



# Waterwise Bayswater

## A strategy to 2030

Prepared for the City of Bayswater

By Urbaqua

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Cover image courtesy of [abc.net.au](http://abc.net.au)

## 1 INTRODUCTION

### 1.1 What is a waterwise city?

*A waterwise Perth is cool, liveable, green and sustainable, a place where people want to live, work and spend their time.*

*It is a city where communities care about and value water, while making best use of its various sources (groundwater, surface water, stormwater, seawater and wastewater).*

*The city serves as a catchment and provides healthy natural environments, supporting a range of social, ecological and economic benefits.*

Waterwise Perth Action Plan, Government of WA, 2019.

In a Waterwise City, urban areas can exploit the synergies between local water management and urban greening while creating resilient and liveable neighbourhoods. This is achieved by strengthening governance arrangements, building community capital, and investing in multifunctional adaptive infrastructure. This is complimented by the provision of high quality and connected open spaces, protecting and enhancing the ecological values of the urban landscape, providing a diversity of water supply options and recreating a more natural water cycle that restores soil moisture and recharges the groundwater, while reducing stormwater runoff (Water Sensitive Cities Benchmarking and Assessment: City of Bayswater, 2019).

### 1.2 Waterwise Vision for Bayswater

The Vision for a Waterwise Bayswater is...

Working together to care for the water sources that give life to our river,  
green places and the community.

### 1.3 Aim of the report

This report makes recommendations for strategies and actions to be collaboratively implemented to 2030 to achieve the Vision for a Waterwise Bayswater.

It provides an update to the Bayswater Brook Action Plan and builds on the actions undertaken by the City in partnership with key stakeholders to date.

### 1.4 Use of the report

Waterwise Bayswater is intended to support implementation of the City's *Environment and Liveability Framework*, providing more detailed guidance regarding management of the water cycle and creation of a Waterwise City.

The Strategy provides a framework for ongoing collaboration within and between organisations, optimising the delivery of shared values, objectives and outcomes.

It is also consistent with the intent of the State Government's Waterwise Perth Action Plan (2019).

## 1.5 Preparation of the report

The findings and recommendations of this report are reflective of a process of collaboration during 2019 between the City, key stakeholders and the community. This included a number of workshops, an on-line community survey and review of background information. Key inputs were derived from:

- WSC Index Benchmarking Workshop - 30 April 2019
- Community survey - 1 – 22 November 2019
- Vision workshop - 28 November 2019
- Enabling strategies workshop - 5 December 2019
- Strategies and actions workshop -12 December 2019

## 2 CONTEXT – WATER IN THE CITY OF BAYSWATER

The City of Bayswater is an inner-city local government area in the Perth metropolitan region located along a 10 km stretch of the Swan. It is a mixed-use municipality of approximately 35 km<sup>2</sup> comprised mostly of residential areas, including schools and commercial centres, with a light industrial area in the east.

The current residential population of City of Bayswater is approximately 68,720 (City of Bayswater, 2019) and includes the suburbs of Bayswater, Bedford, Dianella (part), Embleton, Maylands, Morley, and Mount Lawley (part). In 2018/19, the Bayswater community used nearly 6.5 GL of scheme water, equating to a per capita scheme use of just under 98 kL/annum. This is lower than the Perth average of 126 kL/person/annum and the WA Government's target of 110kL/person/annum (Government of WA, 2019).

There are a number of environmental assets within the City which have significant ecological value. These include Lightning Swamp Bushland and Swan River Foreshore, together with the Baigup wetlands, Bardon Park wetlands, Berringa Park wetlands, Browns Lake, Carter's wetland, Claughton Reserve, Eric Singleton Bird Sanctuary, Gobba Lake, Swan Lake and the constructed lakes: Bungana, Brearley and Brickworks.

The Bayswater Brook catchment is the major catchment within the City of Bayswater, discharging stormwater runoff into local wetlands before entering the Swan River. It comprises the Bayswater Main Drain network and is one of the largest urban catchments in the Perth metropolitan area with an area of approximately 27,000 hectares (SRT, 2008). The City of Bayswater contains over 50km of drains and over 40 Compensating basins and sumps. This includes 37 Water Corporation basins, around 14km of Water Corporation open drains, ~30km of Water Corporation piped drains and at least 7km of City drains. This drainage network provides a good level of service to the City which generally does not experience nuisance flooding. However, flooding may occur in areas around the Swan River in response to major rainfall events.

The City maintains over 300 hectares of public open space. This is comprised of 145 irrigated parks, ovals, and open spaces, which are either actively or passively managed depending on function and use. Groundwater is the key water source for irrigation of parks and the City manages a number of groundwater licences which equate to just over 2.3GL/annum.

### 2.1 A history of catchment management and collaboration

Much of the City of Bayswater is within the Bayswater Brook catchment which is a notable contributor of nutrients into the Swan River. The City has a long history of effective catchment management action, spearheaded by the Bayswater Integrated Catchment Management (BICM) Group in the 1990s and continued by the Bayswater Brook Working Group in the 2000s. The Bayswater Brook Action Plan, finalised in 2012, formally recognises the need for a multi-disciplinary and inter-agency approach to manage water flows and improve water quality, whilst providing multiple long-term benefits including ongoing flood management, improved community amenity and ecological function in the Bayswater Brook catchment and the Swan River.

The strength and collaborative nature of the partnerships between State and Local Government and the community is recognised as a key success factor for the achievements to date. Some of the notable successes underpinned by the Bayswater Brook Action Plan include the multi-award winning Eric Singleton Bird Sanctuary nutrient stripping wetland, the Peters Place micro wetland and Living stream projects in Russel St, Jakobsons Way and the Morley Activity Centre.

## 2.2 Key environmental conditions

The Perth Groundwater Map (DWER, 2019) indicates that groundwater within the City generally flows in a south-east direction towards the Swan River. Maximum groundwater levels vary between 3 mAHD and 30 mAHD and depth to groundwater varies between approximately between 0 m and 12.5 m below ground level. The Bayswater Main drain intercepts groundwater to prevent flooding of low-lying areas. Limited monitoring of groundwater levels or quality is currently being undertaken by the City.

Regular surface water quality monitoring within the Bayswater Brook catchment began in 2006. The *Swan Canning Water Quality Improvement Plan* (SRT 2009) identified the Bayswater Main Drain sub-catchment as having an unacceptable total nitrogen load requiring a load reduction of > 45%. A target of 27% reduction of current TP loads was also established for the Bayswater Brook catchment. This equates to target winter concentrations for nitrogen of 0.5 mg/L (down from 1.22 mg/L) and 0.05 mg/L for phosphorous (down from 0.06 mg/L).

Recent results from the Bayswater Brook monitoring program (2018/19) still show elevated concentrations of nutrients and metals at various locations across the study area. A number of sites recorded exceedances of water quality parameters for ecosystem health guidelines (ANZECC & ARMCANZ 2000 south-west lowland rivers trigger values and site specific HMTV), as well as recreational guidelines (ANZECC & ARMCANZ 2000). However, most samples were below the short-term Nitrogen target (2 mg/L) and both short term and long-term Phosphorous reduction targets (0.2 and 0.1 mg/L respectively) identified in the *Swan Canning Water Quality Improvement Plan* (SRT 2009).

Within the catchment, the biggest concern is widespread elevated concentrations of nitrogen and soluble metals, particularly soluble aluminium and zinc. Sources of nutrients and metals in the catchment are likely associated with both current and historic land use practises within the catchment (GHD, 2016), as it is noted that prior to residential development in recent decades, the area also included many factories, market gardens, orchards, pastures for livestock, brickworks and associated clay pits, and a number of landfills. The continued presence of a high density of septic tanks throughout the Bayswater Industrial area (Barron *et al.* 2010) also provides a potential large source of nutrients to the lower section of the Bayswater Brook. Although the widespread nature of exceedances indicates that the source is more likely from the surrounding surface geology and groundwater intrusion rather than contamination from surface runoff, there were a number of sites that had multiple exceedances of soluble metals that indicate poor water quality that could potentially impact the ecosystem health.

## 2.3 What does the community value?

The Bayswater community has been actively engaged by the City over a number of years, largely to obtain input into key strategic documents. Feedback on the Strategic Community Plan identified key issues in relation to the environment and the delivery of green spaces and more sustainable lifestyles. Other comments focussed on the need for high quality development and innovation and promotion.

These themes and their connection to water were further explored through a community survey. The goal of the survey was to obtain feedback from the community on their perceptions of water resources within the City to inform creation of the Vision for Waterwise Bayswater. The survey was issued to the “Engage Bayswater” panel of around 300 community members on 1 November for three weeks.

The survey questions were:

1. What comes to mind when you think about water in the City of Bayswater? (open question)

2. **What do you value about the public spaces in the City?** People were asked to rank green grass; use for sport and fitness; a place to connect with nature; shade and cooling; a place to meet people; improves local property values; nature linkages; trees and family time
3. **How would you like the City to prioritise rates expenditure on water management in the future?** People were asked to choose up to 2 of more green parks; more trees and landscaping of streets; more walk trails and pathways; healthier wetlands and drains; sewerage in the industrial areas or none of the above
4. **If the City was not able to irrigate as many parks as it does now, what should the space become?** People were asked to choose 1 of basketball courts and other non-irrigated playing spaces; planted with native vegetation; developed for other uses or it should stay green – the City should pay to water it

Responses to the four questions were received from 141 people as shown in Appendix A. Key themes noted from the community responses were:

- the river;
- drains as vegetated networks;
- concerns about water usage;
- desire for improved irrigation and water conservation;
- nature; and
- trees and parks.

These responses were supported by the responses to the other questions, which showed that respondents generally valued the natural aspects of parks over the recreational and a desire for landscaping of streets, more native vegetation in parks (if irrigation needed to be reduced), and healthier wetlands.

From this feedback and discussion with City staff and stakeholders, the important elements associated with water were considered to be the river, healthy, sustainable, life-giving, green, working together, nature and water. These values and attributes were used to form the Vision for a Waterwise Bayswater.

## 2.4 Making progress

The City has been working with key partners in the implementation of the Bayswater Brook Local Water Quality Improvement Plan and Bayswater Brook Action Plan. Key recent projects, many of which have been recognised with local and national awards, include:

- Rehabilitation of the Eric Singleton Bird Sanctuary into a nutrient stripping wetland to improve water quality within the catchment, reduce use of groundwater and reduce pollutants discharging into the Swan River;
- Raingarden installation at The RISE, Bayswater Station, Lightning Park car park, and Bath St car park;
- Living stream construction at Weld Square, Russell St Park, and Jakobson Way;
- Transformation of the Peters Place drainage site into a micro wetland;
- Continued commitment to the Light Industry Program which is an education program for light industry businesses that also monitors the quality of surface water to determine unauthorised discharges to drains; and
- Establishment of a sediment monitoring program supported by a compliance and education officer.

The Bayswater community is recognised as being an important element in becoming waterwise. Capacity building regarding sustainable living and waterwise behaviours occurs at multiple levels. Programs run by the City which aim to foster broad sustainable living behaviours include Environment House workshops, Schools outreach program, Night stalks and bushwalks, Nearer to Nature, Millennium kids, FOGO Food and garden organics, waste composting workshops and Grow it Local.

The City's liveability is also a focus of the Council and community, with the City aiming to increase tree canopy coverage from 13.2% to an aspirational target of 20% by the year 2025 through street, parks and natural area plantings (City of Bayswater Urban Forest Strategy, 2017).

The City has also recognised that their management of public open space irrigation and fertiliser application has the potential to contribute nutrients to the environment. Staff from the Parks and Gardens team and Sustainability and Environment team work together to manage irrigation, fertilisation, and maintenance of its public open space areas. This includes hydrozoning, using information from weather stations, soil moisture probes and lysimeters (including SWAN systems decision-support tool), wetting agents, soil amendments, appropriate pesticide storage and use, and ongoing professional development. The City has also recently completed a Nutrient and Irrigation Management Plan to provide additional guidance.

The City is also committed to the improvement of water efficiency and water conservation. The City has obtained Gold Waterwise Council status through the Department of Water and Environmental Regulation (DWER) and Water Corporation Waterwise Council Program and develops and implements an annual Water Efficiency Action Plan designed to reduce water use and improve water quality outcomes. Key actions include a new leak detection program for Council facilities.

## 2.5 WSC Benchmarking workshop results

The report: *Water Sensitive Cities Benchmarking and Assessment: City of Bayswater* (Urbaqua, 2019) provides a summary of the current state of the City of Bayswater, as a whole, in its journey towards a Water Sensitive City (WSC)<sup>1</sup>. The current state was benchmarked using the CRCWSC's WSC Index tool with input from the City, community and stakeholders and is shown in Figure 1.

The City of Bayswater exhibits 100% of the characteristics of the Water Supply, Sewered and Drained Cities. For further information on the City-state typologies, see Brown et al. 2009. This is largely as a result of access to safe and secure drinking water and sanitation, and appropriate management of flood risks.

Bayswater attained 97% of the Waterway city typology. A key component of the Waterway city is stormwater management. The City of Bayswater was developed decades ago, at a time when drainage was conveyed directly to sumps, wetlands or the river in pipes or steep sided open drains. The City is actively working with the Water Corporation, who are responsible for around 80% of the drainage system, to deliver improved ecological, amenity and community outcomes within this network.

The City has also substantially progressed towards both the Water Cycle City and the Water Sensitive City. Key positive factors include the transparent, collaborative and integrated approach to implementation of the wide range of sustainability, surface water and natural area management initiatives across the City.

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<sup>1</sup> Note the terms Waterwise City and Water Sensitive City can be used interchangeably

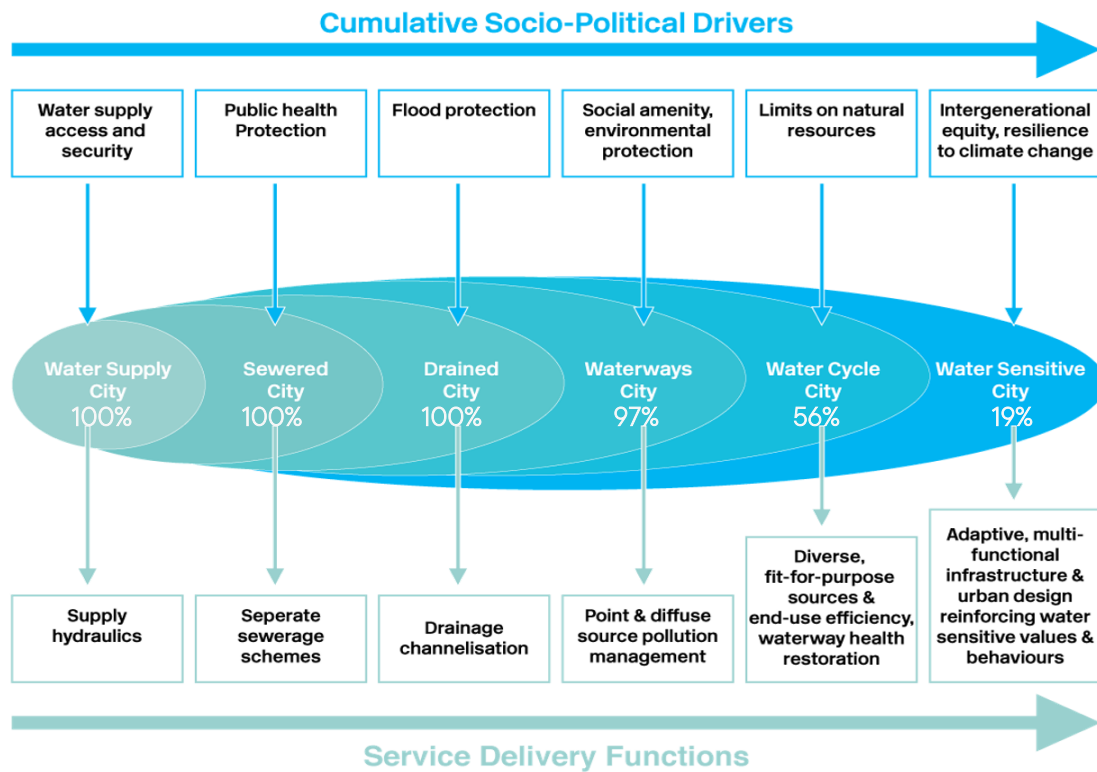


Figure 1: Urban water transitions framework and benchmarking results for City of Bayswater

Figure 2 summarises the performance of the City of Bayswater against the 7 goals of a Water Sensitive City. The results for the City (shown by the shaded light blue area) are compared to an idealised Water Cycle City (shown by the dashed purple line).

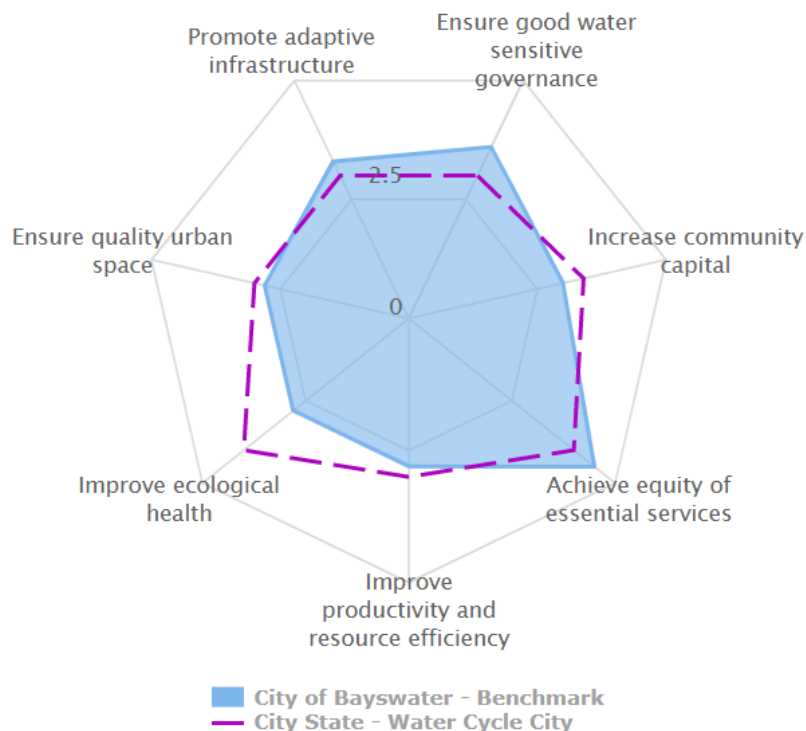


Figure 2: Performance against water sensitive goals

The City met the Water Cycle City benchmark for the goals of (1) Ensure good water sensitive governance, (3) Achieve equity of essential services and (7) Promote adaptive infrastructure, and is nearing the Water Cycle City benchmark for the goals of (4) Improve productivity and resource efficiency and (6) Ensure quality urban space.

A deficit in attaining key attributes of a Water Cycle City is most evident for the goal to (5) Improve ecological health, while a small shortfall is evident for the goal to (2) Increase community capital.

## 2.6 Challenges and opportunities

The City of Bayswater is identified by the State Government as a significant area of infill and redevelopment in the future, predicting that its population will nearly double from around 65,000 to 100,000 by 2050. This will place substantial pressure on community assets, the environment and infrastructure, and could result in a reduced level of service and amenity in the future. This provides an opportunity for the City's planning role to require all new developments in the City to demonstrate how they have considered and are delivering green infrastructure and water sensitive urban design outcomes appropriate to the site and development context.

There are a small number of very healthy and high value ecological areas in the City including Lightning Swamp and areas of Swan River foreshore. Lightning Swamp Bushland is recognised as one of the best areas of remnant native bush in the metropolitan region. However, connectivity between these important areas of habitat is limited and the majority of the City is highly urbanised. There are significant opportunities to increase habitat connectivity through the City associated with creation of living streams and wetlands from urban drains and detention basins.

There is no remaining groundwater available for allocation in the City of Bayswater and groundwater quality throughout the City has been historically impacted by contamination from urban and industrial land uses. There has been a significant focus on improving surface water quality in the City and whilst there is recognition that contaminant rich groundwater mobilised in the urban drainage system is a significant source of poor surface water quality there is a lower level of attention to groundwater quality monitoring and management. The City should seek to reduce groundwater use for irrigation, limit mobilisation of groundwater in drainage systems and increase local replenishment. Consideration should also be given to facilitating resource recovery including use of rainwater tanks and greywater systems as well as stormwater harvesting at lot and precinct scales.

There is a need to improve water literacy across the community. Improved literacy is the precursor to greater understanding and involvement in the planning, ownership and management of water related assets (both natural and constructed). This will also strengthen the understandings around water's contribution to liveability through contributing to greener, cooler and more pleasant urban spaces.

Climate change presents significant challenges for the City such as declining groundwater availability and increasing urban heat. Building the resilience of community and environment is an essential response to climate change. Disconnection of piped drainage systems, capturing stormwater from roofs, roads and carparks for passive irrigation of parks, raingardens and trees will help to sustain healthy and cool green streetscapes. In turn this will also help to increase recharge of groundwater systems and sustain the City's ongoing and future use of groundwater for irrigation, which is particularly important during summer droughts.

An assessment of opportunities for on-ground waterwise projects was undertaken using available desktop GIS data. The assessment is summarised in Appendix B and included consideration of the following project types:

- Foreshore planning and restoration;
- Conversion of linear open drains into living streams;
- Retrofit of raingardens/tree pits into road reserves and car parks;
- Installation of permeable paving to driveways, carparks and low traffic streets;
- Rainwater or greywater harvesting from buildings;
- Diversion of building downpipes into on-lot raingardens;
- Implementation of hydrozoning and/or improved irrigation systems in parks;
- Installation of green roofs or walls to buildings.

The assessment identified a potential project area for foreshore management planning, 74 potential drainage retrofit project areas including 44 for consideration under the Drainage for Liveability program, and 229 other potential waterwise projects including upgrades to public open spaces, buildings and other facilities owned or managed by the City of Bayswater.

## 3 TOWARDS WATERWISE BAYSWATER

The Vision for a Waterwise Bayswater is....

*Working together to care for the water sources that give life to our river,  
green places and the community.*

This Vision can only be achieved through effective partnerships and collaboration between the City and stakeholders including government, industry and the community.

### 3.1 Water strategy framework

In order to optimise delivery, the strategies and actions in Waterwise Bayswater have been aligned to the Environment and Liveability framework, which sets the overarching goals for the City of Bayswater. Waterwise Bayswater is intended to assist in the delivery of the Environment and Liveability Framework goals.

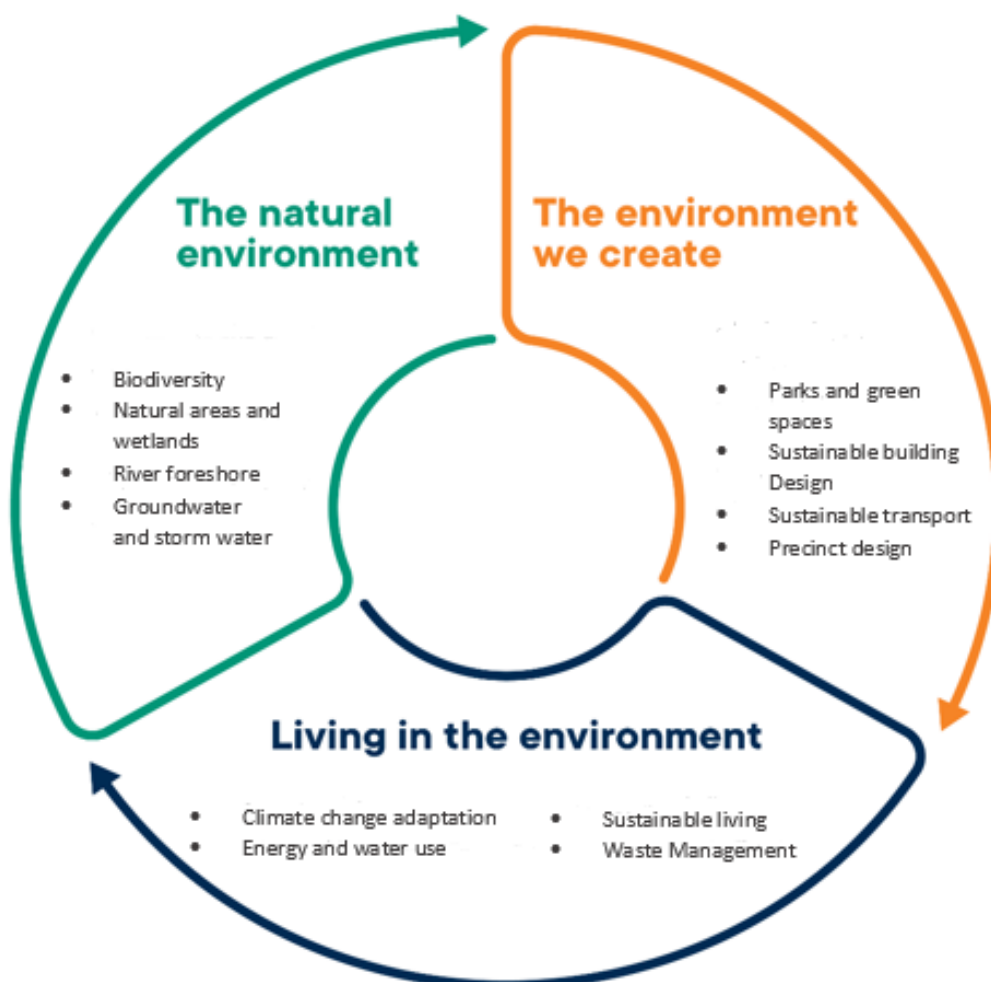


Figure 3: City of Bayswater Environment and Liveability Framework

### 3.2 Priority strategies and actions

The priority strategies for achievement of the Vision for Waterwise Bayswater were identified by a group of key stakeholders using a tool developed by the Cooperative Research Centre for Water Sensitive Cities.

The Transition Dynamics Framework facilitates the identification of critical factors that are required to support a city's transition to a Water Sensitive City State. It recognises that changes in practice will only become mainstream by moving through a series of phases (phases of change) and that this must occur across a range of aspects which include champions, platforms for connecting, knowledge, projects and applications, and tools and instruments.

The Transition Dynamics Framework assessment was undertaken for the three key areas in the Environment and Liveability Framework. The results of the assessment are described below and shown in Appendix C.

#### 3.2.1 The natural environment

The Natural Environment theme includes consideration of landscape character, biodiversity, wetlands, natural areas, environmental water, and the river.

A key factor in identifying the priority strategies relevant to the natural environment, was the need to change the way water system services are considered to contribute to environmental and ecological health across the municipality. This requires a shift in thinking, particularly about stormwater and wastewater as a waste, to how these sources can contribute to better environmental outcomes. This includes thinking about the implications of discharges from the unsewered industrial area and the drainage system on the health of wetlands, waterways and groundwater.

There is strong knowledge of surface water issues including causes, impacts and solutions; however, groundwater health is not as well understood. All parties are working collaboratively to test solutions which achieve multiple objectives, including research into the practice of instream planting (and its impact on volume management). There is a "learning by doing" approach, with learnings communicated across the agencies and approaches upscaled when possible. Key projects include the revitalisation of Eric Singleton Bird Sanctuary and living streams at Jacobsons Way and Russell St park. The community is largely supportive of drain revitalisation projects that enhance natural features and aesthetics but are unaware of the impact of the unsewered industrial area of groundwater and waterway health.

Strong guidance has been provided by the Bayswater Brook Action Plan and the Morley Activity Centre Local Water Management Strategy and opportunities outside these areas are now being explored. Delivery is enhanced through access to State planning and technical guidance on water sensitive urban design. Practices within Council are often led by a range of champions and this will be cemented in future through the development of an internal "Management Practice" that will require WSUD and responses to climate change.

There are many environmental and water champions across the community and industry, which include the 2019 WA Water Professional and Young Water Professional of the Year. There is evidence of effective partnerships and stakeholder alignment through the Bayswater Brook Working Group, which also provides a strong platform for connecting. This collaboration is currently centred around delivery of individual environmental retrofitting projects (although the strength of the Drainage for Liveability program is noted), so an opportunity exists to strengthen the collaborative delivery platform more broadly and leverage the influence of champions.

Having consideration of the above, the following priority strategies and actions are recommended to enhance the natural environment in Bayswater.

**Priority strategy 1: Build on the existing mechanisms for collaboration (established by the Bayswater Brook Action Plan) and continue to align influential champions to build broad support for practices that improve surface water and groundwater health, including management of impacts from the unsewered industrial area.**

This strategy is to be delivered through implementation of the following actions.

- 1.1 Expand the Bayswater Brook Working Group into a Waterwise Bayswater Working Group with representatives from key stakeholders and responsibility for implementation of this strategy.
- 1.2 Undertake cost benefit analysis of options to reduce environmental impacts from the industrial area (including for sewerage) and develop a business case.
- 1.3 Collaborate with local Aboriginal people to gather water stories and information to assist with the planning and management of the City's environmental assets.
- 1.4 Continue to participate in the Water Sensitive Transition Network and Sub-Groups.
- 1.5 Continue to support the Drainage for Liveability program.

**Priority strategy 2: Expand monitoring to include groundwater health and develop a program of drainage retrofits, coordinated with asset renewal projects, that increase groundwater recharge and deliver biodiversity and cooling benefits (use vegetation).**

This strategy is to be delivered through implementation of the following actions.

- 2.1 Expand the monitoring program to include groundwater levels and quality.
- 2.2 Develop a prioritised list of sites where drainage retrofits could improve ecological function, amenity and water quality, whilst maintaining or improving flood protection of infrastructure. This includes conversions to living streams, basin revegetation, roadside rain gardens, and car park retrofits.
- 2.3 Develop a methodology for identifying WSUD options that must be applied when undertaking road and car park asset upgrades.
- 2.4 Identify foreshore restoration projects.

**Priority strategy 3: Continue to improve raingarden and living stream designs, incorporating the achievement of multiple outcomes (including tree canopy) and actively share outcomes with broader networks.**

This strategy is to be delivered through implementation of the following actions.

- 3.1 Audit existing rain gardens and living streams in the City and document good and bad outcomes including costs of construction and maintenance.
- 3.2 Develop a practice note for (i) tree pits and raingardens and (ii) living streams that documents the design and construction process and key "success factors".
- 3.3 Develop a program of installation of roadside raingardens.

### 3.2.2 The environment we create

The environment we create includes our urban form and movement networks which underpin the layout of our city, together with the form and function of our buildings, parks and public spaces.

In order to improve the environment we create it is critical to integrate urban planning and design with water systems and water services. This requires an understanding of how water systems and services can influence or contribute to better urban form and built form outcomes, including in the design of streets, buildings and parks. The process of planning and design, even in the “retrofit” circumstances that are faced within the City of Bayswater, should also consider opportunities for water system infrastructure that is multi-functional and adaptive. This is more often achieved through localised, small-scale solutions.

Delivery of WSUD as part of small scale development is largely ad-hoc in Bayswater and, although there is supportive State Government planning policy (SPP 2.9 Water Resources and SPP7 Design WA), successful outcomes largely rely on individual officer intervention (practice) rather than policy. However, recent works undertaken by the City have experimented with a range of solutions including raingardens and pervious paving, and the inclusion of trees as part of road upgrades (although without a connection to stormwater systems).

The City has supported good design and activated places; however, there is a lack of awareness or visibility of how these elements are underpinned by water and few connected champions advocating for the level of integration required. Progress may occur in the future as Council moves to looking at the lifecycle and non-financial benefits to the future community.

Although there are good examples of localised water services outside the City (e.g. WGV shared bore and Josh Byrne’s house), this information is not well shared across Bayswater. In addition, there is currently insufficient information on City and community water use to inform a water balance that would identify different or localised source/supply opportunities including reuse. Park design is improving incrementally through better irrigation design including hydrozoning. The City is also implementing a program of retrofitting efficient fixtures and fittings in recreational facilities with support from the Department of Local Government, Sport and Cultural Industries.

Strategies to enhance the environment we create are outlined below.

**Priority strategy 4: Build understanding amongst urban planning, design and development professionals about their role in delivering water outcome.**

This strategy is to be delivered through implementation of the following actions.

- 4.1 Actively promote (through City social media) good design outcomes across the City that reduce/reuse water and/or improve water quality and liveability.
- 4.2 City staff to attend professional development training in WSUD opportunities and benefits.
- 4.3 Undertake a Council briefing on the role of water in underpinning the Environment and Liveability outcomes in the City.
- 4.4 Ensure future projects and council reports consider the actions of the Waterwise Bayswater Report.

**Priority strategy 5: Build capacity of planning, design, development and water professionals to create pathways for scoping and implementing solutions that improve urban and built form outcome.**

This strategy is to be delivered through implementation of the following actions.

- 5.1 Prepare simple diagrams that depict WSUD solutions appropriate to low, medium and high density residential and commercial/industrial built forms.
- 5.2 Promote early consultation with the City regarding new development to optimise the delivery of multiple outcomes appropriate to site context.
- 5.3 Measure reductions in water use and heat benefits from park and facilities improvements and share information with the community and Council to ensure ongoing support.
- 5.4 Host multi-disciplinary events to showcase exemplar projects that encourage networking and knowledge transfer.

**Priority strategy 6: Implement trials and demonstrations of innovative urban and built form solutions that enable learning about how the elements of urban space can be integral parts of water management systems.**

This strategy is to be delivered through implementation of the following actions.

- 6.1 Work with the METRONET team to ensure the Morley, Bayswater and Noranda stations and precincts incorporate WSUD.
- 6.2 Support a building demonstration project and instigate an inter-disciplinary planning and co-design processes involving the community and clarify where and how the community can make choices and contribute to solutions.
- 6.3 Install alternatives to soakwells in new/upgraded City buildings (e.g. in-ground rain garden, raised wicking bed, buffer strips, rainwater tanks, pervious paving).
- 6.4 Release stories showcasing the alternatives including videos on “how to install”.

**Priority strategy 7: Consolidate and align policy and regulatory tools to strengthen the role of water in delivering quality urban and built form.**

This strategy is to be delivered through implementation of the following actions.

- 7.1 Prepare a local planning policy for new development that describes outcomes and requirements for WSUD solutions appropriate to difference scales and site context.
- 7.2 Prepare a procedure for City capital works (roads, buildings, parks) that integrates the consideration of water with other objectives.
- 7.3 Initiate a life cycle costing data base to enable improved planning for maintenance of drainage assets, fit-for-purpose water supply infrastructure and other WSUD assets to assist the City to better forecast budgets for retrofit and management into the future.

### 3.2.3 Living in the environment

Living in the environment requires consideration of resource use and the generation and management of waste. These aspects are influenced by business and community behaviour for sustainable living, with the goal being to create a liveable and resilient community. This requires a commitment to and sense of responsibility for the need for innovative (or just untried in the local area) actions which may incur a financial cost, but which result in social and environmental benefits (and often economic savings) now and into the future.

Within Bayswater, there is a high level of community and agency understanding of the need for water efficiency and water conservation and there are a number of effective champions in this area, led by the Water Corporation. These messages are supported by the City through the Waterwise Councils program and Action Plan, including the City's programs for leak detection for Council facilities and Park hydrozoning and irrigation optimisation. The Water Corporation also undertakes monitoring of the community's behaviour regarding scheme water use, and while people support the need for water conservation and environmental restoration, there is limited personal responsibility attributed to these needs.

Capacity building regarding sustainable living occurs at multiple levels. Programs run by the City include Environment House workshops, Plants to residents program, community planting days, verge demonstrations, Schools outreach program, Night stalks and bushwalks, Nearer to Nature, Millennium kids, FOGO Food and garden organics, waste composting workshops and Grow it Local, although it is recognised that the primary focus of these programs is not water. Other platforms for connecting with broader messages include workshops with RecFishWest and Irrigation Australia, as well as the Light Industry Program which is an education program for light industry businesses that also monitors the quality of surface water to determine unauthorised discharges to drains. Sediment and erosion control education and enforcement is also a focus of the City's Environmental Health Officers.

There is limited information that would support individuals to take responsibility or ownership of their own water system services; however. There are currently no rebates provided for rainwater tanks, raingardens or greywater systems and little readily available information or encouragement of these systems.

Current discussions in Bayswater around resilience and adaptation are largely focussed on reducing urban heat through retention and creation of tree canopy and the city is working with the Australian Urban Design Research Centre to identify opportunities for increased greening. Options include school routes, drainage lines, parks, areas without canopy.

Initial steps have been taken towards a recognition of Indigenous values and shared responsibility through the City's Reconciliation Action Plan. Although this is limited to the incorporation of Noongar values and voices, it is possible that this will lead to the consideration of other cultural associations with water.

Key strategies and actions to support people (agencies and communities) to adopt more sustainable living practices are outlined below.

**Priority strategy 8: Develop a narrative to increase community understanding of water's role in liveability outcomes beyond water efficiency including an emphasis on shared responsibility.**

This strategy is to be delivered through implementation of the following actions.

- 8.1 Support State Government education of waterwise practices (Water for life campaign and Waterwise programs) by including articles and links in social media and the City's website.
- 8.2 Consider establishing local water awards for builders, businesses and homeowners.

- 8.3 Identify local natural areas where some management could be undertaken by the community and facilitate action by locals.
- 8.4 Ensure strong water narrative is included in activities associated with delivery of the City's Urban Forest Strategy.
- 8.5 Consider ways to actively promote and increase uptake of fit-for-purpose alternative water supply options, both with residents and in City-owned/operated assets. Options for promotion include provision of a greywater design and installation or rainwater tank maintenance workshops; sharing resident success stories and scheme water savings via the City's website or during a home open day events; or the use of subsidies.

**Priority strategy 9: Enhance existing platforms for connecting to enable the sharing of ideas about localised solutions and the role of the community.**

This strategy is to be delivered through implementation of the following actions.

- 9.1 Use the City's website to report on targets for City water use – community, City parks and City buildings.
- 9.2 Engage with the community regarding use and function of the foreshore through preparation of a Foreshore Management Plan for the length of the Swan River foreshore.
- 9.3 Continue to support programs such as the Phosphorus Awareness Project, the Fertilise Wise Project and garden education programs to address behaviour change towards fertiliser use, water efficiency and the use of appropriate soil amendments.

**Priority strategy 10: Gather knowledge about the City's water balance to identify different source/supply opportunities including reuse.**

This strategy is to be delivered through implementation of the following actions.

- 10.1 Quantify use of rainwater, scheme water and groundwater, production of wastewater and generation of stormwater/export of groundwater spatially.
- 10.2 Identify options for reuse spatially and quantify likely available volumes.
- 10.3 Develop a protocol for retrofit of City buildings that includes improvements to water efficiency, water reuse, stormwater capture and treatment and establishment of green infrastructure and develop a program of building and facilities upgrades.

**Priority strategy 11: Develop guidance to empower actions by individual businesses and homeowners.**

This strategy is to be delivered through implementation of the following actions.

- 11.1 Increase availability and access to waterwise plants and trees by working with nursery and landscape industry – scope ideas and develop options.
- 11.2 Develop brochure(s) to demonstrate the value and process for downpipe diversions and rain gardens.
- 11.3 Develop additional material for the Light Industry Program that shows costs and benefits of better stormwater and water (re)use practices.

- 11.4 Actively promote and consider rebates for grey water systems and rainwater tanks. This could involve greywater design and installation or rainwater tank maintenance workshops; sharing resident success stories and scheme water savings via the City's website or during a home open day events; or the use of subsidies.

## 4 IMPLEMENTATION PLAN

Actions are proposed which the City can implement to achieve the Vision for Waterwise Bayswater. A timeframe and level of priority is proposed for each action. Responsibility for implementation of each action is allocated to a specific business unit within the City, who will be required to consider the relevant action in setting its annual budget and providing input into the Integrated Planning Framework.

The timeframe reflects the suggested timeframe in which the action should be implemented while the priority reflects the importance of the action in contributing to the overall aim of the Strategy. The priority and timeframe should be considered together; actions which are of low priority but have a short timeframe may represent some early achievements in the Strategy's implementation. Actions that are of high priority may require a long timeframe due to the complexity of the action. These identified timeframes and priority levels should be considered indicative only and should not hinder an action of low priority or long-term timeframe being undertaken if an opportunity should arise.

Tables 2 to 4 provide guidance on timeframes, priority and funding source of actions in Table 5.

**Table 1: Key to timeframe**

Timeframe	Actions to be completed
Short term	2020/21 – 2022/23 – within Annual Budget or Corporate Business Plan
Medium term	2022/23 – 2025/26 – within Corporate Business Plan
Long term	2025/26 – 2030/31 – within Long Term Financial Plan
Ongoing	To occur through operations and accounted for in annual operational budget.

**Table 2: Key to priority designation**

Priority	The approach actions require
High	Of high importance, needs a strong proactive approach, opportunities should be created.
Medium	Of medium importance, opportunities should be sought out.
Low	Of low importance, opportunities should be undertaken as they arise.

**Table 3: Key to funding estimation**

Priority	Likely order of magnitude costs
High	Over \$100,000
Medium	\$50,000 – \$100,000
Low	Under \$50,000

**Table 4: Key to funding consideration represented by the colour of the action number**

	Funding consideration
	The action can be absorbed into operations and does not require additional budget allocation
	The action is included or forms part of an Action included in the Corporate Business Plan or Annual Budget
	The action is not included in the Corporate Business Plan or Annual Budget and is considered of a high priority. It should be considered for inclusion in next review and may require budget allocation
	The action is to be considered for inclusion in the Long Term Financial Plan and future reviews of the Corporate Business Plan

Table 5: Waterwise Bayswater action plan

Action		Responsibility	Timing	Priority	Indicative annual cost	Indicator
Theme 1: The Natural Environment						
Priority strategy 1: Build on the existing mechanisms for collaboration (established by the Bayswater Brook Action Plan) and continue to align influential champions to build broad support for practices that improve surface water and groundwater health, including management of impacts from the unsewered industrial area						
1.1	Expand the Bayswater Brook Working Group into a Waterwise Bayswater Working Group with representatives from key stakeholders and responsibility for implementation of this strategy	Sustainability and Environment	Short term then ongoing	High	Low	Group created and meeting bi-monthly
1.2	Undertake cost benefit analysis of options to reduce environmental impacts from the industrial area (including for sewerage) and develop a business case	Sustainability and Environment	Medium	High	Medium	Cost benefit analysis and business case completed
1.3	Collaborate with local Aboriginal people to gather water stories and information to assist with the planning and management of the City's environmental assets	Community development	Ongoing	High	Low	Advice sought on wetland management from local Aboriginal representative
1.4	Continue to participate in the Water Sensitive Transition Network and Sub-Groups	Sustainability and Environment	Ongoing	High	Low	Attendance at WSTN and Sub-group meetings
1.5	Continue to support the Drainage for Liveability program	Sustainability and Environment	Ongoing	High	High	Projects agreed and progressed/completed
Priority strategy 2: Expand monitoring to include groundwater health and develop a program of drainage retrofits, coordinated with asset renewal projects, that increase groundwater recharge and deliver biodiversity and cooling benefits (use vegetation)						
2.1	Expand the monitoring program to include groundwater levels and quality	Sustainability and Environment	Short term then ongoing	High	Medium	Program expanded Annual reporting (ongoing)
2.2	Identify possible drainage retrofit projects across the City and develop a program of implementation	Engineering Services	Short term then ongoing	High	High	Assessment completed and sites prioritised # sites retrofitted
2.3	Develop a methodology for identifying WSUD options that must be applied when undertaking road and car park asset upgrades	Engineering Services	Medium	Medium	Low	Methodology developed and supported by Council

## Waterwise Bayswater

Action	Responsibility	Timing	Priority	Indicative annual cost	Indicator
2.4 Identify foreshore restoration projects	Sustainability and Environment	Medium	Low	Low	Projects described
Priority strategy 3: Continue to improve raingarden and living stream designs, incorporating the achievement of multiple outcomes (including tree canopy) and actively share outcomes with broader networks.					
3.1 Audit existing rain gardens and living streams in the City and document good and bad outcomes including costs of construction and maintenance	Engineering Services	Short term	Medium	Low	Practices and costs documented
3.2 Develop a practice note for (i) tree pits and raingardens and (ii) living streams that documents the design and construction process and key "success factors"	Engineering Services	Medium	Medium	Low	Practice notes completed and supported by Council
3.3 Develop a program of installation of roadside raingardens	Engineering Works	Medium then ongoing	Medium	High	Program developed and implementation commenced
Theme 2: The environment we create					
Priority strategy 4: Build understanding amongst urban planning, design and development professionals about their role in delivering water outcome					
4.1 Actively promote (through City social media) good design outcomes across the City that reduce/reuse water and/or improve water quality and liveability	Communications and Marketing	Medium then ongoing	Medium	Low	Articles published
4.2 City staff to attend professional development training in WSUD opportunities and benefits	Development approvals	Short term then ongoing	Low	Low	Staff attendance at training sessions
4.3 Undertake a Council briefing on the role of water in underpinning the Environment and Liveability outcomes in the City..	Sustainability and Environment	Medium	Medium	Low	New WAtEr Ways to deliver 1 hour session for Bayswater Councillors
4.4 Ensure future projects and council reports consider the actions of the Waterwise Bayswater Report.	Sustainability and Environment	Medium	Medium	Low	Council briefing note template revised to include consideration of Waterwise Bayswater

Action		Responsibility	Timing	Priority	Indicative annual cost	Indicator
<b>Priority strategy 5: Build capacity of planning, design, development and water professionals to create pathways for scoping and implementing solutions that improve urban and built form outcome</b>						
5.1	Prepare simple diagrams that depict WSUD solutions appropriate to low, medium and high density residential and commercial/industrial built forms	Sustainability and Environment	Medium	Medium	Low	Diagrams prepared and supported by Council
5.2	Promote early consultation with the City regarding new development to optimise the delivery of multiple outcomes appropriate to site context	Development Approvals	Short term and ongoing	High	Low	City staff add value to development proposals
5.3	Measure reductions in water use and heat benefits from park and facilities improvements and share information with the community and Council to ensure ongoing support	Parks and Gardens	Medium	Medium	Low	Measurements undertaken and information circulated
5.4	Host multi-disciplinary events to showcase exemplar projects that encourage networking and knowledge transfer	Sustainability and Environment	Medium	Low	Low	Event held
<b>Priority strategy 6: Implement trials and demonstrations of innovative urban and built form solutions that enable learning about how the elements of urban space can be integral parts of water management systems</b>						
6.1	Work with the METRONET team to ensure the Morley, Bayswater and Noranda stations and precincts incorporate WSUD	Sustainability and Environment	Short term	High	Low	Morley station and precinct includes WSUD
6.2	Support a building demonstration project and instigate an inter-disciplinary planning and co-design processes involving the community and clarify where and how the community can make choices and contribute to solutions.	Strategic Planning and Place	Medium	Medium	Low	Demonstration project identified Guidance for community input prepared.
6.3	Install alternatives to soakwells in new/upgraded City buildings (e.g. in-ground rain garden, raised wicking bed, buffer strips, rainwater tanks, pervious paving)	Building Works	Medium then ongoing	Medium	Medium	Soakwell alternatives installed
6.4	Release stories showcasing the alternatives including videos on "how to install".	Communications and Marketing	Medium	Medium	Medium	Videos completed and released
<b>Priority strategy 7: Consolidate and align policy and regulatory tools to strengthen the role of water in delivering quality urban and built form</b>						
7.1	Prepare a local planning policy for new development that describes outcomes and requirements for WSUD solutions appropriate to difference scales and site context.	Strategic Planning and Place	Medium	High	Low	Local Planning Policy prepared and supported by Council

## Waterwise Bayswater

Action	Responsibility	Timing	Priority	Indicative annual cost	Indicator
7.2 Prepare a procedure for City capital works (roads, buildings, parks) that integrates the consideration of water with other objectives	Project Services	Medium	High	Low	Procedure completed and supported by Council
7.3 Initiate a life cycle costing data base to enable improved planning for maintenance of drainage assets, fit-for-purpose water supply infrastructure and other WSUD assets	Asset and Mapping Services	Medium then ongoing	Medium	Low	Database created and populated with information
<b>Theme 3: Living in the environment</b>					
<b>Priority strategy 8: Develop a narrative to increase community understanding of water's role in liveability outcomes beyond water efficiency including an emphasis on shared responsibility</b>					
8.1 Support State Government education of waterwise practices by including articles and links in social media and the City's website	Communications and Marketing	Short term and ongoing	Medium	Low	Articles on City's website
8.2 Consider establishing local water awards for builders, businesses and homeowners	Communications and Marketing	Long term then ongoing	Low	Low	Awards established and call for nominations released
8.3 Identify local natural areas where some management could be undertaken by the community and facilitate action by locals	Sustainability and Environment	Medium then ongoing	Medium	Low	Areas identified and management agreed with Group
8.4 Ensure strong water narrative is included in activities associated with delivery of the City's Urban Forest Strategy	Sustainability and Environment	Short term and ongoing	Medium	Low	Urban Forest Strategy specifically references Waterwise Bayswater and co-delivery
8.5 Consider ways to actively promote and increase uptake of fit-for-purpose alternative water supply options, both with residents and in City-owned/operated assets.	Sustainability and Environment	Long term and ongoing	Medium	High	Systems promoted
<b>Priority strategy 9: Enhance existing platforms for connecting to enable the sharing of ideas about localised solutions and the role of the community</b>					
9.1 Use the City's website to report on targets for City water use – community, City parks and City buildings	Communications and Marketing	Short term and ongoing	Low	Low	Information on website
9.2 Engage with the community regarding use and function of the foreshore through preparation of a Foreshore Management Plan for the Swan River foreshore.	Sustainability and Environment	Long term	Medium	Medium	Foreshore management plan completed and supported by DBCA and Council

Action		Responsibility	Timing	Priority	Indicative annual cost	Indicator
9.3	Continue to support programs such as the Phosphorus Awareness Project, the Fertilise Wise Project and garden education programs to address behaviour change towards fertiliser use, water efficiency and the use of appropriate soil amendments.	Community Development	Ongoing	Medium	Low	Program activities maintained annually
<b>Priority strategy 10: Gather knowledge about the City's water balance to identify different source/supply opportunities including reuse</b>						
10.1	Quantify use of rainwater, scheme water and groundwater, production of wastewater and generation of stormwater/export of groundwater spatially	Sustainability and Environment	Short term	Medium	Low	Annual volumes estimated
10.2	Identify options for reuse spatially and quantify likely available volumes	Sustainability and Environment	Medium	Medium	Low	Options quantified
10.3	Develop a protocol for retrofit of City buildings that includes improvements to water efficiency, water reuse, stormwater capture and treatment and establishment of green infrastructure.	Building Works	Short term	Medium	Low	Protocol developed and supported by Council
10.4	Develop a program of building and facilities upgrades.	Building Works	Medium then ongoing	Medium	Low	Program developed and implementation commenced
<b>Priority strategy 11: Develop guidance to empower actions by individual businesses and homeowners</b>						
11.1	Increase availability and access to waterwise plants and trees by working with nursery and landscape industry – scope ideas and develop options	Sustainability and Environment	Long term	Low	Low	Options scoped
11.2	Develop brochure to demonstrate the value and process for downpipe diversions and raingardens	Sustainability and Environment	Medium	Medium	Low	Brochure developed and supported by Council
11.3	Develop additional material for the Light Industry Program that shows costs and benefits of better stormwater and water (re)use practices.	Environmental Health	Medium	Medium	Low	Cost benefit information obtained and material incorporated into Program
11.4	Actively promote and consider rebates for grey water systems and rainwater tanks	Financial Services and Water Corporation	Long term	Low	High	Information on website Rebates established

## 5 REFERENCES

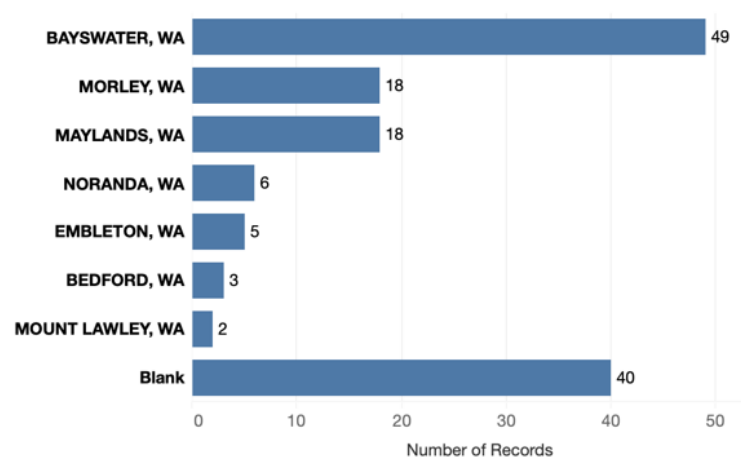
- ANZECC & ARMCANZ (2000) *Australian and New Zealand guidelines for fresh and marine water quality*.
- Barron, O., Donn, M.K., Pollock, D., Johnstone, C. (2010) *Determining the effectiveness of best management practices to reduce nutrient flows in urban drains management by the Water Corporation: Part 1 Water quality and water regime in Perth urban drains*, CSIRO: Water for a healthy country National Research Flagship.
- Blue Sands Environmental, 2012, *Bayswater Brook Action Plan*.
- Brown, R., Rogers, B., Werbeloff, L., 2016, *Moving toward Water Sensitive Cities: A guidance manual for strategists and policy makers*. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.
- City of Bayswater, 2017, *Urban Forest Strategy*.
- City of Bayswater 2019, *City Profile*. Available at: < <https://www.bayswater.wa.gov.au/city-and-council/profile-and-maps/city-profile> > [26 April 2019]
- Department of Water and Environmental Regulation, 2019a, *Perth Groundwater Map*. Available at: <<http://www.water.wa.gov.au/maps-and-data/maps/perth-groundwater-atlas>> [6 May 2019]
- GHD (2016) *Water and sediment quality in the Bayswater Brook: Winter 2014 and 2015*. Report prepared for the City of Bayswater.
- Government of WA, 2019, *Waterwise Perth Action Plan*.
- Swan River Trust, 2008, *Local Water Quality Improvement Plan Bayswater Brook*
- Swan River Trust, 2009, *Swan Canning Water Quality Improvement Plan*. Swan River Trust, Perth, Western Australia.
- Urbaqua, 2019, *Water Sensitive Cities Benchmarking and Assessment: City of Bayswater*.

APPENDIX A: COMMUNITY SURVEY RESULTS

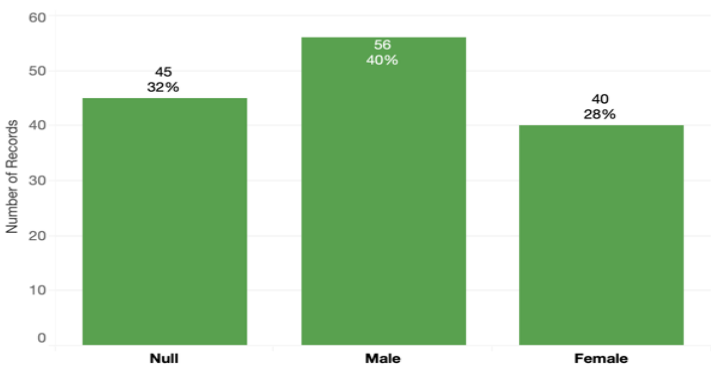
The survey was issued to the Engage Bayswater Panel by the City on Friday 1 November, closing three weeks later on 22 November 2019. A total of 141 responses were received. Unfortunately, not all respondents completed the demographic questions, hence the “null” responses below.

Demographics

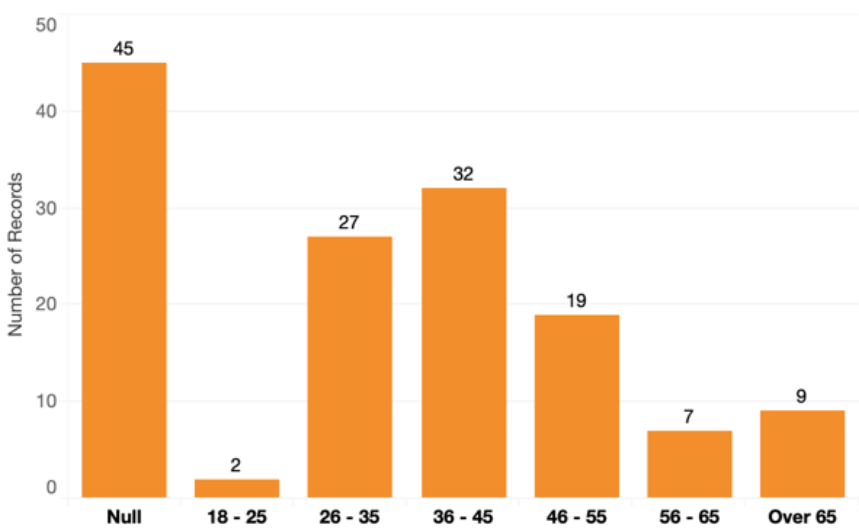
Suburb



Gender

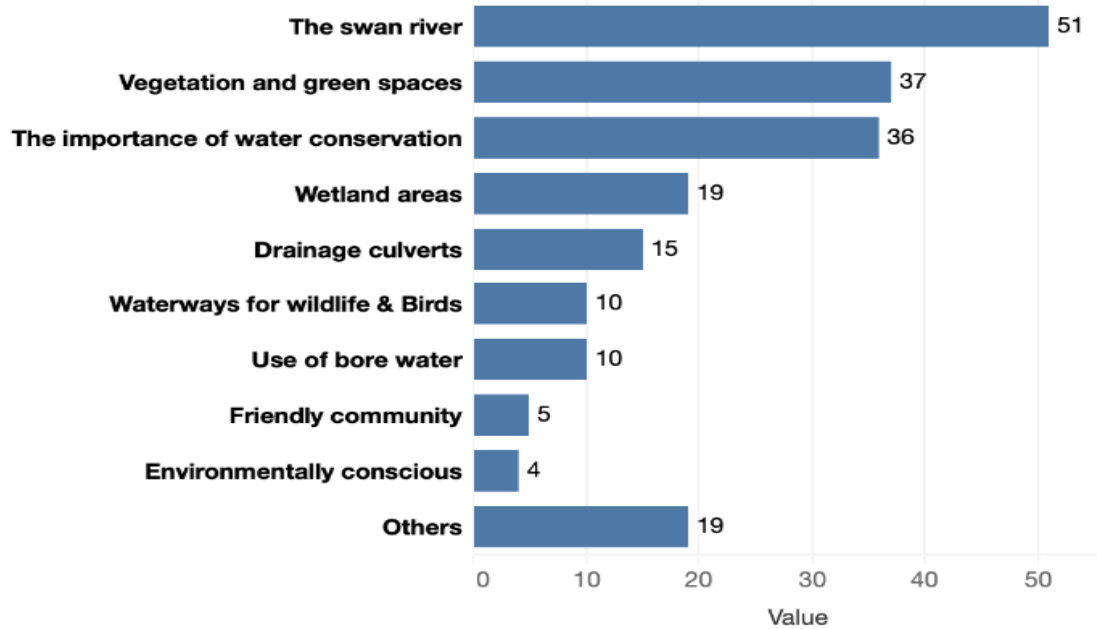


Age Group

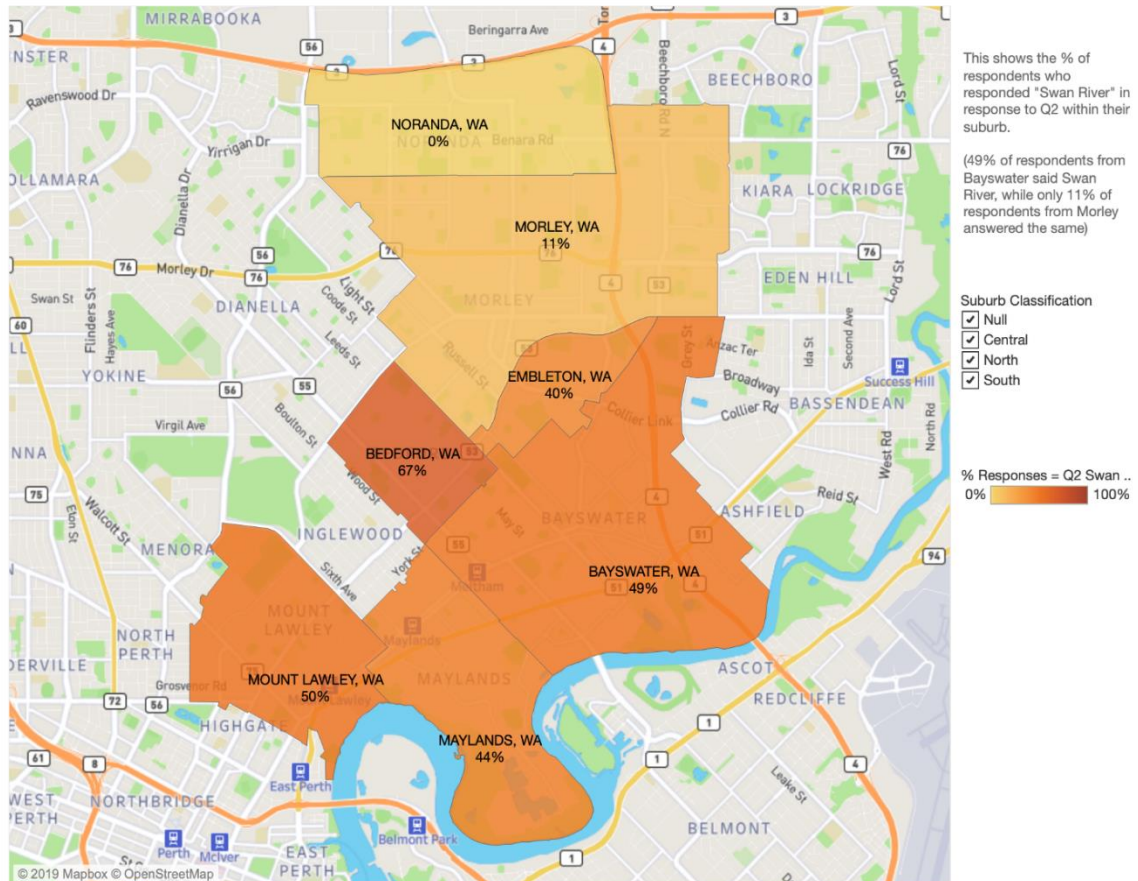


## Results

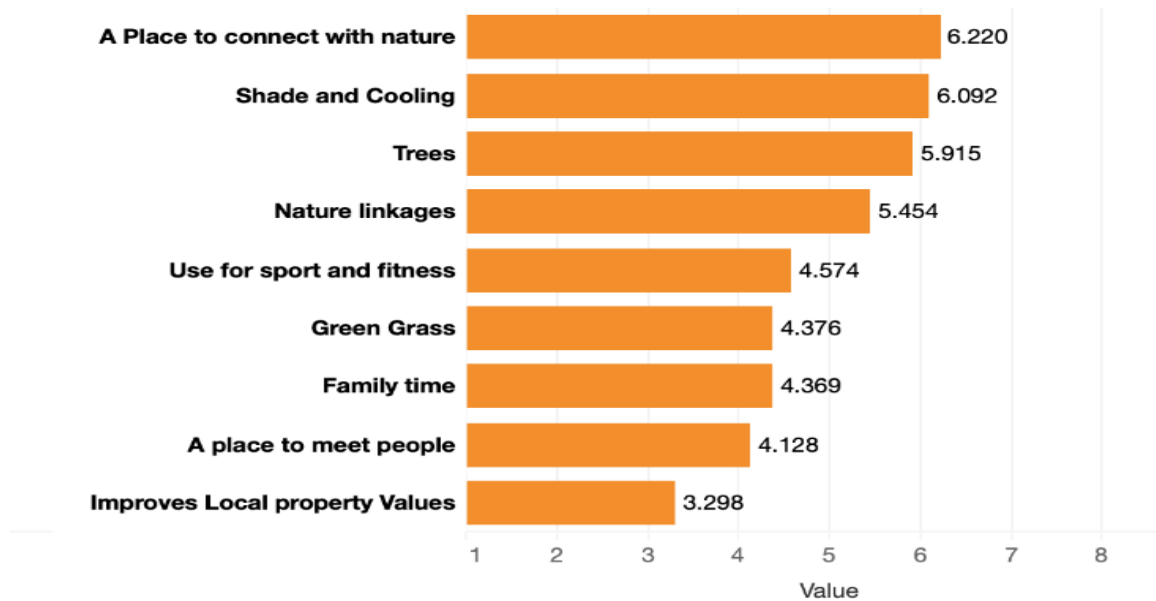
**What comes to mind when you think about water in the City of Bayswater?**



Map - Q2 "Swan River"



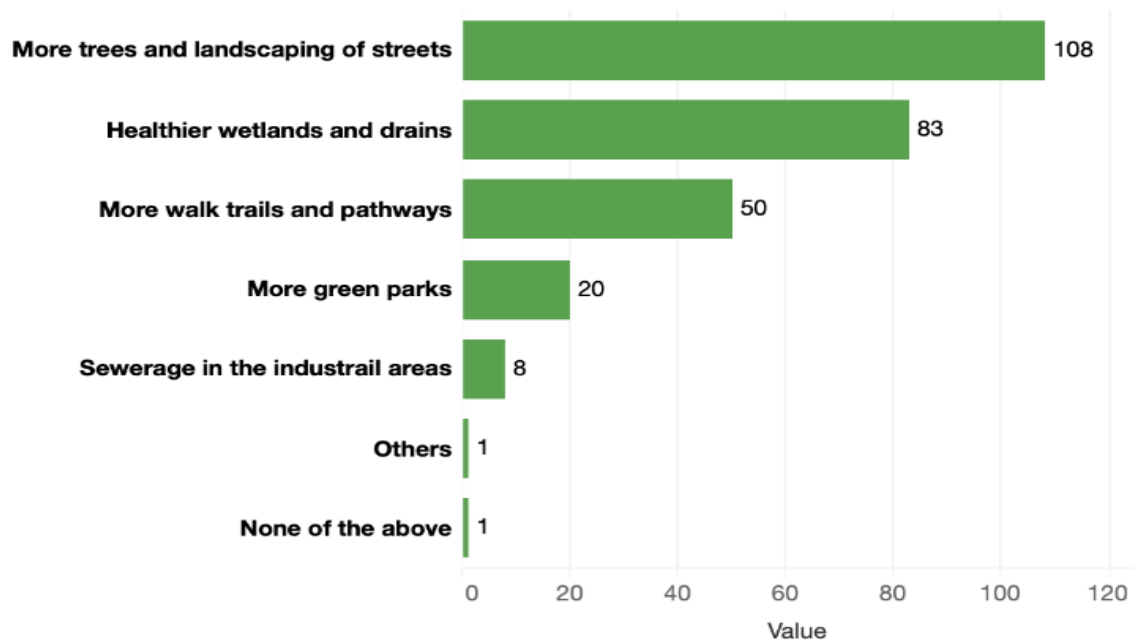
## What do you value about the public Spaces in the City? (Highest score = highest value)



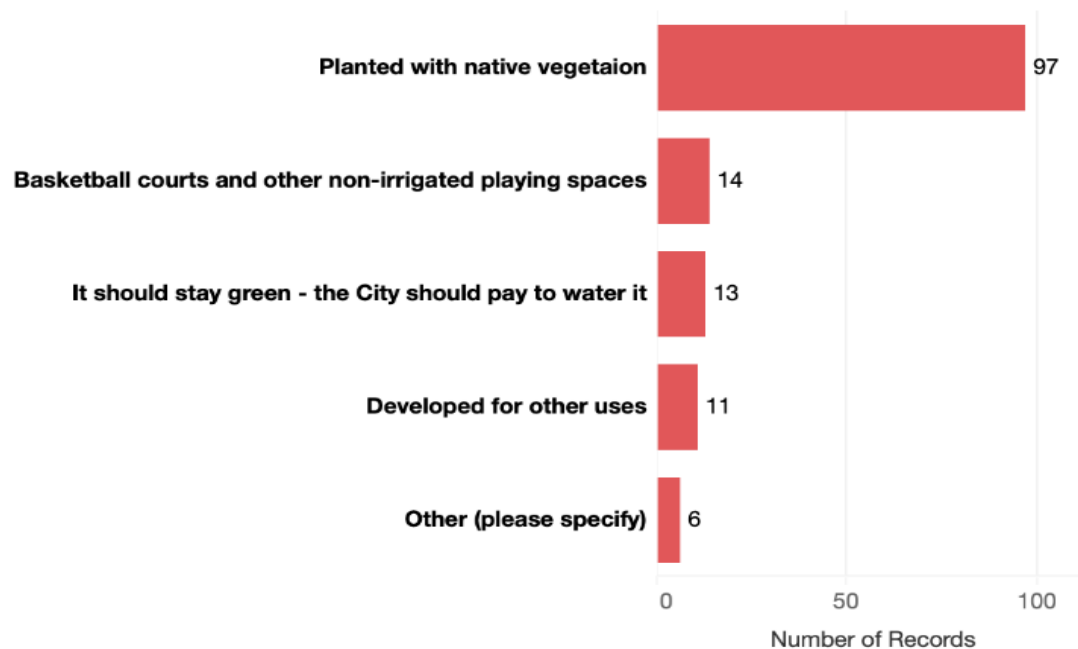
This response was broken down by suburb. The darker colours represent the higher proportional responses.

Suburb Classification	Q3.Suburb		Green Grass	A Place to connect with nature	Nature linkages	Shade and Cooling	Trees	Use for sport and fitness	Family time	A place to meet people	Improves Local property Values
North	NORANDA, WA		6.00	4.00	4.83	5.17	5.33	5.50	6.50	4.83	2.83
	MORLEY, WA		6.11	5.89	5.61	5.28	5.28	5.00	4.83	3.56	3.44
Central	EMBLETON, WA		4.40	7.00	6.20	5.80	5.60	5.60	3.60	3.00	3.80
	BEDFORD, WA		2.67	4.67	7.67	8.00	6.33	2.33	6.00	2.67	4.67
South	BAYSWATER, WA		4.00	6.04	4.96	6.59	6.14	4.47	4.65	4.51	3.63
	MAYLANDS, WA		3.50	6.89	6.56	5.50	6.17	5.11	3.72	4.44	3.11
	MOUNT LAWLEY, WA		4.50	8.50	5.00	7.50	6.00	6.50	2.50	3.00	1.50
Null	Blank		4.33	6.53	5.35	6.08	5.90	4.08	3.85	3.98	2.90

## How would you like the City to prioritise rates expenditure on water management in the future?



## If the City was not able to irrigate as many parks as it does now, what should the space become?



## APPENDIX B: IDENTIFYING ‘ON GROUND’ WATERWISE OPPORTUNITIES

The City of Bayswater owns and is responsible for the management of substantial land areas within the City boundaries. These land areas include:

- Lots in City ownership containing public buildings and facilities;
- Public open space and drainage reserves in City ownership; and
- Public open space, drainage and foreshore reserves in State Government ownership vested with the City for management and maintenance.

In addition, there are substantial land areas within the City boundaries that contain Water Corporation drainage assets. These land areas are typically owned by the Water Corporation but in some cases may be owned by the City or another State Government agency with the assets only owned and managed by the Water Corporation.

Lastly, there are land areas within the City boundaries that are owned and managed by other State Government agencies.

All of these land areas may present opportunities for implementation of water sensitive urban design strategies by the City, either alone or in partnership with relevant State Government agencies. The types of opportunities that exist in these areas may include:

- Foreshore planning and restoration;
- Conversion of linear open drains into living streams;
- Retrofit of raingardens/tree pits into road reserves;
- Retrofit of raingardens/tree pits into carparks;
- Installation of permeable paving to driveways, carparks and low traffic streets;
- Rainwater or greywater harvesting from buildings;
- Improved water efficiency of fixtures, fittings and infrastructure (including irrigation);
- Diversion of building downpipes into on-lot raingardens; and
- Installation of green roofs or walls to buildings.

It is recognised that this is not a comprehensive suite of waterwise projects, as the focus of this assessment was on identifying ‘on-ground’ projects that could be delivered by the City (priority strategies 2.2, 3.4, 6.3, 8.5 & 10.4). Other waterwise outcomes will be delivered through implementation of the remaining strategies and actions in this report.

### Methodology

A desk top assessment was undertaken using available GIS information to identify potential water sensitive urban design project opportunities. The steps undertaken by this assessment are summarised below.

#### Step 1: Initial scan

1. Selection of City of Bayswater owned lands intersected by drainage – saved as “possible drainage projects”
2. Selection of City of Bayswater owned lands within 50m of River – saved as “possible foreshore projects”

3. Selection of Water Corporation owned lands intersected by drainage – saved as “possible Drainage for Liveability projects”

Visual consideration of aerial imagery and landuse information was undertaken within the created tables to:

1. Select City of Bayswater owned lands containing buildings to save as “possible waterwise buildings projects”; and
1. Select City of Bayswater owned lands containing carparks or streets to save as “possible other waterwise projects”.

## **Step 2: Project area identification**

This step involved the:

1. Review of land surrounding possible projects which intersect with adjacent City of Bayswater, Water Corporation & Other State Government agency owned lands;
2. Creation of boundaries around relevant lands in a new layer to save as “project boundaries”, with individual project names and reference numbers; and
3. Review of each project to add a suggested project type column. Project types used include:
  - a. Living stream
  - b. Roadside raingardens/tree pits
  - c. Carpark raingardens/tree pits
  - d. Permeable paving
  - e. Rainwater or greywater harvesting
  - f. Downpipe diversion to raingarden
  - g. Green roof or walls

## **Findings**

The Project area identification process has identified the following types of potential projects:

- Foreshore management plan
- 44 potential Drainage for Liveability projects
- 30 other potential drainage projects (9 are piped drains with potential for daylighting – low priority)
- 229 other potential waterwise stormwater projects of which:
  - 25 are buildings & other facilities;
  - 44 are rear laneways (possibility for permeable paving and/or other green infrastructure treatments but likely low priority)
  - Remainder are POS, Recreation Facilities, Carparks & Public Access Ways

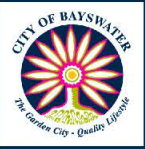
These potential project areas are presented on the following series of maps.

Map 1 – Potential foreshore management plan project boundary

Map 2 – Potential drainage project boundaries

Map 3 – Potential waterwise project boundaries

# Waterwise Bayswater







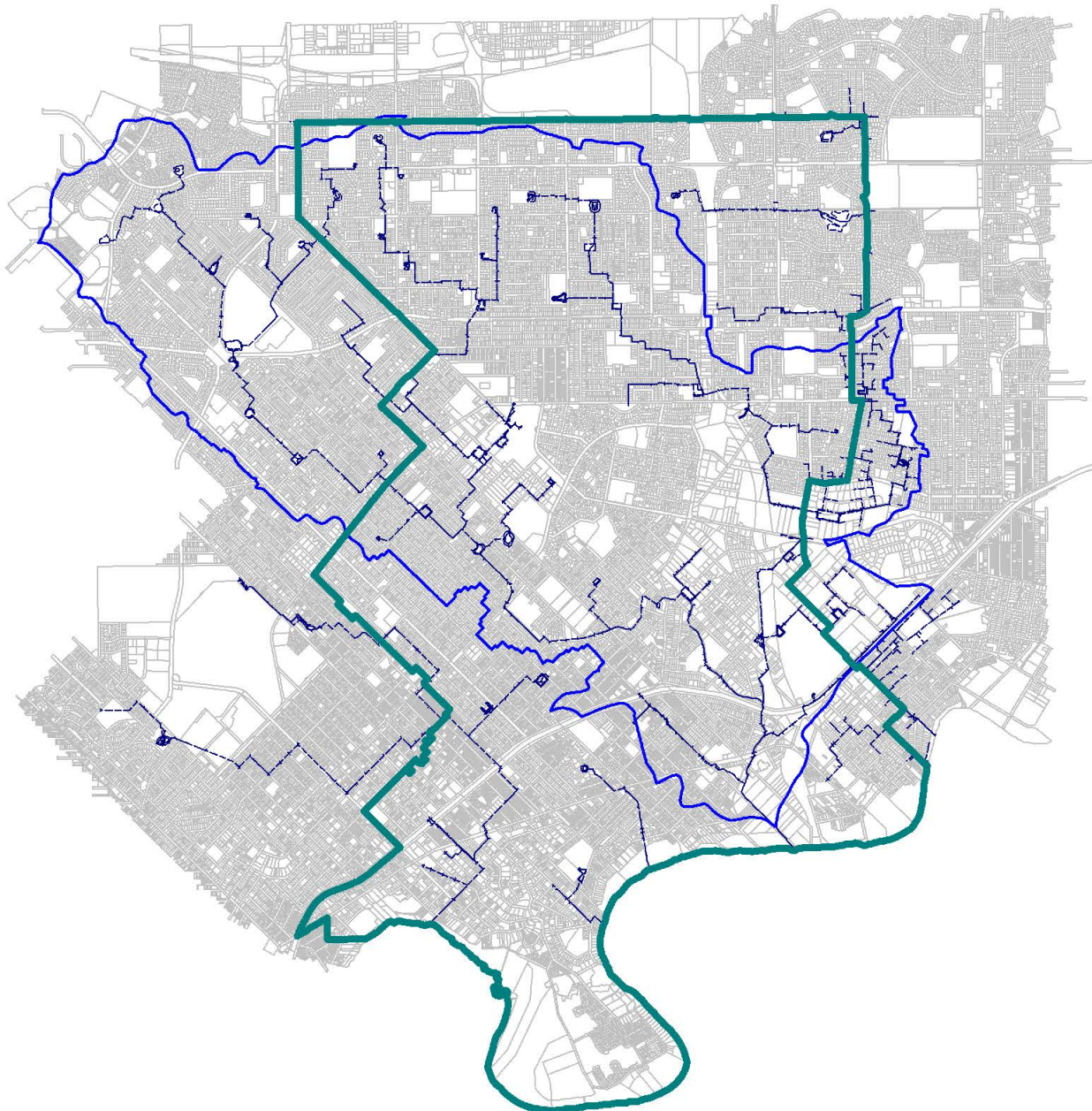
**urbagwa**  
land and water solutions

## Bayswater Brook Catchment

April 2020

### LEGEND

-  City of Bayswater
-  Bayswater Brook Catchment
-  Waterways and major drains
-  Cadastre



0 2.5  
kilometres  
Scale 1:60,000

# Waterwise Bayswater



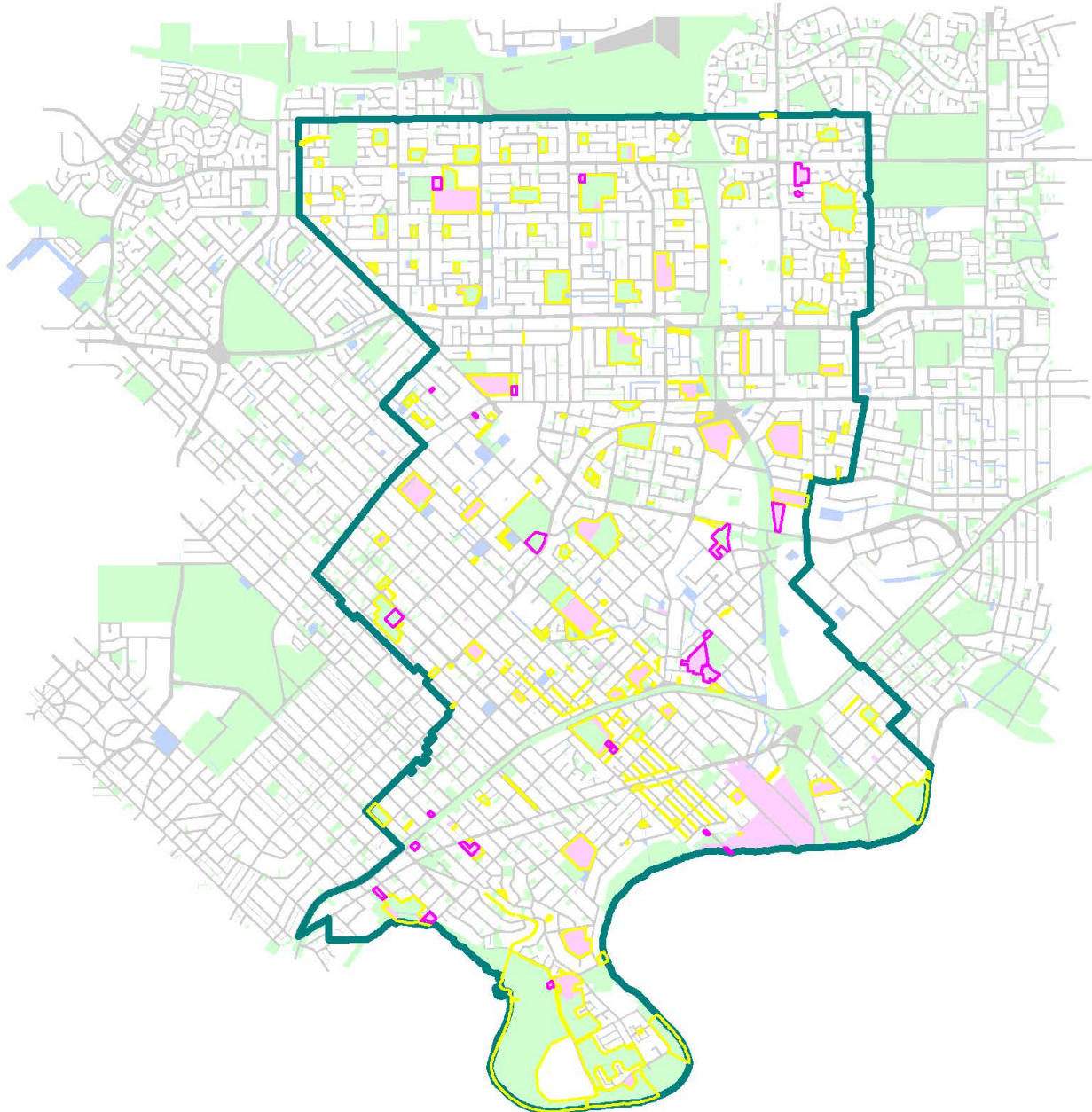
## Potential waterwise projects

April 2020

### LEGEND

-  City of Bayswater
-  Water Corporation landholdings
-  State Government landholdings
-  Road reserves and unallocated lands
-  City of Bayswater landholdings
-  Possible waterwise building project boundaries
-  Possible waterwise landscapes project boundaries

0 2.5  
kilometres  
Scale 1:60,000



# Waterwise Bayswater



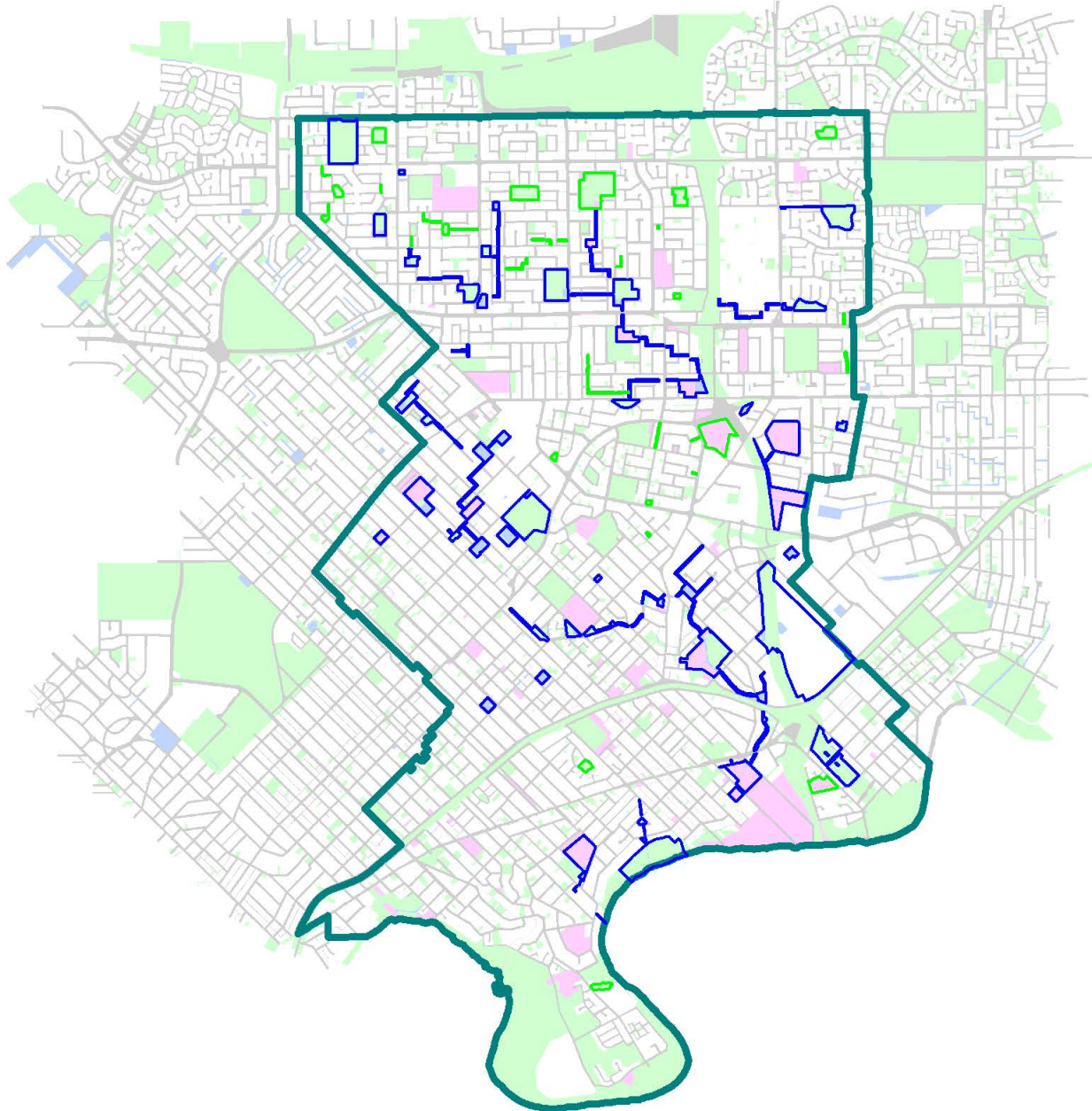
## Potential drainage retrofit projects

April 2020

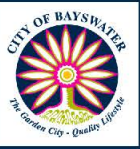
### LEGEND

- City of Bayswater
- Water Corporation landholdings
- State Government landholdings
- Road reserves and unallocated lands
- City of Bayswater landholdings
- Possible 'other' drainage project boundaries
- Possible Drainage for Liveability project boundaries

0 2.5  
kilometres  
Scale 1:60,000



# Waterwise Bayswater








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land and water solutions

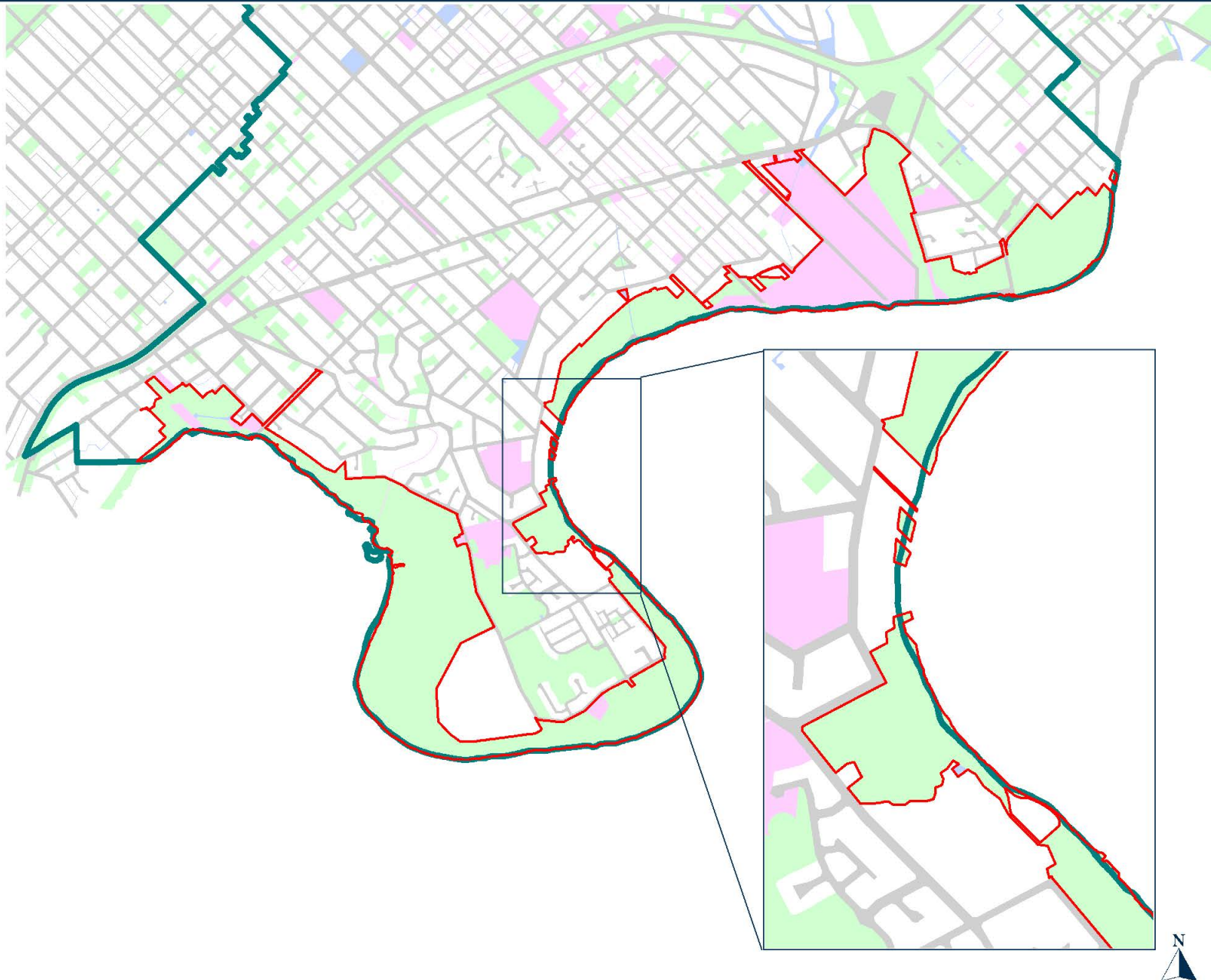
## Potential Foreshore Management Plan project

April 2020

### LEGEND

-  City of Bayswater
-  Water Corporation landholdings
-  State Government landholdings
-  Road reserves and unallocated lands
-  City of Bayswater landholdings
-  Possible foreshore management plan boundary

0 1  
kilometres  
Scale 1:30,000



## APPENDIX C: IDENTIFYING ENABLING STRATEGIES

A workshop was held with City officers and key stakeholders to identify priority enabling strategies using the Cooperative Research Centre for Water Sensitive Cities' Transition Dynamics Framework (TDF)(Figure 4). The TDF utilises the urban water transitions theory (Figure 2), and works through defined transition phases, focussing on the enablers (or domains) of change.

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
<b>1. Issue Emergence</b>	Issue activists	N/A	Issue highlighted	Issue examined	N/A
<b>2. Issue Definition</b>	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	N/A
<b>3. Shared Understanding &amp; Issue Agreement</b>	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
<b>4. Knowledge Dissemination</b>	Aligned and influential champions	Building broad support	Solutions advanced	Solutions demonstrated at scale	Refined guidance and early policy
<b>5. Policy &amp; Practice Diffusion</b>	Organisational champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Early regulation and targets
<b>6. Embedding New Practice</b>	Multi-stakeholder networks	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

Figure 4: CRCWSC Transition Dynamics Framework (Brown et al, 2016)

The phases of change (transition phases) are described in Brown et al but are summarised as follows.

In the **Issue Emergence** phase, a particular problem is identified (e.g. poor waterway health), followed by the **Issue Definition** phase, in which a cause of that problem is identified (e.g. stormwater pollution). The **Shared Understanding and Issue Agreement** phase is characterised by a common understanding of – and agreement on – the problem, its causes, and its repercussions. Solutions are not yet agreed on, but the need for action is acknowledged. From this point, the **Knowledge Dissemination** and **Policy and Practice Diffusion** phases are marked by greater agreement on the appropriate solutions among a broad cross-section of stakeholders. The final transition phase, **Embedding New Practice**, involves making the new practice mainstream.

With regards to the enablers, **Champions** comprise individual networks of people which grow over time with greater cross-section of stakeholders. **Platforms for connecting** are formalised or semi-formalised organisations, structures, and processes that facilitate collaborations across science, policy, and industry spheres. Their primary function changes over the course of a transition and so a number of different bridging mechanisms may be needed. **Knowledge** is based on scientific understanding of the problem and the potential solutions. It generally starts with contextualised knowledge informed by local research activities and changes through the course of a transition from fundamental science and pilot-scale investigations to more applied research and capacity building initiatives. **Projects** include experiments and demonstrations. They generally start with scientific prototypes which evolve into demonstration projects (proof of concept) then to large-scale field applications to build trust and sector-wide capacity. **Tools** are both administrative and practical and include legislative and regulatory instruments, market mechanisms, models, and best-practice guidelines which help embed the new practice. Early tools enable and support innovative approaches while later tools focus more on compliance and enforcement.

# Waterwise Bayswater

Participants discussed the practice changes required to embed waterwise behaviours and achieve the Vision for Waterwise behaviours. Each Enabler was discussed by the group, with the facilitator documenting the evidence that would support the phase of change, using the following key:

	Enabling factor fully present, regression unlikely
	Enabling factor present but vulnerable to regression
	Enabling factor absent, progression unlikely
	Enabling factor absent,, preceding conditions not established

The practice changes that were considered are provided below:

1. Achieving waterwise objectives for the natural environment requires a change in the way water system services are considered to contribute to environmental and ecological health across the municipality.
2. Achieving waterwise objectives for the environment we create requires better integration of urban planning and design with water systems and water services.
3. Improved waterwise living in the environment requires people (agencies and communities) to adopt more sustainable living practices.

The completed TDF assessments for each of the Environment and Liveability Framework areas are shown below.

## The natural environment

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
<b>1. Issue Emergence</b>	Issue activists	N/A	Issue highlighted	Issue examined	N/A
<b>2. Issue Definition</b>	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	N/A
<b>3. Shared Understanding &amp; Issue Agreement</b>	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
<b>4. Knowledge Dissemination</b>	Aligned and influential champions	Building broad support	Solutions advanced	Solutions demonstrated at scale	Refined guidance and early policy
<b>5. Policy &amp; Practice Diffusion</b>	Organisational champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Early regulation and targets
<b>6. Embedding New Practice</b>	Multi-stakeholder networks	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

The enabling strategies that are recommended to progress the required practice changes for the natural environment are:

- Build on the existing mechanisms for collaboration (established by the Bayswater Brook Action Plan) and continue to align influential champions to build broad support for practices that improve surface water and groundwater health, including management of impacts from the unsewered industrial area;
- Expand monitoring to include groundwater health and develop a program of drainage retrofits, coordinated with asset renewal projects, that increase groundwater recharge and deliver biodiversity and cooling benefits (use vegetation); and
- Continue to improve raingarden and living stream designs, incorporating the achievement of multiple outcomes (including tree canopy) and actively share outcomes with broader networks.

## The environment we create

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
<b>1. Issue Emergence</b>	Issue activists	N/A	Issue highlighted	Issue examined	N/A
<b>2. Issue Definition</b>	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	N/A
<b>3. Shared Understanding &amp; Issue Agreement</b>	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
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<b>6. Embedding New Practice</b>	Multi-stakeholder networks	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

The enabling strategies that are recommended to progress the required practice changes are:

- Build understanding amongst urban planning, design and development professionals about their role in delivering water outcomes;
- Build capacity of planning, design, development and water professionals to create pathways for scoping and implementing solutions that improve urban and built form outcomes;
- Implement trials and demonstrations of innovative urban and built form solutions that enable learning about how the elements of urban space can be integral parts of water management systems; and
- Consolidate and align policy and regulatory tools to strengthen the role of water in delivering quality urban and built form.

## Living in the environment

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
<b>1. Issue Emergence</b>	Issue activists	N/A	Issue highlighted	Issue examined	N/A
<b>2. Issue Definition</b>	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	N/A
<b>3. Shared Understanding &amp; Issue Agreement</b>	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
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<b>5. Policy &amp; Practice Diffusion</b>	Organisational champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Early regulation and targets
<b>6. Embedding New Practice</b>	Multi-stakeholder networks	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

The enabling strategies that are recommended to progress the required practice changes are:

- Develop a narrative to increase community understanding of water's role in liveability outcomes beyond water efficiency including an emphasis on shared responsibility;

- Enhance existing platforms for connecting to enable the sharing of ideas about localised solutions and the role of the community;
- Gather knowledge about the City's water balance to identify different source/supply opportunities including reuse; and
- Develop guidance to empower actions by individual businesses and homeowners including ideas for simple home interventions such as downpipe diversions into raingardens.



Client: City of Bayswater

Report	Version	Prepared by	Reviewed by	Submitted to Client	
				Copies	Date
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