertake an Integrated Water Management Plan to guide place-based investment. This will consider the extent of meaningful outcomes and the most appropriate locations for IWM implementation. This action will be informed by sourcing and analysing additional relevant data, e.g.:</p> <ul style="list-style-type: none"> <li>▪ Engagement of traditional owners to understand cultural values associate with water and local waterways.</li> <li>▪ Place-based alignment with other projects and strategies.</li> <li>▪ Ecological and social values of specific waterway tributaries and reaches.</li> <li>▪ Directly connected imperviousness (DCI).</li> <li>▪ Nuisance flooding hotspots.</li> <li>▪ Lessons from implementation to date.</li> </ul> <p>This action will inform the 5-10 year Implementation Plan for this strategy.</p>	2024/25	\$70,000  (Consultant Budget)  <i>New business initiative via the annual budget and capital works program</i>	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Project Delivery and Assets (Capital Works Program, Design and Construction), City Planning and Development, Community Engagement and Development, Engineering Approvals  <i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water, Department of Environment, Land, Water and Planning (DELWP), Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation

Action	Timing	Indicative budget*	Lead Department & Officer	Support
3. Establish process to identify and, as appropriate, incorporate WSUD in capital projects, i.e. passively irrigated street trees, raingardens in kerb outstands, swales in new car parks.	2023/24	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Project Delivery and Assets (Capital Works Program)
4. Develop 10-year delivery plan for WSUD capital works to meet IWM targets.  Consider funding mechanisms for projects including Development Contributions Plans (DCPs), grants, funding agreements, developer offsets, and partnerships (agencies and/or private sector).	2024/25	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Project Delivery and Assets (Capital Works Program, Design and Construction), Strategic Planning  <i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water, Department of Environment, Land, Water and Planning (DELWP)
5. Investigate options to leverage off the IWM planning requirements for major projects (e.g. North East Link and Suburban Rail Loop) to better align with Council's IWM Strategy.	In Progress (from 2022/23)	Existing Operational Budget and Resourcing	Major Transport Projects  <i>Officers in this team responsible for these projects will liaise with relevant departments and individual officers for comment during consultation phases of these projects.</i>	Project Delivery and Assets (Design and Construction), Parks and Natural Environment, Strategic Planning  <i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water

Action	Timing	Indicative budget*	Lead Department & Officer	Support
<b>Construction of IWM projects</b>				
<p>6. Construct new WSUD assets, seeking external funding where possible. This includes works from the 10-year WSUD capital works program and opportunistic projects.</p> <p><i>\$6 million is an Indicative budget based on high-level 2021 early probable cost estimates – these require further investigation and validation. Actions 1, 2, &amp; 4 will inform these projects and more detailed costings.</i></p>	2024/25 then ongoing	<p>New Capital Works \$6 million</p> <p><i>New nominations via the annual budget and capital works program.</i></p>	<p>Project Delivery and Assets (Design and Construction)</p> <p>Coordinator Design and Construction</p>	<p>Parks and Natural Environment, City Services, Project Delivery and Assets (Capital Works Program, Asset Management, Facilities Maintenance)</p> <p><i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water, neighbouring councils</p>
<b>Management and maintenance of IWM assets</b>				
7. Undertake assessment of required WSUD maintenance tasks and costs, to inform future operational budgets.	2022/23	Existing Operational Budget and Resourcing	<p>Parks and Natural Environment</p> <p>Coordinator Natural Environment and Strategy</p>	Project Delivery and Assets (Capital Works Program, Asset Management, Design and Construction) City Services
8. Undertake asset audit of current Council WSUD assets to assess functionality and to recommend improvements for future asset designs. Verify baseline treatment performance assumptions.	2022/23	<p>\$50,000</p> <p>Existing Operational Budget &amp; Melbourne Water Grant Funding</p>	<p>Parks and Natural Environment</p> <p>Coordinator Natural Environment and Strategy</p>	<p>Project Delivery and Assets (Asset Management, Design and Construction)</p> <p><i>External Stakeholders:</i> Melbourne Water (funding support)</p>
9. Undertake a Water Efficiency Audit of existing Council buildings/facilities, including assessing performance of rainwater tanks and identifying opportunities to improve water efficiency and IWM outcomes.	2023/24	<p>\$25,000</p> <p>(Consultant Budget)</p>	<p>City Services (Environmental Sustainability)</p> <p>Sustainability Officer</p>	Project Delivery and Assets (Facilities Maintenance)

Action	Timing	Indicative budget*	Lead Department & Officer	Support
10. Include WSUD assets in appropriate Asset Management Plans outlining lifecycle management requirements and renewal costs.	2022/23	Existing Operational Budget and Resourcing	Project Delivery and Assets Coordinator Strategic Asset Management	Parks and Natural Environment
<b>Community programs</b>				
11. Develop, plan and deliver community engagement programs, in line with the Whitehorse Engagement Policy, around IWM themes: <ul style="list-style-type: none"> <li>▪ Water security</li> <li>▪ Waterways and catchments</li> <li>▪ Impacts on waterway health</li> <li>▪ Preparedness for extreme weather</li> <li>▪ The role of water in supporting urban ecology</li> </ul> Align with Yarra Valley Water and Melbourne Water programs.	2023/24	\$20,000 (Communications Budget)  0.2 FTE for one year  <i>New business initiative via the annual budget and capital works program.</i>	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Community Engagement and Development, Strategic Marketing and Communications  <i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water, Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation
12. Investigate programs/opportunities with local businesses to deliver catchment-based IWM projects.	2023/24	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Investment and Economic Development  <i>External Stakeholders:</i> EPA, Yarra Valley Water, Melbourne Water



Action	Timing	Indicative budget*	Lead Department & Officer	Support
<p>13. Identify sources of pollution and work with stakeholders to address. This should include:</p> <ul style="list-style-type: none"> <li>▪ Investigating targeted litter management programs and assets, e.g. GPTs and additional litter traps</li> <li>▪ Working with partners to identify and address areas where unintended wastewater discharges to stormwater/ waterways occurs.</li> </ul>	2023/24	<p>\$20,000 (Communications Budget)</p> <p><i>New business initiative via the annual budget and capital works program.</i></p>	<p>Parks and Natural Environment</p> <p>Coordinator Natural Environment and Strategy</p>	<p>City Services (Waste Reduction &amp; Recycling, Cleansing)</p> <p><i>External Stakeholders:</i> EPA, Melbourne Water, Yarra Valley Water, neighbouring councils, Parkland Advisory Committees</p>
<b>IWM outcomes through planning controls</b>				
<p>14. Prepare guidelines and case studies to support planning applicants to meet WSUD requirements. These should consider:</p> <ul style="list-style-type: none"> <li>▪ Promoting the benefits to developers and demonstrating cost neutrality.</li> <li>▪ Developing case studies that include successful examples of WSUD in planning applications.</li> </ul>	2023/24	<p>\$10,000 (Communications Budget)</p> <p><i>New business initiative via the annual budget and capital works program.</i></p>	<p>Parks and Natural Environment</p> <p>Coordinator Natural Environment and Strategy</p>	<p>Statutory Planning, Engineering Approvals, Strategic Planning</p> <p><i>External Stakeholders:</i> CASBE, Yarra Valley Water</p>
<p>15. Integrate the internal referral processes for current planning requirements for management of stormwater quality and stormwater quantity.</p>	2023/24	Existing Operational Budget and Resourcing	<p>City Planning and Development</p> <p>ESD Advisor</p>	Engineering Approvals

Action	Timing	Indicative budget*	Lead Department & Officer	Support
16. Develop a policy on proprietary products outlining if and when they can be used to address planning requirements.	2023/24	\$20,000 (Consultant Budget)  <i>New business initiative via the annual budget and capital works program.</i>	City Planning and Development  ESD Advisor	Engineering Approvals  <i>External Stakeholders:</i> CASBE
17. Develop a business case for resourcing to enforce stormwater management requirements in new developments.	2023/24	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Engineering Approvals, Statutory Planning
18. Investigate a WSUD developer offset scheme to address compliance shortfalls, and implement if feasible. This will include developer engagement and an offset framework.	2024/25	\$50,000 (Consultant Budget)  <i>New business initiative via the annual budget and capital works program.</i>	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Statutory Planning, Strategic Planning, Engineering Approvals  <i>External Stakeholders:</i> DELWP, Melbourne Water, Local Councils
<b>Traditional owner engagement</b>				
19. Work with Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation and local indigenous groups to identify opportunities for genuine engagement and outcomes related to water and waterways.	2023/24 then ongoing	\$10,000 (Communications Budget)  <i>New business initiative via the annual budget and capital works program.</i>	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Community Engagement and Development  <i>External Stakeholders:</i> Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation, Melbourne Water, Yarra Valley Water, neighbouring councils

Action	Timing	Indicative budget*	Lead Department & Officer	Support
<b>Improved processes to embed Integrated Water Management</b>				
20. Develop a comprehensive IWM dataset to support future IWM planning and decision making. This should build on the data used to inform this Strategy and should inform its future review.	2023/24	Existing Operational Budget and Resourcing	Project Delivery and Assets (Asset Management)  Coordinator Strategic Asset Management	Project Delivery and Assets (Design and Construction) Engineering Approvals, Parks and Natural Environment, Statutory Planning, City Services  <i>External Stakeholders:</i> Melbourne Water, Yarra Valley Water
21. Embed project management and asset management processes to ensure all new WSUD assets consider lessons from past projects and future maintenance requirements (e.g. incorporate in relevant Council guidelines/standards as appropriate).	2023/24	\$25,000  (Consultant & Communications Budget)	Project Delivery and Assets (Design and Construction, Asset Management)  Coordinator Design and Construction  Coordinator Strategic Asset Management	Project Delivery and Assets (Capital Works Program), Parks and Natural Environment, Engineering Approvals, City Services
22. Ensure all new Council buildings and building retrofits address Council's water efficiency standards within internal ESD Policy.	Ongoing	Existing Operational Budget and Resourcing	Project Delivery and Assets  Coordinator Building Projects  Coordinator Facilities Maintenance  Project Director Major Projects	City Services (Environmental Sustainability)

Action	Timing	Indicative budget*	Lead Department & Officer	Support
23. Embed IWM considerations in Council structure plans and master plans. These should recognise where community connection with water and waterways can be made through an urban design response.	2023/24	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Project Delivery and Assets, Strategic Planning, Statutory Planning, Leisure and Recreation Services.
24. Embed IWM considerations in Council's flood and drainage management projects. This should involve: <ul style="list-style-type: none"> <li>Drainage Policy and Drainage Asset Management Plan including IWM actions as part of network renewal.</li> <li>Identifying localised overland flow paths to inform work program to mitigate nuisance flooding.</li> <li>Collaborating with Melbourne Water on flood modelling and IWM.</li> </ul>	2023/24	Existing Operational Budget and Resourcing	Project Delivery and Assets (Asset Management)  Coordinator Strategic Asset Management  Engineering Approvals Coordinator	Parks and Natural Environment, Project Delivery and Assets (Design and Construction), Engineering and Investment  <i>External Stakeholders:</i> Melbourne Water
<b>Strengthening partnerships</b>				
25. Implement an internal IWM Working Group to monitor and progress the implementation of this strategy.	2022/23	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Engineering Approvals, Project Delivery and Assets, Statutory Planning, Strategic Planning, City Services, Community Engagement and Development
26. Continue to participate in regional collaborations including the IWM Catchment Forums and CASBE	In progress & ongoing	Existing Operational Budget and Resourcing	Parks and Natural Environment, City Planning and Development  Coordinator Natural Environment and Strategy  Coordinator Strategic Planning	Statutory Planning, City Services (Environmental Sustainability)  <i>External Stakeholders:</i> DELWP, CASBE

Action	Timing	Indicative budget*	Lead Department & Officer	Support
<b>Capacity building</b>				
27. Ensure all staff responsible for IWM receive ongoing training and support, as appropriate	2022/23 then ongoing	Existing Operational Budget and Resourcing	Parks and Natural Environment  Coordinator Natural Environment and Strategy	Engineering Approvals, Project Delivery and Assets, Statutory Planning, Strategic Planning, City Services  <i>External Stakeholders:</i> Melbourne Water
<b>Advocacy</b>				
28. Advocate for Building Regulations to include WSUD requirements for single dwellings	In progress & ongoing	Existing Operational Budget and Resourcing	City Planning and Development  ESD Advisor	Parks and Natural Environment, Strategic Marketing and Communications
29. Advocate for strong IWM controls in the Planning Scheme	In progress & ongoing	Existing Operational Budget and Resourcing	City Planning and Development  Coordinator Strategic Planning	Parks and Natural Environment, Statutory Planning  <i>External Stakeholders:</i> CASBE
<b>IWM Strategy Monitoring, Evaluation, Reporting and Improvement (MERI)</b>				
30. Review 5-year IWM Strategy Implementation Plan (2022-2026) and develop subsequent 5-year Implementation Plan (2027-2031), as per IWM Strategy MERI.	2026/27	\$20,000  (Consultant Budget)	Parks & Natural Environment  Coordinator Natural Environment and Strategy	Relevant Council departments and external stakeholders

\* Based on high-level 2021 estimates – these require further investigation and validation

## 7. Monitoring, evaluation, reporting and improvement

Whitehorse City Council recognises the need to be effective and impactful in delivering this Integrated Water Management Strategy and seeking the desired outcomes for our environment and our community. A simple monitoring, evaluation, reporting and improvement (MERI) framework has been developed to support the strategy.

The purpose of the MERI is to:

- Demonstrate achievements and progress towards Strategy outcomes.
- Demonstrate accountability to the community for the use of Council funds.
- Establish a learning and improvement process that will inform management decisions, including renewal of Implementation Plan actions, Strategy targets and subsequent strategies.

The MERI Framework:

- Sets up effective mechanisms for governance oversight and monitoring of the Integrated Water Management Strategy and its implementation.
- Supports delivery of actions within the Implementation Plan.
- Informs future review, improvement and evolution of the Integrated Water Management Strategy, through high-level evaluation.
- Provides clarity and definition around reporting requirements.
- Outlines the timing for review of the Implementation Plan and seek to align with future Council Plans.

This framework is structured around, and is supported by, the following:

- Quarterly monitoring of progress on actions and targets to be undertaken by an internal IWM Working Group.
- Annual reporting of progress on actions and targets to Councillors.
- Five-yearly review and renewal of Implementation Plan (undertaken in Year 4).
- 10-yearly review and renewal of targets (undertaken in Year 9).
- Mid-term (Year 9) and end-term (Year 19) evaluation of:
  - Effectiveness; efficiency; appropriateness; impact; and legacy.
- Review of the MERI Framework itself at Year 10.
- Development of a new Integrated Water Management Strategy at Year 20, informed by review of all Strategy components and evaluation findings.

The MERI Framework centres around the targets listed in the section above, relating to the outcomes sought by the Strategy (as updated). To drive timely implementation, an additional target around progress of agreed actions has been included.

The high-level MERI Framework is provided in Appendix 1. Council will consider the need for the development of a more detailed MERI Plan as strategy implementation progresses.



## 8. Glossary

Baseflow	The portion of the streamflow that is sustained between precipitation events. It is not direct runoff but is fed to streams by delayed pathways, flowing into the channel over a long time period.
Catchment	An area where water falling as rain (or snow/ice) 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.
Daylighting	Reinstating former smaller creeklines and waterways that have previously been placed in underground pipes or drains, not readily visible from the surface. Daylighting can provide environmental and community benefits, including fostering a connection between people and waterways.
Directly connected imperviousness (DCI)	The proportion of the impervious surface of a catchment that is directly connected to a stream through a conventional drainage connection (i.e. pipe or drain), without being 'disconnected' by WSUD systems.
Evapotranspiration	Part of the water cycle, in which water is transferred from the land to the atmosphere by evaporation from the soil, water bodies and other surfaces and by transpiration from plants.
Headwaters	The upper section of a waterway, i.e. the part of a waterway furthest from its endpoint or confluence with another stream.
Infiltration	Permeation of water into soil by filtration.
Potable water	Water that is appropriate for human consumption, i.e. drinking.
Streamflow	The flow of water in a waterway; the amount and fluctuation of water being conveyed down a natural channel or stream.
Urban Heat Island	This effect occurs when a city experiences much warmer temperatures than nearby rural areas, particularly apparent at night time. This occurs because of the replacement of natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This heat significantly contributes to human health impacts, including deaths, as well as increased energy costs for cooling.



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Water Sensitive  
Urban Design  
(WSUD)

An approach that integrates urban planning, design and engineering design with consideration of the urban water cycle (incorporating stormwater, groundwater and wastewater management and water supply) to minimise environmental degradation and support ecological, cultural and liveability outcomes. WSUD assets include raingardens, bioretention tree pits and stormwater harvesting systems.

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Waterway

A river, creek, stream, watercourse or natural channel where water regularly flows whether or not the flow is continuous (in the Victorian context, specifically as defined by the Water Act 1989).

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# Appendix 1 – MERI Framework

## Purpose

The purpose of the Integrated Water Management Strategy MERI is to:

- Demonstrate achievements and progress towards Strategy outcomes.
- Demonstrate accountability to the community for the use of Council funds.
- Establish a learning and improvement process that will inform management decisions, including renewal of Implementation Plan actions, Strategy targets and subsequent strategies.

## Key evaluation questions




The MERI framework addresses the following key evaluation questions (KEQs):

- 1. To what extent has the strategy been implemented as planned?*
- 2. To what extent have strategy outcomes been achieved?*
- 3. What were the key barriers/enablers for achieving the Strategy outcomes?*
- 4. How have strategic outcomes changed over time, and why?*

Responsibility for implementing the MERI Framework will sit with Council's IWM Working Group.

## MERI Framework – Targets and reporting requirements

Table 8: Integrated Water Management Strategy's MERI Framework

Measure of...	KEQ	2030 Target	Indicator	Frequency	Baseline (2019/20)
Implementation effectiveness	KEQ1	≥80% of Implementation Plan actions 'on track' or 'completed'	Review of status of Implementation Plan actions relative to indicated completion timelines	Annual	N/A
Outcome 1 – All water is valued as a resource 	KEQ2	10 % decrease in Council's potable water use	Council water use data*	Annual monitoring; Evaluation at Year 10	237 ML
	KEQ2	15 % of Council water use to be sourced from alternative water	Total designed water use / total Council water use	Annual monitoring; Evaluation at Year 10	8.5%
	KEQ2	Aspiration – Support the community to reduce their potable water use to 140 litres/person/day (L/p/d)**	Yarra Valley Water data for residential use within Whitehorse / total number of Whitehorse residents in that year	Annual monitoring; Evaluation at Year 10	162 L/p/d
Outcome 2 – Healthy landscapes and waterways 	KEQ2	500 kg/yr of nitrogen removed from stormwater through Council projects	Total aggregated design TN treatment of all WSUD assets functional (per maintenance/ inspection data)	Annual monitoring; Evaluation at Year 10	N/A***
	KEQ2	60 ML/yr reduction in stormwater discharged to waterways through Council projects	Total aggregated design stormwater flow reduction of all WSUD assets functional (per maintenance/ inspection data)	Annual monitoring; Evaluation at Year 10	N/A***
Outcome 3 – Reduced flood risk 	KEQ2	100% of projects cross consider IWM and flood mitigation as part of design	Proportion of IWM and flood mitigation projects with completed checklist indicating consideration of multiple (flood/IWM) benefits	Annual monitoring; Evaluation at Year 10	N/A

Measure of...	KEQ	2030 Target	Indicator	Frequency	Baseline (2019/20)
Barriers/enablers	KEQ3	N/A – aims to inform Strategy review	WSUD Working Group and external partner review (workshop/survey/interviews) of barriers and enablers	Evaluation at Year 10	N/A
Evolving outcomes	KEQ4	N/A – aims to inform Strategy review	WSUD Working Group and external partner review (workshop/survey/interviews) of Strategy outcomes and any changes over time	Evaluation at Year 10	N/A

\* Council mains water use baseline is based on Yarra Valley Water billing data for the 2019/20 year. For the purpose of annual reporting against this baseline, any representative 12-month billing data can be used, e.g. Q4 of the previous year to Q3 of the year being reported, to align with reporting timelines (i.e. to avoid delays waiting for Q4 billing data).

\*\* Note: this is not completely within Council's control, although Council has the opportunity to work with partners to influence this outcome.

\*\*\* Confirmed data on designed asset treatment performance and current functionality was not available at the time of Strategy preparation. Reporting of target performance should include all relevant WSUD assets, once this data has been confirmed.

## Target assumptions

Targets are based on the following assets (or equivalent) being constructed in the next 10 years:

- 3 stormwater harvesting systems (incl wetland pre-treatment) supplying ~5ML/year each; plus
- 3 wetlands at ~2000m<sup>2</sup> each; plus
- 17 raingardens at ~80m<sup>2</sup> each.

Targets also assume Box Hill Gardens and Bolton Park (Box Hill Oval) will be fully functional (rectified if required) and providing intended benefits.

## Appendix 2 – IWM opportunities and considerations

The following list provides examples of IWM opportunities that Council may consider based on specific needs at various locations across the municipality, along with some high-level considerations.

### **Distributed stormwater treatment and passive irrigation**

Water Sensitive Urban Design systems such as raingardens, street tree pits, infiltration systems help reduce pollutants from stormwater, naturalise flow regimes and support urban greening. They are of value across the municipality, but consideration should be given to:

- opportunities to integrate with other planned capital works (e.g. road/drainage upgrades, municipal car parks, streetscape works, open space improvements);
- location within priority waterway catchments (i.e. focusing on waterways with priority ecological/social values to be protected or with higher potential to facilitate meaningful outcomes downstream);
- any similar assets upstream/ downstream (which may diminish pollutant reduction performance);
- urban cooling need (urban heat hotspots);
- priority locations for urban greening in the Urban Forest Strategy;
- opportunities to alleviate nuisance flooding and/or drainage capacity constraints;
- opportunities to improve community awareness of and connection to waterways;
- general feasibility, risks, community support, safety and ease of maintenance.

### **Large-scale stormwater harvesting systems for parks, sports fields and reserves**

These systems offer an alternative water source to reduce potable consumption, whilst also reducing excess stormwater flows and pollutants, that both damage receiving waterways. In this regard, these systems can provide environmental and liveability benefits as well as potential financial savings. In addition to irrigating parks, reserves and sports fields, stormwater harvesting can provide an alternative water source to standpipes for filling of Council water trucks for use further afield.

Considerations include:

- equitable access to quality green space;
- location within priority waterway catchments (i.e. focusing on waterways with priority ecological/social values to be protected or with higher potential to facilitate meaningful outcomes downstream);
- any stormwater assets upstream/ downstream (which may diminish pollutant reduction performance);

- urban cooling need (urban heat hotspots);
- priority locations for urban greening in the Urban Forest Strategy;
- priorities within the Open Space Strategy (as updated)
- opportunities to integrate with other planned capital works (e.g. sports field/park upgrades, Master Plans);
- opportunities to alleviate nuisance flooding and/or drainage capacity constraints;
- general feasibility, risks, community support, safety and ease of maintenance.

Council can also consider partnerships with other water users such as local businesses and industry to improve the business case for stormwater harvesting systems.

### **Targeted large-scale assets to improve waterway health and amenity**

There are opportunities for targeted large-scale asset-based to support specific waterway health and amenity outcomes, that are worthy of further exploration. These include opportunities for infiltration and baseflow recharge (e.g. in riparian parkland), daylighting of underground drains, and partnering with Melbourne Water to install stormwater treatment (e.g. wetlands, bioretention) and improve public access in existing retarding basins such as Elmhurst and Glen Valley.

Considerations include:

- equitable access to quality green space;
- location within priority waterway catchments (i.e. focusing on waterways with priority ecological/social values to be protected or with higher potential to facilitate meaningful outcomes downstream);
- extent of environmental/biodiversity/amenity/recreational benefits;
- opportunity/willingness to collaborate with other partners;
- general feasibility, risks, community support, safety and ease of maintenance.

### **Gross pollutant traps (GPTs) to reduce discharge of litter to waterways**

These are an asset-based solution to reduce the amount of litter entering waterways, primarily to reduce impacts on amenity and wildlife. They work effectively when appropriately sited and maintained, although do not significantly reduce stormwater flows or other pollutants.

Consideration should be given to:

- identifying the location of litter hotspots (i.e. priority locations where litter is generated);
- the type of litter generated and suitability of the GPT in removing it;
- locating GPTs in high value waterways where litter is a key amenity/ecological impact, and potential to meaningfully improve outcomes downstream;
- potential alternative approaches to litter reduction (e.g. education, engagement and behaviour change campaigns);



- general feasibility, risks, community support, safety and ease of maintenance.

### **Point-source pollution investigation**

There is potential to work with external agencies and partners to investigate specific pollution sources that significantly affect water quality within waterways. This may include industrial discharges, litter and overflow of sewerage systems. Once identified, Council and/or partners can undertake educational, enforcement or partnership initiatives to address the pollution source. Consideration needs to be given to high-risk locations (e.g. industrial areas, food businesses, septic tanks, Emergency Relief Structures for sewage overflow), available resources and water quality data from partner agencies.

### **Improved water-sensitive outcomes in new development and major projects**

The significant urban development in Whitehorse presents both a threat and an opportunity. Increased imperviousness and population growth is ultimately detrimental to the urban water cycle, but development also offers the opportunity to implement improved stormwater management and efficiency measures to reduce potable consumption and wastewater discharge. Private-public partnerships also provide opportunity for improved outcomes – particularly for larger developments and infrastructure projects (such as new freeway and public transport projects). Improved outcomes in development can be supported by providing improved information/materials and education to developers, and by fostering beneficial partnerships. Improved environmental and community outcomes may also be provided by a ‘stormwater offsets scheme’, whereby developers can make a financial contribution to Council in lieu of a meeting a portion of on-site stormwater management obligations, and Council achieves the equivalent treatment through construction of a new public WSUD asset.

### **Community engagement/education initiatives**

Initiatives to engage the Whitehorse community, including residents, businesses and/or community groups, can positively change behaviours, attitudes and awareness around water and waterways. This can achieve a range of beneficial outcomes to improve water management, including:

- reducing polluting activities that impact waterways (e.g. domestic herbicide/fertiliser use, washing paint/contaminants down gutters, inappropriate industrial site management and/or waste disposal)
- driving water efficiency through behaviour change or uptake of offers led by Council and/or partners (e.g. rainwater tanks, water efficient fittings/appliances, leak detection)
- identification of opportunities and synergies for capital investment, e.g. potential precinct-scale rainwater harvesting schemes by identifying large water users in industrial estates with large roof areas.

Community groups and partnerships can also provide valuable contributions to initiating, planning and delivering appropriate IWM projects.

Consideration should be given to:

- priority outcomes (e.g. water conservation, pollution reduction);
- high-risk activities;
- the most appropriate form of engagement (e.g. with regards to the IAP2 Framework and communication modes);
- leveraging existing champions (e.g. community groups);
- local initiatives/pilots in high-priority catchments; and
- general feasibility, risks, community support, safety and ongoing operational arrangements.



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