

INTEGRATED WATER CYCLE STRATEGY

January 2012



City of
KINGSTON

Contact Us

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City of Kingston

PREPARED BY

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CityOfKingston

FURTHER COPIES

To obtain a copy of the

City of Kingston Integrated

Water Cycle Strategy 2011

is available for viewing at

www.kingston.vic.gov.au or

contact Council on 1300 653 356.

If you have any ideas on assisting the City of Kingston in achieving its objective of becoming a Water Sensitive City please let us know.

ACKNOWLEDGMENTS

Council would like to thank all who contributed to the development of the Integrated Water Cycle Strategy.

In particular, Council gratefully acknowledges the work of AECOM and Melbourne Water.



Cover Image: A view of La Perouse Boulevard, Carrum.

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Introduction

Changes to our climate and increased urbanisation place immense pressure on every part of the water cycle. For the City of Kingston, this has serious implications for water security, stormwater quality, flooding, groundwater quality, wastewater quantity and poor waterway health.

The Kingston Integrated Water Cycle Strategy recognises all elements of the water cycle are linked. This plan for the first time, considers the issues and opportunities associated with mains water, stormwater, wastewater and groundwater in one document.

The *City of Kingston Integrated Water Cycle Strategy* (The Strategy) is supported by a Technical Report and Implementation Plan. The Strategy outlines the issues, the vision and the steps required to achieve our goal of becoming a water sensitive city by 2040.

The Strategy Technical Report and Implementation Plan was produced following extensive research and consultation by AECOM, a leading, global consultancy with considerable experience in sustainable water management.

Our Water

Conventional approaches

The conventional approach to water distribution involves a single, drinking mains water supply system and wastewater discharge network that is continually expanding to meet demand. In these systems, the rain water that has been captured in the rural catchment areas gets treated to drinking water quality standards and is then pumped great distances to the consumer.

Similarly, our stormwater drainage system has evolved to transport large volumes of water in a centralised and isolated way. However; the main difference is that these systems have been designed to remove vast quantities of unwanted water from our communities to prevent flooding or to maintain the health of our population.

These centralised systems consume large amounts of energy and, as we have seen from recent events, they are vulnerable to climate variability. They also have a detrimental affect on our receiving waters through discharges of contaminated stormwater, or treated effluent.

Smarter water use

Around 30% of the high quality drinking water produced by centralised supply systems is used for non-drinking uses such as irrigation and toilet flushing. This is not an efficient way of managing a scarce resource.

Smarter water use means conserving high quality drinking water just for drinking, cooking and washing. All other uses ultimately should be supplied with alternative water sources such as rainwater, stormwater and recycled wastewater.

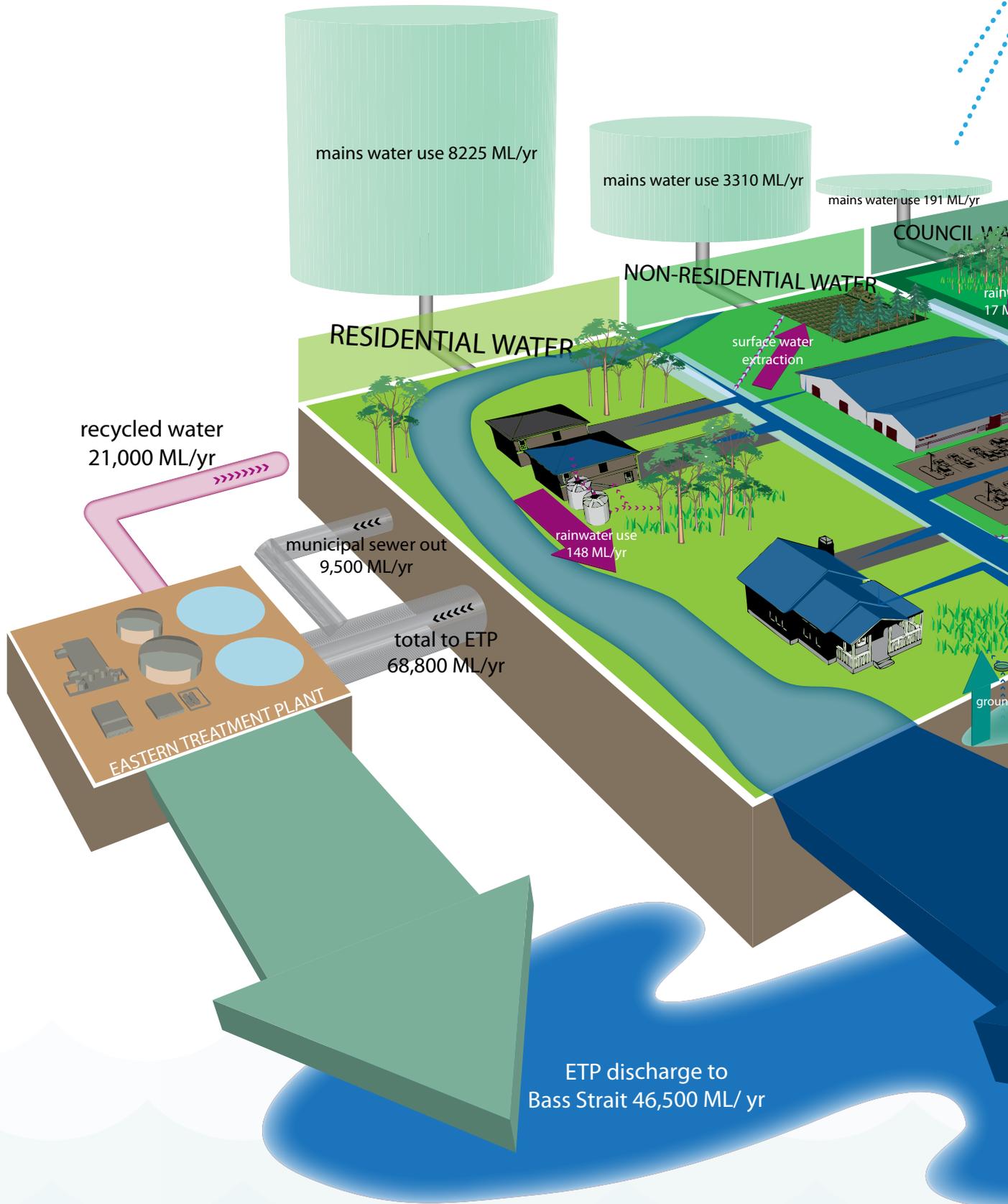
The City of Kingston Water Balance (Page 4) illustrates the potential sources that could be used as an alternative to mains water.

Desalination

The centralised water supply system that services Melbourne is being increased with the Wonthaggi desalination plant. It is estimated that this plant will be sufficient to supply Melbourne's growing demands until at least 2026 (DSE 2008). Desalinated water is costly and energy intensive. Nevertheless, the plant provides Melbourne with the necessary time to continue to diversify its water supply options to provide enhanced economic, environmental and social outcomes.

Our Water

The City of Kingston water balance 2011

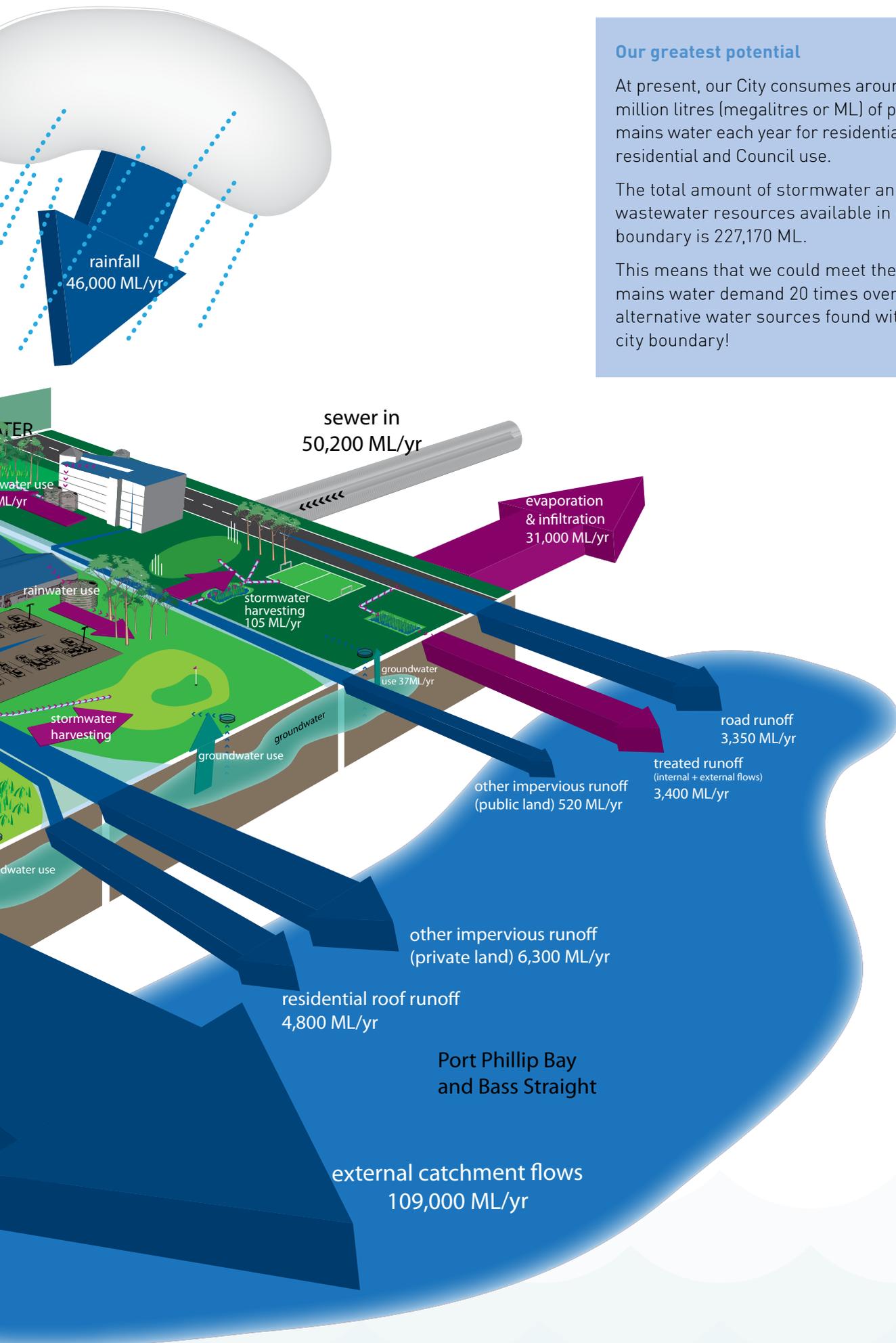


Our greatest potential

At present, our City consumes around 11,726 million litres (megalitres or ML) of potable mains water each year for residential, non residential and Council use.

The total amount of stormwater and wastewater resources available in our city boundary is 227,170 ML.

This means that we could meet the City's mains water demand 20 times over with alternative water sources found within our city boundary!



Our Water

Healthier waterways and bay

The City of Kingston recognises that stormwater runoff from our streets, rooves and other impervious areas has a negative impact on the Mordialloc Creek, Patterson River and Port Phillip Bay.

The health of these iconic waterways is vital for our City and Kingston has taken a lead role in the implementation of Water Sensitive Urban Design (WSUD) initiatives. WSUD is the term given to a wide range of measures that, although initially aimed at reducing stormwater contamination, can also deliver additional benefits such as reductions in potable water use, visual improvements to our streetscapes and enhancement to local community pride. Good examples of this include streetscape raingardens, vegetated swales, wetlands or even rainwater harvesting with tanks.

To date Council has implemented WSUD assets to treat 83 hectares of urban runoff to 'best practice' stormwater pollutant removal while the community (through private rainwater tanks) and other stakeholders such as Melbourne Water, have provided assets like large scale wetlands that treat the equivalent of around 1180 hectares of urban area.

Best Practice Stormwater Management

Objectives for best practice stormwater quality are established by the Victorian Government to reduce the amount of contamination in stormwater runoff. The objectives set targets which seek the removal of 80% of total suspended solids, 45% of the total nitrogen and 45% of the total phosphorus from stormwater. These pollutants can severely affect the health of our waterways by depositing contaminated sediment and introducing excessive nutrients.

While stormwater is just one component of the water cycle; best practice stormwater quality targets are a great indicator of how well we are tracking towards our water sensitive future. This is because the methods to achieve best practice are diverse and deliver multiple water sensitive benefits. For example, the primary purpose of a rainwater tank is to store harvested rainwater, yet it is also great at preventing pollution running off into stormwater drains and natural waterways.



Raingardens in Mentone

The Water Sensitive City

A new approach

The next steps for Kingston are to build on the great work that's been done in areas of water efficiency, treatment and reuse and to integrate these systems into every aspect of our City's ongoing development.

Transitioning to a water sensitive city will take a concerted effort and the next five years will play a vital role in achieving this objective.

So, what is a Water Sensitive City?

Water Sensitive Cities are cities that:

- are viewed as a catchment where water and wastewater resources are predominantly managed within the catchment boundary,
- are even more liveable places, with innovative open spaces and public places that enhance ecosystems whilst being used for diverse purposes, and
- have social and political capital, where the community are actively engaged in decision making and where future planning includes a long term view to water management.



Mordialloc Creek

Our vision

For Kingston, being part of a Water Sensitive City will ensure residential, employment and recreational spaces are healthy places to live, work and enjoy. Our buildings and streets will exist in harmony alongside waterways, local parks and Port Phillip Bay.

Council and community will utilise every opportunity to ensure that water is used efficiently for its intended purpose, particularly where drinking water quality is not required. Important natural and constructed landscapes such as Port Phillip Bay, Braeside Park, the Edithvale wetlands, Mordialloc Creek and Patterson River will be enhanced for their ecosystems as well as their social value.

Diverse public open spaces will be key areas where Council can showcase integrated water cycle initiatives including stormwater harvesting, water reuse and water quality treatment.

The benefits of transforming the City of Kingston into a Water Sensitive City are:

- Protecting highly valued receiving waters wetlands, creeks and the Bay
- Providing greener, functional public open space in a variable climate
- Valuing and recreating ecosystem services in highly urban settings
- Being able to better protect the community from increased economic costs associated with water pricing and climate change by planning ahead.



Water Sensitive Living in the City of Kingston

1. Street stormwater filtered through raingardens, swales, tree pits and other Water Sensitive Urban Design devices.
2. Rainwater filtered through green roofing and green wall systems
3. Stormwater harvesting and storage for non-drinking use
4. Wastewater treatment and storage for non-drinking use
5. Increased porous surfaces reducing stormwater runoff and replenishing groundwater
6. Sustainable water projects integrated with energy, waste, transport and biodiversity projects
7. A sustainable, prosperous and healthy community thriving in an attractive and liveable environment
8. Widespread and interlinked green spaces that keep our cities cool and provide habitats for wildlife
9. Urban waterways and drains returned to healthy waterways with pre-settlement characteristics and reduced flooding
10. Sustainable, water smart communities using water that is fit for purpose
11. Passive and active recreation areas using fit for purpose water
12. Highly visible sustainable water initiatives that play an important education purpose



Ref: Image provided
courtesy of AECOM and
Brisbane City Council

Guiding Principles of our Water Sensitive City

The following guiding principles form the building blocks for our targets and aspirations to become a Water Sensitive City:

Potable Mains Water

- Reduce potable mains water consumption (long term)

Alternative Water Supply

- Incrementally provide alternative water sources (rainwater, stormwater, recycled wastewater, groundwater) to improve security of supply and enhance local amenity

Stormwater

- Incorporate Best Practice Urban Stormwater Management (stormwater quality) into Council projects and new developments to protect valuable receiving waters and manage stormwater as a resource

Groundwater

- Work with Southern Rural Water to sustainably manage the use and quality of groundwater

Wastewater

- Minimise wastewater discharges to the environment

Environmental Protection

- Protect Kingston's natural assets (e.g. Port Phillip Bay, Mordialloc Creek, Patterson River, Edithvale Wetlands)

Amenity and Education

- Promote projects with multiple benefits – projects that provide appealing, usable green spaces and public places but also have other social and environmental benefits including microclimate control, stormwater harvesting, WSUD.
- Enable the residential and business communities to understand the role they play in creating a water sensitive city

Sustainability

- Promote water projects that are sustainable considering energy consumption, embodied energy, life cycle costs, carbon emissions.



Large Bioretention Swale in Mordialloc

Targets and Aspirations

Targets presented below reflect the City of Kingston's commitment to the guiding principles of becoming part of a Water Sensitive City and are based on analysis of existing conditions and key achievements to date.

The aspirations are intended to highlight opportunities where Council can lead through example and provide the foundations for a Water Sensitive City.

Actions relating directly to Council activities and operations will play a vital role in the achievement of a Water Sensitive City. However, for this vision to be fully realised, the City of Kingston must also influence private investment, build community capacity, and foster partnerships across other parts of the public sector in relation to integrated water cycle management.

Potable Mains Water

Council TARGET

Quantify Council's water use and implement strategies to achieve, a realistic target for mains water reduction in relation to Council's activities and operations.

COMMUNITY ASPIRATION

Maintain current mains water demands of 155 litres per person per day, through a combination of demand management and the provision of appropriate alternative water supplies.

Alternative Water Supply

Council TARGET

By 2016, supply an additional 30ML/yr of water from alternative sources to reduce potable mains water demand and/or improve local amenity across Council assets.

COMMUNITY ASPIRATION

Provide alternative water source for uses where potable mains water is not required (e.g. toilet flushing, garden irrigation).



Residential rainwater harvesting and reuse in Cheltenham

Stormwater

Council TARGET

Provide best practice stormwater treatment (80:45:45 percent removal of total suspended solids, total nitrogen and total phosphorus) for the equivalent of an additional 75 hectares of impervious area within the municipality by 2016. This is equivalent to replicating what has already been achieved by Council over the last five years (short term).

Provide best practice stormwater treatment for the entire City by 2040 (long term).

COMMUNITY ASPIRATION

To best practice stormwater management from all new impervious areas into the future.

Groundwater

Council TARGET

With Southern Rural Water, investigate groundwater use and quality in sufficient detail to allow clear identification of the opportunity and impacts of its use as a resource.

COMMUNITY ASPIRATION

Reduced groundwater use through greater community awareness and the widespread implementation of 'fit for purpose', alternative water supply services.

Targets and Aspirations



Cr Arthur Athanasopoulos with Graeme Dank of Danks, providing water for Council's street tree watering program.

Wastewater

Council TARGET

With Melbourne Water and South East Water identify and implement opportunities for wastewater reuse and minimisation within the City of Kingston.

COMMUNITY ASPIRATION

Reduce wastewater discharges through greater community awareness, widespread implementation of water efficiency measures. Explore wastewater reuse as appropriate.

Environmental Protection

Council TARGET

Reduce nitrogen loads to Port Philip Bay by 300kg/yr through the achievement of the Stormwater Target, and reduce impacts on local waterways increasing rehabilitation potential.

COMMUNITY ASPIRATION

Increase community awareness about the link between stormwater runoff and the quality of natural assets.

Amenity and Education

Council TARGET

Facilitate projects that have multiple benefits and education opportunities at key strategic locations which include high profile activity centres and the Green Wedge.

COMMUNITY ASPIRATION

Through friends groups and local communities create community leaders to promote opportunities to create a water sensitive city.

Sustainability

Council TARGET

Promote and deliver projects that achieve a high level of environmental performance and reduce ongoing financial costs.

COMMUNITY ASPIRATION

That households and local businesses understand the financial and sustainability benefits they can achieve by rethinking how they use and manage water.

Key Actions

The targets presented in the Kingston Integrated Water Cycle Strategy are intended to be a first step in the transition towards a water sensitive city. Meeting them will require a doubling of the current effort in water initiatives. This will include a mix of ongoing, 'business as usual' actions as well as 'enabling actions' that will use the next five years to prepare for the implementation of more significant projects.

Over the past decade, the City of Kingston has played a very active role in the implementation of large water quality and reuse projects (e.g. Waterways Estate and the more recent Namatjira Park wetland). Projects of this scale must continue on a frequent basis reinforcing the partnership required between all levels of Government to support the Kingston Integrated Water Cycle Strategy.

Widespread community action is essential to support Council's efforts to reach these targets. The actions of South East Water's Regional Integrated Water Management Plan and the efforts of Melbourne Water will lead this transition amongst the community. At a community level the widespread uptake of water tanks, more use of recycled water and more private raingardens are key actions. Strong collaboration between Council and the relevant stakeholders will be vital to ensure this community action is delivered.

The City of Kingston Integrated Water Cycle Strategy Implementation Plan contains a detailed, 5 year action plan for every sector of council and community.

Many of these actions are defined as 'Water Sensitive City enablers'. These describe the additional effort required beyond the 'business as usual' approach to sustainable water management. Without these enablers our 2040 indicator target would be unattainable.



Innovative stormwater treatment devices incorporated into traffic calming measures, Mentone

Key Actions

Key actions from the strategy are:

- In partnership with the water companies undertake a detailed feasibility study on a major integrated water sensitive project in the Green Wedge.
- In partnership with the water companies undertake a feasibility study on creating a recycled water supply network and sewer mining opportunities for playing fields south of Mordialloc Creek.
- Ensure all new Council buildings and renovation projects are provided, where appropriate, with WSUD, fit for purpose supply and water efficient delivery infrastructure.
- Implement actions from the Sportsground Irrigation Plan to convert selected ovals to warm season grasses and upgrade the efficiency of irrigation systems.
- Identify opportunities for the development of a network of stormwater harvesting schemes to assist in maintaining water reliant recreational areas, street tree establishment, shopping centre displays and for civil infrastructure works.
- Develop a Water Sensitive Cities Masterplan that examines each minor drainage catchment and identifies key projects to showcase the components of a Water Sensitive City and deliver the most efficient capital works investment across the city.
- Develop opportunities to showcase integrated water management in key public space projects at Activity Centres.
- Provide for the treatment of the equivalent of 75 hectares of urban land to best practice stormwater management requirements till the end of the 2016/2017 financial year through the installation of raingardens, wetlands, stormwater harvesting and reuse schemes and rainwater tanks etc.
- Work in partnership with EPA Victoria to deliver Council's Industry Stormwater Program (Education and Enforcement) to ensure appropriate stormwater management at industrial premises in accordance with the Local Law and state environmental legislation.



A wetland nearing completion in Chelsea Heights.

Implementation and Support

A Water Sensitive City Score has been developed to ensure future investment progresses the City of Kingston towards a Water Sensitive City.

One of the fundamental steps towards this goal is the implementation of projects with multiple benefits. The Water Sensitive Cities Score recognises projects with multiple benefits and ensures that future project selection is a true reflection of the principles of a Water Sensitive City.

The Water Sensitive City Score ranks projects based on the following criteria:

- Water Quality
- Potable Mains Water Reduction & Alternative Water Supply
- Energy Savings
- Liveability
- Building Awareness & Education.

Future projects will be assessed against the five criteria and assigned a level of Negative, No Change, Medium, High and Very High. Definitions have been developed to assist in the determining the relevant WSC score for each project.

Monitoring, evaluation and reporting on the action plan of this strategy will occur annually up to the first review in 2017.



Water sensitive urban design in Mordialloc



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