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to live

WATERSHED: TOWARDS A WATER SENSITIVE DAREBIN

Darebin City Council
Whole of Water Cycle
Management Strategy

2015-2025



Acknowledgements

Darebin City Council acknowledges the Wurundjeri people as the traditional landowners and the historical and contemporary custodians of the land on which the City of Darebin and surrounding municipalities are located.

Strategy Development

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

Stakeholder Consultation

Council consulted with many others on this strategy including committees, groups, organisations, agencies, individuals and councils. This includes the following stakeholders:

- Melbourne Water www.melbournewater.com.au
- Yarra Valley Water www.yvw.com.au
- Office of Living Victoria www.depi.vic.gov.au
- EPA Victoria www.epa.vic.gov.au
- Monash University www.monash.edu
- La Trobe University www.latrobe.edu.au
- Merri Creek Management Committee www.mcmc.org.au
- Darebin Creek Management Committee www.dcmc.org.au
- Friends of Merri Creek www.friendsofmerricreek.org.au
- Friends of Darebin Creek www.friendsofdarebin creek.org.au
- Friends of Edgars Creek www.foec.org.au
- Friends of Edwardes Lake (no website) email: FoEL@live.com.au
- Yarra Riverkeepers Association www.yarrariver.org.au
- City of Banyule www.banyule.vic.gov.au
- City of Whittlesea www.whittlesea.vic.gov.au
- City of Moreland www.moreland.vic.gov.au
- City of Yarra www.yarracity.vic.gov.au
- City of Hume www.hume.vic.gov.au
- City of Melbourne www.melbourne.vic.gov.au
- Wurundjeri Tribe Land and Compensation Cultural Heritage Council (no website) email: wurundjericouncil@yahoo.com.au
- Darebin Environmental Reference Group www.darebin.vic.gov.au/Your-Council/How-council-works/Council-and-Elections/Community-Advisory-Committees
- Darebin Aboriginal Advisory Committee www.darebin.vic.gov.au/Your-Council/How-council-works/Council-and-Elections/Community-Advisory-Committees
- Darebin Disability Advisory Committee www.darebin.vic.gov.au/Your-Council/How-council-works/Council-and-Elections/Community-Advisory-Committees
- Darebin Ethnic Communities Council www.decc.org.au
- Darebin Parklands Association www.dpa.org.au
- Darebin community

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EXECUTIVE SUMMARY



Watershed: Towards a Water Sensitive Darebin, is a whole of water cycle management strategy for the City of Darebin. It sets out Council's approach to water management and marks our watershed – our turning point, a critical time for us to move forward and progress the way we manage water using a more integrated, whole of water cycle approach. This Strategy is our path to do that and to realise our vision of becoming a Water Sensitive City.

Water underpins our quality of life in Darebin. By managing our local water cycle well, we can deliver a range of environmental, economic, social and liveability benefits. Currently, we experience heavy impacts on our potable water supplies, pollution of our local creeks and increased risk of local flooding.

A water sensitive approach will deliver clear outcomes for Council, our residents and businesses in Darebin, creating a more resilient city, a healthier environment and more collaborative culture.

This strategy is supported by an Implementation Plan and Background Studies. Please refer to these documents for further detail.



Edwardes Lake



AG Davis Reserve, Preston

OUR VISION

Darebin will be a Water Sensitive City that values water and manages it wisely to enhance liveability, support a healthy environment and build resilience to drought and climate change: a city where people want to live.

Outcome 1: Water Systems to support a Resilient City

- Responsible use of water
- Fit for purpose water sources
- Best practice stormwater management
- Flood risk mitigation

Outcome 2: Water for the Environment and Liveability

- Healthy waterways and waterbodies
- Healthy ecosystems and biodiversity
- Greener spaces and healthy trees
- Good urban design

Outcome 3: Water Smart Council and Community

- Council working collaboratively
- Informed and engaged community
- Working partnerships
- Working together for joint benefits

Council will lead the journey to deliver a Water Sensitive Darebin, and to do this have developed a series of targets.

WATER SENSITIVE DAREBIN TARGETS FOR 2025

Water Systems to Support a Resilient City

Reduce Council's annual potable water use by 15%

Increase Council's annual use of water from alternative sources by 30 megalitres (ML)

Reduce the number of properties identified as being in high flood hazard zones from Council drains by 5%

Work with the State Government and others to support the reduction of annual residential potable water use to a maximum of 155 (L) per person per day

Work with the State Government and others to support the reduction of non-residential potable water use by 3%

Water for the Environment and Liveability

Reduce annual nitrogen load leaving the municipality by a further 650 kilograms (kg)

Continue to ensure that 100% of new or replacement trees planted have either:

- no irrigation need (beyond establishment)
- passive irrigation
- irrigation from alternative water sources

Ensure that 100% of sports grounds, sports courts, sports fields, sports courses and other sports areas have either:

- warm season grasses
- no irrigation need
- irrigation from alternative water sources
- treatment to reduce water use

Water Smart Council and Community

Hold a minimum of four Water Sensitive City Group meetings per year

Invest a minimum of eighty hours of Council staff total time in water-related training annually

Ensure 100% of water related capital works have an allocated maintenance budget

Hold a minimum of three water focused community engagement and education activities each year

Our strategy is supported by Background Studies and an Implementation Plan which provide a series of actions to drive change. Specific actions are listed in the Implementation Plan, however some of the key opportunities in Darebin include:

- The use of alternative water sources, such as rainwater and stormwater, for the irrigation of our sporting grounds, trees and open spaces
- The introduction of pollution prevention and water sensitive urban design measures which provide treatment of stormwater before it flows into our local creeks
- Best practice design of new developments and improvement of existing buildings
- Reducing the risk of flood damage to property through infrastructure improvements and landscape design
- Support of education and innovation in water management within the council and community



**WATERSHED:
OUR STRATEGY**

Edwardes Lake

WHAT IS THIS STRATEGY ABOUT?

Watershed: Towards a Water Sensitive Darebin, is a whole of water cycle management strategy for the City of Darebin. It sets out Council's approach to water management, considers all types of water and the benefits that good water management can bring to our neighbourhoods and environment. This Strategy marks our Watershed – our turning point, a critical time for us to move forward and progress how we manage water with a more integrated, whole of water cycle approach. This Strategy is our path to doing that and to realise our vision towards becoming a water sensitive city.

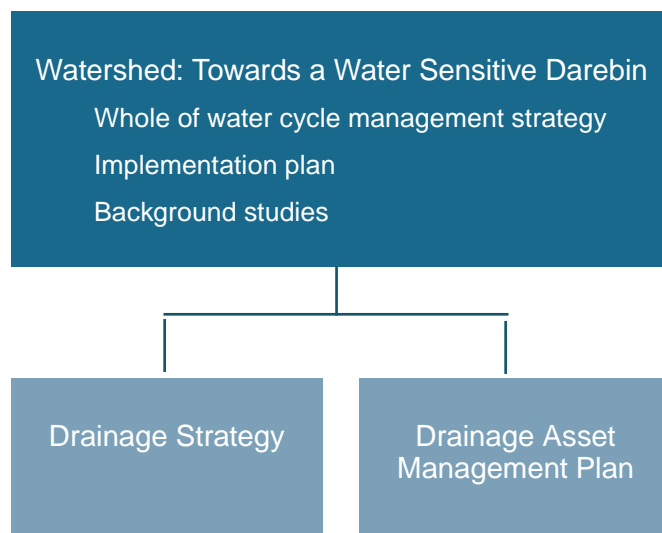
Water helps support a thriving future for our community. There are many types of water that influence our lives and support our City including the water we drink, the water that feeds our parks and gardens and the rainwater that falls in our municipality, flows across our land and into our local creeks.

Our strategy considers all these parts of the local water cycle, including:

- Water use
- Water supplies, both potable and non-potable
- Rainwater and stormwater management
- Water pollution
- Wastewater disposal
- Waterway ecosystem health
- Environmental flows
- Flood risk management
- Water for liveability and amenity

Our strategy is underpinned by Background Studies, which detail and analyse the Darebin context and water management information. It is also supported by an Implementation Plan, which sets out the specific actions Council will need to undertake to achieve our vision. Together these documents provide the roadmap for progression towards Darebin becoming a water sensitive city.

This strategy replaces Darebin's previous Sustainable Water Strategy, Stormwater Management Plan and Sustainable Water Use Plan and is supported by the Drainage Strategy and Drainage Asset Management Plan.



WATER MANAGEMENT IN THE CITY OF DAREBIN



Our urban context

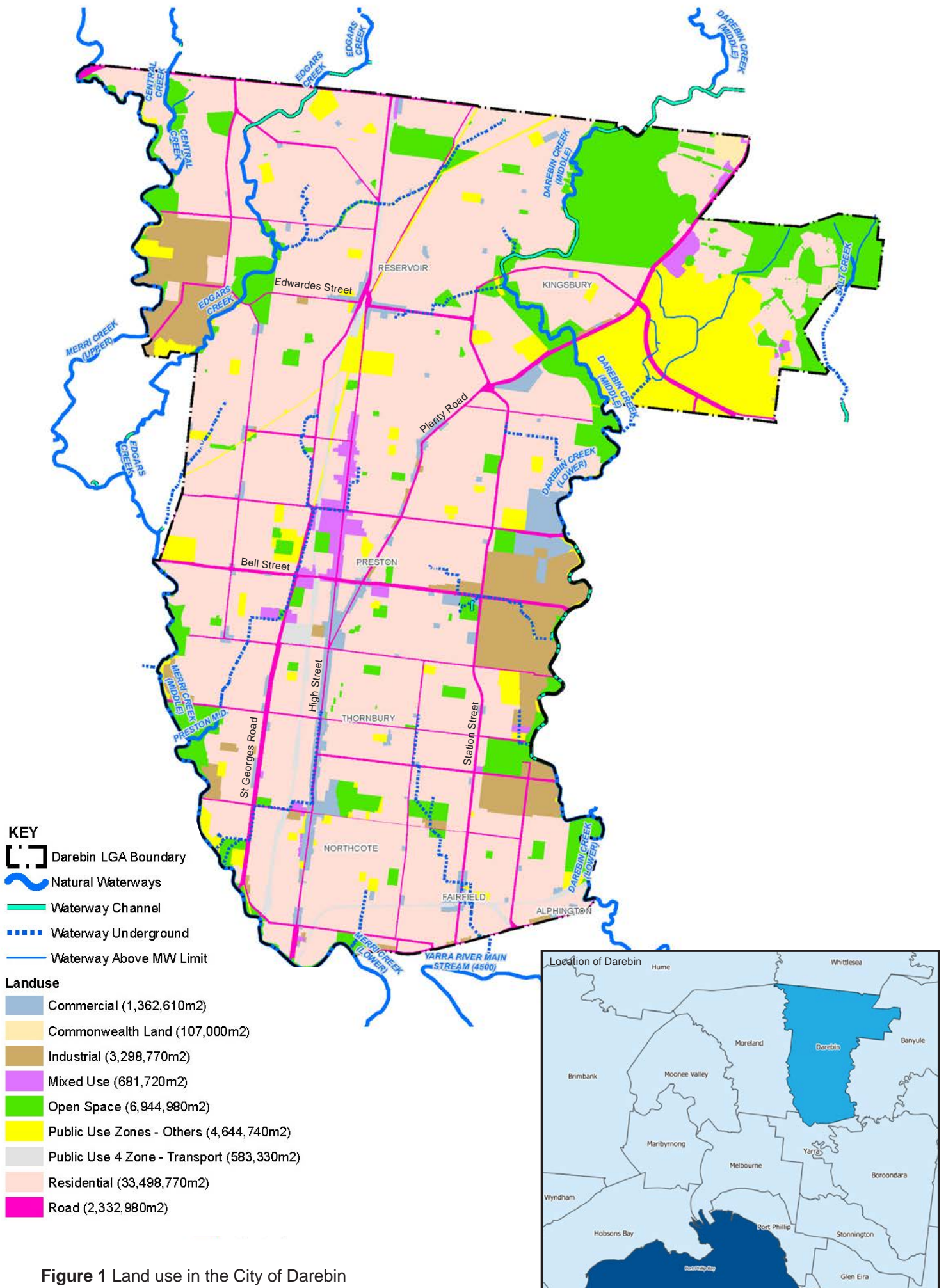
An understanding of the local urban context is important for understanding local water management issues and opportunities. The City of Darebin is mostly made up of residential neighbourhoods with clusters of commercial and industrial areas (Figure 1) and is a great place to live, in part because of its excellent access to local facilities, businesses, entertainment and restaurants. Darebin's urban centres are important places for people to meet and offer strong opportunities for water to be used to support improved amenity, street trees and vegetation.

Businesses in Darebin can play an important role in water management, by recognising the potential they have to harvest water from their sites. These opportunities allow businesses to identify ways that they can use or share this water with others. Industrial areas also have a significant role to play with regards to pollution. In industrial parts of areas such as East Preston and East Coburg, ensuring strong local pollution management is in place is critical to protect waterway health.

The largely residential nature of the city means that there are a variety of ways the local

community can make a difference to the local water cycle. This can include actions like creating greener streets and backyards which will naturally absorb rainwater, using downpipe diverters, creating raingardens at home for treatment and runoff reduction, or installing rainwater tanks to store water for toilet flushing, laundry or garden watering and decreasing the impact of nitrogen and stormwater runoff. Given the large number of homes in Darebin, such residential initiatives can have a significant collective benefit on the health of our local waterways.

Residents also enjoy access to a variety of sporting grounds and parks which function best when they are watered and healthy. Identifying and developing local water sources can ensure alternative supplies are available for irrigation to keep Darebin's open spaces green, protect the liveability and biodiversity of these spaces and enable them to be excellent recreation and leisure resources.



Our water cycle

Darebin is supported by a water supply system that distributes drinking water from the Melbourne potable water supply system and by a wastewater system that collects sewage from homes and businesses for treatment after use. The Melbourne water supply and wastewater systems use large amounts of energy to treat and distribute water across Melbourne. With the potential use of desalinated water in the future, this cost and energy intensity is likely to increase.

Water infrastructure systems support our homes and businesses by providing essential access to drinking water and protecting public health, however, the introduction of these systems has fundamentally changed the local water cycle and impacted on our environment in various ways. Melbourne's water supply depends largely on reservoir supplies, which draw their water from our river systems.

Darebin's stormwater drains carry rainwater from roofs and stormwater from roads to Edwardes Lake, Darebin Creek, Merri Creek and other local waterways, which then flow to the Yarra River and into Port Phillip Bay. When rain falls on our roofs and roads and runs off as stormwater, it carries pollution down the drains and into our treasured creeks. As Darebin is developed and more buildings are built, the proportion of paved and roofed areas increases, meaning more water runs into our drains instead of soaking into the ground. This creates problems with waterway health and local flooding.

Drought and water use

Melbourne's water mainly comes from the Thomson, Upper Yarra and Goulburn rivers. These rivers have reservoirs built on them, that they flow into. These reservoirs can become strained during drought conditions. In times of severe drought water restrictions may result. This can mean that our parks, trees and gardens are left with less or no irrigation, which can affect the liveability, health and amenity of our city.

During the drought that affected Victoria between 1997-2009 the average volume of water in Melbourne's mains water supply reservoirs dropped by almost 40%. This drastic reduction in potable water supplies led to the establishment of metropolitan wide water restrictions and the construction of the Victorian Desalination Plant (Wonthaggi). During the drought, Darebin City Council was one of the first to establish strong potable water use reduction targets, reduce irrigation, install water efficient appliances and rainwater tanks and undertake warm season grass conversions. Cumulatively, this reduced Council's water usage by 65%.

The Darebin community response to the drought was equally impressive. The establishment of water restrictions, water wise gardening, the installation of rainwater tanks and water efficient appliances and behaviour change all contributed the achievement of a 25% reduction in residential water use and a 40% reduction in business/industrial water use during this period. While the drought has eased, it is important to retain water efficiency measures for future resilience to changes in climate.

Our local waterways and water bodies

Darebin is bordered by two major creeks: the Merri and the Darebin. Both of these waterways are visited and travelled along frequently and are significant parts of the urban fabric in Darebin. They provide recreation, travel, wildlife and amenity corridors that the community values highly. Stormwater drains into each of these creeks throughout the catchment, as can be seen in Figure 2.

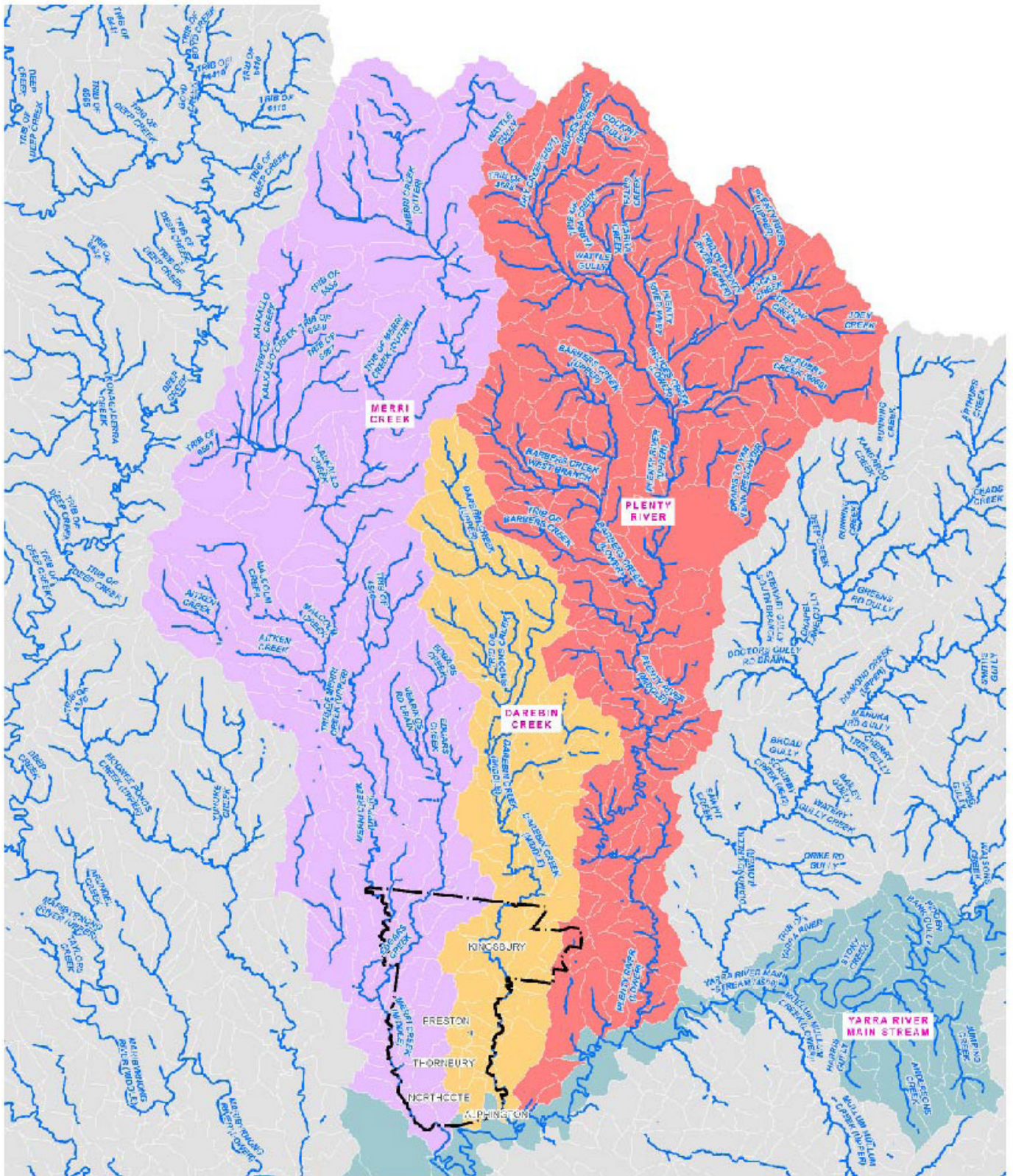
As Figure 2 shows, Darebin is located in the lower part of the catchments of both creeks. This results in the Darebin parts of these creeks being strongly influenced by impacts from upstream areas, with both creeks suffering from urbanisation impacts from water pollution and increased flows.

Darebin's waterways form an important part of our natural heritage, providing opportunities for current and future generations to experience and connect with intact landscapes of indigenous flora and fauna. The protection and enhancement of biodiversity and ecosystem health is central to the success of Darebin's waterways. Management of water quality and stream flows will support this, but it also needs to be complemented through enhancement and restoration of waterway corridors and associated habitat. Much work occurs to improve the biodiversity and ecological health of the creeks and their amenity and Council will continue to work with partners to provide ecological management, increase streamside planting and enhance community engagement around waterway improvement.

Darebin also has a major water body - Edwardes Lake - which is fed by Edgar's Creek and local stormwater. The lake is the second largest water body in metropolitan Melbourne (after Albert Park Lake) and provides a beautiful setting, as well as a local alternative water source for Darebin. The lake is highly valued and well used by the Darebin community and is a significant and treasured asset, providing substantial biodiversity habitat, strong recreation and leisure opportunities and cultural and social engagement points.

The urban stream syndrome

Urbanisation significantly affects the natural water cycle by increasing the proportion of hard surfaces (i.e. impervious areas) within a catchment and reducing the extent of vegetation. This greatly reduces the volume of water that is evaporated and transpired by plants into the atmosphere (called evapotranspiration) or infiltrated into groundwater. Conversely, stormwater runoff greatly increases, resulting in more frequent and severe flooding as well as altered stream flows. This greatly disrupts natural waterway ecosystems as it degrades both streamside vegetation and channel form. Stormwater runoff from an urbanised catchment also picks up various harmful pollutants before entering local waterways, including sediment, nutrients, litter, organic material, heavy metals, oils and surfactants. Collectively, the altered stream flows and increased pollution of natural waterways that occurs as a result of urbanisation destroys habitat and kills sensitive aquatic life. This predicament is often referred to as the 'urban stream syndrome'. In one way or another, urbanisation has had a significant effect on all the waterways in Darebin. Many of the targets and objectives identified in this strategy and the accompanying Implementation Plan are designed to mitigate these negative impacts.



KEY

Darebin LGA Boundary

Aisleways

Major Catchments

DAREBIN CREEK

MERRI CREEK

PLENTY RIVER

YARRA RIVER MAIN STREAM

Other Catchments



Figure 2 Catchments of the Merri and Darebin Creeks in relation to the City of Darebin

Water and pollutant balance for Darebin

The water and pollutant balance for the City of Darebin helps us to better understand the local water cycle (Figure 3). The balance shows the availability of water from different sources, the typical pollution levels of stormwater reaching local creeks each year, the amount of water used, pollutants removed and the balance remaining.

As the City of Darebin is predominantly hard surfaced, a large amount of stormwater runoff is generated across the city. Runoff from the roofs of our homes and businesses carry nitrogen, which can seriously impact on Port Phillip Bay over time. Runoff from roads and paved surfaces tend to carry sediments, solids and litter which harm our local creeks. Council has already installed a range of water sensitive urban design systems that remove stormwater pollution, but there is much more we and our community can do.

Approximately 9,000 million litres of stormwater runs off surfaces in Darebin and flows into the Merri and Darebin Creeks and other waterways each year. This amount is nearly equivalent to the 11,000 million litres of water that is piped into Darebin from Melbourne's drinking water supply, for use each year. We can reduce pressures on Melbourne's drinking water supply and also lessen harmful flows to our creeks by capturing and reusing rainwater or stormwater for non-drinking uses like toilet flushing and garden irrigation.

The water and pollutant balance is based on the most up-to-date Darebin land use data and a thorough analysis was conducted to select appropriate rainfall templates and pollutant concentrations for modelling. Substantial efforts were made to minimise the level of uncertainty in the final water and pollutant balance, however, a number of assumptions and approximations were required. It should be interpreted in light of these simplifications.

The water and pollutant balance provides an overview of the water cycle in Darebin and informs our targets and actions.



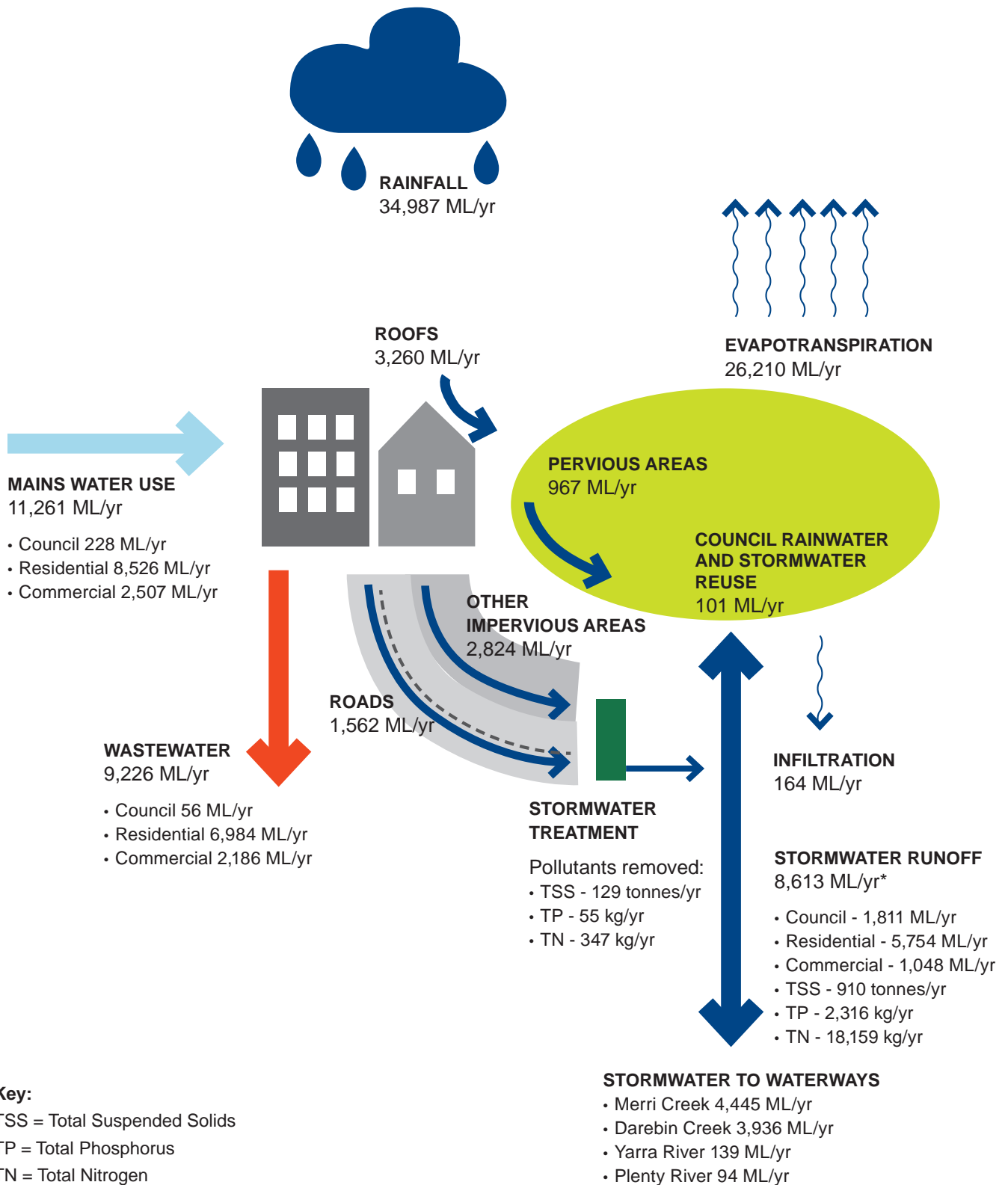


Figure 3 Water and pollutant balance for Darebin (2013/2014 data)

Darebin's journey so far

Council, government agencies, community groups, local residents and businesses have worked hard to continually improve water management and support the development of a healthy community and urban environment as the city has grown. From the 1800s, investment in water supply and infrastructure began, with ready access to fresh water as the urbanisation of this area started. Sewerage systems were also introduced to manage wastewater and protect public health. As the 20th century progressed, our community noticed that our environment was degrading, particularly with pollution of local creeks and more frequent occurrences of flooding. This increased concern resulted in more focus being given to waterway health. More recently, drought has emphasised the limitations of our current water supply system, and led to major improvements in water use behaviours and to new innovations in alternative water supplies.

Over the last 20 years, Council has invested in initiatives to improve local water cycle outcomes such as water efficiency measures, rainwater tanks, street raingardens, stormwater harvesting and wetlands. Residents, businesses, water companies, government and community groups in Darebin have also taken actions that have helped the city become more resilient, more self-sufficient in water and a better place to live. Figure 4 tracks an overview of the journey of water management in Darebin so far. Future focus needs to remain on creating a more resilient and liveable Darebin through greater use of alternative water supplies, better pollution control and flood mitigation. Through this strategy, management of the water cycle in Darebin will improve and our vision and our actions through our implementation plan will begin to move us towards becoming a water sensitive city.

RECENT INVESTMENT IN DAREBIN



RAINGARDENS

Raingardens and tree pits

In several streets in Darebin, Council has installed raingardens, which are gardens that are specially designed to capture and filter stormwater from adjacent roads and paved areas. By channelling stormwater runoff into a raingarden, the plants and trees planted in them are supplied with water to irrigate them. Below ground level there are different thicknesses of soil layers which filter out pollution in the water before it drains to local creeks. Excellent examples can be seen in High Street, Northcote, and on the corner of Ballantyne Street in Thornbury.

RECENT INVESTMENT IN DAREBIN



Bundoora Park

Bundoora Park stormwater harvesting

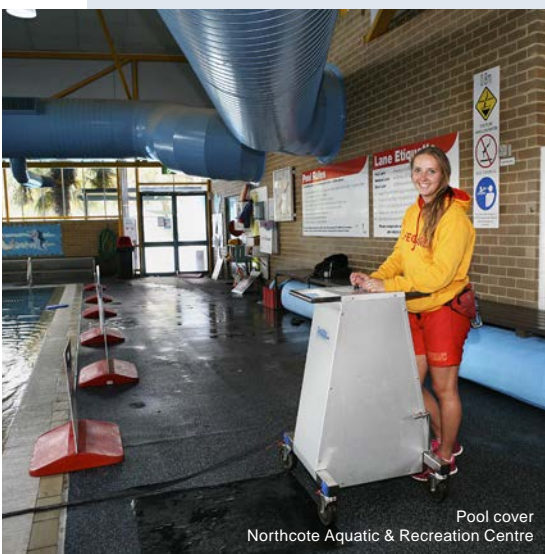
Darebin City Council undertook a comprehensive water management project to secure non-potable water supplies to irrigate Bundoora Park's Public Golf Course. Stormwater harvesting plays a key role in the park's reduced water consumption. At the centre of this is a 49 megalitre dam, which provides water for irrigation of the park's golf course. Stormwater run-off from the adjacent Mt Cooper housing estate is filtered through a gross pollutant trap, and then channelled through the park's wetland system, which is made up of five small billabongs and a number of grassy creek beds. To complement this, Council has also converted all 18 golf course fairways from cool season to warm season grass and has begun converting the tees.



Merri Creek and Darebin Creek

Caring for our creeks

Council works with several organisations and volunteer groups to improve and care for the Merri and Darebin Creeks and local waterways and water bodies. Significant work is done by the Creek Management Committees. 'Friends of' groups and Waterwatch groups are also of great importance for their work on these creeks. Recent initiatives include revegetation, litter removal, installation of walking and cycling tracks and pollution signage.



Council Facilities

Water efficient council facilities

Council has invested in a range of water efficiency and water management initiatives in our buildings and facilities over the last ten years, resulting in significant reductions in potable water use. Initiatives include the installation of low flow taps and showers, dual flush toilets and other fixtures, fittings and appliances in buildings. Pool covers were introduced at aquatic centres to prevent evaporation loss and rainwater harvesting systems, which are mostly used year-round for toilet flushing, were installed on a number of Council buildings.

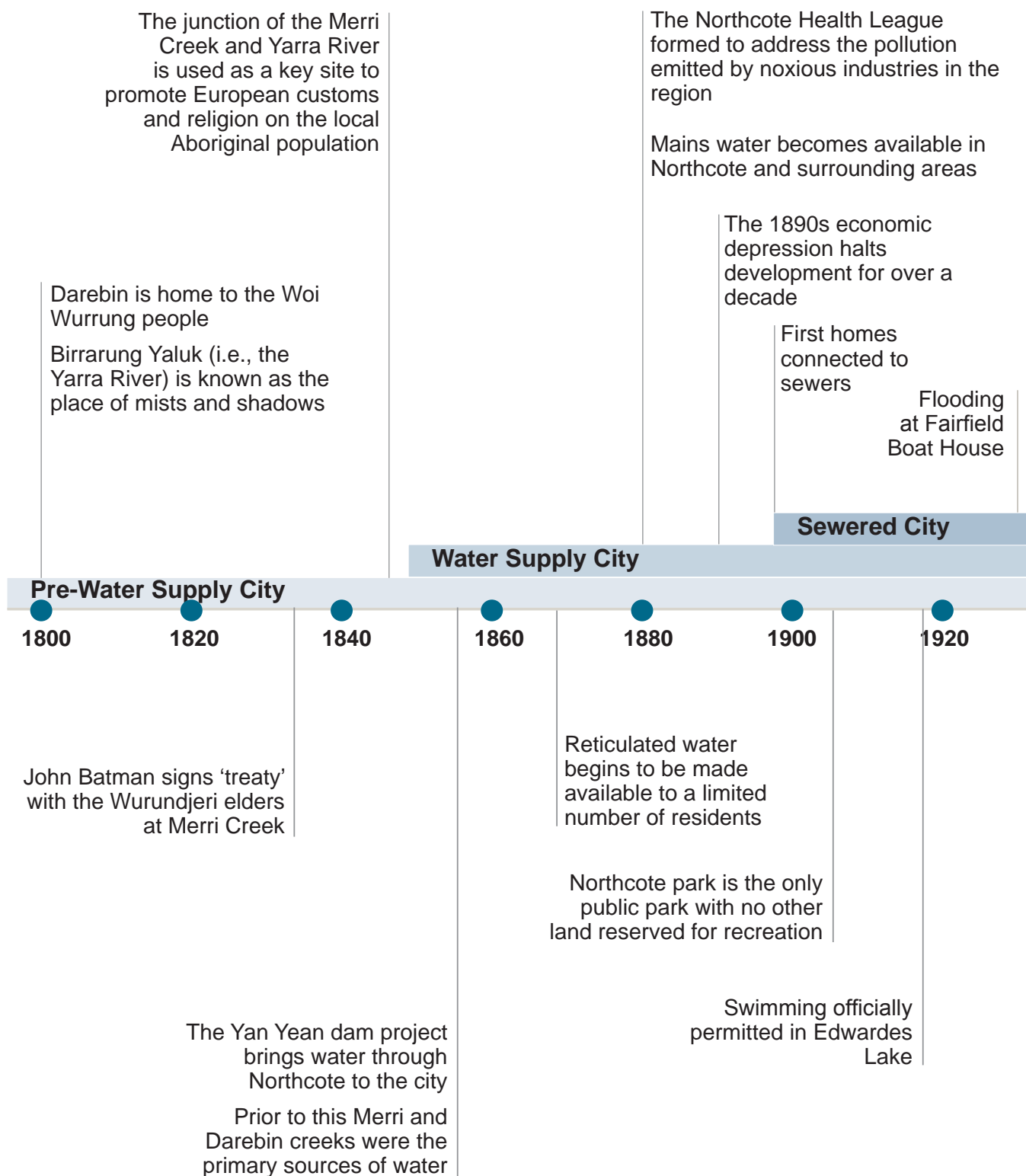
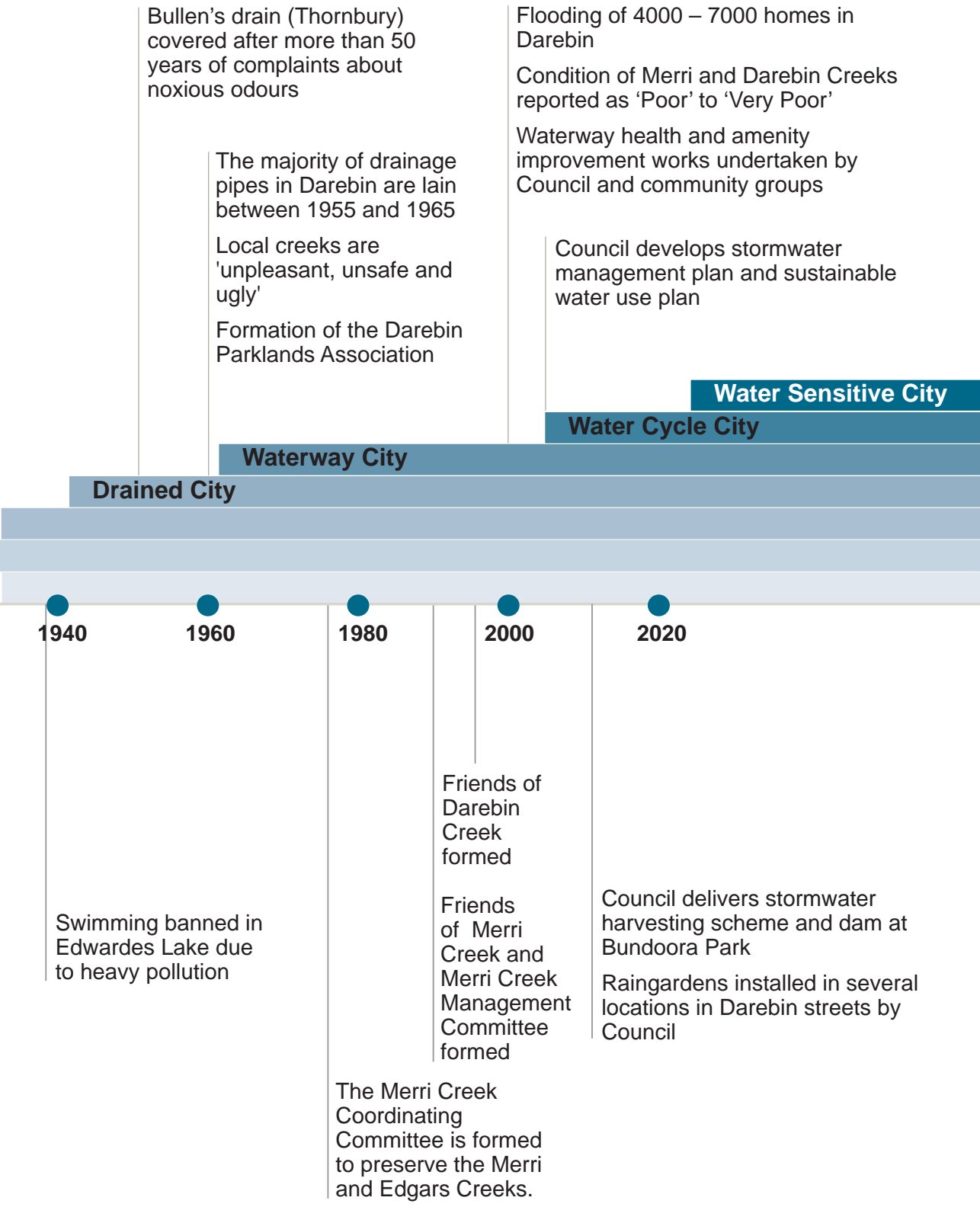


Figure 4 Timeline showing the changing focus of water management in Darebin's history



WHERE TO FROM HERE?

Making changes in Darebin for the better

As Darebin grows, we want to ensure we have best practice water management systems and processes in place so that the City of Darebin remains a great place to live and work. To do this Council and others will need to invest in a range of initiatives and undertake actions to improve and support management of our local water cycle.

Darebin benefits from access to a range of potential alternative local water sources which can be harvested and treated for many different uses. By using water sensibly and making more frequent use of local sources of rainwater, stormwater and recycled water, we can reduce our reliance on Melbourne's drinking water supply and become more resilient to the impacts of drought and climate change. This will support improved economic, social and environmental outcomes and help us to create a more liveable Darebin, with healthy trees, sporting grounds, green parks and gardens and efficient buildings and facilities.

Changes to water cycle management in Melbourne

The introduction of local water management systems, the use of alternative water sources and better management of stormwater are principles that are supported by national and state legislation. A vision has been set out for Melbourne as a whole that a range of partners including State Government, water utilities and local councils are working to achieve.

Better management and use of water locally will also help to support our environment. By reducing the amount of stormwater that flows into our creeks, we will improve water quality, ecosystems and biodiversity and the health of local creek habitats. We can do this by allowing more rainfall to soak into the ground or harvesting rainfall from our roofs and hard surfaces to use locally for laundry, toilet flushing and irrigation. Council can also introduce treatment systems into our drainage network, using plants, sands and soils to filter water and clean it before it reaches our creeks.

Water sensitive urban design techniques, such as stormwater treatment wetlands, rain gardens, rainwater tanks, buffer strips and permeable paving can provide these outcomes and play an important role in addressing urban water management issues. By using these techniques and reducing run off, decreasing stormwater flows and re-using rainwater and stormwater, we can remove pollution, lessen the number of times that the drainage system becomes overwhelmed and create a sense of place by bringing vegetation and water into our neighbourhoods.

Investing in better local water management, will improve the health and liveability of Darebin and will also better prepare us to support a growing population and be resilient and adaptive in the face of climate change.



Darebin Creek, Alphington

OUR VISION FOR THE FUTURE – A WATER SENSITIVE DAREBIN

Council, along with community groups, organisations and other stakeholders have set the future vision for Darebin to become a Water Sensitive City.

What is a Water Sensitive City?

A water sensitive city is one that uses an approach which considers the whole water cycle and looks at the city as a catchment. It considers the water that comes in and goes out of the city and identifies where we can use alternative water sources to reduce use of the drinking water supply and help offset flooding.

A water sensitive city works to ensure our waterways are clean and healthy, our biodiversity is protected and our trees and vegetation receive enough water.

A water sensitive city is one that is comprised of a water smart community, where its leaders are at the forefront and the community is engaged on water issues.

Figure 5 illustrates the three key principles that underpin a water sensitive city.

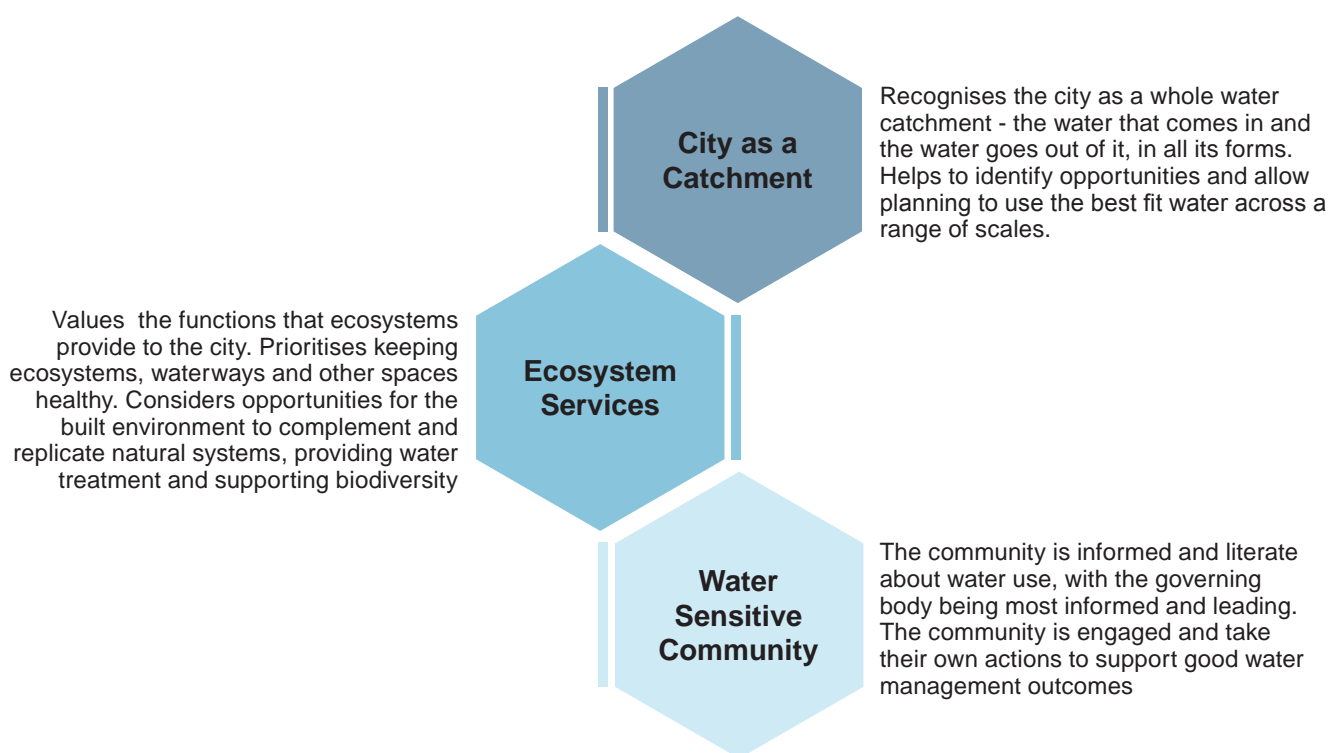


Figure 5 The three key principles of a water sensitive city

What is our vision?

Our vision for 2025 and beyond, is for Darebin to be a water sensitive city, drawing on these principles to become a city that is resilient, liveable, productive and sustainable.



Edwardes Lake



AG Davis Reserve, Preston

OUR VISION

Darebin will be a Water Sensitive City that values water and manages it wisely to enhance liveability, support a healthy environment and build resilience to drought and climate change: a city where people want to live.

Watershed: Towards a Water Sensitive Darebin Vision

Our Watershed: Towards a Water Sensitive Darebin vision focusses on the key issues and opportunities for our municipality. Based on these principles, the three primary outcomes we are working towards to create a water sensitive Darebin are:

Outcome 1: Water Systems to support a Resilient City

- Responsible use of water
- Fit for purpose water sources
- Best practice stormwater management
- Flood risk mitigation

Outcome 2: Water for the Environment and Liveability

- Healthy waterways and waterbodies
- Healthy ecosystems and biodiversity
- Greener spaces and healthy trees
- Good urban design

Outcome 3: Water Smart Council and Community

- Council working collaboratively
- Informed and engaged community
- Working partnerships
- Working together for joint benefits

Figure 6 Key outcomes to support our vision

Water systems to support a resilient city

A water sensitive Darebin is one that needs to be robust, with resilient water systems. Our vision for Darebin requires some changes to our water management systems and involves creating new infrastructure and adjusting existing assets. These actions will help ensure Darebin is better able to withstand the impacts of climate change, particularly risks of drought and flooding and that we are managing our local water sources in the best way possible. New technologies and water management techniques will allow us to improve water use efficiency and stormwater management in particular.

Responsible use of water

Both Council and local residents in Darebin have already achieved significant reductions in water use over the last ten years. Our growing appreciation of water as a precious resource has ensured we use water efficient fittings and appliances and have developed water efficient practices. Ongoing responsible water use is essential for future resilience to variations in climate.

Fit for purpose water sources

Our mains supply of water is high quality drinking water. However, other sources of local water can be used for some activities that don't require drinking water quality. Alternative water sources such as rainwater, treated stormwater or recycled water can be matched to local uses like garden irrigation and toilet flushing. Alternative sources of water can be delivered using local 'decentralised' water supply systems.

Best practice stormwater management

Council holds an important responsibility to manage local stormwater. We are committed to reducing the amount of stormwater entering our creeks and increasing treatment of stormwater that does. Council will work with partners to deliver water sensitive urban design and water quality treatment and continue to improve Darebin's drainage infrastructure to improve stormwater management.

Flood risk mitigation

Council is working with Melbourne Water and the local community to reduce flood risk in Darebin. Council will deliver, support and advocate for initiatives to increase permeability of ground cover, detain and reuse water on-site and provide drainage infrastructure to convey and slow flood water and reduce the likelihood of flood damage.



Raingarden
Keon Park Childrens Hub, Reservoir



Swale
The Common, Macleod



Passive-irrigation tree pit
Martin Street, Thornbury



Warm season grass conversion



Rainwater tank
Bundoora Park

Water for the environment and liveability

Understanding the role that the environment plays in the quality of our human life is a key component of a water sensitive city.

Darebin values its environment – especially its waterways and green spaces – for their inherent environmental and social qualities and also the improved liveability outcomes they provide. A water sensitive Darebin will protect and enhance local waterways, support multifunctional green public and private spaces and healthy urban trees. Providing the right type of water to support the local environment is important to protect the biodiversity, recreation, amenity and character of our neighbourhoods.

Healthy waterways and waterbodies

Framing the edges of the Darebin municipality, the Merri and Darebin Creeks are treasured community assets. They provide key recreational and travel routes, and function as crucial ecological and waterway corridors. Darebin has a significant water body at Edwardes Lake which is considered by some to be 'the jewel of the north'. Assets like these demonstrate the benefits of past and ongoing investment in ecological and water management improvement. Cleansing stormwater which flows from our developed areas into these aquatic environments helps to protect water quality. Riparian vegetation enhancement provides shade and woody debris for habitat. Natural channel design approaches to waterway rehabilitation can also provide a range of habitat types which support a diversity of animals and plants.

Healthy ecosystems and biodiversity

Although Darebin is an urban city, we have diverse ecosystems in our water and on our land. Recognising and valuing the roles these play and supporting them to become and remain healthy is an important component of Darebin becoming a water sensitive city. Darebin has significant biodiversity and good water management is essential to its conservation. By protecting and enhancing native vegetation, habitats, urban green corridors and water in our environment, we can look after our ecosystems and biodiversity more effectively while also managing water wisely.

Greener spaces and healthy trees

Our vision for a greener Darebin includes more trees in our streets and parklands and greener open spaces - parks, gardens and sporting grounds. Ensuring water for these will support healthy, green environments and provide beauty and shade to our city and help keep it cool, mitigating urban heat impacts on public health. It will also support the delivery of increased tree canopy cover as part of Darebin's Urban Forest Strategy. Using fit for purpose water sources and good water management will provide a range of benefits to the community, while minimising impacts on potable water supplies. Preserving and protecting existing indigenous landscapes will also minimise water needs. Multi-functional green spaces can provide public health benefits, stormwater treatment and flood management. Previous investments have already proven their worth, including use of rainwater tanks, stormwater harvesting and warm season grass conversions.

Good urban design

Access to high quality public spaces is core to liveability. Creating greener, more permeable public and private spaces will help reduce stormwater run off and improve our properties and streets. We can create green roofs or green walls, use stormwater in our backyards for watering and design our homes and public space with water in mind. By capturing and managing rainwater locally, we can create interesting water features and flow paths, using water for art, play and amenity. By having water on the surface rather than in underground drains, we can restore and create new water corridors to support local ecosystems and biodiversity and create attractive walking and cycling routes through the city.



AG Davis Reserve, Preston



Darebin Creek



Merri Creek, Northcote



Fez's Wetland, Thornbury



Edwardes Lake fitness stations



Edwardes Lake birdlife

Water smart council and community

An essential element of a water sensitive city is the people that create change. While Darebin as a city is already on this journey, more progress is needed to achieve our vision. The journey will require various partners to work together to bring about a range of benefits by demonstrating good communication, strong knowledge and continuous learning and ongoing commitment. Council as the governing body will take a leading role in the journey, ensuring it is and remains a water smart organisation, sharing and embedding knowledge to enable and support changes in practices, systems and infrastructure.

Council working collaboratively

An integrated approach to water management requires input and commitment from a wide range of Council staff, embodying a water sensitive leadership approach at all levels of Council. The initial community that will be engaged and supported is the internal Council community. This will ensure leadership, more collaborative planning around whole of water cycle management and embedding of this new approach into work plans and key performance indicators (KPIs). Without such internal uptake, Council's ability to show leadership will be significantly hindered. Further developing and embedding water-focussed processes in Council, supported by strong communication systems and education programmes, is critical to create and deliver opportunities for change. Council will establish a new Water Sensitive City Group to lead this process and change.

Informed and engaged community

Residents, businesses, community organisations and groups play a central role in water management. Their choices about water use, water sources, runoff and stormwater are important, alongside the value that they place on our waterways and water bodies and green open spaces. Our community is critical in identifying potential projects on their sites - such as water harvesting opportunities - and have important impacts on Darebin's journey to water sensitivity. Council will investigate community projects with partners and support and encourage positive actions from our local community with training, education and knowledge sharing for behaviour change and capacity building.

Working partnerships

Water roles and responsibilities do not sit solely with Council, but are shared across a range of groups, agencies, organisations, other councils and individuals. Council values working with others in partnership – for example, this strategy has been developed with key partners. Council welcomes and prioritises working collaboratively with partners, as it is critical to support Darebin's transition to water sensitivity and to strengthen potential outcomes, actions and projects.

Working together for joint benefits

By managing the whole water cycle in an integrated way, there are opportunities to deliver multiple benefits. For example, using stormwater runoff to irrigate street trees can provide a water source, reduce creek pollution, reduce flood risk, support healthy trees and improve neighbourhood amenity. Council will advocate to key stakeholders and government to identify and incorporate multiple benefits in projects which have water sensitive and other positive outcomes.



Darebin Council rain garden tour



Waterwatch group meeting



Water efficient showerhead exchange



Fez's Wetland, Thornbury

DAREBIN'S COMMITMENT - OUR TARGETS

Through this strategy, Council is committed to meeting our vision for Darebin to be a water sensitive city. To guide us in this, we have set targets to achieve our vision (see below). Our targets are important because they identify what needs to be done for Darebin to be water sensitive.

Through our Implementation Plan we have committed to undertaking key actions to achieve these targets and to ensure we are keeping on track, we will monitor progress towards meeting our targets each year and we will review the Implementation Plan actions and targets in five years (2020).

WATER SENSITIVE DAREBIN TARGETS FOR 2025

Water Systems to Support a Resilient City	Baseline 2013/14
Reduce Council's annual potable water use by 15%	228 ML/yr
Increase Council's annual use of water from alternative sources by 30 megalitres (ML)	101 ML/yr
Reduce the number of properties identified as being in high flood hazard zones from Council drains by 5%	to be determined by Darebin Drainage Review
Work with the State Government and others to support the reduction of annual residential potable water use to a maximum of 155 (L) per person per day	157 l/person/d (8,526 ML/yr)
Work with the State Government and others to support the reduction of non-residential potable water use by 3%	2,507 ML/yr
Water for the Environment and Liveability	
Reduce annual nitrogen load leaving the municipality by a further 650 kilograms (kg)	347 kg/yr
Continue to ensure that 100% of new or replacement trees planted have either: <ul style="list-style-type: none"> no irrigation need (beyond establishment) passive irrigation irrigation from alternative water sources 	100% replacement
Ensure that 100% of sports grounds, sports courts, sports fields, sports courses and other sports areas either have: <ul style="list-style-type: none"> warm season grasses no irrigation need irrigation from alternative water sources treatment to reduce water use 	to be developed in 2015/16
Water Smart Council and Community	
Hold a minimum of four Water Sensitive City Group meetings per year	N/A
Invest a minimum of eighty hours of Council staff total time in water-related training annually	N/A
Ensure 100% of water related capital works have an allocated maintenance budget	N/A
Hold a minimum of three water focused community engagement and education activities each year	N/A

Priority Actions

This strategy is underpinned by Background Studies and its Implementation Plan. The Background Studies give technical and specific detail on the data and information used to develop our strategy and the Implementation Plan. The Implementation Plan outlines actions and initiatives to meet our targets and deliver our vision. Specific projects and initiatives will be prioritised by the Water Sensitive City Group,

based on an evaluation of performance factors including the ability to deliver key outcomes, funding availability and value for money. An overview of some priority actions are listed below however, for detail on the specific actions, see this strategy's accompanying document - *Watershed: Towards a Water Sensitive Darebin Implementation Plan*.

<p>HARVESTING RAINWATER AND STORMWATER</p> <p>Council will deliver more rainwater and stormwater harvesting schemes to provide alternative water sources for irrigation and other uses.</p>	<p>PLANNING POLICY UPDATES</p> <p>Council is committed to reviewing planning policy on water management to ensure best practice standards are incorporated.</p>
<p>SUPPORTING A GREENER DAREBIN</p> <p>Council is committed to ensuring existing and new trees and gardens are kept healthy, using passive irrigation techniques and water sensitive urban design features.</p>	<p>SUPPORTING CREEK HEALTH AND BIODIVERSITY</p> <p>Council will work with partners such as Melbourne Water and EPA Victoria to improve the health of our local creeks and water bodies such as Edwardes Lake and protect and improve our biodiversity.</p>
<p>WELL-DESIGNED PUBLIC SPACES AND COUNCIL FACILITIES</p> <p>Through development and renewal of public spaces and major council facilities, Council will ensure our buildings and public realm are designed to incorporate best practice water management solutions.</p>	<p>CONTINUING TO REDUCE DRINKING WATER USE</p> <p>Council will continue to reduce our potable water use and support the local community in doing the same through water efficiency, behaviour change and the use of alternative water supplies.</p>
<p>FLOOD RISK REDUCTION</p> <p>Council will continue to deliver measures to reduce flood risk to properties and assets in Darebin by identifying high risk areas and putting in place mechanisms to reduce risk. Council will also continue advocating to and working with Melbourne Water to undertake flood protection works within the City to reduce the likelihood of Darebin properties flooding.</p>	<p>COUNCIL LEADERSHIP</p> <p>Council will show leadership in water management improving pollution, waterway health, drinking water and alternative water use through increased investment and improved outcomes for water management issues in Darebin.</p>
<p>MAKING THE BEST OF OUR EXISTING ASSETS</p> <p>Council will maintain and improve our existing assets which support a water sensitive Darebin, including raingardens, wetlands and lakes as well as existing rainwater and stormwater harvesting systems.</p>	<p>INNOVATION, EDUCATION AND BEHAVIOUR CHANGE</p> <p>Council will work to improve knowledge, skills and behaviour of staff and the community, through training, events, monitoring, workshops, information sharing, research and investing in demonstration projects and technologies.</p>

GLOSSARY

Alternative water source: Water that isn't sourced from the mains water supply system. This includes rainwater, stormwater, creek/river water and recycled water.

Billabong: A dead-end channel that extends from the main stream of a river to form an isolated pool of water that may only fill seasonally.

Background Studies: Provide information to support Watershed: Towards a Water Sensitive Darebin, Darebin City Council Whole of Water Cycle Management Strategy 2015-2025 and its associated Implementation Plan. The Background Studies present a detailed analysis of Darebin's water cycle and key opportunities for improved water management. They also outline contextual information and the results of consultation undertaken during the development of the strategy.

Catchment: An area that drains to a given point, typically drainage is dictated by topography but may be modified by man-made structures including drains and canals.

Desalinated water: Potable water that is produced by removing salt and other minerals from seawater or brackish water.

Evapotranspiration: The combined processes of evaporation (i.e. the transfer of water from the land to the atmosphere) and transpiration (i.e. the transfer of water from plants to the atmosphere).

Green roofs: Green roofs consist of a growing medium, typically soil, and vegetation placed on a roof surface. The vegetation and soil soak up rainfall and in the process reduce runoff and pollutants entering the stormwater drainage network. Green roofs may be extensive (i.e. thin

growing media that only support small plants) or intensive (i.e. deep growing media that supports large shrubs and even trees).

Green walls: A wall that is partially or completely covered with vegetation, this vegetation is supported by a growing medium such as soil. Green walls are also known as living walls or vertical gardens.

High flood hazard: An area that has a high probability of being inundated with substantial volumes of water during major rainfall events.

Infiltration: The process by which surface water enters the soil.

Implementation Plan 2015-2025: Provides a framework for action to support the delivery of Watershed: Towards a Water Sensitive Darebin, Darebin City Council Whole of Water Cycle Management Strategy 2015-2025. The Implementation Plan sets out the outcomes, targets and actions to develop our path and to realise our vision of becoming a water sensitive city.

Local water cycle: The interactions between the various water streams (e.g. rainwater, stormwater, potable water, greywater, wastewater) in a discrete area that is smaller than the regional scale but larger than the lot scale. In the context of this strategy the local water cycle refers to the interactions between these streams within the City of Darebin.

Natural heritage: The social and environmental value provided for current and future generations as a result of a range of complex interactions between physical and non-physical processes that support ecosystems of native flora and fauna.

Nitrogen load: Nitrogen is an essential chemical element that is required by animals and plants. However, high levels of nitrogen contribute to eutrophication (i.e. nutrient enrichment including algal blooms) in waterways.

Non-potable water: Water that is not fit for drinking purposes but may be fit for other end uses (e.g. garden watering, toilet flushing etc.).

Passive Irrigation: Irrigation that occurs without active intervention (i.e. not using an irrigation system). Generally refers to areas that are irrigated through stormwater flow.

Potable water: Water that is fit for drinking purposes.

Rain garden: A garden which uses plants and layered filter media (soils and sands) to capture, retain and filter stormwater before slowly releasing it to ground or into the stormwater system.

Runoff: Rainfall that hits the surface of an area of land, a building or structure etc. and drains away.

Sewage: Liquid and solid waste transported in sewers or drains (includes greywater and blackwater). In the residential sector this consists predominantly of water discharged from toilets, sinks, showers, baths and the laundry.

Stormwater: Surface water runoff that occurs as a result of rainfall from all surfaces within a catchment (e.g. roofs, driveways, roads, footpaths and vegetated areas).

Stormwater harvesting: the process of collecting, treating and then reusing stormwater. Typically stormwater is harvested to supply non-potable water demands, however the technology exists to treat stormwater to a potable (i.e. drinking) water standard.

Stormwater treatment wetland: A vegetated waterbody that is specifically designed to treat stormwater (i.e. reduce inflow velocities, settle sediments and remove pollutants).

Tree pit: An infiltration trench which is located adjacent to a tree to facilitate passive irrigation.

Warm season grasses: Grass species that require less water and are able to survive and even often thrive on sporadic summer rainfall (e.g. Couch, Buffalo and Kikuyu).

Wastewater: See sewage.

Waterbodies: Natural or man-made structures that store water, in some cases waterbodies also provide a treatment function (e.g. sedimentation) and/or habitat value.

Water efficiency measures: Tools and techniques used to reduce the volume of water used to sustain human activity, examples include installation of fittings and appliances that reduces water usage and loss and landscaping/gardening that reduces the need for irrigation.

Water sensitive city: A water sensitive city is one that uses an approach which considers the whole water cycle and looks at the city as a catchment. It identifies where we can use alternative water sources to reduce use of the drinking water supply and help offset flooding and ensures our waterways are clean and healthy, our biodiversity is protected and that our trees and vegetation receive enough water.

Water sensitive urban design (WSUD): A holistic approach to water management that integrates urban design and planning with social and physical sciences in order to deliver water services and protect aquatic environments in an urban setting. A WSUD approach could include the integration of rain gardens and wetlands in an urban area to manage stormwater.

Waterway: A defined route that water travels along, including a tributary, creek, river or canal.

Wetland: An area that is permanently or seasonally saturated with water. Water within a wetland may be static or flowing, fresh, brackish or saline.

Whole of water cycle approach: An approach that considers the sustainable management of all types of water in the urban water cycle. It optimises opportunities and manages risks and costs of water management by considering all aspects of the urban water cycle at multiple scales.



the place
to live



Darebin Creek, Alphington

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