Yarra Ranges Council

Integrated Water Management Plan 2017

Contents

Summary

Water is essential to sustain life. The responsible management of water underpins the sustainability of our communities, economy and natural environment. The Yarra Ranges has some of the most pristine and highly-valued waterways of any Victorian municipality, including the headwaters of the iconic Yarra River. As outlined in the State Environmental Protection Policy (SEPP, Waters of Victoria), various agencies have the responsibility to work together to protect these waterways, including Yarra Ranges Council. Council's primary water management responsibilities are: the management of local stormwater drainage and flood risk; domestic wastewater approvals and compliance; and land use planning and approval that is consistent with the protection of waterways and water quality. Yarra Ranges Council has developed the Integrated Water Management Plan (IWM Plan) to set the strategic direction for the sustainable management of water resources for Council operations over the next five years. It builds on Council's achievements over the past decade in increasing water efficiency and the capture, treatment and reuse of stormwater.

The IWM Plan is consistent with the policy position outlined in Council's Environment Strategy (2015-2025) and directly addresses Goal 2: 'Our water resource is improved and preserved'.

Adopting the IWM Plan will assist Council to make the best use of the resources available, by:

- Identifying actions that will generate multiple benefits
- Prioritising actions by greatest impact
- Focusing on Council's areas of influence
- Providing a framework to work in partnership with other agencies

An integrated approach to water management considers all facets of the water cycle, including: water supply, wastewater, surface water, groundwater and stormwater. Managing these aspects together can result in better and more cost-effective outcomes than the traditional approach of managing in isolation.

The purpose of adopting IWM is to:

- Minimise potable water use
- Increase use of fit-for-purpose alternative water supplies, such as rainwater, stormwater and recycled water
- Apply best practice stormwater management to protect valuable receiving waterways and to optimise the use of stormwater as a resource
- Minimise wastewater discharges to the environment, including discharges from the sewerage system and septic tanks
- Ensure the sustainable use of groundwater and surface water

Achieving these outcomes will require stronger partnerships between stakeholders with responsibilities for aspects of water management, including local Councils, Melbourne Water, water corporations, Port Phillip and Western Port Catchment Management Authority, other State Government agencies and the community.

The development of the IWM Plan was overseen by a cross-departmental steering committee. The actions in the plan were developed with input from five different working groups consisting of representatives from relevant departments within Council and external agencies. A specialist consultant was commissioned to produce a water and pollutant balance for the Yarra Ranges and to identify opportunities for IWM projects. This revealed that the Yarra Ranges still relies heavily on mains (drinking water) supply and that alternative water supply sources are a virtually untapped resource.

Seville Water Play Park

A long-term vision for water management was developed to guide the IWM Plan:

> The Yarra Ranges is a 'water sensitive place', known for its clean, healthy waterways and its attractive streetscapes and landscapes incorporating water sensitive design. Homes, businesses, farms and community infrastructure incorporate elements, such as rainwater tanks, swales and raingardens that retain water within the catchment and filter it through natural processes. As custodians of the upper Yarra River and Dandenong Creek catchments, the Yarra Ranges ensures water passing through the municipality is of high quality for downstream users and the environment.

The IWM Plan outlines a number of objectives that will move Council's operations towards its vision of an integrated approach to water management, including:

Water Efficiency

» Reduce Council's total potable water consumption through permanent water efficiency measures.

Alternative Water Sources

» Increase the use of fit-for-purpose alternative water supplies, such as rainwater, stormwater and recycled water in Council operations.

Stormwater

» Apply best practice stormwater management to Council-managed land and facilities to protect valuable receiving waterways and to optimise the use of stormwater as a resource.

Wastewater

» Minimise wastewater discharges to the environment, including discharges from septic tanks.

Groundwater

» Investigate the sustainability of groundwater use in the Yarra Ranges.

Planning and Processes

» Ensure the Yarra Ranges Planning Scheme includes adequate provisions to support integrated water management and waterway protection.

» Embed integrated water management in Council policies and processes, ensuring the strategic use of resources to support IWM.

Partnerships and Education

» Establish and maintain effective partnerships with water corporations, State Government agencies and community groups to undertake key initiatives.

» Support and encourage the Yarra Ranges community to adopt integrated water management practices.

The Plan outlines actions to achieve each of these objectives that will be implemented over the next 5 years. Progress towards meeting the objectives will be monitored and reported on annually.

1. Background

Water management in the context of this plan includes the following aspects:

- Water supply for drinking, washing, industry, recreation and irrigation
- Disposing of domestic wastewater (e.g. via the sewerage system or septic tanks)
- Stormwater drainage
- Groundwater and surface water
- Protecting rivers, streams and wetlands as natural habitats that support biodiversity and recreational values

Conventional approach

The conventional approach to water management has been to maintain centralised supply and wastewater systems that continually expand to meet growing demand. Stormwater drainage systems are usually built for the single purpose of conveying water away as quickly as possible. Managing water in the conventional way has lead to a number of problems, including:

- High potable water use
- Declining waterway health due to pollution and changes to natural flow regimes
- Increasing cost of water supply and sewerage services

There are also emerging issues that will impact on our ability to sustainably manage water into the future, including:

- Climate change – will decrease local runoff and increase the intensity of storm events, resulting in added pressures on stormwater systems and natural waterways
- Population growth – higher demand for limited water supplies and pollution pressures caused by urban growth and consolidation

A New Approach - Integrated Water Management

Addressing these issues requires significant changes to the way our water resources are managed. Developing more integrated and local responses to water management is necessary to ensure the long-term sustainability of water resources and the environment. IWM is the current best practice approach to water management. Advancements in alternative water supply, reuse and treatment technologies have opened up new opportunities to optimise our use of water resources. An integrated approach to water management considers all facets of the water cycle, including water supply, wastewater, surface water, groundwater and stormwater. Managing these aspects together can be more efficient than the traditional approach of managing in isolation.

The purpose of adopting IWM is to:

- Minimise potable water use
- Increase use of fit-for-purpose alternative water supplies, such as rainwater, stormwater and recycled water
- Apply best practice stormwater management to protect valuable receiving waterways and to optimise the use of stormwater as a resource
- Minimise wastewater discharges to the environment, including discharges from the sewerage system and septic tanks
- Ensure the sustainable use of groundwater and surface water

Adopting IWM will assist Yarra Ranges Council to adapt to a changing environment in a way that builds resilience and is environmentally sustainable. By reducing demand for water and developing alternative sources, Council will improve the resilience of its water supply systems. This will reduce risk and vulnerability to external factors such as climate change, water restrictions and increasing cost of water. Sustainable water management practices will enable Council to maintain and improve the amenity of parks and recreational areas and ensure that these continue to provide a range of community benefits during periods of drought.

Guiding Principles for Integrated Water Management

Efficiency – water should be used as efficiently as possible and in a way that brings maximum benefit to the community and the environment.

Fit-for-purpose use – ensuring the quality of the water is appropriate for the intended use. For example, recycled water can be safely used for purposes such as irrigation of public open space and toilet flushing, while conserving high quality water for drinking and other personal uses.

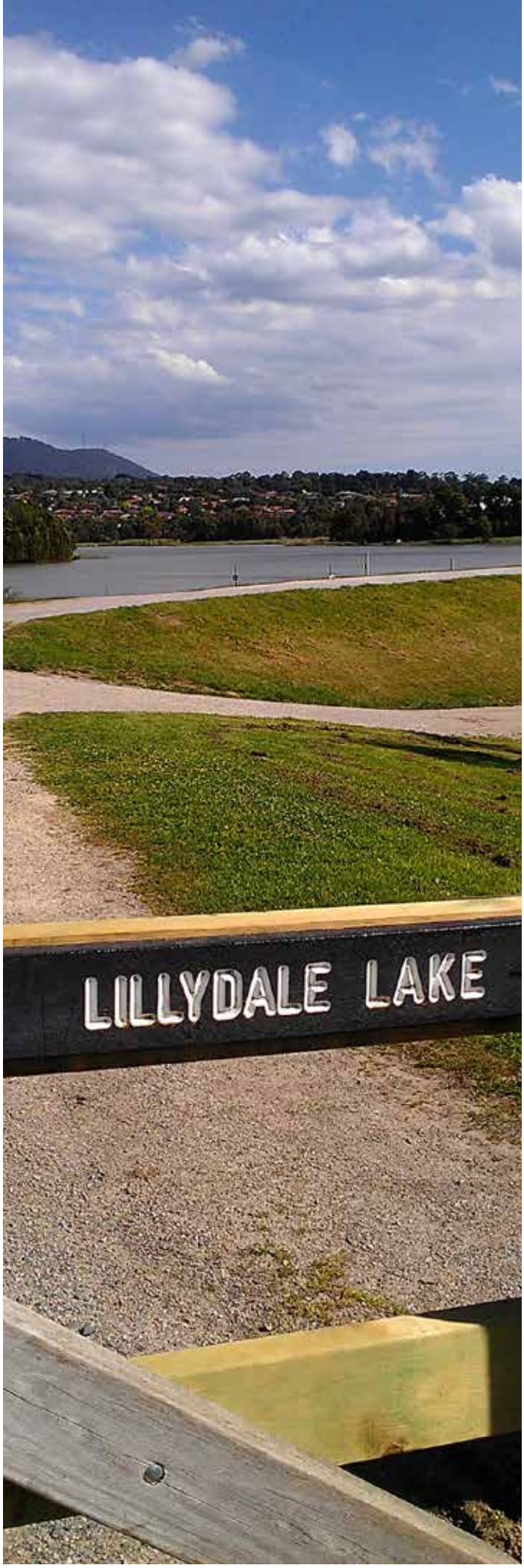
Multiple benefits – uses of water that provide multiple benefits to the community are preferred over single purpose use. For example, in urban areas, using tank water on the garden, is preferable to using mains (drinking water) from the tap, because it serves the dual purpose of saving potable water and keeping stormwater out of urban creeks.

Centralised and decentralised systems – a combination of large-scale, centralised systems (e.g. water supply dams) and small-scale, distributed systems (e.g. rainwater tanks) provides greater flexibility and resilience.

Responsibilities for water management

Various organisations are responsible for different aspects of water management in the Yarra Ranges region. Achieving more integrated water management will require collaboration and commitment by these agencies and individuals.

Key Stakeholders	Roles and Responsibilities
Council	Manage the local stormwater drainage network Manage risks associated with local flooding Domestic wastewater management approvals, including septic tanks Plan for and approve land use activities through the Victorian Planning Provisions, Municipal Strategic Statements (MSS) and planning permits. Increasingly, implement local alternative water supply and stormwater treatment projects
Melbourne Water	Manage regional stormwater drainage networks Regional flood risk management Manage Melbourne's water supply catchments Water supply wholesaler Caretaker of waterway health for the region Manage the environmental water reserve Manage larger sewer network and treatment plants
Water corporations (Yarra Valley Water and South East Water)	Water supply retailer (potable and recycled water) to households and businesses Provision of waste services Manage smaller (local) sewer networks.
Department of Environment, Land, Water and Planning	Manage Victoria's water resources in partnership with a network of government agencies and water authorities Develop Victoria's Water Plan
Environmental Protection Authority (EPA)	Protect waterways by regulating pollution under the Environment Protection Act 1970 and according to the State Environmental Protection Policy (Waters of Victoria) Environmental monitoring and reporting
Port Phillip and Westernport Catchment Management Authority	Responsible for the overall strategic management of natural resources and planning through the development of the Regional Catchment Strategy
Southern Rural Water	Manage groundwater in the region
Householders, landholders, businesses and community groups	Consumers of water Engage with Council and other agencies on water-related projects Advocates for increased protection of waterways and better management of water resources



2.Waterways In the Yarra Ranges

A Special Place

The Yarra Ranges has many important waterways, including the Yarra River and many of its major tributaries, such as the Watts River, Little Yarra River, Woori Yallock Creek, Steels Creek, Olinda Creek and Brushy Creek. The Yarra Ranges also includes the upper portion of the Dandenong Creek catchment, which includes the most environmentally intact reaches in the Dandenong Ranges.

The middle Yarra, upstream of the Yering Gorge pumping station is an important water supply catchment for Melbourne. Responsible land and water management in this region will help to protect drinking water quality.

Waterways in the Yarra Ranges support high-value agriculture and provide opportunities for active and passive recreation to residents and visitors alike.

Many iconic species are dependent on the waterways of the Yarra Ranges, including breeding populations of platypus, fish, water birds, plants and invertebrates.

Threats to Waterways in the Yarra Ranges

The main threats to Yarra Ranges' waterways are alteration of natural flow regimes and pollution. These impacts can occur in a number of ways, including:

Extraction of surface water and groundwater for human use - Adequate environmental flows are essential to maintain the health of the Yarra and other major rivers and wetlands, especially during times of drought. However, during the Millennium Drought (1996-2010), the environmental flow allocation (17 GL) to the Yarra River was not released and the minimum passing flow at Yering was reduced due to the

need to maintain Melbourne's water supply. Water conservation and the use of alternative sources, such as stormwater and recycled water, would help to reduce dependence on waterways for basic supply and ensure there is sufficient water available for the environment during times of drought.

Groundwater is also an important source of water that often recharges baseflows (dry weather flows not associated with rain events) in rivers and streams. Conservation of groundwater will help to sustain surface waterways during dry periods.

Climate change is expected to reduce the average long-term stream flow into Melbourne's water supply catchments. There is also an increased risk of a bushfire in the water supply catchments. This means there will most likely be a decrease in the volume of water that can be sustainably extracted for human use (including for domestic consumption, industry and agriculture). At the same time, increased rainfall intensity during storm events will put more pressure on stormwater drainage infrastructure and increase the risk of local flooding.

Polluted stormwater runoff is an increasing threat to many urban creeks in the Yarra Ranges. New and infill urban development reduces vegetation cover and increases the area of hard surfaces (roads, roofs, car parks, etc.) in a catchment. Conventional, piped drainage systems convey polluted runoff from these hard surfaces quickly and efficiently to the nearest waterway. Typical urban creeks receive a greater volume of runoff, delivered much more frequently than non-urban creeks. This causes erosion and high levels of nutrients, sediments and toxicants. Hard surfaces also prevent infiltration of water into the soil, which reduces vital baseflows

Sedimentation - from unsealed roads and eroded land. A high proportion of roads in the Yarra Ranges are unsealed and are a source of sediment-input to waterways. However, simply upgrading these unsealed roads to sealed roads with conventional drainage infrastructure would increase the volume of stormwater reaching waterways, likely resulting in a worse environmental outcome. Therefore, alternative ways of upgrading roads and/or managing sediment from roads are needed if we are to protect our waterways.

Wastewater - Yarra Ranges has one of the largest numbers of septic tanks of all Victorian municipalities, accounting for 9% of all septic tanks across the state. There are approximately 22,000 properties, or 37% of all rateable properties, within the Yarra Ranges that manage domestic wastewater on-site through a septic tank or equivalent form of on-site wastewater system. Domestic wastewater contains high levels of pathogens, chemicals and other contaminants capable of causing human illness and adversely impacting on the local environment if discharged without sufficient treatment.

Pollution from point and non-point sources, including: litter, oil, heavy metals, fertilisers, pesticides and other chemicals, all contribute to poor water quality.

3. Our Current Water Use

Yarra Ranges' Water and Pollutant Balance

How water flows through a municipality depends on its unique landforms, rainfall and development patterns. A specialist consultant (Design Flow), was commissioned by Council to develop a water balance to better understand the urban water cycle in our municipality. Figure 1 shows how water moves in and out of our municipality (excluding rural areas). Water enters via rainfall or from the water mains (sourced from catchment dams). Water leaves via evaporation, as stormwater runoff or wastewater treatment plants.

The results of the water balance study show that our municipality consumes around 8,510 million litres (megalitres or ML) of mains, drinking quality, water each year for residential and non-residential use. Almost half (44%) of the rain that falls on our municipality runs off again as polluted stormwater - directly into our waterways. The amount of stormwater generated by the municipality is 35,200 ML/year, of which only a small proportion is treated (27%) and an even smaller amount is harvested for reuse (3%). In addition, 6,060 ML of treated recycled wastewater is discharged from local sewerage plants to natural waterways each year. Currently, less than 1% of treated recycled wastewater is reused. This means that Yarra Ranges' entire mains water demand could be met nearly five times over with alternative sources. Using treated stormwater for suitable applications (e.g. irrigation, toilet flushing) would not only save drinking quality mains water, it would also protect urban waterways from the negative impacts of stormwater runoff on water quality and stream flows.

Alternative water sources: a virtually untapped resource

Only 3% of available stormwater and less than 1% of recycled wastewater is currently used.

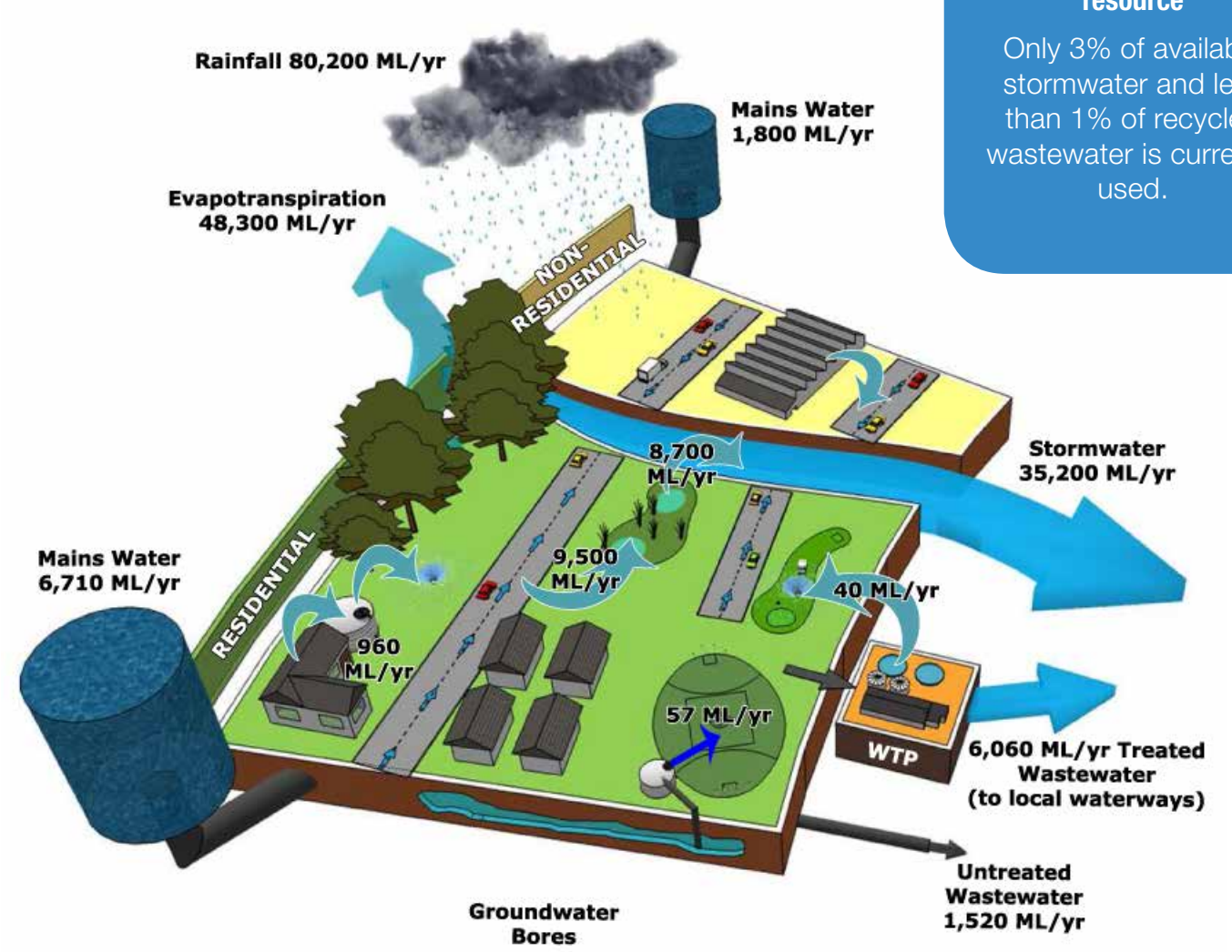


Figure 1. Yarra Ranges water and pollutant balance

Council's Water Use

Council's potable mains water use decreased by 57% between 2000 and 2011 and then increased again with the easing of water restrictions in Melbourne (Figure 2). Council's mains water use is currently 22% lower than what it was in 2000. Over the same time period, the cost of water to Council has approximately tripled in price to $681,796, despite an overall decrease in water use. Playing fields/open space and swimming pools are the highest water users, accounting for 32% and 25% of Council's total potable mains water use respectively (Figure 3).

What have we done so far?

Yarra Ranges Council has already achieved a number of water efficiency and stormwater quality improvements since 2000:

- Reduction in potable mains water use by 22%. These reductions have been achieved by:
  - Converting sports grounds to warm season grasses that require less water
  - Capturing wastewater from swimming pools and treating it for re-use on adjoining outdoor sports grounds
  - Retrofitting rainwater tanks to Council facilities to provide water for toilet flushing and at the depot to provide water to wash vehicles
  - Installing water-efficient shower heads
- Installing stormwater harvesting systems at Kimberley Reserve in Chirnside Park and Morrison Reserve, Mt Evelyn – saving millions of litres of potable water each year.
- Construction of raingardens and other water sensitive urban design assets as part of the Little Stringybark Creek Project and other streetscape improvement projects.
- Improving the design of unsealed roads to reduce sediment-laden runoff

Yarra Ranges Council - Annual Water Consumption and Cost

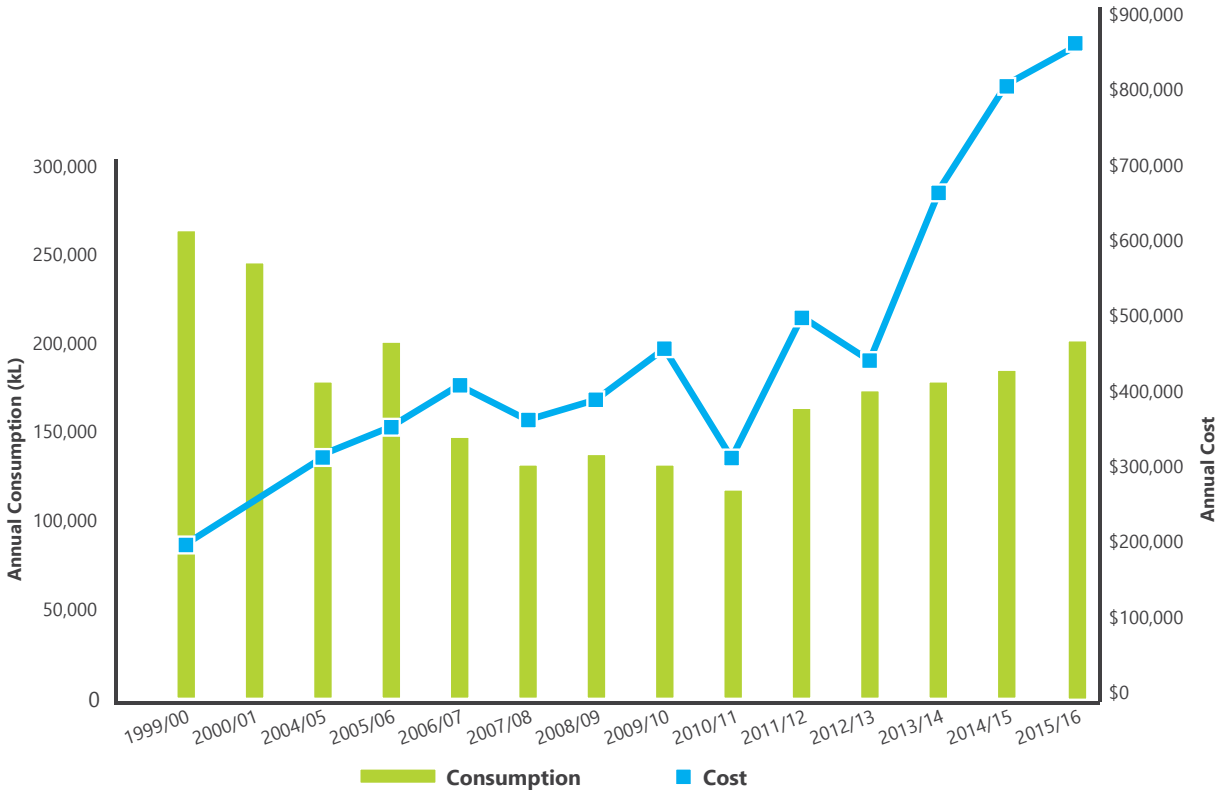


Figure 2. Council's annual water consumption and cost

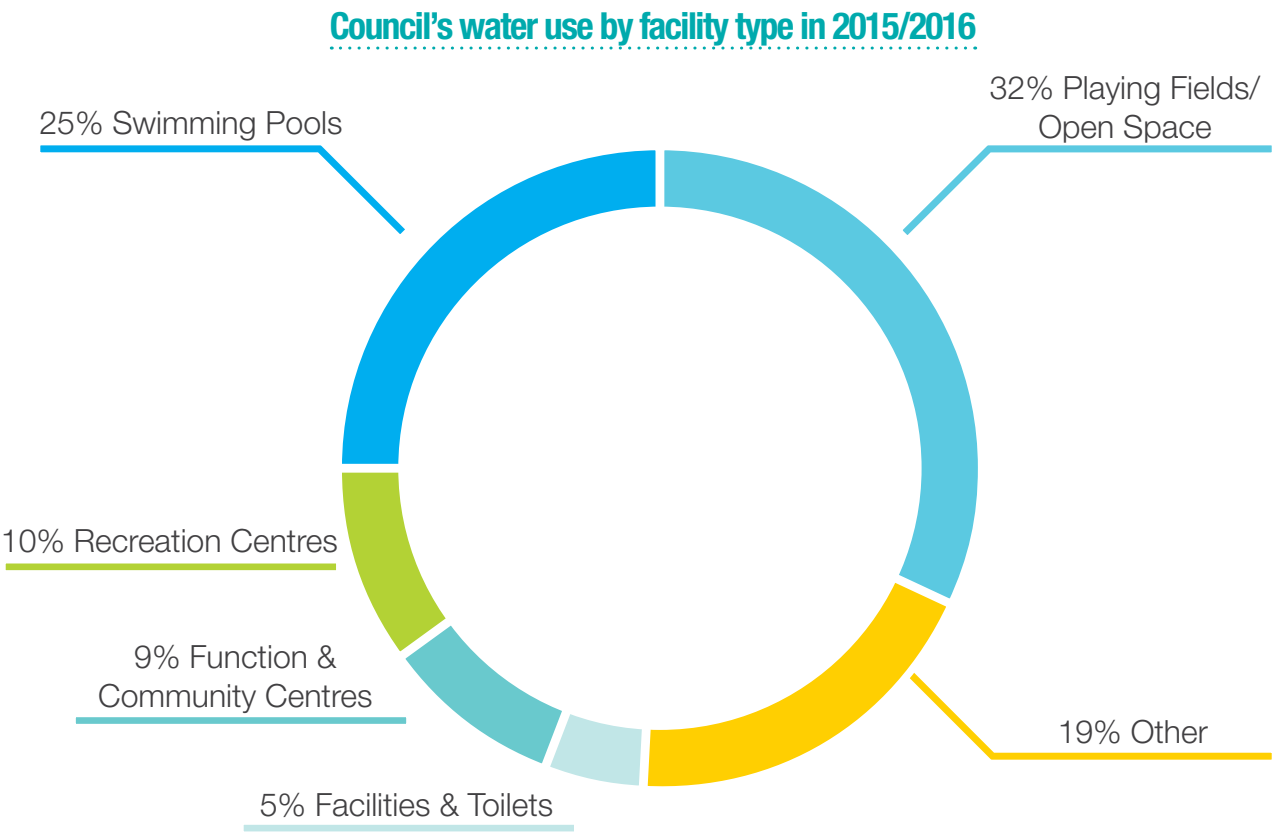


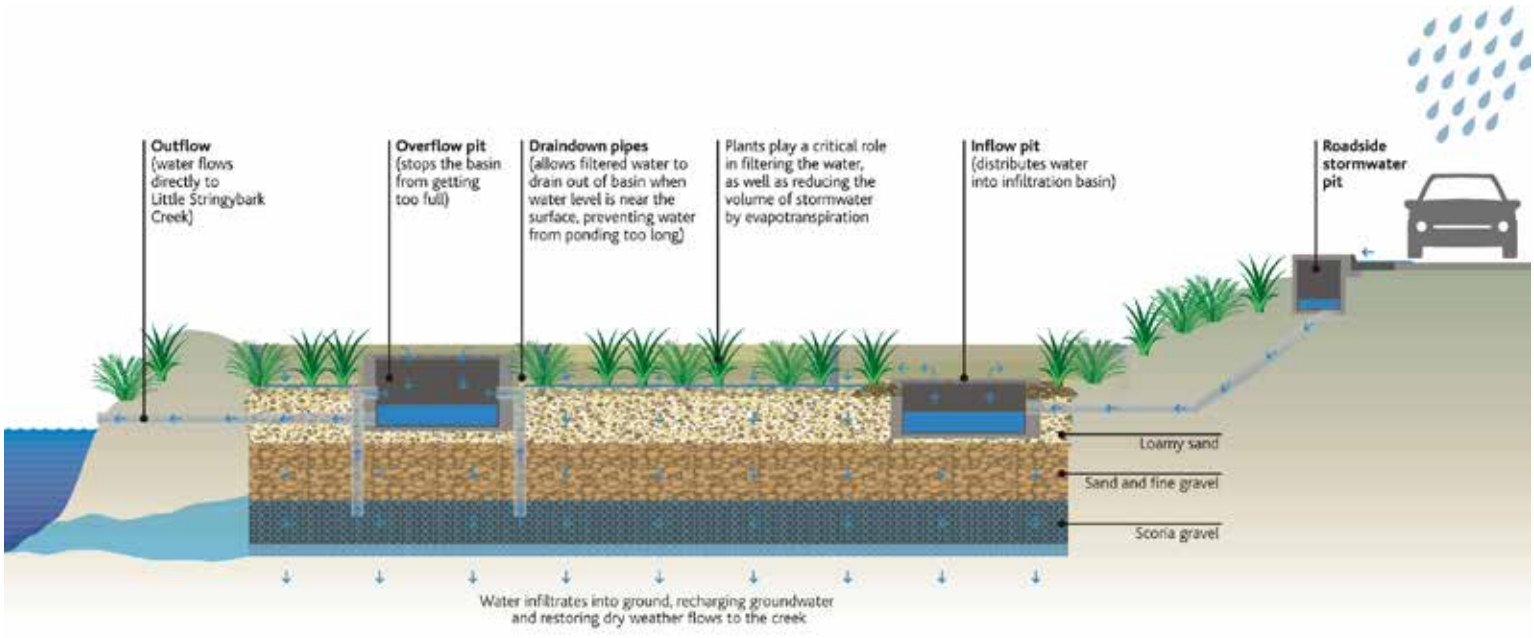
Figure 3. Council's water use by facility type in 2015/16

Water Sensitive Urban Design

An integrated approach to water management is closely associated with water sensitive urban design (WSUD). WSUD is the use of best practice methods to avoid and mitigate stormwater impacts from drainage infrastructure. Stormwater runoff from urban areas degrades aquatic ecosystems due to excessive flows (compared with pre-developed conditions) conveying pollutants to the receiving waters. Stormwater impacts have been increasing in extent and severity over the past decades. At the same time our understanding of its impact on natural waterways has improved greatly. As stormwater is now known as a key driver of environmental degradation in waterways, there has been an increasing need for local government to build its capacity to ensure our drainage assets do not cause undue harm to our natural waterways. Water sensitive urban design incorporates features, such as swales, raingardens and wetlands that capture and treat stormwater before it reaches waterways. Rainwater harvesting with tanks is also a form of WSUD.

Water sensitive urban design not only reduces stormwater pollutants, but can also: reduce local flooding impacts; provide passive irrigation of urban landscapes; and improve the microclimate through increased evapotranspiration to reduce heat island effects. Yarra Ranges Council has worked in collaboration with Melbourne Water and the University of Melbourne to install over 100 WSUD assets, approximately half of which are part of internationally recognised Little Stringybark Creek Project.

Despite improvements in our ability to avoid and mitigate stormwater impacts, Yarra Ranges Council has experienced significant difficulties in maintaining WSUD drainage assets due to an ongoing lack of funding. A WSUD asset maintenance plan was completed recently, and this will help to ensure our WSUD assets are adequately maintained in the long-term



Little Stringybark Creek Project

Council is working with the University of Melbourne, Melbourne Water and residents in Mt Evelyn to implement a world first attempt to restore a waterway by targeting stormwater in the catchment. The project involves systematically implementing water sensitive urban design in the catchment to improve the health of Little Stringybark Creek. Raingardens, swales and rainwater tanks all contribute to restoring more natural flows and improved water quality in the creek. Results show the water quality in the creek has greatly improved since the beginning of the project in 2009. The project has also hosted many visits and tours by national and international government and scientific research groups. The Little Stringybark Creek is now listed as a UNESCO International Ecohydrological Demonstration Site

Hereford Rd Raingarden

What is a Raingarden?

A raingarden is a water-saving garden that is designed specifically to capture stormwater from hard surfaces such as roads, carparks and roofs.

A raingarden is made up of layers of infiltration media which help to slow the rate of stormwater entering waterways. These layers also assist in the removal of pollution, such as nitrogen, phosphorus, sediment, oils and litter that are washed off these hard surfaces.

Plants in raingardens help to further filter out pollution that would otherwise end up in our rivers and creeks.

The Green Spine Gateway to the Yarra Ranges

Raingardens were included as part of the Green Spine along the Maroondah Highway in Chirnside Park. The raingardens treat polluted runoff from the road and reduce the amount of pollutants entering Brushy Creek.

Old Coach Road sediment traps

Sustainable Roads

Old Coach Road, in Mt Dandenong was upgraded as part of the Sustainable Roads Project in partnership with Melbourne Water. Sloping the road to disperse the water, and building check dams and sediment traps greatly reduces the risk of erosion and sedimentation from this unsealed road and reduces maintenance costs.

4. Development of the IWM Plan

Strategic Context

The Responsibility for managing different aspects of the water cycle lies with a number of different agencies, as well as different departments within Council. Therefore, it is important that Council's IWM Plan is consistent with the strategic direction set by these agencies as well as other strategies and policies within Council.

The State Environmental Protection Policy (Waters of Victoria) is a legal tool under the Environment Protection Act 1970, which sets in law community expectations, needs and priorities for protecting and sustainably using Victoria's water environments. The SEPP (Waters of Victoria) provides a legal framework for State and local government agencies, businesses and community to work together to protect and rehabilitate surface water environments. The IWM Plan will assist Council to meet its obligations under the SEPP (Waters of Victoria) in a strategic way that makes the best use of limited resources.

The IWM Plan will play an important role in implementing the Yarra Ranges' long term vision as outlined in its community plan, Vision 2020. In relation to environmental stewardship, Vision 2020 seeks that:

- Water is valued as a precious and scarce resource and is conserved accordingly
- Catchments and waterways are managed to improve water quality
- Development should not be at the expense of the environment
- The community and Council strengthens its role as an environmental advocate, particularly on water and wastewater issues

The IWM Plan aligns with the Council Plan's Protected and Enhanced Natural Environment objective. The IWM plan links up existing Council plans and strategies, including the Environment Strategy, Flora and Fauna Plan Domestic Wastewater Management Plan (draft), and the Flood Management Plan, to enable a more consistent approach to managing water across Council.

The IWM Plan is consistent with the policy position outlined in the Environment Strategy 2015-2025 and directly addresses Goal 2: 'Our water resource is improved and preserved'.

Guiding principles

The IWM Plan was developed using these guiding principles:

1. Valuing water – water is valued as an essential resource that should be conserved
2. Considering the whole water cycle – by including surface water, groundwater, stormwater and wastewater
3. Focusing on Council's areas of influence – i.e. local drainage and road management; planning approvals; land use planning; domestic wastewater (septic tanks) approval and compliance; and management of community recreational facilities with high water use.
4. Working in partnership – acknowledging IWM requires cooperation with other groups and agencies
5. Prioritising actions by greatest impact

Process

The Plan was developed after a literature review and consultation with staff from Council, Melbourne Water and Yarra Valley Water as well as feedback from the Yarra Ranges Environmental Advisory Committee. A steering committee was established to oversee the development of the Plan, consisting of representatives from relevant departments, including: Parks and Environment; Built and Active Spaces; Infrastructure Services; Strategy and Sustainability; and Planning, Building and Health. The steering committee developed a long-term vision and objectives for the IWM Plan. Five workshops with relevant Council staff and representatives from external agencies were held to develop actions needed to achieve the objectives set by the steering committee.

A water and pollutant balance for the Yarra Ranges was commissioned with the support of a

Melbourne Water grant (Section 3.1.). This was used to account for how water flows through our municipality and to identify opportunities for improved water management.

A priority map for stormwater capture and treatment projects was also developed (See Appendix).

Council Framework

Vision 2020 Community Plan

Council Plan

Municipal Strategic Statement - Local Planning Policy

Other Council Plans and Strategies

- Environment Strategy
- Flood Management Plan
- Flora and Fauna Plan
- Green Wedge Management Plan
- Domestic Wastewater Plan (draft)

State Government Framework

State Environment Protection Policy: Waters of Victoria

Victorian Planning Provisions Legislation

- Local Government Act 1989
- Water Act 1989
- Planning & Environment Act 1987
- Building Act 1993
- Environment Protection Act 1970
- Catchment & Land Protection Act 1994
- Flora and Fauna Guarantee Act 1988

State Plans and Strategies

- Healthy Waterways Strategy and Stormwater Strategy (Melbourne Water)
- Regional Catchment Strategy (Port Phillip & Westernport CMA)
- A Cleaner Yarra River & Port Phillip Bay Action Plan
- Water for Victoria Plan
- Flood Management Strategy - Port Phillip and Westernport

Federal Framework

National Water Quality Management Strategy

National Water Initiative

Water Act 2007

Water Amendment Act 2008 Environment Protection and Biodiversity Conservation Act 1999

5. Our Plan for supporting Integrated Water Management in the Yarra Ranges

Vision

A long-term vision for the future of water management in the Yarra Ranges was developed by the steering committee to provide a focus for the development of the IWM Plan:

Our Vision

The Yarra Ranges is a 'water sensitive place', known for its clean, healthy waterways and its attractive streetscapes and landscapes incorporating water sensitive design. Homes, businesses, farms and community infrastructure incorporate elements, such as rainwater tanks, swales and raingardens that retain water within the catchment and filter it through natural processes. As custodians of the upper Yarra River and Dandenong Creek catchments, the Yarra Ranges ensures water passing through the municipality is of high quality for downstream users and the environment.

Integrated water management Objectives

The following objectives were identified as the most effective ways Council can advance integrated water management in the Yarra Ranges:

Water Efficiency

» Reduce Council's total potable water consumption through permanent water efficiency measures

Alternative Water Sources

» Increase the use of fit-for-purpose alternative water supplies, such as rainwater, stormwater water and recycled water in Council operations

Stormwater

» Apply best practice stormwater management to Council-managed land and facilities to protect valuable receiving waterways and to optimise the use of stormwater as a resource

Wastewater

» Minimise wastewater discharges to the environment, including discharges from septic tanks

Groundwater

» Investigate the sustainability of groundwater use in the Yarra Ranges

Planning and Processes

» Ensure the Yarra Ranges Planning Scheme includes adequate provisions to support integrated water management and waterway protection

» Embed integrated water management in Council policies and processes, ensuring the strategic use of resources to support IWM

Partnerships and Education

» Establish and maintain effective partnerships with water corporations, State Government agencies and community groups to undertake key initiatives

» Support and encourage the Yarra Ranges community to adopt integrated water management practices

Actions

The following table outlines the key actions that were identified to achieve Council's IWM objectives. These actions will be implemented over the next 5 years.

Objective	Action
1. Reduce Council's total potable water consumption through permanent water efficiency measures	1.1. Improve tracking, analysis and reporting of water consumption data 1.2. Reduce potable water use at the Anderson St, Lilydale, site by 50% on 2013/14 levels as a result of the redevelopment project 1.3. Identify sports grounds with high potable water use and investigate water efficiency options 1.4. Investigate further water efficiency options for swimming pools 1.5. Retrofit water efficient appliances to facilities, especially those with high potable water use
2. Increase the use of fit-for-purpose alternative water supplies, such as rainwater, stormwater water and recycled water in Council operations	2.1. Identify opportunities for using alternative water sources to irrigate playing fields, including stormwater harvesting schemes and recycled water for facilities that are close to wastewater treatment plants 2.2. Retrofit rainwater tanks to buildings, prioritising those with potential for high internal use (e.g. for toilet flushing) 2.3. Identify opportunities to use alternative water sources for applications that do not require a potable standard of water

Objective	Action
3. Apply best practice stormwater management to Council-managed land and facilities to protect valuable receiving waterways and to optimise the use of stormwater as a resource	3.1. Develop a stormwater plan to guide management of existing WSUD assets and identify strategic opportunities for future projects 3.2. Compile WSUD design guidelines that are specific to the unique environmental conditions found in the Yarra Ranges (i.e. typically high sediment and leaf litter loads, tree protection requirements, designs for steep slopes etc.) 3.3. Streetscape works – Identify and implement streetscape works including rain gardens, street trees and passive irrigation in appropriate locations such as roadways, nature strips, roundabouts and kerb extensions, especially in identified priority catchments 3.4. Road works- Apply best practice WSUD design standards to Council roads and car parks, especially those in identified priority catchments: Develop standard WSUD sealed and unsealed road designs Identify opportunities for WSUD when scoping Special Charge Scheme projects and drainage issues 3.5. Continue the Water Sensitive Urban Design (WSUD) working group/ steering committee to: Promote best practice WSUD Share knowledge across disciplines Encourage innovation Review what works and what doesn't 3.6. Identify suitable guidelines on management practices for sediment and erosion control on construction sites and unsealed roads. Ensure contractors are required to implement sediment and erosion control measures on Council construction projects and can access suitable guidelines 3.7. Consider ongoing maintenance requirements when scoping new WSUD projects 3.8. Ensure that adequate resources exist to maintain existing WSUD assets by developing a WSUD asset management plan 3.9. Incorporate WSUD assets into the asset management system 3.10. Undergo a process review project to improve WSUD planning, design, construction, handover and maintenance 3.11. Design and implement stormwater retention/treatment projects to address local environmental problems (e.g. erosion, sedimentation) 3.12. Investigate options to address local flooding issues that are consistent with best practice stormwater management principles
4. Minimise wastewater discharges to the environment, including discharges from the sewerage system and septic tanks	4.1. Advocate to the State Government for changes to domestic wastewater regulations 4.2. Advocate to the State Government to increase and expedite delivery of its sewerage backlog program in the Yarra Ranges 4.3. Investigate more effective ways to educate residents about responsible wastewater management techniques, including septic tank maintenance and encouraging property owners with a sewer point available to connect to mains sewer
5. Ensure the sustainable use of groundwater in the Yarra Ranges	5.1. Investigate the sustainability of groundwater use by Council 5.2. Investigate the feasibility of using aquifer recharge technology in the Yarra Ranges

Objective	Action
6. Ensure the Yarra Ranges Planning Scheme includes adequate provisions to support integrated water management and waterway protection.	6.1. Advocate to the State Government to introduce a state-level planning scheme amendment that requires all developments to incorporate stormwater retention and treatment measures 6.2. Prepare an amendment to the Yarra Ranges Planning Scheme encouraging development to achieve best practice sustainable stormwater management (as part of a broader package to address environmentally sustainable design) 6.3. Develop an Environmental Significance Overlay for waterways to support sustainable land management 6.4. Consider whether additional assessment criteria should be introduced into the planning scheme for farm dams. 6.5. Evaluate the implementation of the Little Stringybark Creek Environmental Significance Overlay (ESO) to determine the feasibility of applying similar ESOs to other high value catchments
7. Embed integrated water management into Council policies and processes, ensuring the strategic use of resources to support IWM.	7.1. Ensure opportunities for IWM and WSUD are identified and investigated when developing masterplans and when scoping new or upgraded Council buildings and facilities by amending scoping procedures to include these factors
8. Establish and maintain effective partnerships with water corporations, State Government agencies and community groups to support Integrated Water Management	8.1. Work with Melbourne Water to identify and implement key stormwater retention and treatment measures 8.2. Work with Yarra Valley Water and South East Water to identify and implement water efficiency measures 8.3. Support community groups and schools to implement projects to improve waterway health 8.4. Continue to support the development of a detailed business case for the Coldstream Recycled Water Pipeline Scheme 8.5. Work with Yarra Valley Water and South East Water to promote water efficiency to residents and businesses 8.6. Work with relevant authorities (Melbourne Water, CMA, DPI and Yarra Valley Water) to promote sustainable water use in agriculture
9. Support and encourage the Yarra Ranges community to adopt integrated water management practices	9.1. Investigate and implement effective stormwater education programs for schools, residents, commercial and agricultural sectors 9.2. Provide relevant information to developers to support water efficiency and water sensitive urban design (WSUD) 9.3. Review information provided to developers with applications for approved points of discharge (APD) and pre-planning application discussions 9.4. Promote IWM using Council buildings and other facilities as demonstration sites for best practice. 9.5. Review the provisions for enforcing responsible management of sediment runoff from private property

6. Implementation and Monitoring

The Plan will be delivered over the next five years, subject to funding availability within existing budgets as well as any additional funds secured as grants from partners and other funding bodies.

Proposed progress indicators	Monitoring
Council's mains potable water use	Data received from Yarra Valley Water and South East Water are used to compile an annual report on Council's overall water consumption and use by facility type. This report will be used to identify and investigate sites with particularly high water use.
Council's use of alternative water sources: Capacity of rainwater tanks on Council buildings Capacity of stormwater harvesting systems Volume of rainwater and stormwater used per year	Baseline data will be collected during 2017 and usage will be monitored annually thereafter.
Volume of stormwater runoff treated and pollutants removed by Council's WSUD infrastructure	Baseline data was collected during 2015 as part of a WSUD asset audit. Additional assets will be added as needed. Volumes of water and pollutants removed are based on modelled performance in MUSIC.

Appendix. Stormwater Management / Water Sensitive Urban Design Priority Catchments

Stormwater has been identified as a major threat to urban stream health. Satisfactory stormwater management measures should take into account the sensitivity of the receiving waters, with high value urban waterways receiving a higher level of protection from stormwater impacts. This is consistent with the principle that it is more cost-effective to protect intact ecosystems than to try to restore them after they have degraded.

A good measure of stormwater impact is the proportion of directly connected imperviousness (DCI) in the catchment; that is, hard surfaces that are directly connected to streams by pipes or sealed drains. Impervious surfaces can include car parks, sealed roads and buildings. Streams with DCI values of > 2% are invariably in degraded ecological condition[1]. Platypuses are highly sensitive to urbanisation and breeding populations are generally absent where DCI exceeds ~ 2%. Maintaining disconnection of impervious surfaces throughout catchments to as low a level as possible (i.e. much lower than 2%) is therefore required to preserve good ecological condition.

Opportunities to retrofit existing infrastructure to capture and treat stormwater runoff (e.g. with the addition of raingardens) should target high priority catchments first and should also be considered in medium priority catchments where practical (Tables 1 and 2).

All new developments occurring in urban areas should avoid adding directly connected impervious surfaces where possible. This may or may not involve the construction of water sensitive urban design infrastructure, such as raingardens and swales. Alternatively, avoiding increased % DCI could involve maintaining informal drainage systems, such as table drains instead of installing piped drainage. Water sensitive urban design can be used to address both hydrology (flow rates, volumes, frequencies) and water quality (pollutant loads, concentrations) objectives (see Table 3).

Belgrave Lake Park

[1] Walsh, C.J. et al.(2012) PLoS ONE, 7(9), e45814

Table 1.

Categories based on an analysis of the Yarra Ranges region by % directly connected imperviousness (DCI) in the catchment (data supplied by Melbourne Water). WSUD = water sensitive urban design.

WSUD Catchment	Description	Actions
High Priority	Urban waterways with high environmental values that are threatened by stormwater runoff (DCI 0.5-2%)	All new development should avoid adding directly connected impervious surfaces High priority for WSUD - opportunities to retrofit existing infrastructure to capture and treat stormwater runoff should be identified and implemented as a priority.
Medium Priority	Urban waterways with medium-high environmental values that are less impacted by stormwater (DCI 0-0.5%) or have lower rehabilitation potential (DCI 2-5%)	New development should avoid adding directly connected impervious surfaces where possible Medium priority for WSUD - opportunities to retrofit existing infrastructure to capture and treat stormwater runoff should be identified and implemented where practical
Low Priority	Urban waterways that have been significantly degraded by stormwater and have low rehabilitation potential (DCI >5%)	New development should avoid adding directly connected impervious surfaces where possible Low priority for WSUD retrofit
Rural	Rural catchments where stormwater is not a major threat	New development should avoid adding directly connected impervious surfaces where possible Low priority for WSUD retrofit.

Table 2.

Priority catchments for stormwater management and water sensitive urban design in the Yarra Ranges. DCI = directly connected imperviousness.

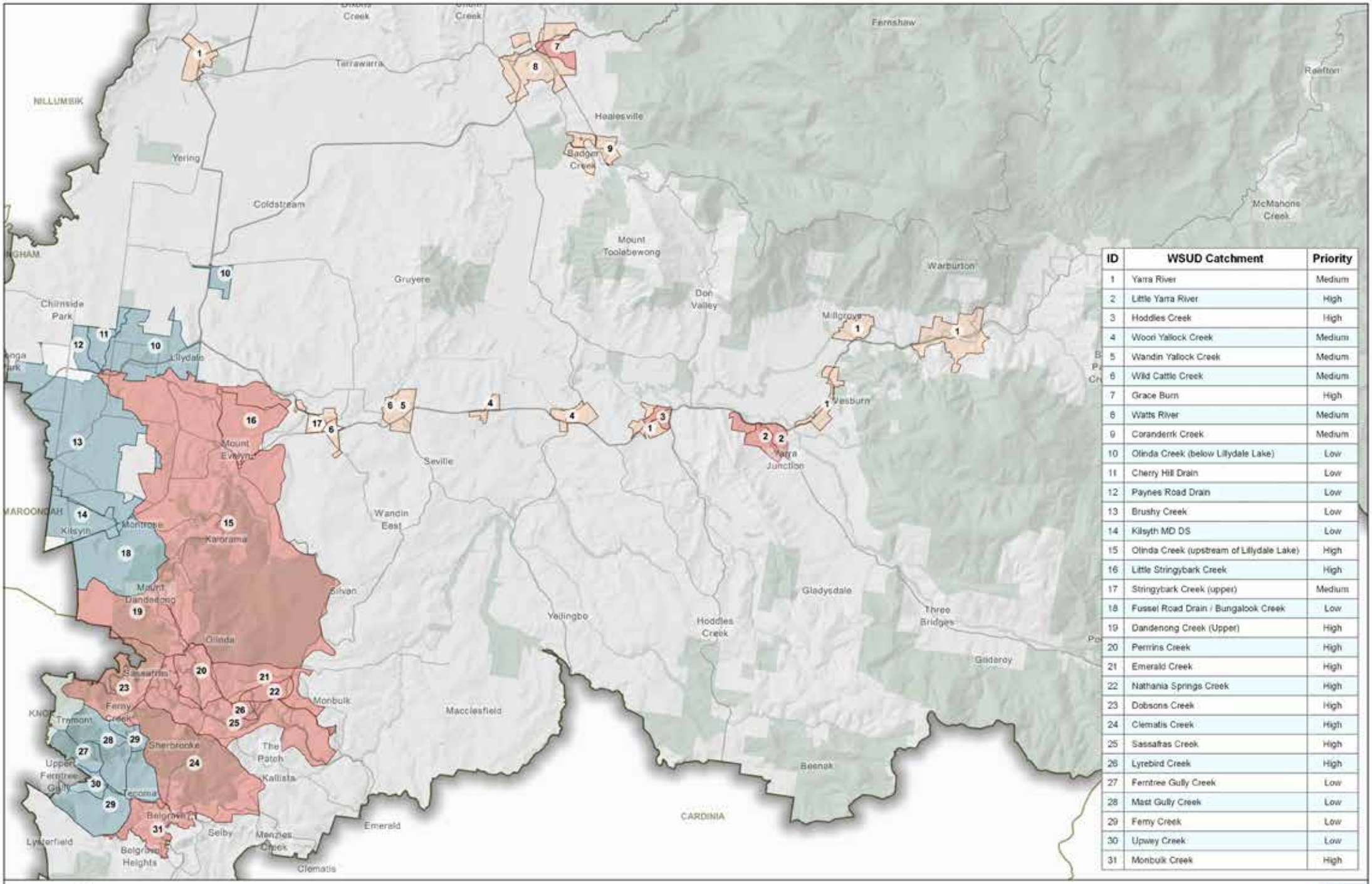
Catchment	Urban Areas	Priority	DCI %	Stream Health *	Platypus Population
Monbulk Ck / Clematis Creek	Belgrave	High	0.5—2	Good - V Good	Threatened
Sassafras Ck / Perrins Ck / Emerald Ck / Nathania Springs Creek	Monbulk, Kallista, Sassafras, Sherbrooke, Olinda	High	0.5 —2	Good - V Good	Breeding
Dobsons Creek	Sassafras, Ferny Creek	High	0.5-2	Good	Threatened
Olinda Creek (upstream of Lillydale Lake)	Lilydale, Mt Evelyn, Mt Dandenong	High	0.5 —2	Good - V Good (Good WQI)	Threatened
Little Stringybark Creek	Mount Evelyn	High	2 —10	Poor (Restoration Project)	Unknown
Little Yarra River / Yarra Junction Main Drain	Yarra Junction	High	0.5 —2	V Good (Fair WQI Good ISC)	Breeding
Hoddles Creek	Launching Place	High	0.5 —2	Good	Transient
Grace Burn Creek	Healesville	High	0.5 —2	Good - V Good	Breeding
Yarra River	Warburton, Milgrove, Wesburn, Yarra Glen	Medium	0 —0.5	Poor-V Good (Moderate ISC Good-Fair WQI)	Breeding
Coranderrk Creek	Badger Creek	Medium	0 —0.5	V Good (Good WQI)	Breeding
Watts River	Healesville	Medium	0 —0.5	Good (Poor ISC)	Breeding
Stringybark Creek	Wandin North	Medium	0 —0.5	Good	Threatened
Wandin Yallock Creek / Wild Cattle Creek	Seville	Medium	2 —5	Good (Poor WQI)	Breeding
Woori Yallock Creek	Woori Yallock, Seville East	Medium	2 —5	Good (Poor WQI V Poor ISC)	Breeding
Olinda Creek (below Lillydale Lake)	Lilydale, Coldstream	Low	2 —5	Poor – V Poor (V Poor WQI)	Transient
Fussel Road Drain / Bungalook Creek	Montrose, Kilsyth	Low	5 —10	V Poor	Absent
Ferny Creek/ Mast Gully Creek	Upwey, Upper Ferntree Gully, Ferny Creek	Low	> 10	Poor	Absent
Brushy Creek	Mooroolbark, Chirnside Park, Wonga Park	Low	> 10	V Poor (V Poor WQI)	Transient
All other catchments	Non-urban areas	Rural			

*Modelled stream health using the Land Use Macroinvertebrate Response index (LUMaR) (Walsh and Webb, 2013). Other indicators are listed where data are available: ISC = Index of Stream Condition (see http://www.depi.vic.gov.au/water/water-resource-reporting/Third-Index-of-Stream-Condition-report); WQI = Water Quality Index (see http://yarraandbay.vic.gov.au/report-card).

Table 3.

Current performance objectives for urban stormwater listed under the Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee 1999) Guidelines.

Pollutant	Receiving Water Objective	Current Best Practice Performance Objective
Total Suspended Solids (TSS)	Comply with SEPP	80% retention of the typical urban load
Total Phosphorus (TP)	Comply with SEPP	45% retention of the typical urban load
Total Nitrogen (TN)	Comply with SEPP	45% retention of the typical urban load
Flow	Maintain flows at pre-urbanization levels	Maintain discharges for the 1.5 yr average recurrent interval (ARI) at predevelopment levels



ID	WSUD Catchment	Priority
1	Yarra River	Medium
2	Little Yarra River	High
3	Hoddles Creek	High
4	Woori Yallock Creek	Medium
5	Wandin Yallock Creek	Medium
6	Wild Cattle Creek	Medium
7	Grace Burn	High
8	Watts River	Medium
9	Coranderrk Creek	Medium
10	Olinda Creek (below Lilydale Lake)	Low
11	Cherry Hill Drain	Low
12	Paynes Road Drain	Low
13	Brushy Creek	Low
14	Kilsyth MD DS	Low
15	Olinda Creek (upstream of Lilydale Lake)	High
16	Little Stringybark Creek	High
17	Stringybark Creek (upper)	Medium
18	Fussel Road Drain / Bungalook Creek	Low
19	Dandenong Creek (Upper)	High
20	Perrins Creek	High
21	Emerald Creek	High
22	Nathania Springs Creek	High
23	Dobsons Creek	High
24	Clematis Creek	High
25	Sassafras Creek	High
26	Lyrebird Creek	High
27	Ferntree Gully Creek	Low
28	Mast Gully Creek	Low
29	Ferny Creek	Low
30	Upwey Creek	Low
31	Monbulk Creek	High

YARRA RANGES COUNCIL
WSUD CATCHMENTS

Legend

- Highway
- Arterial Road
- Sub Arterial Road
- High Priority
- Medium Priority
- Low Priority
- Rural
- Public Land
- LGA Boundary

Map scale: 1:125000 @ A3
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