



GLEN EIRA
CITY COUNCIL

BENTLEIGH
BENTLEIGH EAST
BRIGHTON EAST
CARNEGIE
CAULFIELD
ELSTERNWICK
GARDENVALE
GLEN HUNTLY
MCKINNON
MURRUMBEENA
ORMOND
ST KILDA EAST

GLEN EIRA INTEGRATED WATER MANAGEMENT PLAN

DHUMBALI W'URNEET GADHABA

A COMMITMENT TO WORKING TOGETHER WITH OUR WATERWAYS

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Prepared by E2Designlab and Three Seeds Agency
with input from Rain Consulting (Flood Assessment)
and Spatial Vision (Permeability Assessment)

CULTURAL SAFETY

Djilbruk/respect is more than a word.

Glen Eira City Council acknowledges that Boonwurrung language and concepts contained in this document are the cultural intellectual property (IP) of the Boonwurrung people. Council has been granted permission to include the cultural content contained in this document, with acknowledgment of its authors, N'arweet Dr Carolyn Briggs AM and David Tournier. It is shared for the purposes of this strategic report and associated communications and must not be used for other purposes without the appropriate permissions of N'arweet Dr Carolyn Briggs AM and the Boonwurrung Land and Sea Council.

Cover Image: Elster Creek Trail, Bentleigh. Photo: Philip Game.
The trail follows the former path of Elster Creek, which has been hidden underground since the late 1970s when it was reconfigured to create an enclosed drain.

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ACKNOWLEDGEMENT OF TRADITIONAL OWNERS

Glen Eira City Council acknowledges the Boonwurrung/ Bunurong and Wurundjeri Woi Wurrung peoples of the Kulin Nation as Traditional Owners and Custodians, and pays respect to their Elders past, present and emerging. We acknowledge and uphold their continuing relationship to land and waterways. Council extends its respect to all Aboriginal and Torres Strait Islander peoples.

Council honours the rich histories and cultures of First Nations peoples and recognises and values the important contribution of Aboriginal and Torres Strait Islander peoples in enriching our community. We support the Uluru Statement from the Heart and are committed to a *Reconciliation Action Plan* which is underpinned by the principles of self-determination. We work towards improved outcomes and long-term generational change, and to consolidate Glen Eira as a culturally safe place for Aboriginal and Torres Strait Islander peoples. We are committed to achieving equality for Aboriginal and Torres Strait Islander people to live healthy and prosperous lives and to improve life outcomes for current and future generations.

Glen Eira resides on country that always was, and always will be, Aboriginal land.

A CROSS-CULTURAL APPROACH TO INTEGRATED WATER MANAGEMENT

Dhumbali W'urneet Gadhaba

A commitment to working together with our waterways

W'urneet/water is the lifeblood of Boonwurrung Country. Local Elders past and present teach us that caring for the wellbeing of our waterways is caring for the wellbeing of our djeembana/community.

In the City of Glen Eira, w'urneet/water is often hidden or hard to see, flowing below the surface in stormwater pipes and drains rather than open waterways and wetlands/swamps. During intense rain events the memory of old waterways and swamps reveal themselves again. This can be a challenge but it can also remind us of the First Nations stories that have been connected to this place for millennia.

Similarly, understanding the impacts of colonisation can be confronting but also empowering because it gives us signposts for a shared yirramboi/future. We have an opportunity to weave together First Nations, Western and diverse knowledge systems to inform how we adapt to a changing climate. Opportunities for households, neighbourhoods, businesses and other stakeholders to contribute to this collective adaptation need to be clearly identified. We need to learn how to safely live with w'urneet/water.

Through a journey of djilbruk/respect, Glen Eira City Council has begun working with members of our First Nations community, including Boonwurrung Elder N'arweet Dr Carolyn Briggs AM and Senior Cultural Advisor David Tournier, so that we can find ways to improve the resilience and quality of life for all people who live in our local area.

We're committed to working together with our w'urneet/waterways and honouring the sacred wurrungi-biik/laws of this land.

EXECUTIVE SUMMARY

Glen Eira’s *Integrated Water Management Plan* is a commitment to working together with waterways (*Dhumbali W’urneet Gadhaba*) and an exploration of the relationships between water, place and people.

This Plan is informed by *Our Climate Emergency Response Strategy 2021–25/Dhumbali Wurrung-biik Parbin-ata* and the requirement to develop an integrated water management plan to support the understanding and management of the cultural, environmental, social and economic importance of Glen Eira’s water in the landscape.

Glen Eira’s community vision is for a thriving and empowered community working together for an inclusive and sustainable future. This vision and associated principles have informed the identification of six integrated water management (IWM) objectives and 20 locally relevant IWM actions to embed integrated water management in Council’s capital and operational works.

The three pillars of the First Nations-led *Kummargii Yulendji/Rising Knowledge Project* provide a framework for understanding IWM objectives and actions from the perspective of our *Dhumbali W’urneet Gadhaba*/commitment to working with water: This reflects Council’s aspiration of working toward a water-based partnership with the Boonwurrung Land and Sea Council through respectful and collaborative engagement on IWM planning and implementation.

YULENDJI KNOWLEDGE

DEEP LISTENING



Exploring how Indigenous and non-Indigenous knowledge systems can be woven together to inform and support integrated water planning.

Objective 1: Deepen Council and community understanding of water by bringing together First Nations and Western knowledge.

BALERT KOOLIN CAPABILITY

WEAVING KNOWLEDGE AND SKILLS



Building community capacity for working with water, including developing training and career pathways for local First Peoples to find their place in managing water on Country.

Objective 2: Engage, support and empower communities through a shared place-based commitment to work with our w’urneet/waterways.

Objective 3: Strengthen cross-organisational collaboration on community wellbeing, cultural regeneration, climate adaptation, urban greening and water management.

Objective 4: Support planning and implementation of integrated water management actions through urban development.

GADHABA WORKING TOGETHER

COLLABORATIVE PLANNING AND ACTION



Applying Indigenous and non-Indigenous knowledge to integrated water management systems and projects.

Objective 5: Identify strategic integrated water management opportunities in the municipality where ancient knowledge and new technology can be brought together.

Objective 6: Demonstrate best-practice integrated water management through regenerative on-ground project.

WHAT IS INTEGRATED WATER MANAGEMENT?

Defining integrated water management — a First Nations perspective

Through a series of facilitated cross-cultural workshops, a fresh perspective to our waterways has been uncovered, with the guidance of N’arweet Dr Carolyn Briggs AM and David Tournier.

The water cycle of which Boonwurrung Country is a part, linking mountains, rivers, bays and oceans, is a powerful framework for understanding how First Nations knowledge can inspire the way we live in Glen Eira, now and into the future.

Below is an illustration connecting water and cultural concepts:

- > Water is a living entity – People need to learn to live with water, not making water live with us.
- > Everything on Country is interconnected – We cannot separate water, land and life.
- > Traditional water management practices encourage the slowing down of water, embracing it as the lifeblood of cultural landscapes and communities.
- > Traditional flooding (in swamplands and marshes) is Mother Earth putting water where it needs to go.
- > Through cross-cultural collaboration we have the opportunity to use old knowledge in new, innovative ways.

HONOURING THE SACRED LAWS OF BUNDJIL*

Core principles to guide citizens in making *dhumbali* /commitments to care for Boonwurrung Country.



*Bundjil is the creator spirit of the Kulin Peoples and takes the form of a wedge-tailed eagle.

Figure 1: A visual guide to caring for Boonwurrung Country

WHAT IS INTEGRATED WATER MANAGEMENT? CONTINUED

Defining integrated water management – a Western perspective

Integrated water management (IWM) is a collaborative approach to water planning and management encompassing water supply (drinking and non-drinking water), wastewater, stormwater and groundwater that supports sustainable environments and healthy communities. IWM involves collaboration between State and local governments and the private sector, delivered through urban planning, design and development.



Figure 2. Integrated water management within an urban environment

WHAT IS INTEGRATED WATER MANAGEMENT? CONTINUED

Different terms are sometimes used to describe contemporary water management. The relationship between waterway catchments, integrated water management, water sensitive urban design and blue-green infrastructure is shown in Figure 3.

Water sensitive urban design

The inter-government agreement on a National Water Initiative defines water sensitive urban design (WSUD) as the integration of urban planning with the management, protection and conservation of the urban water cycle, that ensures urban water management is sensitive to natural hydrological and ecological processes. Urban design is a well-recognised field associated with the planning and architectural design of urban environments, covering issues that have traditionally appeared outside of the water field but nevertheless interact or have implications to environmental effects on land and water. WSUD brings ‘sensitivity to water’ into urban design, aiming to ensure water is given due prominence within the urban design processes.¹

Blue-green infrastructure

Blue-green infrastructure describes the functional role of the natural environment (water, soil and vegetation). Describing natural systems in this way makes it easier to include them in municipal asset planning and management systems, supporting the allocating of capital and operational resources to establish, protect and maintain their ecological function and associated value as part of our urban landscapes.

Blue-green infrastructure can support the retention of soil moisture in the landscape rather than discharging stormwater directly to underground piped drainage systems. This provides water for plant growth and improves the health and resilience of plants during dry periods.



Figure 3. The relationship between waterway catchments, integrated water management, water sensitive urban design and blue-green infrastructure

WHAT IS INTEGRATED WATER MANAGEMENT? CONTINUED

Benefits of integrated water management

Drinking water reliability

We have become more efficient in our use of water in recent times (particularly since the millennium drought). Continuing water-efficient behaviour, including use of water-efficient fixtures and fittings (indoor) and irrigation systems (outdoor) is important to ensure we minimise the use of valuable drinking (potable) water and make best use of alternative water supplies (eg. rainwater, stormwater and recycled water) for non-drinking purposes. Use of alternative water sources reduces the volume of stormwater and associated pollutants discharged into waterways, reducing flood risk and protecting receiving waters. It also reduces the discharge of treated wastewater to the bays and ocean.

A fit-for-purpose approach can be used to match the quality of water supplied to the quality of water required. This approach considers the risk profile of the intended water use (demand) and ensures water is treated to the standard required for this use, managing risks to end-users and improving reliability of supply.

Biodiversity – cooling, shade and habitat

Healthy urban vegetation and waterways support terrestrial and aquatic biodiversity. Well-designed blue-green infrastructure (eg. green roofs, passively irrigated vegetation, rain gardens, wetlands) can provide valuable habitat for native species, including plants, insects, birds and smaller animals. Increasing soil moisture within the landscape by increasing permeable surfaces provides water for plant growth and improves the health and resilience of plants during dry periods and drought.

Impervious surfaces (eg. roofs, roads and car parks) contribute to increased urban heat and reduced thermal comfort, particularly during hot and dry conditions. Dark surfaces absorb and store heat during the day and release it at night. Retaining water in the landscape through passively or actively irrigated landscapes contributes to urban cooling, offsetting offset urban heat impacts from dark

and/or impervious surfaces. Enhanced growing condition supports increased shading and greater evapotranspiration.

Flood risk reduction

Flooding presents substantial risks in some urban environments. Increasing rainfall intensities and sea level rise associated with climate change are increasing the severity of flooding and decreasing the level of protection (service levels) provided by existing drainage systems.

Increasing impervious surfaces associated with increasing population and urban densification will also exacerbate flood risks in some areas, as impermeable surfaces generate substantially more runoff than permeable surfaces.

On-site and regional stormwater management initiatives can influence the frequency and severity of local flooding resulting from stormwater exceeding the capacity of waterways (including piped drainage). Blue-green infrastructure in the private and public realm and stormwater harvesting can contribute to flood risk reduction.

Contemporary water management approaches recognise the potential benefits of combined stormwater retention and detention on flood risk reduction, particularly where this is undertaken at a local scale. This has the potential to defer or eliminate the need for new or upgraded drainage infrastructure to maintain or reduce flood risk in some areas.

Healthy receiving environments

Stormwater contains a broad range of potential pollutants, including:

- > litter or gross pollutants (man-made and organic);
- > sediment, nutrients and heavy metals;
- > pathogens; and
- > micro-plastics.

Water quality can be improved by reducing the volume of stormwater discharged to downstream environments through stormwater treatment using blue-green infrastructure in the private and public realm.

WHAT IS INTEGRATED WATER MANAGEMENT? CONTINUED

Improvements in stormwater quality are typically measured as a reduction in the amount of total suspended solids (TSS), total nitrogen (TN) and total phosphorus (TP) flowing downstream. As these pollutants are contained in stormwater, reducing the volume of stormwater flowing downstream through the use of blue-green infrastructure is an effective way of reducing stormwater pollution and improving the health and amenity of downstream receiving environments, including Port Phillip Bay and the water bodies in Elsternwick Park.

OUR WATER STORIES

Since the beginning of time (more than 60,000 years)

The City of Glen Eira exists on the traditional estate of the Yaluk-ut Weelam clan from the Boonwurrung language group of the Kulin Nation. Water from ephemeral streams, wetlands and springs (groundwater) has sustained the Yaluk-ut Weelam clan and their visitors for tens of thousands of years. They have witnessed and responded to changes in climate and sea level, including the retreat and inundation of Nerm (Port Phillip Bay) and the arrival of namadji (the white spirit). Their knowledge and connection continues today alongside the diverse peoples who live, work and play in Glen Eira.

Boonwurrung connection to Country extends back to a time when the sea level was much lower than it is now, when the Birrurung/Yarra River flowed across a large flat grassy plain to the warren/sea. Indigenous knowledge, conveyed via story through many generations, tells of the filling of the bay – a time of chaos.² It tells of an earlier part of our water story and reminds us of our responsibility to respect the laws of Parbin-ata/Mother Earth.

Dhumbali W'urneet Gadhaba – a commitment to working together with our waterways – reflects an understanding that waterways sustain our environment and people, that water and waterways are integral to our past, present and future, and that we have a shared responsibility to connect with and care for waterways. This commitment signals a return to a relational understanding of nature and people. It represents a positive step forward in our evolving understanding of water and waterways, moving beyond resource extraction towards management practices that benefit all forms of Life.

1800s

Describing the landscape of present-day Glen Eira and surrounds, early Europeans (c. 1840) wrote of:

“A network of small ephemeral meandering streams flowed into a marshy swamp near Point Ormond (Red Bluff) ... The area of wetlands waxed and waned with the weather, and were a source of food and wildlife for the Traditional Owners.”³

These waterways became a valuable water source for early Europeans with small land holdings in the area (from 1839) and by squatters passing through the area with cattle and sheep. We acknowledge this was interlinked with the dislocation and dispossession of First Peoples, disrupting their access to Country as well as their cultural resources and practices. Natural springs and constructed groundwater wells also supported market gardens in the Moorabbin area from the early 1840s (Cribben, 1995. Quoted in *The Elster Creek Story*).

“... natural springs were one of the main reasons for the early settlement of East Bentleigh and Cheltenham after Dendy's Special Survey. [Dobson] states that one such spring, at the corner of Centre Road and Bignell Road, had been a camping site for Aborigines [Traditional Custodians].”⁴

Caulfield Park was known as Paddy's Swamp in the 1850s. The following account provides a sense of how waterways were valued and used by Indigenous and non-Indigenous people at this time.

“Paddy's Swamp abounded in plants, black swans, wild fowl, eels and yabbies, all a rich source of food for local Aborigines. By the 1850s European settlers were utilising the swamp as a watering place for travelling stock. It was part of a string of swamps stretching out to the east on the south side of the ridge which carries Dandenong Road.

Early residents saw the area as a recreational area for picnics, fishing, duck shooting and strolling Paddy's Swamp and nearby Black Swamp were a source of water for homes

OUR WATER STORIES CONTINUED

and farms and the deeper pools were fished commercially. The catch was sold in nearby shopping centres or from barrows wheeled door to door. After commercial fishing was disallowed children still caught fish and yabbies as well as leeches which they sold to local chemists. The Deep Pool at Caulfield Park was a popular paddling and swimming place for local children.”⁵

Rippon Lea Estate was established by Frederick Sargood in the late 1860s.

“The Estate gardens were supported by an elaborate underground watering system, and the house had internal toilets (unusual in Melbourne at that time). With no mains water available, the stormwater harvested from surrounding suburbs (conveyed via the metropolitan stormwater infrastructure from as far away as Caulfield Racecourse) was stored in the ornamental lake and pumped by windmill for use within the Estate. A grey-water system is also understood to have been installed.

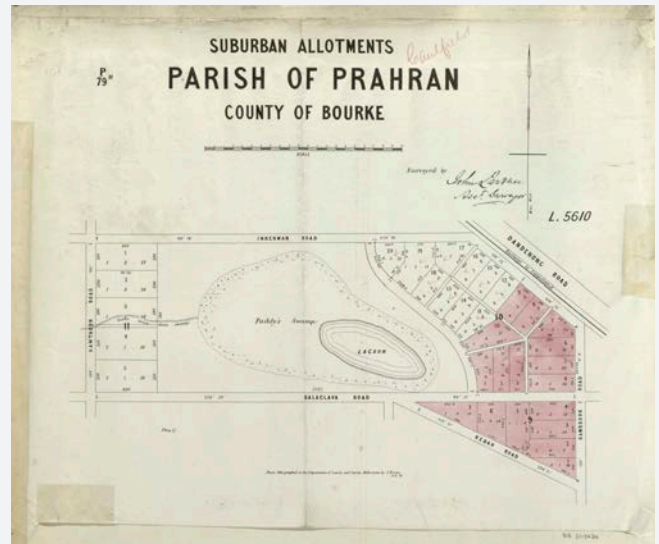
The original water collection and distribution system still exists and (as of 2004) was being reinstated by the National Trust for heritage and environmental reasons.”⁶

1900s and today

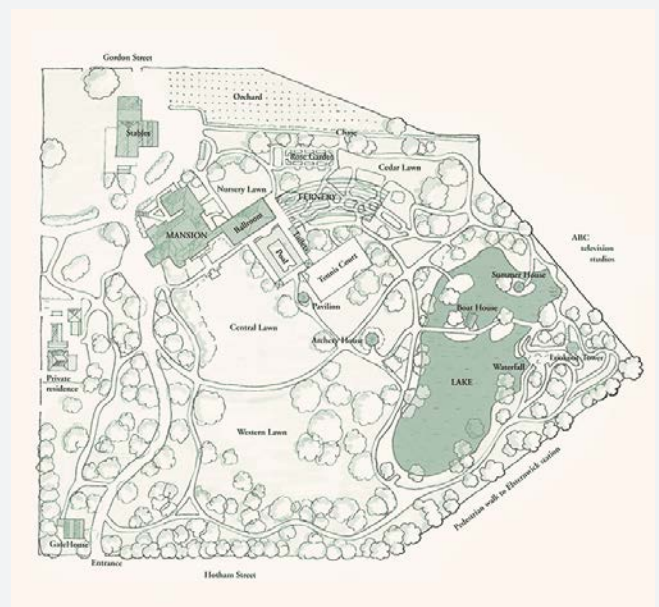
Many waterways within the City of Glen Eira are now hidden underground. Wetlands have been filled to facilitate urban development and ephemeral streams have been piped and covered over.

“... two early “river crossings” noted by Ward appear to have been associated with a seemingly unnamed creek that formerly wove through the eastern edge of the study area, in present-day McKinnon. Branching south from the more well-known Elster Creek, this minor watercourse gradually disappeared during the twentieth century, downgraded to the status of a mere drainage easement. While no trace of the creek itself remains visible today, its diagonal alignment is still evident in the pattern of subdivision extending from the south-east corner of Centre Road and Thomas Street, all the way to Brewer Road, and beyond towards the railway line.

Until it was reconfigured in the late 1970s to create an



Parish of Prahran. Source State Library of Victoria.



Rippon Lea Estate. Source: National Trust of Victoria.

OUR WATER STORIES CONTINUED

enclosed drain, Elster Creek was the only other significant watercourse in the study area ...”⁷

Many open space areas and habitat corridors within the municipality today are associated with natural watercourses and swamps.



Image: Elster Creek Trail, Bentleigh.
Photo: Philip Game.

Waterways

Waterways in the City of Glen Eira are shown in Figure 4. Most waterways within the municipality flow through underground drainage pipes. However, rainfall runoff in excess of the drainage capacity flows overland, impacting people and property.

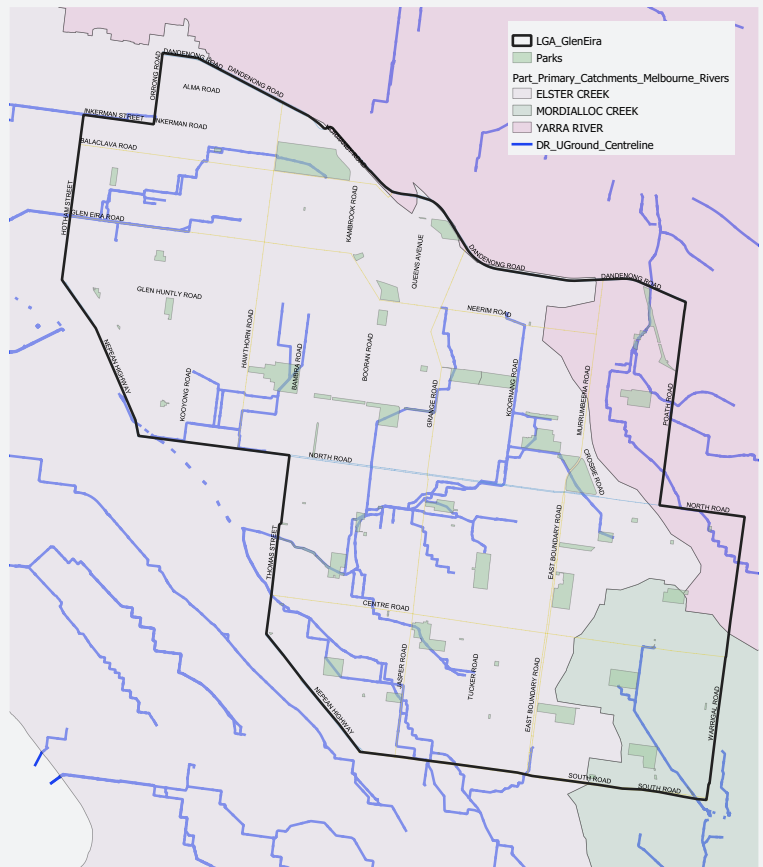


Figure 4. City of Glen Eira waterways and drains

OUR WATER STORIES CONTINUED

Water supply and use

Current water use by Council and the community predominantly comes from Melbourne's drinking water catchments, supplied via Melbourne's water supply system. Protected water catchments located to the north and east of Melbourne are managed by the Victorian Government Department of Environment, Land, Water and Planning, Parks Victoria and Melbourne Water. Melbourne Water also manages water storage reservoirs and water treatment and supply of water to regional storage reservoirs. South-East Water manages the local distribution of drinking water in the southern and eastern parts of Melbourne.

Annual rainfall across the municipality in 2019 was estimated to produce over 25,000 megalitres of water (refer Figure 9). An estimated 45 per cent of this water infiltrated into the soil or evapotranspired back into the atmosphere.

An estimated 11,412 megalitres of drinking water was used in the municipality in 2019 (refer Figure 9). Approximately 85 per cent of this water was used by residential customers. Non-residential customers account for 15 per cent of drinking water use, with Council using approximately 280 megalitres in 2019–20 and 200 megalitres in 2020–21 (two to three per cent of the municipal total).

Flooding

Local experiences of flooding have been reported since the earliest developments in the area and continued through the 1900s to today.

Research by the Glen Eira Historical Society shows ... "incidents varied from localised flooding of a former watercourse delineated by Long Street, Elsternwick (1904) to a major squall that caused widespread flooding and property damage from Brighton and St Kilda to Bentleigh, McKinnon and Glen Huntly (1918). While Bentleigh and environs experienced recurring floods during the 1930s, that decade brought reports of flooding elsewhere in the [municipality], including retail premises along Koornang Road, Carnegie (1934; associated with Melbourne's record-

breaking flood that year) and the Caulfield Racecourse (1937).

In the early post-war era, many of the new residential subdivisions in Bentleigh East suffered from inadequate drainage, resulting in localised flooding and oft-reported quagmires. Flash flooding in other parts of the study area has continued to occur to the present day, with major instances reported in 1996 and into the early twentieth century. According to a map prepared in 2018, the areas within the City of Glen Eira that still most prone to flash flooding include parts of Caulfield South, Ormond, McKinnon, Glenhuntly and Carnegie."⁸

Significant and frequent devastating flooding has occurred in the City of Glen Eira over a long period of time. Large flood events were experienced in February 2011 and December 2016, both of which resulted in wide-spread, above floor flooding of properties. Flash flooding (resulting from rainfall events where runoff exceeds the capacity of the local drainage system) in parts of Glen Eira was recorded in 11 out of 20 years between 1996 and 2017 (*City of Glen Eira Local Flood Guide*, 2018).

Investigations and works to mitigate flood risk are ongoing. A coordinated and collaborative approach to flooding issues in Elster Creek catchment was established in 2017 between Melbourne Water and Cities of Port Phillip, Kingston, Bayside and Glen Eira following the 2016 flood.

The Elster Creek Catchment Flood Management Plan 2019–2024 states:

"existing drainage infrastructure does not have the capacity to take the amount of runoff needed to eliminate flooding. The opportunity to add new infrastructure is limited due to the extent of existing development within the catchment. As future development within the catchment is expected to increase urban runoff, exposure to flooding events will remain an ongoing challenge and represents a complex problem."

Melbourne Water is in the early planning phase of work to increase the capacity of the Elwood Diversion Drain and reduce flooding in the Elster Creek catchment.

OUR WATER STORIES CONTINUED

CASE STUDY: BEST PRACTICE IWM IN GLEN EIRA

The multi-award winning park and playground at Booran Reserve is a leading example of integrated water management in Glen Eira. Booran Reserve was created through redevelopment of the decommissioned Caulfield Service Reservoir. Opened in 2017, the Reserve incorporates a 500,000 litre stormwater

harvesting system that treats and reuses water for open space irrigation and toilet flushing within the Reserve. Automated water and energy monitoring provides useful data to Council and on-site displays provide visitors with information about the former reservoir and new water sensitive urban design elements.



Image: Booran Reserve, Glen Huntly water play. Photo: Philip Game.

OUR WATER STORIES CONTINUED

Cultural values of water

It is not only waterways that have been hidden in recent times. First Nations knowledge and cultural practices related to water and waterways have also been hidden through dispossession, disease, massacre and forced assimilation. This knowledge is not completely lost – it endures in Country and is being reawakened through First Nations-led initiatives, such as the *Kummargii Yulendji/Rising Knowledge Project* and supported by an increasing awareness and understanding of the cultural values of water by Indigenous and non-Indigenous people.

KUMMARGII YULENDJI RISING KNOWLEDGE PROJECT

Kummargii Yulendji is a First Nations-led education platform and consultancy service designed to share Boonwurrung yulendji/knowledge with Western leaders and organisations through innovative, culturally-safe ways of working to address systemic socio-cultural, ecological and economic challenges.

By combining First Nations, Western and diverse cultural knowledge we become better equipped and resourced, working together towards our collective growth and the strategic development of our djeembana/community.

The facilitated workshops that have informed this *Integrated Water Management Plan* involved simple practices like listening both ways, intercultural knowledge weaving and partnership building based on common ground.

RESPONDING TO CONTEMPORARY CHALLENGES

Climate emergency

Glen Eira City Council declared a climate emergency in May 2020, joining the growing movement calling for urgent action to address climate change. This declaration represents a commitment to consider all Council decisions through the lens of climate change.

Dhumbali Wurrungi-biik Parbin-ata is the Boonwurrung name of *Our Climate Emergency Response Strategy 2021–2025* (the *Strategy*) and translates to Our Commitment to the Laws of Mother Earth. It emphasises the importance to Traditional Owners and Custodians of change and action starting within.

The *Strategy* sets out how we will:

1. respond to the climate emergency in our own operations;
2. support the community to take action; and
3. advocate to, and partner with, governments to drive stronger action.

All strategies, plans and policies developed by Council following the climate emergency declaration will outline opportunities to contribute to the goals and objectives set out in the *Strategy*. Actions will be integrated into annual work plans across Council to ensure climate action is truly integrated into our planning, implementation and reporting systems.

The *Strategy* identifies 70 actions to help deliver six goals:

	COUNCIL	COUNCIL SUPPORTING COMMUNITY
<p>SYSTEMIC: The foundational work necessary for an efficient, effective mitigation and adaptation response within our operations and in partnership with all sections of our community</p>	<p>GOAL 1 We embed climate change action in everything that we do</p>	<p>GOAL 2 Our community is active and mobilised on climate action</p>
<p>ADAPTATION: Preparing for the economic, social and environmental shocks that are expected due to climate change</p>	<p>GOAL 3 Council-owned buildings and infrastructure are resilient and safe for our staff and community</p>	<p>GOAL 4 Our community is protected from the worst impacts of climate change</p>
<p>MITIGATION: Reducing the carbon emissions that are the root cause of climate change</p>	<p>GOAL 5 Net zero corporate emissions by 2025</p>	<p>GOAL 6 Net zero community emissions by 2030</p>

RESPONDING TO CONTEMPORARY CHALLENGES CONTINUED

To have the biggest possible impact through the implementation of the *Strategy*, we will:

- > work in close partnership with our community, including learning from Traditional Owners;
- > replicate the successes and learn from the trials of other like-minded councils; and
- > deliver strategic initiatives and share our insights with other councils.

Action 3.1.4 of the *Strategy* is to develop an integrated water management plan to support understanding and management of the cultural, environmental, social and economic importance of Glen Eira’s water in the landscape.

Key climate risks in Victoria and the environmental, social and economic impacts associated with these climate risks on Glen Eira, are identified in the *Strategy*. The key climate risks are:



Lower rainfall



More frequent and intense heavy downpours



Rising sea level and increased frequency and height of extreme sea level events



Longer, more extreme fire seasons



Reduction in air quality due to bushfires



Higher temperatures year-round and more frequent and extreme heat waves



Fewer frosts

The frequency and severity of many of the associated climate impacts is influenced by our relationship with water and the way we manage it.

Increasing population, urban density and open space

Glen Eira’s population is estimated as 159,152 (2021) and is projected to reach 180,626 by 2036, representing an average annual increase of one per cent over the next 15 years.⁹ The largest population growth is predicted to occur in Caulfield North – Caulfield East (2.3% average annual increase) and the lowest in Ormond (0.4% average annual increase) and St Kilda East (0.1% average annual increase).

Social and economic disruption associated with the COVID-19 pandemic is expected to impact the size and distribution of future population growth, particularly population increases associated with overseas migration. Economic resilience and local amenity will also influence future population growth.¹⁰

Population growth, irrespective of the growth rate, will drive an increase in housing density and apartment living with a diverse range of associated climate-related implications. Increasing areas of impervious surfaces result in increased stormwater volumes and exacerbation of flooding as less water is infiltrated or evapotranspired. A greater proportion of impervious areas associated with roads, residential development, commercial and industrial precincts and recreational areas also increase pollutant loads flowing into sensitive downstream environments.

Demands on the quality and quantity of public open space will increase with a growing population, as will the need to mitigate impacts of climate change on urban heat. The availability of fit-for-purpose water to irrigate public and private open space, replenish soil moisture and support tree health is an increasingly important consideration.

RESPONDING TO CONTEMPORARY CHALLENGES CONTINUED

Community connection with water

Our relationship with water and waterways does not always reflect our understanding that water is essential for life. Our reliance on high-quality drinking water and efficient wastewater systems is often only considered when there is an issue that directly impacts us, such as the reduced reliability of supply during the millennium drought. With Elster Creek piped underground, our connection with the arteries of the landscape is often only sparked when the piped system capacity is exceeded during intense rainfall events.

This contrasts with the experience of Indigenous peoples and early settlers.

Remembering and reconnecting to local Indigenous knowledge creates opportunities for Indigenous and non-Indigenous communities to strengthen connection to Country and to plan for and use water responsibly in a changed and changing climate. Reconnecting to the knowledge and experiences of early Europeans is also important as we plan and create a sustainable shared future in Glen Eira.

Competing priorities and financial constraints

Glen Eira's *Council Plan 2021–2025* is structured around five priority areas, striving for a city that is:

1. well informed, with transparent decisions and highly valued services;
2. accessible to well-designed and maintained open spaces and places;
3. a liveable and well-planned city;
4. a green and sustainable community; and
5. a healthy, inclusive and resilient community.

Water-related objectives and actions identified in this *Integrated Water Management Plan* respond to these priority areas and align with the goals identified in *Our Climate Emergency Response Strategy*.

Council's ongoing financial sustainability underpins progress on all Council actions, including integrated water management. Council determines spending on

capital works and operational services within the financial constraints of the organisation. Actions related to the way we plan for and use water are considered within Council's broader capital, operational and financial planning processes.

Council's *Financial Plan 2021–22 to 2030–31* supports a strategic approach to place-based planning and integrated transport. The *Financial Plan* also identifies anticipated ongoing financial impacts associated with the COVID-19 pandemic in the medium to long term.

An invitation to dream forward

Dhumbali W'urneet Gadhaba/a commitment to working together with our waterways, is an invitation to come together and mark the beginning of a new chapter, one defined by cross-cultural collaboration on the regeneration of our waterways, where First Nations and Western knowledge weave together to improve the quality of life in Glen Eira.

Glen Eira's *Integrated Water Management Plan*, together with *Our Climate Emergency Response Strategy/Dhumbali Wurrungi-biik Parbin-ata* is a first step in response to this invitation.

STRATEGIC CONTEXT

Victorian integrated water management policy

Water for Victoria is a Victorian Government framework to guide smarter water management, bolster the water grid and support more liveable Victorian communities. This water plan identified eight themes and associated actions to implement the policy. The theme of ‘resilient and liveable towns and cities’ includes commitments to:

- > adopt integrated water planning across Victoria, with place-based planning supporting community values and local opportunities; and
- > put integrated water management into practice, working with water corporations to develop a common economic evaluation framework, promoting exemplar projects, building the capacity of the water sector and local government to participate, and continuing research to improve urban water management.

In 2017, the Department of Environment, Land, Water and Planning released the *Integrated Water Management (IWM) Framework for Victoria*. The *IWM Framework* provides guidance for government, the water sector and the community to work together to better plan and deliver solutions for water management across Victoria’s towns and cities. It also supports the establishment of regional IWM Forums to drive a coordinated delivery of integrated water management.

Catchment IWM strategic outcomes

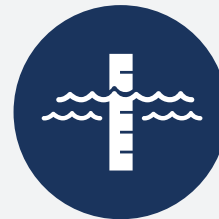
Glen Eira City Council participates in the Dandenong Catchment IWM Forum (incorporating Dandenong catchment and Melbourne’s Bayside area). Catchment IWM Forums identified seven strategic outcomes and three enabling factors (enablers) for catchment-scale integrated water management (refer Figure 5).



Safe, secure and affordable water supplies in an uncertain future



Effective and affordable wastewater systems



Existing and future flood risks are managed to maximise outcomes for the community



Healthy and valued waterways and marine environments



Healthy and valued urban and rural landscapes



Community values are reflected in place-based planning



Jobs, economic benefits and innovation



Enablers

Figure 5. Strategic IWM outcomes identified by Catchment IWM Forums

STRATEGIC CONTEXT CONTINUED

Alignment of Council strategies and plans with catchment-scale IWM strategic outcomes

Glen Eira’s *Integrated Planning and Reporting Framework* (Figure 6) shows the relationship between our community vision, Council planning and reporting, and community outcomes. This *Integrated Water Management Plan* is a tier two, four-year plan associated with *Our Climate Emergency Response Strategy*.

Alignment between government regulation and policies related to integrated water management at Commonwealth, State, regional and local levels strategies is shown in Figure 7. This Figure also shows the Integrated Water Management Plan relative to other Council strategies, plans and supporting documents.

An assessment of key recommendations, actions and priorities outlined in Council’s most relevant existing strategies was undertaken to identify alignment with catchment scale strategic IWM outcomes.

Table 1 illustrates the direct and potential contribution of Council strategies and plans to catchment-scale IWM outcomes. Successful implementation of IWM will also benefit other Council initiatives.

Most catchment-scale IWM strategic outcomes will be captured by this *Plan* and work alongside numerous other Council strategies and plans. Effective and affordable wastewater systems are addressed by Melbourne Water and South East Water and is outside Council’s obligations and ability to directly influence.

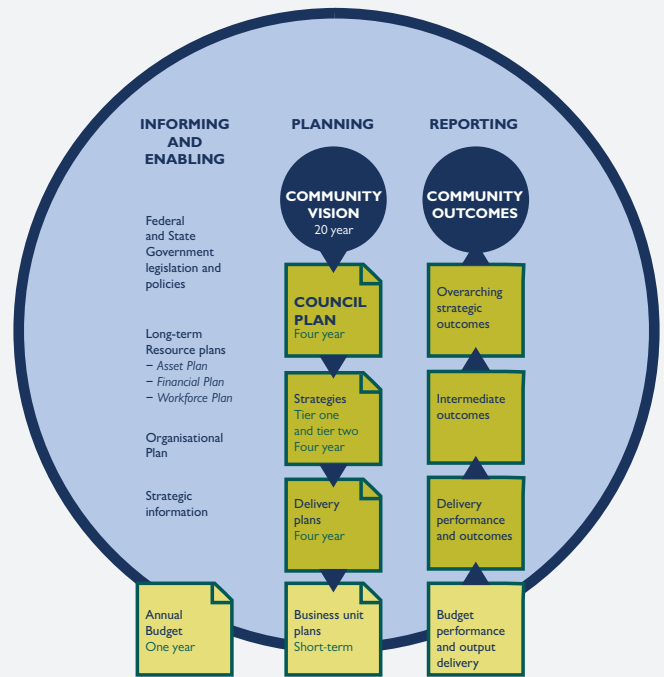


Figure 6. Glen Eira’s Integrated Planning and Reporting Framework

STRATEGIC CONTEXT CONTINUED

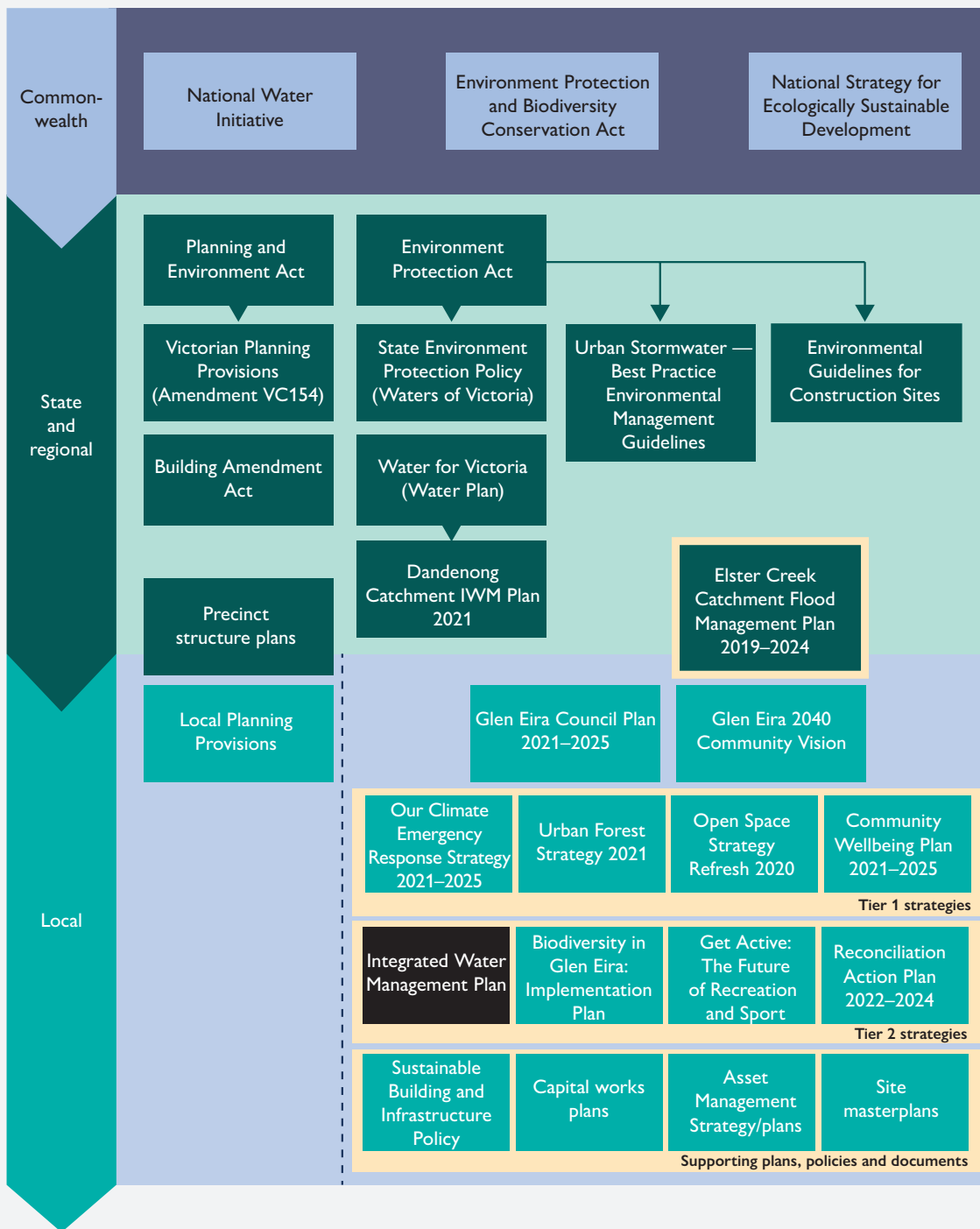


Figure 7. Existing policy framework relating to integrated water management in Glen Eira

STRATEGIC CONTEXT CONTINUED

CATCHMENT-SCALE IWM STRATEGIC OUTCOMES

COUNCIL STRATEGIES AND PLANS	Safe, secure and affordable supplies in an uncertain future	Effective and affordable wastewater systems	Opportunities are sought to manage existing and future flood risks and impacts	Healthy and valued waterways and marine environments	Healthy and valued urban, rural, agricultural and green landscapes	Community values are reflected in place-based planning	Jobs, economic growth and innovation
Glen Eira 2040 Community Vision					●		
Glen Eira Council Plan 2021–2025					●		
Our Climate Emergency Response Strategy 2021–2025					●		
Glen Eira Open Space Strategy Refresh (2020)	●		●	●	●	●	
Elster Creek Catchment Flood Management Plan 2019–2024	●		●	●	●		
Glen Eira Urban Forest Strategy (2021)	●			●	●	●	
Biodiversity in Glen Eira: Implementation Plan (2018)					●	●	
Glen Eira Community Wellbeing Plan 2021–2025				●		●	
Get Active: The Future of Recreation and Sport 2019					●		
Glen Eira Reconciliation Action Plan 2022–2024						●	●

KEY DIRECT CONTRIBUTION POTENTIAL CONTRIBUTION

Table 1. Alignment of catchment-scale IWM strategic outcomes with Council strategies and plans

STRATEGIC CONTEXT CONTINUED

A partnership approach to IWM

Integrated water management involves a co-ordinated approach to water planning and management, including deep collaboration between stakeholders who influence urban design, natural resource management, planning and economic development. Collaboration with multiple stakeholders (within and beyond Council) is often required to establish shared governance, funding and delivery mechanisms that enable multiple benefits to be delivered through integrated water management (refer Figure 8).

Partnering on integrated water management

Council’s involvement in the Dandenong Catchment IWM Forum (which also covers bayside catchments) is an example of a partnership approach to integrated water management. This collaborative, catchment-scale network provides ongoing opportunities for Council to partner with other stakeholders on integrated water management actions identified in this Plan.

Partnering on flood risk reduction

Elster Creek Flood Management Plan 2019–2024 was prepared by the Elster Creek Catchment Collaboration – a partnership between Melbourne Water, City of Bayside, City of Glen Eira, City of Kingston and City of Port Phillip established through the Elster Creek Catchment Memorandum of Understanding. It includes 20 deliverables with Glen Eira responsible for leading seven. These are related to land use planning and flood mitigation projects.



Figure 8. Multiple benefits of integrated water management

LOCAL CONTEXT

Water in the landscape

A municipal water balance quantifies the water flowing into the area, and the water and stormwater pollutants flowing out. Water flowing into the municipality includes rainfall as well as drinking water and non-drinking water used within the area. Water flowing out of the municipality includes infiltration and evapotranspiration, wastewater and water flowing into local waterways, including drains (stormwater). Pollutants in stormwater that flow into our waterways and bays are also quantified. Comparing current water balance and pollutant generation with estimated future water and pollutant flows helps understand changes over time and how to respond to these in ways that support our local environment, culture and economy.

The current (2019) water-balance for Glen Eira is presented in Figure 9 and the projected 2050 water balance under a business-as-usual scenario is presented in Figure 10. This information is from the *Dandenong Catchment Scale IWM Plan*.

Figure 9 shows the rainfall volume estimated to have fallen within the municipality in 2019 was 25,687 ML. Of this, an estimated 11,562 ML was infiltrated or evaporated.

The majority of water used in the municipality in 2019 was obtained from Melbourne's drinking water supply (11,412 ML), with a relatively small volume of water supplied by alternative sources (rainwater, river water, and stormwater). In addition, 14,125 ML/year of stormwater flows into local waterways from the municipality, carrying sediment, nutrients and other pollutants into Port Phillip Bay.



Figure 9. Glen Eira water balance – 2019 scenario (current) ¹¹

LOCAL CONTEXT CONTINUED

A summary of changes in the municipal water balance between the 2019 and 2050 scenarios is presented in Table 2.

The rainfall volume estimated to fall within the municipality in 2050 is 25,593 ML. The total volume is similar to the 2019 estimate. However, we expect lower average annual rainfall totals and more frequent and intense rainfall events due to climate change.

Infiltration and evaporation are predicted to decrease by approximately 17 per cent between 2019 and 2050 under a business-as-usual scenario. Without increased blue-green infrastructure (supported by fit-for-purpose water), a hotter, dryer and less comfortable urban environment can be expected.

Under a business-as-usual scenario, the demand on Melbourne’s drinking water supply from the municipality in 2050 is expected to increase by approximately 11 per cent to 12,412 ML, with only small increases in water from alternative sources (rainwater and stormwater). Stormwater flows into local waterways is expected to increase by approximately 20 per cent to 16,951 ML in this scenario, carrying an additional 23 per cent total suspended sediment volume and 29 per cent total nitrogen volume into Port Phillip Bay.

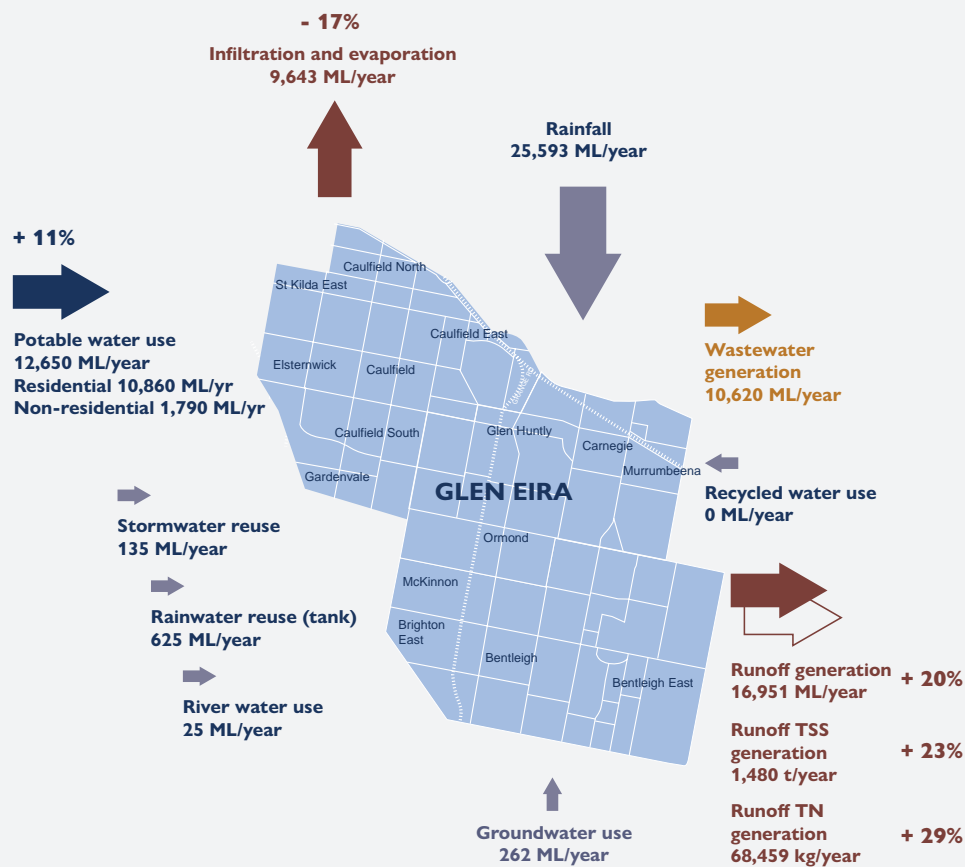


Figure 10. Glen Eira water balance – 2050 scenario (business as usual)¹²

LOCAL CONTEXT CONTINUED

PARAMETER	Change 2019 to 2050
Rainfall (ML/year)	906 (+4%)
Infiltration and evaporation (ML/year)	-1,919 (-17%)
Potable water use (ML/year)	1,238 (+11%)
Harvested rainwater use (ML/year)	407 (+186%)
Recycled water use (ML/year)	0 (0%)
Groundwater use (ML/year)	0 (0%)
River water use (ML/year)	-5 (-18%)
Wastewater generation (ML/year)	1,316 (+14%)
Stormwater generation (ML/year)	2,825 (+20%)
Total suspended solids in stormwater (tonnes/year)	276 (+23%)
Total nitrogen in stormwater (kg/year)	15,186 (+29%)

Table 2. Changes in key hydrological and water quality parameters from 2019 (current scenario; historical data) to 2050 (BAU scenario; modelled data) in Glen Eira

The data in Table 2 shows the expected impact of business-as-usual between 2019 and 2050. Council’s implementation of integrated water management, in collaboration with our community and government and private stakeholders, aims to deliver better outcomes for community and the environment.

Local context in focus

Flooding

When it rains, some water naturally seeps into the ground. The rest of it flows into the drainage system, which directs it into rivers and creeks and eventually into the bay.

Flooding in Glen Eira occurs when rainwater exceeds the capacity of the drainage infrastructure causing overland flow or flash flooding.



LOCAL CONTEXT CONTINUED

Current Special Building Overlay

There is a Special Building Overlay currently in the planning scheme shown in Figure 12 that identifies areas prone to overland flooding. The purpose of this overlay is to set appropriate conditions and floor levels to address any flood risk associated with developments, by ensuring floor levels of a building area are raised above the flood level, and structures such as buildings, sheds and fences do not block the flow of this water. The overlay requires a planning permit for buildings and works.

- Key
- Special building overlay
 - Glen Eira
 - Melbourne Water pipes
 - Glen Eira pipes
 - Suburbs
 - Catchment areas

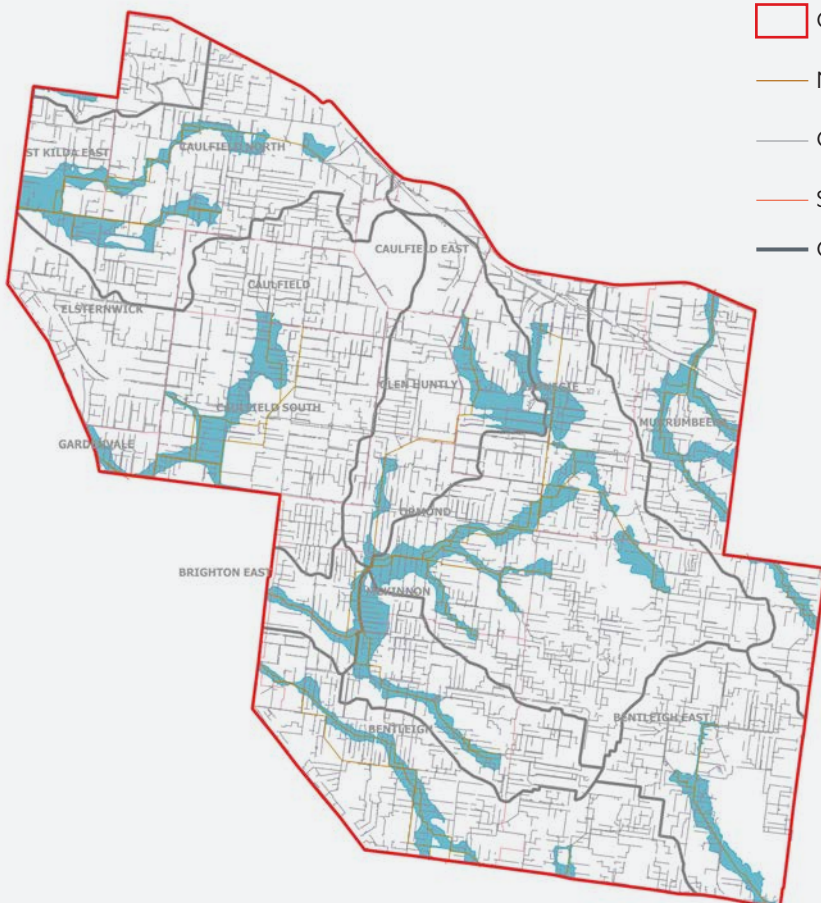


Figure 11. Current Special Building Overlay

LOCAL CONTEXT CONTINUED

Flood assessment 2021

Developing a flood baseline and an understanding of future catchment conditions provides a basis for identifying actions that may help mitigate the impacts of climate change on flood risk. An integrated water management approach to flood risk reduction enables a broader suite of options, in conjunction with traditional flood mitigation works, to be considered. Options including the widespread application of blue-green infrastructure has the potential to defer or eliminate the need for new or upgraded drainage infrastructure to maintain or reduce flood risks in some areas.

A review of available flood information for Elster Creek catchment was undertaken to support a revised flood baseline assessment.

Council and Melbourne Water information considered as part of the flood assessment included:

- > modelled flood extent for a one per cent annual exceedance probability (AEP) scenario – meaning the probability that a flood will occur in this area in a 12-month period is one per cent (current conditions; 2021 study);
- > modelled flood extents for 20 per cent, 10 per cent, five per cent, two per cent and one per cent annual exceedance probability scenarios – Melbourne Water managed drainage areas only (current conditions; 2012/13 study);
- > properties and roads impacted by flood extents (current conditions – partial coverage; 2021 study); and
- > annual average (flood) damages (current conditions: catchment-scale; future scenario: metro-scale; 2020 study).

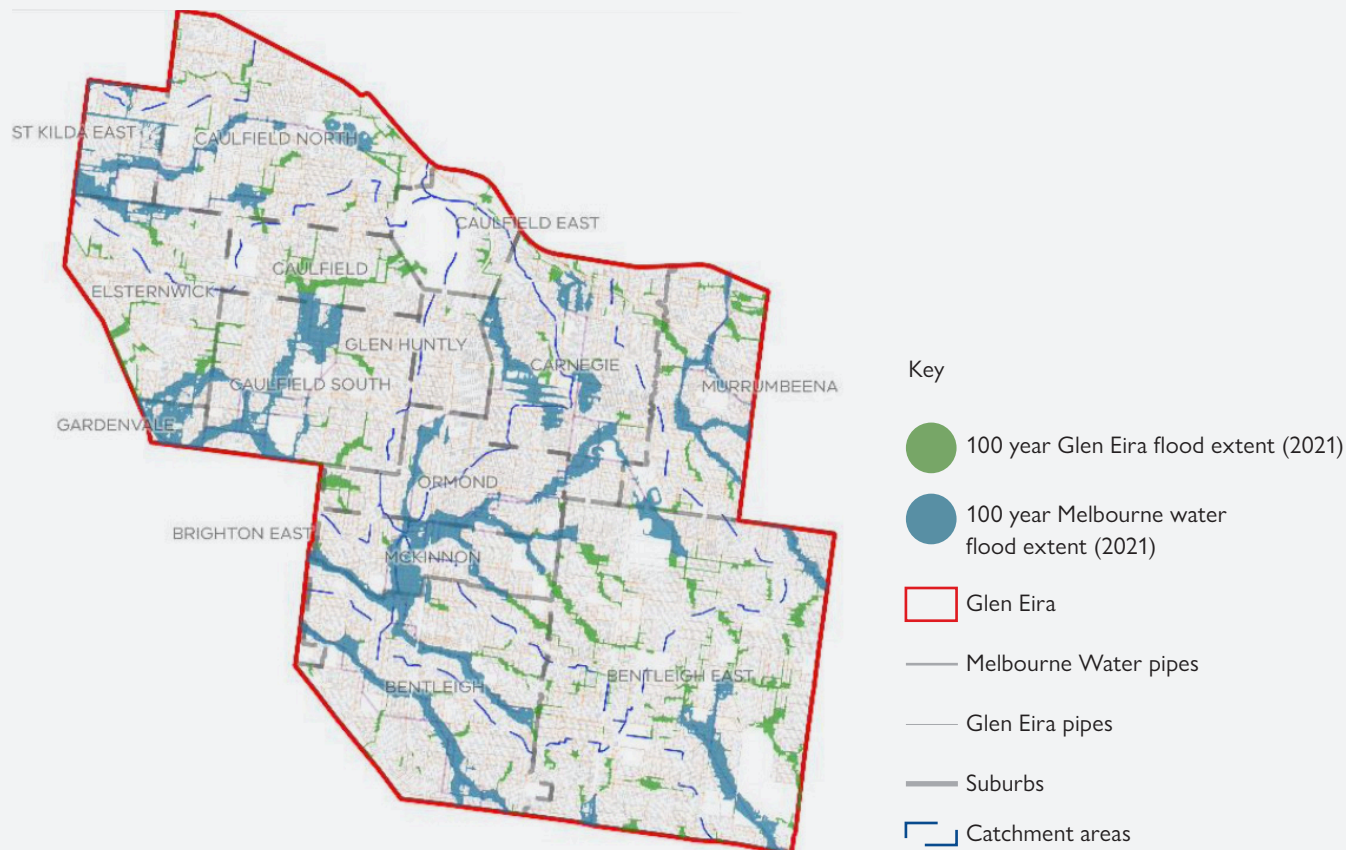


Figure 12. Modelled flood extend: existing conditions; one per cent annual exceedance probability (AEP) scenario (2021 study)

LOCAL CONTEXT CONTINUED

Modelled flood extent

The modelled extent of flooding under current conditions in a one per cent annual exceedance probability scenario (2021 study) is shown in Figure 12. Flooding within the drainage area managed by Council is shown in green and flooding within the drainage area managed by Melbourne Water is shown in blue. Properties outside the predicted flood extent may still be impacted by flooding under more intense rainfall or as a result of local drainage issues.

Financial estimates of flood damage

Average annual (flood) damage is an estimate of average damage per year that would occur in a defined area from flooding over a long period of time taking account of minor damage caused by small, relatively frequent flood events and major damage caused by large, rare flood events. Average annual (flood) damage estimates provide a basis for comparing the economic effectiveness of different management measures against floods of different severity and frequency.

- > Estimated costs associated with damage caused by flooding may be:
- > direct: damage to buildings, property, roads, etc.;
- > indirect: emergency response, clean-up, public transport disruption, etc.; and
- > intangible: cultural impacts, health impacts, ecological impacts, etc.

Estimated average annual (flood) damages are shown in Figure 13. Direct damages resulting from flooding in Melbourne Water and Council managed drainage areas are reported separately (this does not indicate who incurs the estimated damages).

Information gaps

Available flood information provides an overview of current flood conditions and issues in the municipality. It supports the identification of flood risk reduction opportunities linked to other integrated water management and urban renewal initiatives, in addition to deliverables being explored and pursued by the Elster Creek Catchment Collaboration. However, additional modelling and

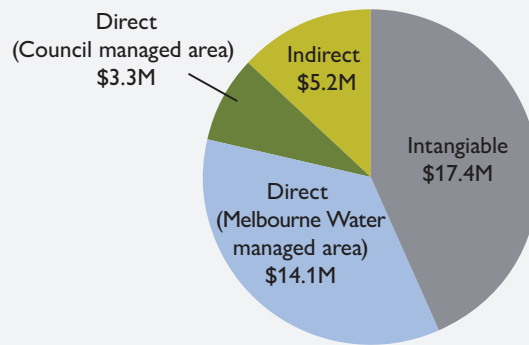


FIGURE 13. Average annual (flood) damage estimates for drainage sub-catchments wholly or partially within Glen Eira¹³

assessment are required to identify a meaningful flood baseline flood risk reduction target.

Increasing rainfall intensities associated with climate change is expected to exacerbate flooding. Modelled impacts are therefore likely to be underestimated.

Additional information required to determine a flood baseline and flood risk reduction targets includes:

- > estimated average annual (flood) damages under future climate change and urbanisation scenarios for Elster Creek catchment (as has been prepared for the current average annual damages estimate);
- > modelled flood extents, depths, etc. for future climate change and urbanisation scenarios for the Elster Creek catchment at a range of annual exceedance probabilities;
- > modelled flood extents, depths, etc. for existing conditions for the Elster Creek catchment covering Melbourne Water and Council managed drainage areas; and
- > assessment of the impacts of possible integrated water management actions on flood risk (this may include blue-green infrastructure in the private and public realm and stormwater harvesting).

This information and analysis are not currently available and is being undertaken by Melbourne Water. Once available, the baseline and targets will be set in collaboration with the Elster Creek Catchment Collaboration and the Special Building Overlay will be updated.

LOCAL CONTEXT CONTINUED

ELSTER CREEK CATCHMENT FLOOD MANAGEMENT PLAN DELIVERABLES

Deliverable 8:
 Seek authorisation from the Minister for Planning to prepare a planning scheme amendment to update the extent of the Special Building Overlay (SBO) to reflect more recent flood mapping data within Glen Eira.

Deliverable 9:
 Establish a flood baseline and set flood risk reduction targets within the Elster Creek Catchment.

Permeability assessment and baseline

Permeable surfaces allow water to be absorbed into the soil. This water can return to the atmosphere via evaporation and plant transpiration or infiltrated into groundwater. Permeable surfaces include parks and ovals, lawns and garden beds, green roofs, porous pavements and other unsealed surfaces. Permeable surfaces reduce stormwater runoff and associated pollutants entering downstream waterways, reduce flood risks and increase urban greening, biodiversity and amenity.

Figure 14 illustrates the role of permeable surfaces in urban environments. Water sensitive urban design can provide permeable surface benefits that are greater than an equivalent area of grass or garden. This is helpful in urban areas that would benefit from increased permeability but where the opportunities to create additional permeable open space are limited.

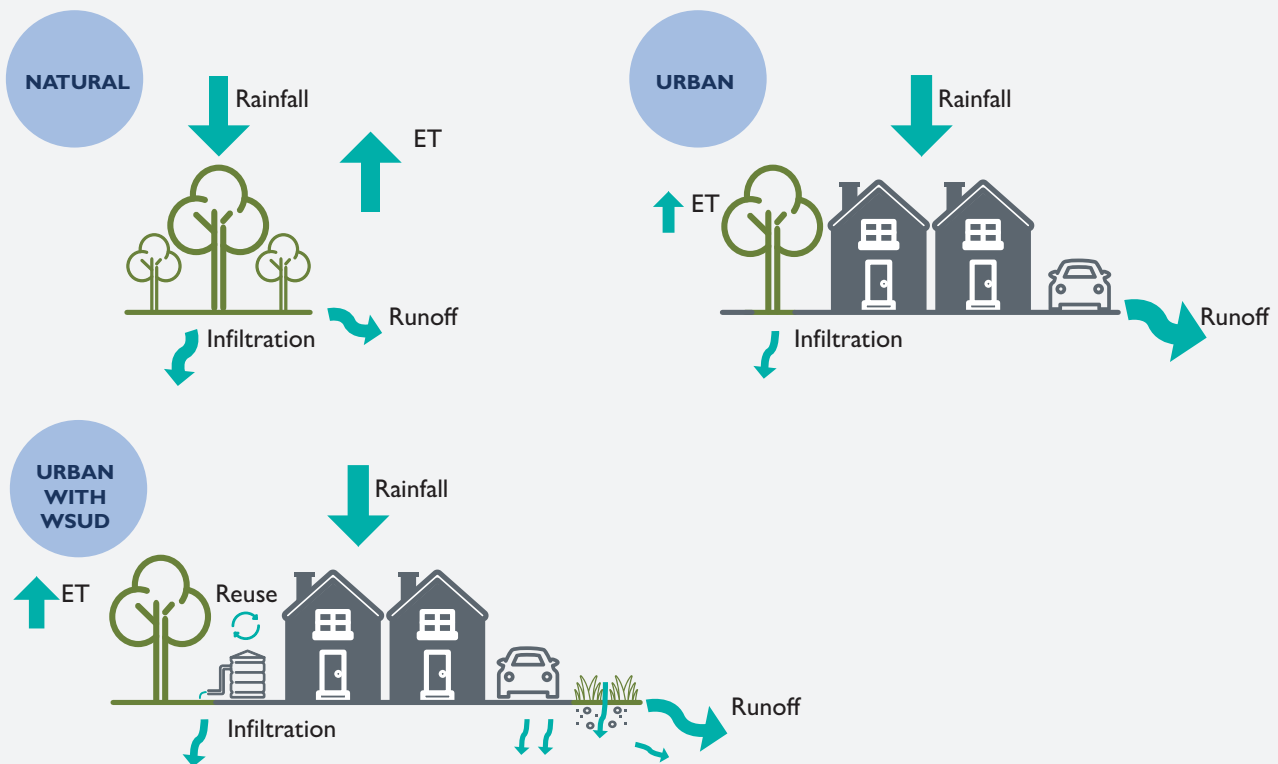


Figure 14. Permeability and the urban water cycle

LOCAL CONTEXT CONTINUED

A spatial assessment of permeable surfaces within Glen Eira has been undertaken to establish a baseline for permeability that can help inform future target setting at the Elster Creek Catchment scale. Details of the permeability assessment methodology is presented in section 4 of the *Glen Eira Integrated Water Management Plan – Supporting Information*.

Establishing a permeability baseline

To establish a permeability baseline for the City of Glen Eira, land surface data for the public and private realm was combined and analysed. This process is described in section 4 of the *Glen Eira Integrated Water Management Plan – Supporting Information*.

Approximately 55 per cent of Glen Eira’s total land area (38,686 hectares) is impervious, consisting of buildings (38 per cent), asphalt (nine per cent) and concrete (seven per cent). Residential land use within the municipality is 57 per cent impervious and accounts for 83 per cent of Glen Eira’s total impervious area. Impermeability is higher for industrial

land (89 per cent impervious) and commercial streets and centres (85 per cent impervious). However, these land uses only constitute three per cent of the municipality’s land surface and therefore have a lower impact on overall permeability.

Spatial variability in imperviousness can be observed between Glen Eira’s suburbs. Caulfield East has the highest permeability (59 per cent) predominantly due to the grassed areas of Caulfield Racecourse. Suburbs with relatively low areas of parkland exhibit the lowest permeability.

This includes Gardenvale (38 per cent permeable), and Caulfield and Glen Huntly (39 per cent permeable). Constraints in the creation of new public open space within the municipality increases the importance of exploring opportunities to increase permeability in the private realm.

See Figures 15, 16 and 17 for a breakdown of surface type and permeability.

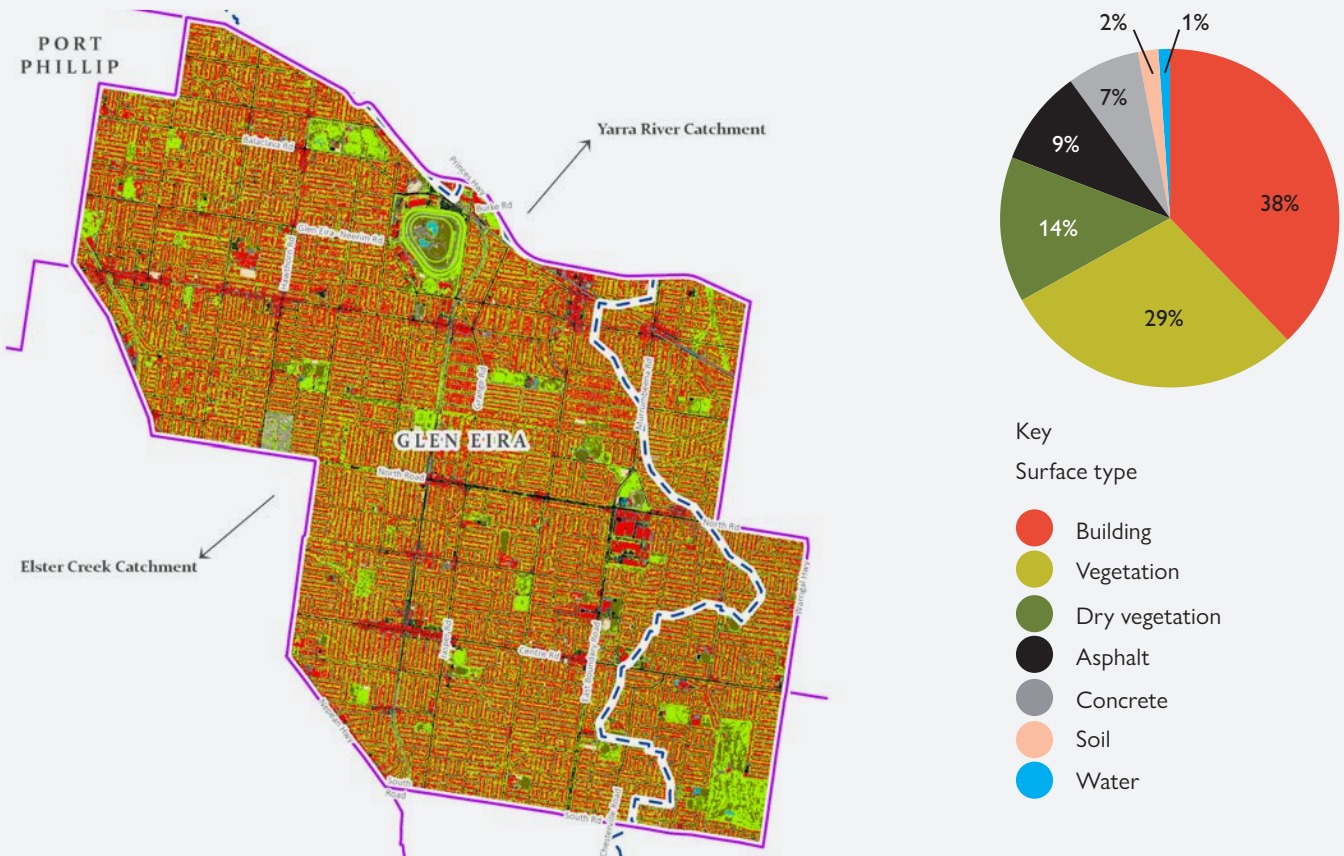


Figure 15. Spatial layout and breakdown of different surface types across the Glen Eira

LOCAL CONTEXT CONTINUED



Figure 16. Permeable and impermeable areas across Glen Eira

LOCAL CONTEXT CONTINUED

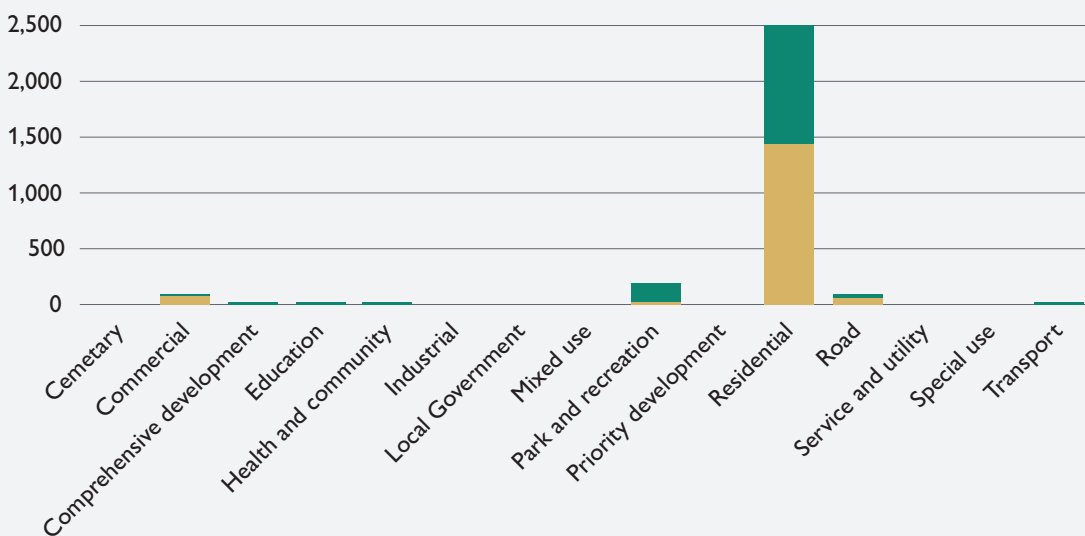
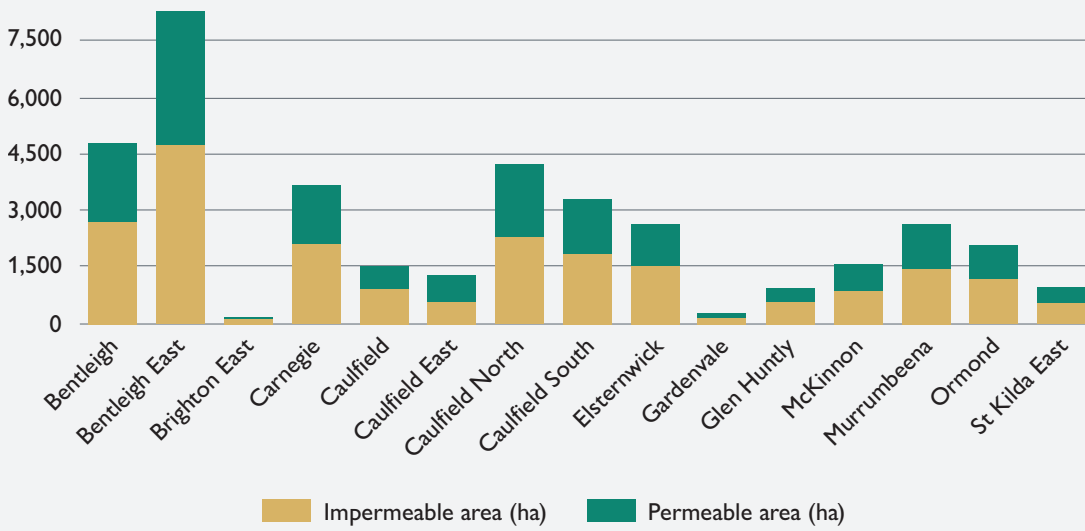


Figure 17. Permeability of each suburb, and impermeable and permeable areas for each land use

LOCAL CONTEXT CONTINUED

Equivalent permeability

Given the limited permeable surfaces in Glen Eira, it is anticipated a 'permeability equivalence' approach will be useful to help manage the adverse impacts of future development and climate change on the local water cycle. There is likely to be limited opportunities for converting hard surfaces to permeable surfaces, such as vegetated soils. There is effort underway to consider how other WSUD responses may provide equivalent permeability services.

When considering WSUD responses it should be noted not all surfaces and WSUD responses are equal. Different responses provide varying levels of permeability benefits for evapotranspiration, reuse and infiltration as well as different greening outcomes. Permeability equivalence provides a means to assign a value to permeability benefits for WSUD responses, such as tree pits, raingardens, rainwater tanks, harvesting schemes and irrigation with alternative water sources.

Figure 18 illustrates the concept of equivalent permeability. Stormwater runoff from 100 square metres of impervious area intercepted by a WSUD tree pit (surface area of five square metres) has similar infiltration and evapotranspiration characteristics as a smaller impervious area (59 square metres) intercepted by a 41 square metre pervious surface (eg. grass). This equivalent permeability is achieved through increased volumes of stormwater captured and removed from the drainage system (via infiltration and transpiration) by the tree pit.



Figure 18. Equivalent permeability provided by WSUD tree pits¹⁴

IMPLEMENTING INTEGRATED WATER MANAGEMENT

Objectives, initiatives and actions

The three pillars of the *Kummargii Yulendji/Rising Knowledge Project* provide a framework for understanding IWM objectives and actions from the perspective of Dhumbali W'urneet Gadhaba/commitment to working with water: This reflects Council's aspiration of working toward a water-based partnership with Boonwurrung Land and Sea Council through respectful and collaborative engagement on IWM planning and implementation.

The six objectives will allow Council to prioritise, resource, communicate and evaluate our integrated water management journey. They work together to build the structural conditions needed to support integrated water management being embedded as business as usual practice within the organisation. These conditions, or enabling factors, are the basis for the IWM transition assessment outlined on page 38.

The objectives (working with the initiatives and actions) also respond to the contemporary challenges, such as the climate emergency, population growth, urbanisation, financial constraints and reconciliation, as well as focus efforts on the local issues of flooding and permeability.

Thirty-two IWM actions that embed sustainability in Council capital and operational works have been developed based on the outcomes of the IWM transition assessment and the flood and permeability assessments. The IWM objectives and actions include projects, processes, capacity building and engagement activities capable of being implemented over the next four years to deliver IWM outcomes for both Council operations and with the community.

YULENDJI KNOWLEDGE

DEEP LISTENING



Exploring how Indigenous and non-Indigenous knowledge systems can be woven together to inform and support integrated water planning.

Objective 1: Deepen Council and community understanding of water by bringing together First Nations and Western knowledge.

BALERT KOOLIN CAPABILITY

WEAVING KNOWLEDGE AND SKILLS



Building community capacity for working with water, including developing training and career pathways for local First Peoples to find their place in managing water on Country.

Objective 2: Engage, support and empower communities through a shared place-based commitment to work with our w'urneet/waterways.

Objective 3: Strengthen cross-organisational collaboration on community wellbeing, cultural regeneration, climate adaptation, urban greening and water management.

Objective 4: Support planning and implementation of integrated water management actions through urban development.

GADHABA WORKING TOGETHER

COLLABORATIVE PLANNING AND ACTION



Applying Indigenous and non-Indigenous knowledge to integrated water management systems and projects.

Objective 5: Identify strategic integrated water management opportunities in the municipality where ancient knowledge and new technology can be brought together.

Objective 6: Demonstrate best-practice integrated water management through regenerative on-ground project.

IMPLEMENTING INTEGRATED WATER MANAGEMENT CONTINUED

IWM transition assessment

An assessment of Council’s integrated water management progress and capacity was undertaken to inform the objectives and actions contained in this *Integrated Water Management Plan*. The IWM transition assessment is adapted from the CRC for *Water Sensitive Cities Transition Dynamics Framework* for application at a municipal scale. Water-related information and perspectives shared by staff members from across Council provides an organisational benchmark and a basis for identifying strategic actions and priorities to guide Council’s integrated water management transition. A visual representation of the IWM transition assessment is presented in Figure 19 with a detailed report included in section 2 of the *Glen Eira Integrated Water Management Plan – Supporting Information*.

The IWM transition assessment focuses on five factors required to stimulate the governance and delivery conditions needed to support integrated water management.

1. Champions
2. Tools and instruments
3. Platforms for connecting
4. Knowledge
5. Projects and application

A traffic light rating is assigned to each enabling factor/ transition phase pair. This provides a visual representation of Glen Eira’s integrated water management strengths (green) and where future action/change is required to firmly embed IWM/WSUD into mainstream practice (orange/ grey).

	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
1. Issue emergence	Issue activists	—	Issue highlighted	Issue examined	—
2. Issue definition	Individual champions	Shared concerns and ideas	Causes and impacts examined	Solutions explored	Basic information
3. Shared understanding and issue agreement	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
4. Knowledge dissemination	Influential champions	Building broad support	Solutions advanced	Solutions demonstrated at scale	Early policy, regulation and targets
5. Policy and practice diffusion	Organisational champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Effective policy, regulation and targets
6. Embedding new practice	Multi-stakeholder networks	Guiding consistent application	Mentoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

Well developed	Indicator descriptions are evident in practice.	Developing	Some aspects of the indicator descriptions are evident but not yet fully embedded in practice and may be at risk of going backwards.	Undeveloped	Indicator descriptions are not evident in practice
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Figure 19. Glen Eira City Council IWM transition overview



ACTION PLAN

ACTION PLAN 2022–2026

The Action Plan was developed to achieve the catchment-scale IWM strategic outcomes and build a strategic foundation to continued development of Council’s approach to IWM both within Glen Eira and in partnership with key stakeholders to contribute to improvement across the major catchments.

The *Action Plan* considers priority initiatives that will deliver on Glen Eira’s six objectives taking into account what actions are possible to enhance existing work, what work will need to start and what can be embedded into current priorities. An estimated cost is considered and subject to the annual Council budget process.



Figure 20. Strategic IWM outcomes identified by Catchment IWM Forums

OBJECTIVE 1: Deepen Council and community understanding of water through First Nations and Western knowledge

TIMING

- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
1.1 Learn and develop cross-cultural ways of working, including how to combine Western technical expertise and First Nation knowledge, research and stories	1.1.1 Establishment of collaborative working groups, terms of reference and timelines to develop an action plan	Ongoing partnership with Traditional Owners, supported by an agreed action plan to work on together	Climate and Sustainability	●	●	●	●
	1.1.2 Undertake cross-cultural mapping of w'urneet/water including past, present and future systems through partnerships with academic and research institutions	Mapping of waterways and cultural values completed	Climate and Sustainability	●	●	●	
	1.1.3 Develop ecologically and culturally aligned water management objectives, actions, measures and communication techniques, learning from local and international benchmarks, alignment with Council's <i>Reconciliation Action Plan</i> and <i>Water for Victoria</i> Action 6.1: Recognise Aboriginal values and objectives of water	Agreed objectives, actions, measures and communications techniques	Climate and Sustainability	●	●	●	
1.2 Advocate for shared outcomes through education and leadership and capacity building	1.2.1 Develop working with water (water care) education programs and toolkits combining First Nations and Western knowledge for diverse community and business stakeholders	Education programs developed and distributed	Climate and Sustainability	●	●	●	
	1.2.2 Advocate for and support the creation of identified Aboriginal and Torres Strait Islander positions related to water management and caring for Country across the region and water sector	Identified Aboriginal and Torres Strait Islander position supported	Climate and Sustainability		●	●	●

OBJECTIVE 2: Engage, support and empower communities through a shared place-based commitment to work with our w’urneet/waterways

TIMING

- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
2.1 Improve water literacy in the community	2.1.1 Identify, develop and share information on best practice water sensitive urban design (WSUD) for business and residents	Increased motivation by community to implement WSUD on private land	Climate and Sustainability	●	●	●	●
	2.2.1 Engage with communities through place-based commitment to work with our waterways (linked to action 1.2.1)	Place-based engagement delivered in targeted locations	Climate and Sustainability	●	●	●	●
	2.2.2 Identify and promote opportunities to enhance or initiate citizen science opportunities	Promotion of citizen science opportunities	Climate and Sustainability	●	●		

OBJECTIVE 3: Strengthen cross-organisational capability and collaboration on community wellbeing, cultural regeneration, climate adaptation, urban greening and water management

TIMING

- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
3.1 Build well-developed capacity with Council to deliver integrated water management strategies	3.1.1 Establish processes for cross-organisational governance of urban greening and water management to provide strategic and technical input into the capital works planning process and asset management framework	Process established and implemented	Climate and Sustainability	●	●		
	3.1.2 Develop locally and culturally relevant IWM training and capacity building series for Council officers with roles in planning, asset management, project management implementation, assessment and reporting	Number of Council officers trained	Climate and Sustainability	●	●		
3.2 Embed IWM into Council planning and delivery frameworks	3.2.1 Identify and leverage synergies between water management objectives and planning, urban greening and community health, strategies, plans and initiatives through the <i>Integrated Planning and Reporting Framework</i> and asset plan process	Council strategies and plans incorporate IWM/WSUD objectives, (including structure plans and asset management plans)	Climate and Sustainability	● ●	●		

OBJECTIVE 4: Support planning and implementation of integrated water management actions through urban development

TIMING

- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
4.1 Build capacity within Council to implement VPP Amendment VC154 (Stormwater management)	4.1.1 Develop and implement a capacity and skills buildings framework for the implementation of VC154, targeted with engineering and planning departments	All relevant permits have VC154 applied	Urban Planning	●			
	4.2.1 Investigate the introduction of a voluntary stormwater offset scheme	Business case developed	Climate and Sustainability	●	●		
4.2 Identify, develop and share information on best practice stormwater management for urban development	4.2.2 Develop and trial small scale innovations, such as incentives in flood hotspots, to encourage onsite detention, leaky tanks and downpipe diversion	Trial conducted	Projects and Infrastructure	●	●	●	
	4.3.1 Prepare a planning scheme amendment to update the extent of the Special Building Overlay to reflect more recent flood mapping data, including future climate change and urbanisation scenarios	Special Building Overlay updated in planning scheme, for Melbourne Water and Council managed drains	City Futures Projects and Infrastructure	●	●		

OBJECTIVE 5: Identify strategic integrated water management opportunities in the municipality where ancient knowledge and new technology can be brought together

TIMING

- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
5.1 Investigation of opportunities to reduce Council’s potable water use (buildings and active and passive open space)	5.1.1 Develop guidelines to support identification, prioritisation and implementation of passive opportunities linked to capital works and asset renewal projects	Guidelines developed	Climate and Sustainability	●	●		
	5.1.2 Identify priority projects to inform the development of future targets for water efficiency and alternative water use	Priority alternative water use plan developed	Climate and Sustainability	●	●		
5.2 Improved governance and accountability in IWM planning at project inception and concept design stage	5.2.1 Develop a decision-support checklist outlining requirements at the project initiation stage to support the integration of IWM outcomes and WSUD principles into all relevant projects	Checklist developed	Climate and Sustainability Project Management Office	●			
5.3 Identify opportunities to improve water quality across the catchments	5.3.1 Undertake an audit and technical review of Council’s WSUD initiatives to explore what has worked and what learnings there are for future design and maintenance	WSUD asset register supporting guidelines	Climate and Sustainability Projects and Infrastructure	●			
	5.3.2 Develop a Council-wide prioritisation matrix for WSUD investment	Prioritisation matrix	Projects and Infrastructure	●	●		

OBJECTIVE 5: Identify strategic integrated water management opportunities in the municipality where ancient knowledge and new technology can be brought together

TIMING

- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
5.4 Increase Council's capacity to manage existing and future flood risk	5.4.1 Development of baseline flood mapping and scenario mapping	Updated flood mapping, including annual average damage	Climate and Sustainability	●	●		
	5.4.2 Develop strategic IWM approach to stormwater management, aligned with stormwater asset management plan	Stormwater asset management plan adopted	Projects and Infrastructure	●	●	●	
	5.4.3 Improve communications and education around flood mitigation, including flood preparedness, flood risk and flood proofing	Updated communications plan implemented	Climate and Sustainability	●	●		
	5.4.4 Prioritise the construction and maintenance of high-quality drainage infrastructure, including maintaining and clearing drains to avoid blockages.	Prioritisation matrix developed, incorporating reduction of local flood risk	Projects and Infrastructure	●			
5.5 Identify opportunities to help the local ecosystem flourish, connect people to nature and recognise Aboriginal values and objectives of water	5.5.1 Develop guidelines to inform the consideration of local biodiversity, community connection to nature and cultural values and objectives in IWM projects	Guidelines developed	Climate and Sustainability	●	●		

OBJECTIVE 6: Demonstrate best practice integrated water management through regenerative on-ground projects

TIMING







- DESIGN
- DELIVER
- REVIEW

INITIATIVE	ACTION	MEASURE	LEAD COUNCIL BUSINESS UNIT	2022–2023	2023–2024	2024–2025	2025–2026
6.1 Plan for and implement a five-year pipeline of IWM projects	6.1.1 Develop and prioritise a five-year project pipeline for suitable WSUD treatments, including integration into existing projects and identification of new projects	Five-year plan developed	Projects and Infrastructure	●			
	6.1.2 Implement IWM as part of the Elsternwick Cultural Precinct project	Implementation as part of overall project	Project Management Office	●			
	6.1.3 Implement IWM as part of the redevelopment of Caulfield Park Grey Brick Pavilion	WSUD design completed, and cost plan prepared	Climate and Sustainability	●			
	6.1.4 Implement IWM as part of the car park upgrades	One to two upgrades designed and delivered	Projects and Infrastructure	●	●		
	6.1.5 Develop an annual plan for consideration as part of the annual budget process based on five-year project pipeline	Annual plan developed and reviewed annually	Projects and Infrastructure	●	●		
6.2 Deliver flagship high priority IWM projects with a focus on stormwater harvesting and reuse	6.2.1 Caulfield Park stormwater harvesting	Design completed and funding sourced	Recreation and Open Space Projects and Infrastructure	●	●		
	6.2.2 Packer Park rehabilitation project	Design completed and project implemented	Climate and Sustainability	●	●		
6.3 Improve the management of urban heat island effects through passive irrigation	6.3.1 Design, implement and evaluate a pilot application of passive irrigation for street trees	Pilot program delivered and reviewed	Parks Services	●	●	●	
	6.3.2 Develop a prioritisation matrix for ongoing projects to embed passive irrigation to enhance existing projects or identify new opportunities	Priorities identified	Parks Services	●	●	●	

MONITORING AND REPORTING

A set of integrated water management measures and targets have been developed as part of Dandenong Catchment integrated water management planning included in section 1 of *Glen Eira Integrated Water Management Plan – Supporting Information*.

Measures and targets relevant to the municipal-scale are presented in Figure 21 and provide a reference for tracking progress on implementation of *Glen Eira’s Integrated Water Management Plan* utilising Council’s established evaluation frameworks and processes.

- 
 - 1.1: Decrease potable water use
 - 1.2: Increase use of fit-for-purpose water sources
- 
 - 3.1: Reduce flooding impacts on communities
- 
 - 4.1: Reduce the total urban stormwater runoff volume discharged to receiving waters
 - 4.2: Decrease pollutants discharged to receiving waters
- 
 - 5.1: Increase provision of alternative water sources for tree irrigation
 - 5.2: Increase provision of alternative water sources for adequate irrigation of public open spaces
- 
 - 6.3: Improve communities’ connection with and understanding of the water cycle
 - 6.4: Increase consideration of the water cycle in town planning
- 
 - E1: Increase organisational commitment to IWM
 - E2: Increase stakeholder capacity to successfully deliver IWM
 - E3: Increase collaboration and partnerships across industry and government

Over time, the municipal and catchment-scale measures will support a collective assessment of actions undertaken by Council, businesses, residents, State Government, authorities and other partners in working towards the objectives and outcomes outlined in municipal and catchment-scale integrated water management plans.

Documentation for individual projects and their impact (ie. mean annual stormwater volume reduction, number of trees planted, number of trees irrigated with an alternative water source, etc.) will be recorded in a database using available data, modelling or information provided by internal teams/consultants. A single database will be developed and maintained for recording all the collective impacts/benefits to be tallied each year for reporting purposes. This will allow Council to monitor trends, recognise contributions, celebrate achievements and identify areas for improvement and support evaluation of this *Integrated Water Management Plan*.

Implementation of continuous improvement processes may include documenting project enablers (eg. extreme climate events, community needs, opportunistic grant funding) and any major barriers that have been encountered. Experiences and insights can inform subsequent review and update of the *Integrated Water Management Plan* and catchment-scale collaborative objectives.

Figure 21. Catchment-scale indicators directly influenced by Council

ENDNOTES

1. *Water sensitive urban design – the journey thus far*. Wong, 2007
2. Shared by Boonwurrung Elder, N'Arweet Dr Carolyn Briggs AM in *Dhumbali Wurrungi-biik Parbin-ata/Our Climate Emergency Response Strategy 2021–2025*. Reproduction of this knowledge requires liaison with N'Arweet Dr Carolyn Briggs AM as the author and keeper of this cultural intellectual property
3. *The Elster Creek Story (Victorian Collections)*
4. The Living Harvest (Dobson) from Andrew Ward's 1996 history, as quoted in *City of Glen Eira Thematic Environmental History* [Refresh] (2020)
5. *Paddy's Swamp and Caulfield Park: A Timeline 1850s to 1960s*. Joy Mawbey and Barbara Hoad, *Glen Eira Historical Society Newsletter – Issue 14* (May 2018) based on "From sand, swamp and heath..." *A History of Caulfield*. (Murray and Wells, 1980) and *Caulfield's Heritage*. (Solomon, 1990); Early Survey map dated 1879 showing the lagoon at Paddy's Swamp (Glen Eira Historical Society Map Collection)
6. Rippon Lea Estate (History) and [A history lesson in how to save our precious water](#) (*The Age*, 25 September 2004)
7. *City of Glen Eira Thematic Environmental History* [Refresh] (2020)
8. *City of Glen Eira Thematic Environmental History* [Refresh] (2020)
9. id forecast, October 2017
10. id forecast, October 2020
11. *Dandenong Catchment Scale IWM Plan*, Department of Environment, Land, Water and Planning, 2021
12. *Dandenong Catchment Scale IWM Plan*, Department of Environment, Land, Water and Planning, 2021
13. Data from *Melbourne's Flood Risk Assessment of Average Annual Damage* (Jacobs, 2020). Prepared for Melbourne Water
14. E2Designlab, 2019



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<https://www.instagram.com/gleneiraleisure>

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