THE CITY OF
GREATER GEELONG

STORMWATER SERVICES STRATEGY 2020-30

30 JUNE 2020

CITY OF GREATER GEELONG

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Mayor's Message

Managing stormwater effectively and responsibly is generally a topic that's 'out of sight, out of mind' for many people. It can be thought of as something that 'just happens' behind the scenes. But the importance of stormwater management and its impacts on Greater Geelong's liveability and environment can't be understated. If our region's network of pipes, open drains, wetlands, levees and other assets were laid end-on-end, it would stretch from Geelong to Alice Springs.

The Stormwater Services Strategy 2020-30 maps out a 10-year approach for the region to reduce dangerous flooding, protect waterways and the marine environment from stormwater pollution and safeguard our transport corridors. These actions and priorities will go towards easing pressure on our stormwater systems, as the effects of population growth and climate change increase.

As you can see, stormwater management really does affect all residents and the broader environment.

This strategy was a real team effort. Thank you to the community members and key stakeholders who gave valuable feedback, which has enabled the City to shape the final strategy for adoption by council. This blueprint will also form the foundation for all public engagement on stormwater into the future.

The goals and objectives of the strategy have a great connection with community values, such as reducing demand on drinking water through the use of alternative water supplies for parks and gardens.

One of the key themes identified during consultation was that we can improve our communication about our stormwater services, including as we implement our priority actions and look to develop catchment management strategies.

This strategy will also result in a review into the City's ability to deliver services, so funding opportunities can be maximised, and service improvements can be streamlined.

The City is committed to upgrading the region's stormwater services for residents and the environment, reaching out for feedback and listening to the community.

Cr Stephanie Asher
Mayor
City of Greater Geelong

Executive summary

The City of Greater Geelong Stormwater Services Strategy 2020–30 **establishes a 10-year program focused on improving long term management of floods, protecting the environment from stormwater pollution, and increasing stormwater reuse through integrated water management. The overall aim is to support Greater Geelong's growth, health and liveability.**

Stormwater management is important in many different aspects of the City's service to the community, including:

- Land use planning
- Responding to storm events
- Maintaining the drainage network
- Protecting local waterways and the marine environment
- Providing and maintaining public open space and recreation assets, and
- Protecting transport corridors.

Our increasing population, a rapidly growing economy and climate change are putting increasing pressure on our stormwater systems. It is important that we account for these pressures to ensure we continue to deliver the services the community expects.

This strategy seeks to provide a clear pathway for managing Stormwater Services into the future, and in so doing support the delivery of the *clever and creative* vision – in particular, the community aspiration for *'sustainable development that supports population growth and protects the natural environment.'*

Key elements of the strategy, outlined in more detail below, include:

- Four strategic goals and 15 objectives that are linked closely with the clever and creative vision
- Priority improvement actions to achieve basic levels of service
- Four flagship projects proposed for the north, east, south and centre of the municipality.

MISSION, GOALS AND OBJECTIVES

The strategy's mission is to:

Lead the adaptation and integration of stormwater services to support the city's growth, health and liveability.

Four goals achieve the strategy's mission:

Goal 1: Foster healthy and resilient communities

Goal 2: Support innovative and sustainable growth

Goal 3: Enhance the natural and built environments

Goal 4: Create positive community experiences

The goals are further supported by 15 best-practice objectives, targets and measures to guide the strategy's delivery to 2030.

PRIORITY IMPROVEMENT ACTIONS AND FLAGSHIP PROJECTS

The strategy recommends improvement actions across 25 catchment management units, which together cover the entire municipality. Planned improvements have been prioritised by comparing how well each catchment management unit is performing when compared to best-practice objectives.

Proposed actions are designed to bring all catchment management units to basic levels of service over the coming 10 years or create an agreed plan to achieve this level of service in cases where a more significant investment of time or money is required.

The strategy has identified four flagship projects which have significant benefits to stormwater service delivery for areas where multiple deficiencies have been identified. The proposed flagship projects are:

- Northern Geelong Green Corridor Project
- Lake Connewarre Protection Project
- Bellarine Sustainable Water Project
- Water Proofing Urban Geelong.

Each of these projects will require us to develop partnerships and attract significant levels of funding to realise them.

STRATEGY DELIVERY

We will deliver the services and actions in the strategy predominantly through:

- Infrastructure maintenance
- Infrastructure Renewals
- Investigation studies
- Performance Monitoring programs
- Community engagement, and
- Building and planning controls.

Income from rates and charges underpin the delivery of basic levels of stormwater service. This will ensure our services and actions are financially sustainable. Acceleration of service improvements, flagship projects, and other more ambitious initiatives will likely require funding via special charges, development contributions, government grants, partnerships or from other external sources. Over the next 10 years we plan to explore alternative funding arrangements linked to each property's discharge of stormwater, as is becoming commonplace overseas.

Local communities have been placed at the centre of the strategy. The community within each catchment management unit will help us to set acceptable levels of service and choose management options that work within our financial and other constraints.

We will review this strategy every 5 years, or as circumstances require.

Glossary

Asset solutions: Stormwater management actions which involve the construction of long-life physical assets.

Catchment Management Strategy (CMS); Outlines key service risks and opportunities within a catchment management unit and documents the required actions to manage the performance of the catchment.

Catchment management unit: A collation of drainage catchments based on similar urban environments, hydrological catchments, risks, opportunities and discharge points. 25 catchment management units have been identified that together cover the municipality.

Drainage network: The network of roads, kerbs, channels, pits, pipes, pumps, drains, retention basins and wetlands used to transport stormwater.

G21: Geelong Region Alliance (G21) a formal alliance of government, business and community organisations working together to improve the lives of people across five municipalities, including Greater Geelong

Green/blue Infrastructure: Infrastructure incorporated in an urban area that uses natural systems to both support urban greening and manage stormwater

Improvement action: An action to be taken to resolve a risk or capture an opportunity identified in a catchment management unit.

Integrated water management: A collaborative way of working with communities and other organisations to plan for, and manage, all elements of the water cycle. This includes managing and protecting waterway and bay health, managing wastewater, alternative and potable water supply, managing stormwater and treating water. Planning in this way allows organisations to identify and deliver greater-value water cycle initiatives and improve liveability and resilience in cities and towns.

Level of service: The outcomes expected to be delivered from the delivery of stormwater services.

Non-asset solutions: Solutions which do not require the construction of long life, physical assets in the urban environment – for example:

- applying building and planning controls to protect existing and future residents from flooding, and
- creating better warning systems to notify the community about potentially damaging flood events.

Ramsar: Refers to an International Convention on Wetlands that was signed in 1971, in Ramsar, Iran,

Stormwater system: The combination of built and natural assets (public and private) and City operations which together manage stormwater.

Water sensitive urban design: An approach to designing urban areas to make use of stormwater, and minimise the damaging impact of stormwater on rivers, creeks and Bays/Oceans.

Introduction

Stormwater is surface water run-off from rain and storm events that has entered the drainage network.[1]

Historically, stormwater management focused almost exclusively on drainage. Rainwater fell on roofs, roads and other impervious surfaces. It was then collected in pits and pipes and conveyed to lakes, streams, waterways, Bays and Oceans to minimise the impact this water had on homes, businesses and the environment.

Today, stormwater is seen as much more than just a hazard that should be conveyed to the nearest waterway. It is seen as a resource that, with careful management, can bring many benefits to the local community.

Stormwater services today include:

- understanding flood risk and control, environmental protection and water use in our urban environment
- planning and controlling land use
- constructing infrastructure and performing maintenance and renewal works
- enhancing the sustainability of urban landscapes
- designing capacity and flexibility in stormwater systems that can keep pace with projected population growth and climate change
- preparing for and recovering from flood events
- supporting the improvement of open space to provide healthier environments for the community
- fostering partnerships with other regional water managers to make sure stormwater is utilised to its fullest potential
- maintaining and improving the health of receiving waterways.

As a local government, we are required to do all of this in the most cost-effective way and for the benefit of the whole community.

Figure 1 - Eastern Beach Gardens Stormwater Pond

[1] Environment Protection Authority Victoria

Background to this strategy

In total, Greater Geelong's drainage networks convey millions of litres of stormwater every year into local waterways, Bass Strait and Port Philip Bay.

The drainage network we manage includes:

- over 1,900 km of pipes
- over 64,000 stormwater pits
- over 300 retarding basins
- 20 pump stations
- over 150 km of open stormwater drains
- 5 km of flood levees, and
- over 150 water sensitive urban design assets, including wetlands and swale drains.

These assets have a total value of over $670 million. Laid end-on-end, our network of stormwater assets would stretch from Geelong to Alice Springs.

We manage stormwater in over 300 drainage catchments. For the purpose of this strategy, we've collated these drainage catchments into 25 catchment management units, each with similar characteristics and environmental sensitivities.

OUR LEGISLATIVE RESPONSIBILITIES

We are empowered by several pieces of legislation and regulation[2] to;

- make land use planning and development decisions
- establish emergency management plans, to help communities respond to and recover from flood events when they occur
- deliver and manage urban stormwater infrastructure, and
- manage flooding on roads and open spaces.

This legislated authority gives us considerable scope to direct the way stormwater is managed in our municipality.

Furthermore, unlike Melbourne's metropolitan councils, we are wholly responsible for stormwater services and the assets that deliver them.

RELEVANT STRATEGIES AND POLICIES

This strategy aligns with the community-led clever and creative vision, our *2018-22 Council Plan* and a range of other relevant strategies, including:

- *Environment Strategy*
- *Sustainability Framework*
- *Reconciliation Action Plan*
- *Social Infrastructure Plan*
- *Open Space Strategy*
- *Integrated Comprehensive Transport Plan*
- *Settlement Strategy*
- *Biodiversity Strategy*
- *Urban Forest Strategy*
- *Climate Change Adaptation Strategy*
- *Customer Focus Strategy*
- *Geelong Play Strategy*
- *Greater Geelong Cycle Strategy*
- *Greater Geelong Physical Activity Strategy*.

It also links to regional strategies and priorities including:

- Greater Geelong Planning Scheme
- Integrated Water Management Forum (Barwon) Strategic Directions Statement
- Corangamite Regional Catchment Strategy
- Corangamite Waterway Strategy
- Corangamite Regional Floodplain Management Strategy
- Geelong Region Alliance (G21) pillars (Sport and Recreation, Environment, Health and Wellbeing, Planning and Services)
- various best-practice guidelines endorsed by government and industry bodies including Australian Rainfall and Runoff Guidelines, and the Best Practice Environmental Management Guidelines

More detail about this relationship is provided in Appendix A.

[2] Local Government Act 1989, Planning and Environment Act 1987, Environment Protection Act 1970, Water Act 1989, Building Act 1993, Emergency Management Act 2013, State Environment Protection Policy – Waters of Victoria, Victorian Infrastructure Plan, Victorian Water Plan, Integrated Water Management Framework for Victoria, Victorian Floodplain Management Strategy, Victorian Planning Provisions, Building Regulations 2006, Corangamite Floodplain Management Strategy,

OUR PARTNERS

To deliver this strategy, we will partner with:

- **State and federal government** – we'll engage to clarify our authority to deliver services and source additional funding.
- **Regional groups** – we'll work with groups, such as G21 and the Integrated Water Management Forum, asking them to support requests for external funding and support governance structures.
- **Barwon Water –** as the government-owned statutory authority responsible for the supply of drinking and recycled water, we'll partner with Barwon Water on water reuse and irrigation initiatives.
- **Corangamite Catchment Management Authority** – as the authority responsible for floodplain management and waterway and land health, we'll work together on waterway enhancement and quality initiatives. This will be in keeping with the Memorandum of Understanding which is already in place with the CCMA.
- **Neighbouring Councils –** we'll work with other councils where our catchments cross service boundaries.
- **Melbourne Water –** we'll engage with Melbourne Water given their industry leadership and their status as an authority with responsibilities in the Geelong municipality.
- **Community groups, developers and industry bodies** – we'll engage and partner with local groups who will influence the development and outcomes of catchment management strategies.

Figure 2 – Image of the Moorabool River

Challenges and opportunities

Underground drainage networks come at significant cost and, for practical and financial reasons, have limited capacity.

Severe storm events can cause stormwater to exceed the capacity of the underground drainage network and flow overland to local creeks and rivers. This can sometimes lead to very damaging consequences, impacting homes, businesses and transport corridors.

While this is an ongoing challenge inherent in drainage networks, there are also many other challenges (and opportunities) we need to consider in this strategy.

CHALLENGES

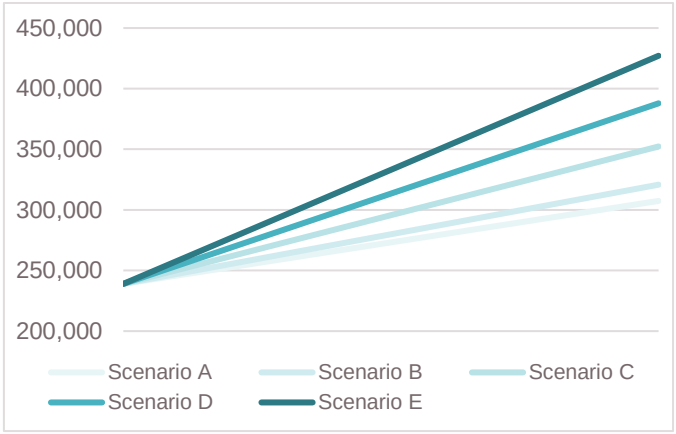
Growth and urban change

Greater Geelong's population has grown from 216,000 to 239,000 over the past 5 years (2013 to 2018), which is a growth rate of 2 per cent per year[3]. As Figure 3 shows, this elevated rate of growth is expected to continue, with population expected to rise to between 307,000 and 427,000 by 2036.

As urban environments become more intensely developed, total roof area increases, and so too does stormwater runoff. This rate of population growth will therefore have consequences for our stormwater system.

In the next 10 years, we're expecting the drainage network will grow at around 20 per cent, while water sensitive urban design assets could increase by 100 per cent.

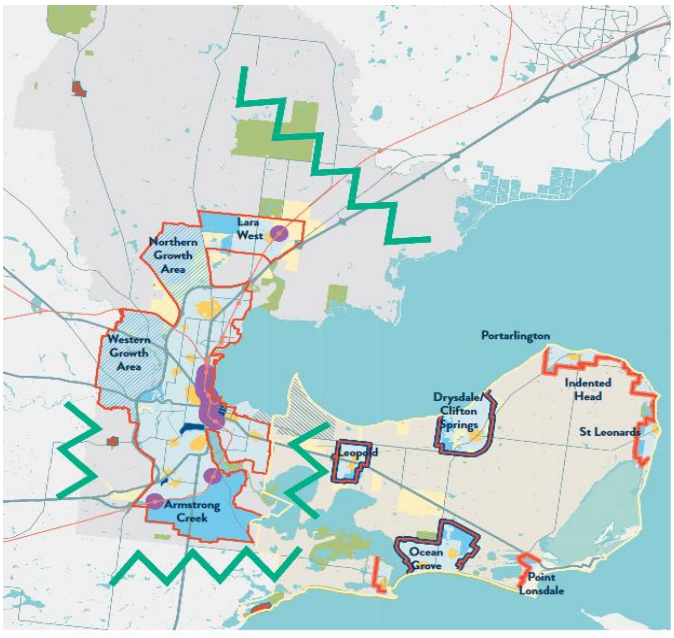
Figure 3 – Projected population in 2036 under growth scenarios



Source: Settlement Strategy 2018

As described in the Greater Geelong Settlement Strategy (2018) and shown in Figure 4, growth will be attained through a combination of infill development within existing township boundaries, and greenfield development in Armstrong Creek and the Northern and Western Geelong Growth Areas.

Figure 4 – Projected areas of growth



Source: Settlement Strategy 2018

To successfully meet projected growth, we need to plan a stormwater system that can meet the demands of new and existing residents. Failure to do so may result in significant flooding, pollution, and deterioration of urban

[3] Settlement Strategy 2018

amenity which may then require significantly higher rates and charges to remedy.

Climate change

Greater Geelong's climate is expected to change significantly over the coming century. Predicted climate change impacts include:

- higher intensity storm events, causing higher peak flow rates within drainage networks and bringing pollution from urban environments into sensitive waterways
- more extreme and frequent heat waves that result in higher urban temperatures, increased health risks and a greater likelihood of blue-green algal blooms in water sensitive urban design infrastructure (such as vegetated swale drains)
- increased coastal erosion and inundation, due to sea level rise, potentially limiting the capacity of stormwater outfalls.

These changes will challenge our existing assumptions about the level of service we can expect from our stormwater system.

To meet the challenge posed by climate change, we need to establish sustainable water strategies that can account for changing rainfall patterns, cool urban landscapes through increasing urban greening and integrating water within our environment, and minimise damage to landscapes and waterways by protecting and enhancing biodiversity.

An ageing asset base

Drainage assets are physical assets. Though they have a long lifespan they're still prone to collapsing and becoming blocked, even with regular maintenance.

Much of Greater Geelong's drainage network was installed post-World War II. However, some assets date back to the 1800s, particularly in inner-urban areas. Drainage assets of this age can't always meet modern service demands.

The challenge for us is to understand our asset base well enough to complete renewals cost efficiently and before critical assets fail.

Constrained funding

We derive a large proportion of our funding for stormwater services from rates and charges. However, this income is finite and is used to pay for a wide range of services delivered by the City.

A shortfall in funding has been identified for renewing, maintaining and operating our stormwater system to meet a basic level of service. This is a critical constraint for our ageing asset network.

In addition to funding from rates and charges, income is sourced from government grants, development contributions, infrastructure levies and special charge schemes.

OPPORTUNITIES

Geelong: A water sensitive city

There has been a transformative change in global stormwater management practice over the last 20 years as cities have become more water sensitive[4]. At the same time, there is a growing expectation for urban landscapes to be leafy, green and include well-connected spaces. This creates an enormous opportunity to consider how we can make better use of stormwater within the urban environment to:

- create greener, healthier landscapes
- reduce demand on drinking water supplies, and
- improve the health of waterways.

Bringing community to the centre of our service

A recent review and amendment to the Victorian Local Government Act focuses on improved democracy, accountability and service delivery in local government. To comply with the Act, Councils will undertake deliberative community engagement processes to enable communities to better inform strategic directions and spending priorities.

We recognise there is a great opportunity for us to work more closely with the community to create a more responsive and accountable service. By doing this, we hope to change our day-to-day conversations from reactive ones – for example, when stormwater services don't meet expectations – to proactive ones where council and the community collaborate to identify opportunities to ensure services meet expectations over time.

Partnering opportunities

Stormwater managers are starting to think and act more holistically as they follow a global trend towards more water sensitive cities.

There are excellent opportunities to partner with State and regional water managers; Department of Environment Land Water and Planning, Barwon Water, Corangamite Catchment Management Authority, Southern Rural Water

[4] "Water Sensitive Cities" Brown (2009)

and Melbourne Water to deliver whole-of-water-cycle services together.

As stormwater passes through the control of multiple parties – including homeowners, councils and other authorities – it is currently difficult to define and control the rights and responsibilities of each party under the various pieces of legislation. By working with our partner organisations, we hope to clarify our individual roles as defined by legislation and develop more inclusive decision-making frameworks that can account for competing objectives.

Exploring Funding Mechanisms

The development of the strategy considered best practices and innovative initiatives from a wide range of sources. While the traditional approach to funding stormwater services draws from council rates and charges linked to property value, we identified many stormwater managers in the United States of America introducing "user pays" funding arrangements which link the charges levied on land owners to the volume and quality of stormwater produced by each land parcel. This approach transparently ties the cost of providing stormwater services to a land parcel's contribution to environmental or social impacts. In so doing, the approach creates an incentive for landowners to partner with water authorities and more actively manage stormwater run-off.

While the funding approach used in many parts of the United States of America is not widely practiced in Australia, this strategy offers the opportunity to explore a similar, or other, user pays approach to funding stormwater services.

Speeding up strategic planning

Taking a more strategic approach to planning and delivering stormwater services can help to unblock delays in the strategic planning system. This in turn will speed up the delivery of projects that provide employment growth, and create increased housing choice, diversity and affordability.

Creating more water resilient communities

The Stormwater Services Strategy 2020–30 has a strong connection to our *Sustainability Framework*. Through more effective stormwater services, we create water resilient communities which reduce their impact on the environment. Our proposed approach to delivering stormwater services will also improve community equity and access and deliver responsible and transparent service to our community.

The Stormwater Services Strategy also connects with the *Climate Adaption Strategy* and *Environment Strategy* by guiding communities to be more resilient and adaptable to the impacts of climate change.

Leading by example

Australia already employs best practice guidelines for the quality of water discharged to waterways[5], and guidelines for modelling rainfall events[6]. But, as Victoria's largest non-metropolitan municipality, we have an opportunity to be an example to other local governments which are looking improve the way they manage their stormwater services.

Figure 5 – Image of a stormwater pond in the Greater Geelong region

[5] Best Practice Environmental Management Guidelines 1999

[6] Australian Rainfall and Runoff (2019) Geosciences Australia

How this strategy was developed

We commenced development of the Strategy in early 2019 and have worked over the past 18 months to refine its structure and priority improvement actions to deliver best practice in stormwater management. Our process has included extensive engagement with stakeholders and the community, which is set to continue over the life of the strategy as we work with communities to identify and plan improvement actions in their localities.

PHASE 1: DEVELOPMENT OF BEST PRACTICE OBJECTIVES

The field of stormwater management is rapidly evolving, so we looked at best practice examples from Victorian and Australian stormwater managers, as well as drawing on the experience of the Co-operative Research Centre for Water Sensitive Cities.

From this process, we developed four strategic goals and 15 objectives to form the basis for all subsequent service decisions.

PHASE 2: PRIORITISATION OF CATCHMENTS

We applied the objectives we developed in Phase 1 to our 25 catchment management units. By working out the gap between current service levels and desired service levels, we then prioritised them – the larger the gap in services, the higher the priority.

The resulting prioritisation framework is designed to help us allocate available budget to the most critical stormwater service needs and associated infrastructure.

There was a lot of quantitative data available to inform the prioritisation, such as flooding, water quality, and tree canopy coverage data (see Appendix B). However, not all data which could be used is available or suitable at present.

To fill the gaps, some subjective assessments were made by our own experts. In cases where that wasn't possible – for example, we were unable to assess the vulnerability of the road, rail and cycling networks to flood events – we have left these measures out of our prioritisation, with plans to add them in once the data becomes available.

Measures used in prioritisation are listed in Table 3.

PHASE 3: STRATEGY DEVELOPMENT

The prioritisation exercise identified improvement actions for each catchment management unit within the municipality. Generally, these actions were focused on:

- **Asset and Non-Asset Solutions**
- **Investigations** – designed to confirm stormwater service risks and opportunities
- **Partnerships** – engagement with other authorities or organisations to better understand stormwater service risks and opportunities
- **Flagship projects** – we identified four complex projects which require partnerships with regional water managers and, most likely, external funding and external oversight.

We then prepared an implementation plan to guide actions over the next 10 years, with a focus on the next five years (until 2025).

PHASE 4: STAKEHOLDER ENGAGEMENT

We engaged with a range of external stakeholders about this strategy, including the Environment Protection Authority, Corangamite Catchment Management Authority, Barwon Water, the Department of Environment Land Water and Planning, neighbouring councils, and land development groups and industry associations.

During February and March 2020, we held four community sessions, and conducted an online survey with interactive maps open to all members of the community.

Though community feedback was limited, we identified general agreement with the objectives of the Strategy and significant opportunity to improve the level of services currently provided by the City.

The limited community feedback indicates that we have more work to do to raise the profile of Stormwater Services. Consequently, ongoing community engagement is a core feature of the strategy's delivery in the years to come.

Stormwater Services Strategy 2020–30

As Table 1 shows, the *Stormwater Services Strategy 2020–30* mission and goals are directly linked to the 30-year community vision described in *Greater Geelong: A Clever and Creative Future*.

Table 1 – Links between *Stormwater Services Strategy 2020–30* and the clever and creative vision

STORMWATER SERVICES STRATEGY	GREATER GEELONG: A CLEVER AND CREATIVE FUTURE
Mission To lead the adaptation and integration of stormwater services to support the city's growth, health and liveability.	**Vision** By 2047, Greater Geelong will be internationally recognised as a clever and creative city-region that is forward looking, enterprising and adaptive, and cares for its people and environment.
Goal 1: Foster healthy and resilient communities A city that can function without severe flooding that disrupts major transport routes, houses and businesses; supports healthy lifestyles by enhancing areas for outdoor activities; and helps people to feel safe in all types of weather, by reducing overland flows of stormwater (where not by design) and urban temperatures in heatwaves.	**Linked community aspirations** • People feel safe wherever they are • A fast, reliable and connected transport network • An inclusive, diverse, healthy and socially connected community
Goal 2: Support innovative and sustainable growth A city where development in new and existing areas is catered for using innovative stormwater management approaches that are fit-for-purpose, well-planned, and delivered effectively.	**Linked community aspirations** • Sustainable development that supports population growth and protects the natural environment • A leader in developing and adopting technology
Goal 3: Enhance built and natural environments A city where development integrates natural and built environments to create pleasant outdoor environments in parks, streets and gardens; protects and enhances bays and waterways, particularly those with international significance; supports conservation of drinking water supplies; and improves community health and wellbeing through urban cooling.	**Linked community aspirations** • Development and implementation of sustainable solutions
Goal 4: Create positive community experiences A city that understands community expectations for stormwater services; how to develop service options that are sustainable, equitable and transparent; and how to deliver best-practice approaches using a variety of funding models.	**Linked community aspiration** • Development of implementation of sustainable solutions

GOALS, OBJECTIVES AND MEASURES

To help deliver the goals, we have created a series of objectives that reflect the context we're operating in, as well as Australian best practice. While each objective is aligned with one goal (see Table 2), some objectives may apply to multiple goals.

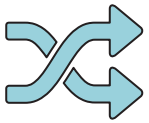
For each objective, we've also created:

- **measures** – these help us assess how well we're tracking towards achieving each objective
- **targets** – this is what we believe we can reasonably expect to achieve within available resources and designated time periods.

Figure 6 – Point Lonsdale

Table 2 – Best Practice Objectives

Goal 1: Foster healthy and resilient communities

Icon	Objective	Context	Measure	Target
	Reduce the impacts of dangerous stormwater flooding.	Deep and/or fast-moving water (high hazard) can cause significant injury and damage to people, places and the environment. Stormwater assets may not remove or reduce all risks, but adaptation programs supported by information and education can help.	Extent of the municipality which has current and well-informed stormwater management strategies.	Catchment management strategies are developed by 2025 (high priority catchment management units) or 2030 (all catchment management units), with ongoing implementation, monitoring and periodical review.
	Support urban greening through integrated water management.	Urban environments with a higher proportion of urban forest (tree canopy) and green space maintain lower temperatures during extreme heat, reducing risk of heat-related illness and death in the community. Stormwater can support urban greening through practices such as stormwater harvesting schemes.	Total area of tree coverage, open space and landscaping passively and/or actively irrigated with stormwater.	A quantified target for tree coverage and green spaces supported by stormwater irrigation is established before 2025. This initiative will in turn help support the clever and creative vision of 25 per cent tree coverage.
	Reduce demand on drinking water through alternative water sources.	Stormwater can be used in City-owned facilities and to support urban greening initiatives. However, the seasonality and variability of rainfall, and lack of water storage capacity in existing urban areas, makes stormwater a valuable supplement to alternative water supplies – for example, augmenting recycled water supply.	Volume of drinking water replaced by stormwater to maintain urban forest and green spaces, as well as service City-owned facilities.	Twenty per cent of our water is sourced from alternative water sources, including stormwater, by 2030.
	Integrate stormwater systems to enhance the use of community spaces.	We want to create community spaces that encourage activity in all seasons, without compromising public safety. Once we understand community expectations, we can design community spaces which safely incorporate stormwater assets (for example Eastern Beach Gardens)	Number of recreation and public open spaces which are constrained or where public safety is compromised by stormwater.	Identify recreation and public open spaces where stormwater can be safely incorporated, and document within catchment management strategies by 2025 (high priority catchment management units) or 2030 (all catchment management units).
	Minimise flood disruption to transport corridors.	Stormwater over roads and pathways can be very disruptive, restricting access to important places and services, such as hospitals and railway stations. This in turn can impact on community safety and can result in economic loss to both people and businesses.	Scale and duration of stormwater flooding impacting the local transport network.	All critical transport links – road, rail, cycling –and customers are identified, the risk of disruption understood, and mitigation actions identified in catchment management strategies by 2025 (high priority catchment management units) or 2030 (all catchment management units).

Goal 2: Support innovative and sustainable growth

Icon	Objective	Context	Measure	Target
	Implement catchment wide practices that guide growth.	Development in urban environments does not necessarily occur sequentially and can result in isolated changes to the stormwater catchment. Taking a whole-of-stormwater-catchment approach to the planning and delivery of stormwater services will enable us to identify all impacts and give us the opportunity to work more effectively with developers.	Extent of growth areas with whole-of-catchment management strategies in place.	Catchment management strategies identify active and known future development by 2025 (high priority catchment management units) or 2030 (all catchment management units).
	Implement stormwater solutions that are financially sustainable.	Stormwater solutions should align with best practice, consider whole-of-life costs, and optimise benefits to the environment and communities at a reasonable cost. Stormwater solutions should also consider the impact of CO2 emissions in the construction and operation of assets. This can be achieved using well-established approaches, as well as by drawing on innovation and new technologies.	Cost to the community to provide services where funding for delivery of stormwater services is sourced from the City's rates and charges. Direct and indirect C02 emissions generated by the delivery of Stormwater Services.	Cost to deliver basic levels of service are detailed in asset management plans before 2025 (high priority catchment management units) or 2030 (all catchment management units). Investment decisions use an appropriate benefit/cost assessment.
	Develop partnerships to plan and deliver stormwater solutions.	Collaboration, exploration, sharing knowledge and building collective capacity enables the most innovative, effective and sustainable water solutions to be implemented. Also, it puts us all in the best possible position to deliver on agreed outcomes.	Partnerships with governments, water corporations and other key agencies, organisations and individuals.	Consider the feasibility and benefits of establishing a formal sustainable water partnership with Barwon Water and the Corangamite Catchment Management Authority before 2025. Participate in legislative reviews to clarify and improve our authority to deliver actions by 2025.

Goal 3: Enhance built and natural environments

Icon	Objective	Context	Measure	Target
	Protect the health of receiving waterways, maximising their value and amenity.	Stormwater flows can bring high volumes of fast-moving water, litter waste, sediments and other pollutants into waterways. Assessing and mitigating the impacts urban environments have on waterways – for example erosion, sediment build up, gross pollution, nutrient pollution and flora/fauna degradation – will protect and enhance the health of these waterways.	Waterway Health Assessments completed through modelling or sampling, as appropriate.	Water quality and flow monitoring is underway in high priority catchment management units by 2025. Complete an audit of waste produced by the stormwater system and introduce targets aligned with Council sustainability objectives before 2025. Highlight catchment management units that don't currently comply with best-practice targets by 2025 (high priority catchment management units) or 2030 (all catchment management units).
	Conserve biodiversity corridors.	A healthy natural environment relies on effectively managed stormwater to support healthy and functioning biological systems. In so doing, the stormwater system promotes a stronger connection between people and nature, improves the way we care for nature, and protects us from storms and floods.	Number of catchments where retention, protection and/or restoration of wetland systems is assessed.	Environmental flow requirements considered by 2025 (high priority catchment management units) or 2030 (all catchment management units.
	Protect cultural values along waterways.	Respectfully acknowledging the connection of Traditional Owners and other Aboriginal and Torres Strait Islander community members to the land and waterways is essential to better understand Aboriginal cultural history, and to acknowledge the experiences and needs of Aboriginal and Torres Strait Islander people.	Engagement with the Wadawurrung and other community groups during catchment planning so that cultural values can be highlighted, and natural flow patterns protected.	Identify culturally significant areas in catchment management strategies by 2025 (high priority catchment management units) or 2030 (all catchment management units).
	Implement stormwater systems that can adapt to future needs.	It is not certain how well stormwater services will cope with future climate change and population growth. Trends suggest an increase in the variability and severity of extreme weather events, along with unprecedented rates of population growth. Stormwater systems must be able to manage these changes.	Long-term infrastructure demand is identified by considering future climate and growth scenarios and contemporary rainfall and run-off datasets and methodologies.	Capital works programs are in place for a minimum 10-year period, are informed by asset management plans and are included in our long-term financial plan before 2025.

Goal 4: Create positive community experiences

Icon	Objective	Context	Measure	Target
	Engage with community on stormwater services.	An informed community is best placed to understand its needs and provide critical information that can shape how stormwater is managed.	Extent of engagement (and participation) with community on the delivery of stormwater services.	Extensive community engagement on stormwater services is underway via Catchment Management Strategies (including using continuous engagement tools such as “snap-send-solve”) by 2021.
	Enable communities to better prepare for, and recover from, damaging stormwater events.	Modern-day technologies make communities better able to prepare for forecast flooding events. We are well-prepared to work with emergency management groups, such as the SES, to support response and recovery.	Extent of preparedness for a stormwater event.	Capability to warn and recover from stormwater events incorporated in the *Municipal Emergency Management Plan* by 2025.
	Establish funding streams which are transparent and equitable.	Stormwater services require funding from a range of sources. To deliver a sustainable service, it is likely that rate revenue will underpin the ongoing (base) cost of the service, whereas user charges (Development Contributions, Infrastructure Levies and Special Charge Schemes) and gifted assets from development will be a primary source of funding for new and upgraded services.	Stormwater service costs covered by rates, user charges and gifted assets.	All adopted catchment management strategies identify new and upgraded infrastructure demand (scope and cost) and funding options (benefiting properties and apportioned cost) for high-priority projects.

PRIORITISING CATCHMENT MANAGEMENT UNITS

We have used pre-existing datasets to help us assess how well each catchment management unit currently meets the best-practice objectives set out in Table 2.

However, catchment management units could not be assessed against all objectives – either because the objectives are generic or can't yet be measured. Table 3 (below) therefore sets out the objectives used for the prioritisation process.

We believe we have sufficient data for the purposes of this strategy. But, as we develop a better understanding of stormwater service performance and gather more data, we expect our ability to prioritise and plan actions will improve.

Table 3 – Objectives used for prioritisation

Icon	Objective
	Reduce the impacts of dangerous stormwater flooding.
	Support urban greening through integrated water management.
	Integrate stormwater systems to enhance the use of community spaces.
	Implement catchment wide practices that guide growth.
	Develop partnerships to plan and deliver stormwater solutions.
	Protect the health of receiving waterways, maximising their value and amenity.
	Implement stormwater systems that can adapt to future needs.
	Protect cultural values along waterways[7]

Refer to Appendix B for a list of the data sources used to assess the abovementioned objectives.

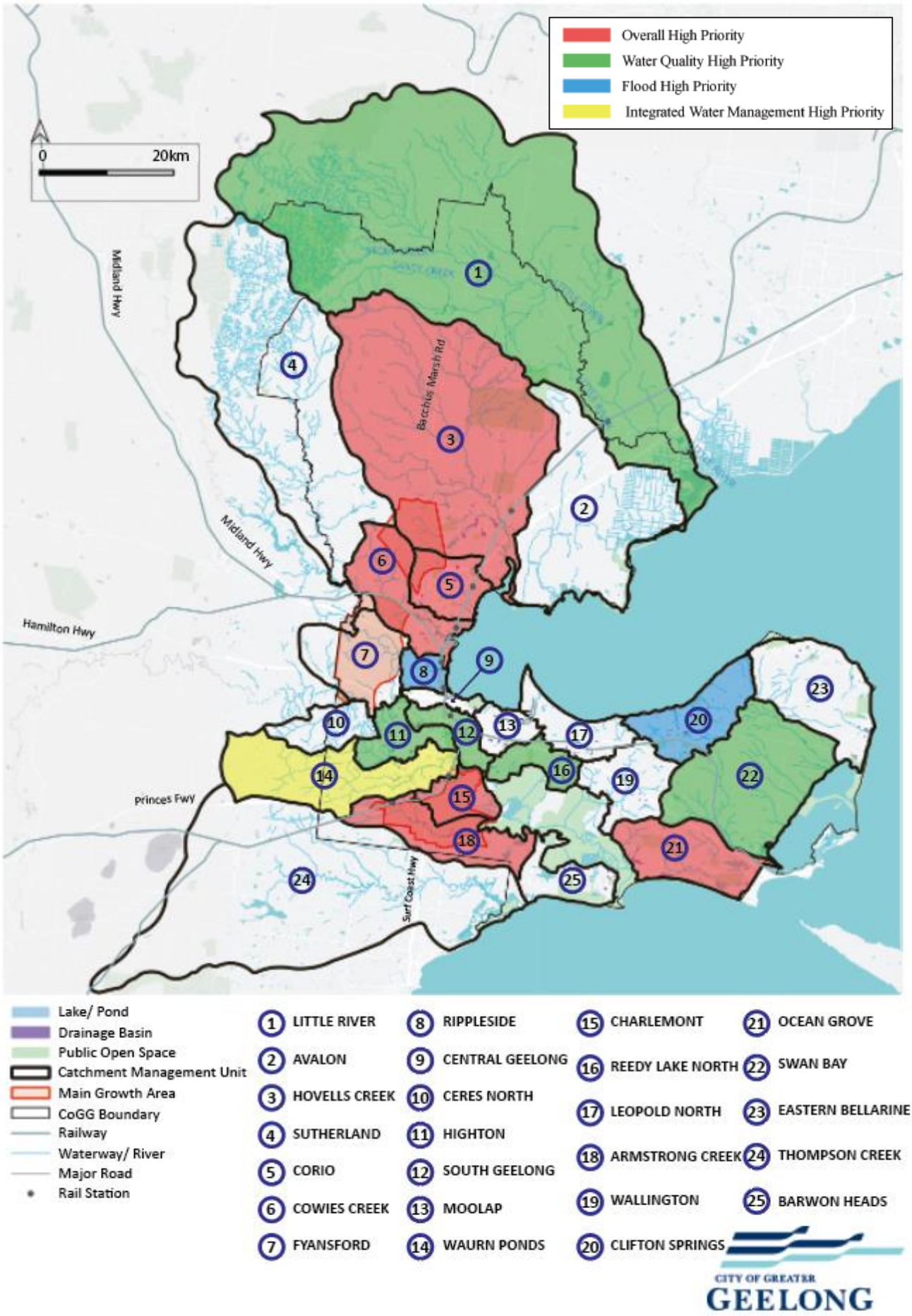
Emerging from the analysis of catchment management units was a series of priority catchments, which included:

- High Priority Catchments: Catchments with 'single' priorities, broadly related to managing flooding risk, stormwater quality risk or integrated water management opportunities, and
- Overall High Priority Catchments: Catchments with 'multiple' priorities, which will require a concerted focus to improve performance across several objectives.

High Priority and Overall High Priority catchment management units are highlighted in Figure 7. The analysis of catchment management units also identified a series of flagship projects, described in more detail below.

[7] Data collected to support prioritisation of this objective was limited. Additional cultural values are expected to be identified in the development of Catchment Management Strategies

Figure 7 – High Priority catchment management units



FLAGSHIP PROJECTS

Northern Geelong Green Corridor Project

This area north of Geelong includes the degraded Cowies Creek and the suburbs of Norlane, Corio and Lara.

Combined with increased infill development currently occurring in established areas, development of the Northern Growth Area will bring further challenges for us to manage these areas to avoid worsening existing flooding problems.

Furthermore, the area has low tree canopy coverage and open space which may act to increase temperatures and the risk of heat-related injury and death in heatwave conditions.

A significant opportunity exists to improve flood management, urban amenity and waterway health through the development of a nationally significant project.

This project would need to be managed in partnership with Barwon Water, Corangamite Catchment Management Authority and the Wadawurrung community, which has strong connections with Cowies Creek.

It would also need significant government funding.

Lake Connewarre Protection Project

Suburbs south of Geelong (including Belmont, South Geelong and Breakwater) are known for flooding and are the source of waterway pollution in the lower sections of the Barwon River.

Further south, the urban areas of Armstrong Creek and Charlemont are complex developments which are rapidly expanding. While they've been designed to meet modern standards, they must be carefully managed to protect Lake Connewarre.

Also, as new growth areas allow less space for gardens than older developments, there is a great need for effective street trees and irrigated open spaces to improve urban amenity during heatwaves.

By upgrading existing infrastructure in the suburbs south of Geelong and maintaining a close watch over new growth at the head of the Connewarre complex, we can make sure that environmental values are protected, and that urban amenity is maintained.

Bellarine Sustainable Water Project

The Bellarine Peninsula is an area of outstanding natural beauty and tourism value. It also has the potential to become the site of an ambitious regional integrated water management priority project, incorporating stormwater management that would:

- manage flooding and waterway problems
- improve biodiversity corridors
- improve tourism and economic outcomes
- improve urban amenity
- support regional agricultural activities
- reduce reliance on drinking water supplies, and
- promote the unique identity of the Bellarine communities.

The project could also incorporate coastal inundation management, which will be required to manage rising sea levels and coastal erosion over time.

By working closely with the Corangamite Catchment Management Authority, the Department of Environment Land Water and Planning, Barwon Water, tourism operators and other regional partners, we could:

- reduce stormwater flooding in several townships such as Ocean Grove and Clifton Springs
- better manage the quality of water entering Swan Bay and Port Philip Bay
- develop sustainable biodiversity, transport, and recreation corridors, which follow natural waterways between Bellarine communities, using stormwater and recycled water harvested from the region (this would also have tourism and economic benefits)
- establish high-quality public open space and green canopies, supported by harvested stormwater and recycled water, to reduce the impact of coastal inundation and erosion in existing communities.

This project would allow Bellarine communities to further express their unique identities and set the region on a path toward a future of sustainable water management.

Waterproofing Urban Geelong Project

The inner urban suburbs of Geelong such as Central Geelong, Geelong West and Rippleside often do not meet contemporary standards for urban design and stormwater management. This has created areas that are significantly flood-prone.

By implementing new drainage assets, flood warning systems, targeted drainage maintenance and planning controls, this situation can be greatly improved. These solutions can also bring further benefits to the community by delivering improved green/blue infrastructure.

Table 4 – Flagship project overview

Flagship Project	Risks and Opportunities	Opportunities for exploration
Northern Geelong Green Corridor Project	Existing flood risk which need to be managed with new growth. Low tree canopy coverage. Degraded Cowies Creek has great potential to be improved for environmental and cultural reasons, to connect people with nature and could promote connectivity between communities. Irrigation of passive open space, in addition to sporting areas.	Develop partnerships with Barwon Water, Corangamite Catchment Management Authority and the Wadawurrung community to develop a project steering committee. Engage with the community to understand project preferences and expectations. Develop a well-justified case to support applications for state and federal funding. Establish widespread street tree and understory planting and irrigation program, using harvested stormwater with recycled water backup, delivered via zero-emission trucks. Engage with Landcare, community and 'friends of' groups to support tree planting and revegetation. Complete significant flow and water quality upgrades to Cowies Creek, while improving walking trails and recreational facilities.
Lake Connewarre Protection Project	Highly sensitive, Ramsar-listed environment. Current development in Armstrong Creek and Charlemont requires a complex network of water sensitive urban design assets and drainage network (which includes the Sparrovale Wetlands). Existing urban development in South Geelong is known to contribute low-quality stormwater into the lower reaches of the Barwon River. Opportunity to transition from industrial to mixed-use development in Fyans Street precinct, incorporating best practice stormwater management.	Develop partnership with Corangamite Catchment Management Authority to understand the current health of Lake Connewarre. Monitor ongoing pollution levels and carry out audits to identify the source of pollution and stormwater flows. Seek support from EPA if required. Maintain rigorous oversight of infrastructure delivery, with regular audits of progress and actions of developers.
Bellarine Sustainable Water Project	Existing flood risk in several Bellarine communities – for example, Ocean Grove and Clifton Springs. Highly sensitive, Ramsar-listed environments. Subject to coastal erosion and inundation, due to sea level rise. Opportunities for individual communities to express their unique identity through innovative water management projects.	Develop partnerships with Barwon Water and community groups to promote a regional integrated water management project that is comparable to other major integrated water management projects in Victoria. Engage with the community to understand project preferences and expectations. Develop a well-justified case to support applications for state and federal Government funding. Plan and implement flood mitigation actions.

		Monitor ongoing pollution levels and carry out audits to locate the source. Develop biodiversity-rich transit corridors between Bellarine communities to improve connectivity and tourism in the region. These corridors could follow waterways and existing biodiversity corridors, with pedestrian, road, cycling and rail linkages. Deliver community-specific sustainable water projects that will enhance identity and promote resilience to flooding, coastal inundation and erosion.
Waterproofing Urban Geelong	Existing flooding of older areas of Geelong, Geelong West and Rippleside. Expected increase in flooding due to infill development (including multi-storey apartment and office buildings), ageing assets and drainage network design which does not meet current needs.	Improve preventative asset maintenance and renewal to reduce our overall asset management cost and deliver community level of service expectations. Install green/blue infrastructure when drainage or roads are remade – for example, linear swale drains, biodiversity corridors and modified roads – to better convey stormwater flows and reduce flooding.

ACTIONS BY CATCHMENT MANAGEMENT UNIT

Notwithstanding the flagship projects identified, this is a strategy of practical measures designed to guide us to achieve basic levels of service for all catchment management units over the next 10 years. These actions have been summarised in Appendix C.

We intend to work with the community to create Catchment Management Strategies for each high priority catchment management unit over the next five years, and for all catchment management units within 10 years. These strategies form part of the overall stormwater service framework and will be directly linked with the *Stormwater Services Strategy 2020–30* actions.

How the strategy will be implemented

The Stormwater Service Strategy is considered a major strategy under our strategic governance framework, and directly supports the community's clever and creative vision.

It is an overarching strategy that will guide long-term planning, asset management, business plans and budgets. The strategy is adaptive and will require ongoing community engagement and consultation

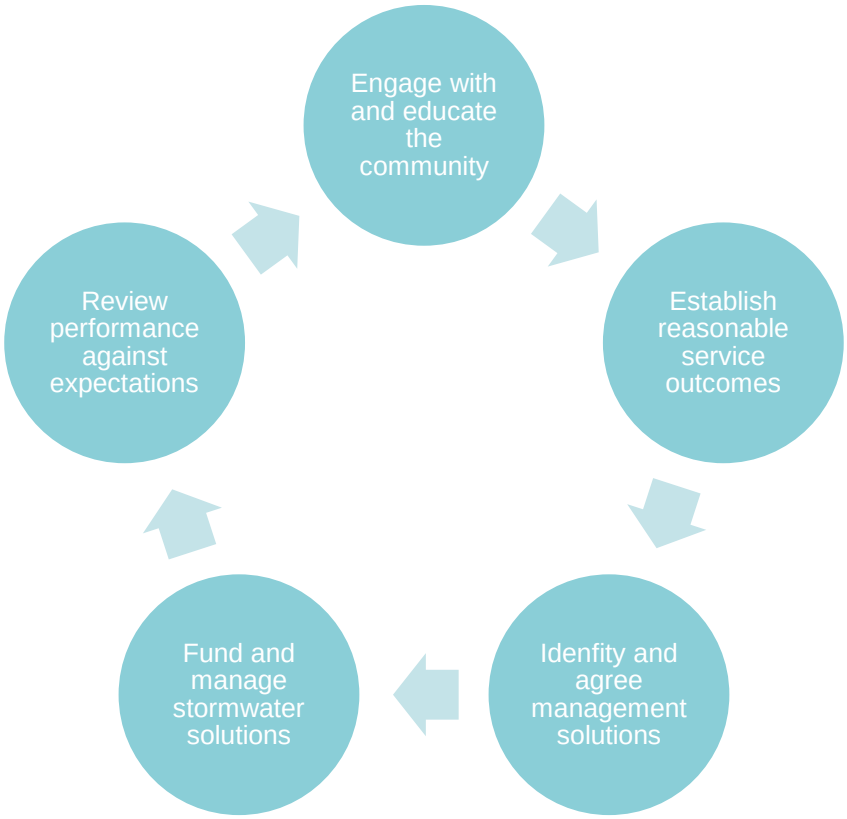
DELIVERING AN ADAPTIVE STRATEGY

The delivery of the recommended actions for each catchment management unit will rely on ongoing engagement with communities to:

- establish and manage desired service outcomes
- contribute to effective decision-making, and
- develop successful partnerships that can help to attract the funding required.

The approach is summarised in Figure 8 below.

Figure 8 – Adaptive strategy delivery approach



Engage with and educate the community

Typically, we engage with the community during and after flooding events that impact the community in varying degrees. These conversations are often singular in focus and reactive.

With this strategy, we hope to start more proactive conversations about why stormwater services are important, and how the community can benefit when services are considered holistically. At the very least, we will take more time to provide the community with valuable information on stormwater, which will hopefully promote better understanding and planning for events and changes.

Establish reasonable service outcomes

We currently manage stormwater services to comply with established standards, but these levels of service do not always meet community expectations. For example, current flood protection standards require us to protect infrastructure against a one-in-one-hundred-year event. This can be a difficult concept to explain to the general community, especially when a one-in-one-hundred-year event can happen several times in one year.

We think that working with communities to establish agreed service levels will bring better outcomes. In developing these agreed service levels, we will have an opportunity to:

- explain how stormwater services operate
- explain that services may vary by location and over time and
- discuss the finite resources we have available to deliver services.

Once a standard has been established, we can create technical standards that shape asset and non-asset solutions that are more easily understood by the community.

Identify and agree management solutions

A robust stormwater management approach contains both asset and non-asset solutions and considers the costs and benefits of each solution. We will engage with communities about the management solutions proposed in each catchment management strategy to make sure we're achieving the best outcome for the funding available.

Fund and manage stormwater solutions

We have many critical assets that we must manage and maintain at a level that supports sustained delivery of service over time.

We will update and maintain asset management plans that can deliver on reasonably expected levels of service and inform an adaptation program that will deliver capital works, maintenance and operations within our available resources.

These asset management plans will:

- record expected levels of service, accounting for future changes in climate and development
- highlight the importance of systematic programming, funding and preventative maintenance to maintain services and meet community expectations, and
- use ongoing monitoring programs to demonstrate how well we're performing and our plan for the future.

We will work toward delivering a basic level of service that can be funded from rates and charges. This basic level would include asset renewal, maintenance and operations.

We will be required to draw on funding from other areas – for example, government agencies, developers and users – in cases where we must go above and beyond a basic level of service. This funding might include grants, special charge schemes, development contributions, infrastructure levies, fees and charges.

We will also work toward understanding how the cost of delivering stormwater services might be better met through contributions from residents/businesses based on the quantity and quality of stormwater generated from their land parcel. This approach is gaining broad acceptance within other jurisdictions such as the United States of America.

Reviewing performance

We will regularly review our performance in delivering catchment management strategies. More information about this process will be known once the catchment management strategies are developed.

SERVICE PLANS

The Stormwater Services Strategy and subsequent catchment management strategies are supported by (and support, through an iterative feedback and review cycle) a range of technical service plans that include detailed assessment of stormwater management practices over a five-year period such as:

Flood Management Plan (2013)

With the aim of supporting a resilient community that is safe, prepared and informed, this plan will assemble river and stormwater flooding knowledge from relevant agencies to plan, develop and deliver best-practice flood management.

This plan is currently under review and is scheduled to be updated by September 2020.

Stormwater Quality Plan (2015)

The aim of this plan is to implement stormwater treatment into areas where the greatest gains can be made for high-value waterways, wetlands and bays.

The plan explores treatment options, such as stormwater treatment wetlands within parks, retarding basins near waterways, streetscape treatments and stormwater harvesting.

This plan is currently under review with a renewed focus on holistic waterway management and is scheduled to be updated by December 2020.

Integrated Water Management Plan

This plan is yet to be developed but will describe an integrated and collaborative approach to water planning and management that considers all facets of the water

cycle, including water supply, wastewater, surface water, groundwater and stormwater.

Managing these aspects together can result in better and more cost-effective outcomes, bringing together organisations with an interest in all aspects of the water cycle.

There are several initiatives that collectively contribute to defining our integrated water management service planning, being the Barwon Region Integrated Water Management Strategic Directions Statement and the Northern and Western Geelong Growth Area Integrated Water Management Plan.

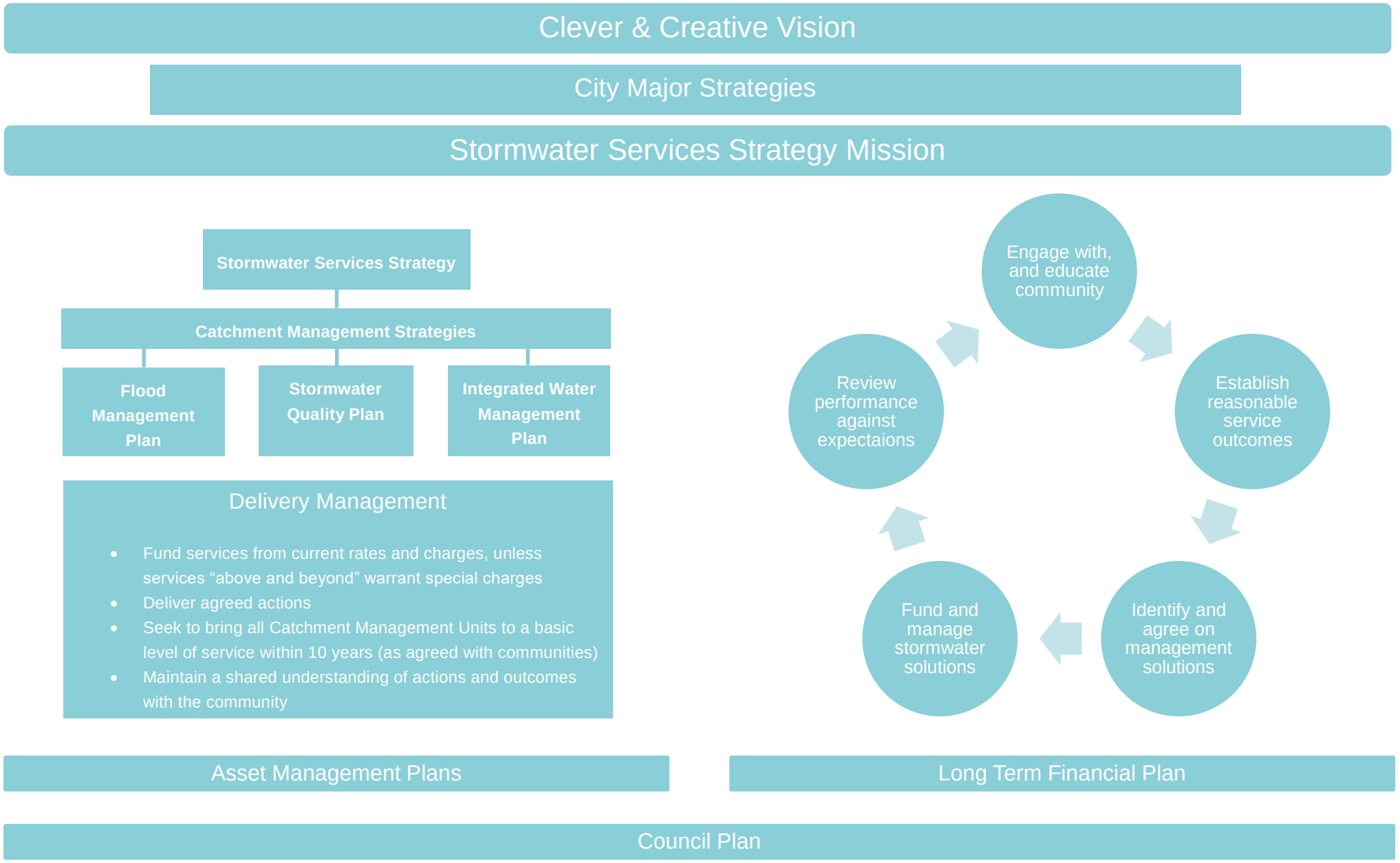
STRATEGY UPDATE

We will review the *Stormwater Services Strategy 2020–30* every five years to ensure it remains up-to-date, accounts for community expectations and reflects best practice for stormwater management.

OUR STRATEGY ON A PAGE

Our *Stormwater Services Strategy 2020–30* operates in collaboration with many other city policies and strategies and has multiple elements. These are illustrated in Figure 9.

Figure 9 – Strategy on a page



IMPLEMENTATION TIMELINE

Table 5, 6 and 7 set out actions in the strategy to achieve by 2030.

Table 5 – Actions July 2020 to June 2022 (0-2 years)

Action ID.	Action Description	Timeline	Key Departments	How
SSS01	Prepare catchment management strategies for the Hovells Creek, Corio, Cowies Creek, Fyansford, Rippleside, Ocean Grove and Clifton Springs catchment management units. The development of these catchment management strategies will be pilots to refine the approach to be rolled out to all catchment management units over time.	By June 2021	Engineering Services	Levels of service will be developed and tested with these communities, then committed to through the adoption of catchment management strategies.
SSS02	Prepare an integrated water management plan to support the *Stormwater Services Strategy 2020–30.*	By June 2022	Engineering Services Environment and Waste Services	Our approach to delivering integrated water management will be clarified and communicated with key stakeholders.
SSS03	Scope Northern Geelong Green Corridor Project (flagship project) and prepare proposal for Council endorsement.	By June 2022	Parks and Gardens Engineering Services	Flagship project will be scoped, and funding opportunities identified.
SSS04	Scope Lake Connewarre Protection Project (flagship project) and prepare proposal for Council endorsement.	By June 2022	Environment and Waste Services Engineering Services	Flagship project will be scoped, and funding opportunities identified.
SSS05	Scope Bellarine Sustainable Water Project (flagship project) and prepare proposal for Council endorsement.	By June 2022	Parks and Gardens Engineering Services Environment and Waste Services	Flagship project will be scoped, and funding opportunities identified.

Action ID.	Action Description	Timeline	Key Departments	How
SSS06	Scope Waterproofing Urban Geelong (flagship project) and prepare proposal for Council endorsement.	By June 2022	Engineering Services	Flagship project will be scoped, and funding opportunities identified.
SSS07	Establish partnership between the Greater Geelong water managers, including Barwon Water and Corangamite Catchment Management Authority.	By June 2021	Engineering Services	A Memorandum of Understanding (or similar) between water managers in Greater Geelong will be drafted and executed.
SSS08	Prepare asset management plans to support basic levels of service in overall high priority catchment management units.	By June 2022	Engineering Services	Asset management approach and funding clarified.
SSS09	Advocate for legislative changes that enhance the City's stormwater practices.	By June 2022	Engineering Services	Our authority, as well as that of our regional water partners, will be clarified. This will enable us to deliver improved stormwater and integrated water management outcomes across the community.
SSS10	Review Alternative Funding Opportunities.	By June 2022	Engineering Services	Review opportunities to establish stormwater charging mechanisms which reflect the contribution of each land parcel to stormwater volume and quality impacts.
SSS11	Complete Catchment Management Strategies for catchments with overall high priority assessments: • Charlemont • Armstrong Creek	By June 2022	Engineering Services	Complete catchment management strategies for all catchment management units with overall high priority.
SSS12	Complete Municipal Flood Management Plan	By December 2020	Engineering Services	Complete flood management plans, ensuring Municipal Emergency Management Plan includes capability to warn of flood events.
SSS13	Complete Municipal Waterway Management Plan	By June 2021	Engineering Services	Complete Waterway Management Plan for entire municipality, ensuring linkage to Corangamite Waterway Management plan.

Table 6 – Actions July 2022 to June 2025 (2-5 years)

Action ID	Action	Timeline	Key Departments	How
SSS14	Review outcomes from Strategy implementation to June 2022.	By December 2022	Engineering Services	Report on the status of strategy implementation to Council.
SSS15	Commence advocacy for Northern Geelong Green Corridor Project.	By June 2025	Parks and Gardens Engineering Services	High-profile projects are well-defined and understood by communities, while necessary partnerships and funding will be sought.
SSS16	Commence advocacy for Lake Connewarre Protection Project.	By June 2025	Environment and Waste Services Engineering Services	High-profile projects are well-defined and understood by communities, while necessary partnerships and funding will be sought.
SSS17	Commence advocacy for Bellarine Sustainable Water Project.	By June 2025	Parks and Gardens Engineering Services Environment and Waste Services	High-profile projects are well-defined and understood by communities, while necessary partnerships and funding will be sought.
SSS18	Commence advocacy for Waterproofing Urban Geelong	By June 2025	Engineering Services	High-profile projects are well-defined and understood by communities, while necessary partnerships and funding will be sought.
SSS19	Update asset management plans (including 10-year capital plan) using information from completed catchment management strategies.	By June 2025	Engineering Services	Asset management approach and funding clarified, with updated information from completed catchment management strategies, including development and adoption of long-term capital works programs and non-asset solutions.
SSS20	Test Alternative funding opportunities.	By June 2025	Engineering Services	Engage with community and regulators to discuss options to modify funding arrangements
SSS21	Develop framework for data collection to inform assessment against objectives.	By June 2025	Engineering Services	Understand approach to capturing data to inform assessment against strategy objectives.

Action ID	Action	Timeline	Key Departments	How
SSS22	Update the stormwater services strategy.	By June 2025	Engineering Services	Prepare report on implementation status to Council. Targets and actions updated. Catchment management unit priorities updated to account for additional knowledge acquired.
SSS23	Complete all remaining High Priority catchment management strategies (those with singular issues related to water quality, flooding or IWM): **Water Quality** • Little River • South Geelong • Highton • Reedy Lake North • Swan Bay **Integrated Water Management** • Waurn Ponds	By June 2025	Engineering Services	Catchment Management Strategies completed for all High Priority Catchments
SSS24	Confirm “Support urban greening through integrated water management” Objective Target	By June 2025	Engineering Services	Develop a quantified target for tree coverage and green spaces supported by stormwater irrigation.
SSS25	Establish water quality and flow monitoring program for high priority catchments	By June 2025	Engineering Services Environment and Waste	Develop water quality and flow monitoring program in collaboration with CCMA.

Table 7 – Actions July 2025 to June 2030 (5 to 10-year period)

Action ID	Action	Timeline	Key Departments	How
SSS26	Commence implementation of Northern Geelong Green Corridor Project.	By June 2025	Parks and Gardens Engineering Services	Commence implementation of actions, including ongoing engagement and partnership processes.
SSS27	Commence implementation of Lake Connewarre Protection Project.	By June 2025	Environment and Waste Services	Commence implementation of actions, including ongoing

Action ID	Action	Timeline	Key Departments	How
			Engineering Services	engagement and partnership processes.
SSS28	Commence implementation of Bellarine Sustainable Water Project.	By June 2025	Parks and Gardens Engineering Services Environment and Waste Services	Commence implementation of actions, including ongoing engagement and partnership processes.
SSS29	Commence implementation of Waterproofing Urban Geelong	By June 2025	Engineering Services	Commence implementation of actions, including ongoing engagement and partnership processes.
SSS30	Include data on all strategic objectives in all catchment management strategies	By June 2030	Engineering Services	All catchment management strategies consider all strategic objectives.
SSS31	Phase in alternative funding (if appropriate).	By June 2030	Engineering Services	Implement alternative funding mechanisms.
SSS32	Complete development of Catchment Management Strategies for all remaining Catchment Management Units.	By June 2030	Engineering Services	All Catchment Management Strategies complete.
SSS33	Update Catchment Management Strategies completed from 2020 to 2025 (in keeping with 5-year review cycle).	By June 2030	Engineering Services	All High Priority Catchment Management Strategies remain up-to-date.
SSS34	Complete Strategy Implementation Status Update	By December 2027	Engineering Services	Prepare report on Strategy implementation status to Council. Targets and actions updated. Catchment management unit priorities updated to account for additional knowledge acquired.
SSS35	Prepare next version of the Stormwater Services Strategy	By June 2030	Engineering Services	Next version of the Stormwater Services Strategy endorsed by Council

Appendix A – Related Documents

Table 8 – Relationship with other strategies

Strategy	Relationship with *Stormwater Services Strategy 2020–30*
City Strategies	
Environment Strategy (2020)	The Environment Management Strategy includes strategic priorities relating to enhanced natural areas and ecosystem health and sustainable urban and rural development.
Sustainability Framework (2020)	The *Sustainability Framework* defines a sustainable community as one that manages its natural, human and financial resources to meet current needs while ensuring that adequate resources are available for future generations. These goals are reflected in the Framework's Key Priority Areas: • Environmental Solutions and Impact minimisation • Community Equity, Access and Inclusion • Responsible and Transparent Business
Reconciliation Action Plan (2020)	The Reconciliation Action Plan outlines practical actions for the City, that build on advancing a positive relationship between Aboriginal and Torres Strait Islander Peoples and non-Indigenous people and demonstrate respect and self-determination for local Aboriginal and Torres Strait Islander Peoples. The plan also ensures equality of opportunity and access in all dealings with the community.
Social Infrastructure Plan (2014 – 2031)	The Social Infrastructure Plan covers the planning, investment and delivery of social infrastructure including parks and playgrounds which provide amenity.
Open Space Strategy (2014)	The Open Space Strategy establishes the extent and quality of existing open space and sets out future actions. The use of stormwater in these spaces can increase the quality of the space and support health lifestyles.
Integrated Comprehensive Transport Plan (2015)	The Integrated Comprehensive Transport Plan sets out the actions for the planning, development and management of the City's transport system. A critical component of transport planning is the management of stormwater flows.
Settlement Strategy (2018)	The Settlement Strategy provides the planning framework to deliver growth within the City, ensuring development is planned and delivered appropriately.
Biodiversity Strategy (2003)	The Biodiversity Strategy outlines the status of biodiversity in Greater Geelong and required future monitoring, review and actions to manage the protection of conservation areas and vegetation.
Urban Forest Strategy (2015 – 2025)	The Urban Forest Strategy focuses on enhancing the public and private tree population throughout the City. There are opportunities for stormwater reuse to support tree canopy coverage.
Climate Change Adaptation Strategy (2011)	The Climate Change Adaptation Strategy support the City to develop responses under a range of possible climate futures. The possible impacts of climate change must be considered when planning for stormwater.

Customer Focus Strategy (2017 – 2020)	The Customer Focus Strategy sets to shared vision for customer service across the City with a priority for the City to be a customer focused organisation. An important element of the *Stormwater Services Strategy 2020–30* is community engagement to ensure services meet customer and community expectations.
Geelong Play Strategy (2017)	The Geelong Play Strategy plans for the provision of well located, well designed and accessible play spaces across the City, providing increased amenity and supporting health lifestyles.
Greater Geelong Cycle Strategy (2008)	The Greater Geelong Cycle Strategy provides guidance on expanding the City's cycle network and encouraging cycling as a means of transport. Stormwater flows over paths can create access restrictions and can impact safety.
Greater Geelong Physical Activity Strategy (2014 – 2017)	The Greater Geelong Physical Activity Strategy focuses on identifying cost effective opportunities that are likely to increase people's on-going participation in physical activity. Stormwater can support urban design that encourages activity and comfortable open public areas.
Regional Strategies and Priorities	
Greater Geelong Planning Scheme (2020)	The Greater Geelong Planning Scheme sets out the objectives, policies and provisions for the use, development and protection of land. The scheme regulates the use and development of land. Where known, this prevents or manages development in areas that are flood prone.
Integrated Water Management Forum (Barwon) Strategic Directions Statement (2018)	The Integrated Water Management Forum provides the opportunity to progress water cycle planning and management within the Barwon region through collaboration with Barwon Water and the CCMA.
Corangamite Regional Catchment Strategy (2013 – 2019)	The Corangamite Regional Catchment Strategy provides a plan for natural resource management within the region. Stormwater flows can impact on waterway health, the *Stormwater Services Strategy 2020–30* seeks to protect and even enhance the health of waterways through mitigating the impacts of stormwater flows.
Corangamite Waterway Strategy (2014-2022)	The Corangamite Waterway Strategy provides a framework and work program to maintain or improve the condition of rivers, estuaries and wetlands so they can continue to support environmental, social, cultural and economic values across the region.
Corangamite Regional Floodplain Management Strategy (2018 – 2028)	The Corangamite Regional Floodplain Management Strategy provides a plan for floodplain management and work program to guide future investment priorities within the area. The strategy focuses on flooding associated with river systems and coastal storm surge inundation.
Geelong Region Alliance (G21) pillars (2020) (Sport and Recreation, Environment, Health and Wellbeing, Planning and Services)	The G21 pillars foster community wellbeing, protect and enhance our environment and ensure sustainable development within the G21 region. The pillars include projects to support the objectives of the G21 Geelong Regional Plan – A Sustainable Growth Strategy'.

Appendix B – Datasets

Table 9 – Datasets used for prioritisation

Dataset	Description	Theme
Request for Service Dataset	A record of reported flooding across the city.	Flood Management
Rate of recent development	Number and location of new dwellings across the City	Flood Management
Future Flood Potential	An assessment made by Engineering Services experts on which areas are prone to future flooding due to topography, expected growth and existing asset capacity	Flood Management
Knowledge of Catchment flooding risk	The current status of knowledge regarding capability of existing drainage networks to manage flood flows	Flood Management
Existing development's capability to impact receiving waterways	An analysis of the nature of existing urban development, and its potential to cause pollution in receiving waterways	Waterway Management
Sensitivity of receiving waterways	An assessment of the quality and sensitivity of receiving waterways	Waterway Management
Tree Canopy Coverage	A measurement of the canopy coverage across the City	Integrated Water Management
Open Space Availability	A measurement of the number and quality of open spaces available to the community for recreational purposes	Integrated Water Management
Integrated Water Management Opportunities	Identified priority sites for IWM actions (created by the IWM Forum)	Integrated Water Management
Biodiversity Value	Identified priority sites of biodiversity value which could be protected or enhanced by stormwater management actions	Integrated Water Management
Cultural Value	Initial advice from Wadawurrung Aboriginal Community regarding sites of cultural value.	Integrated Water Management

Appendix C – Catchment Management Units

OVERVIEW

We have established 25 catchment management units and completed an assessment against the Strategy's objectives.

The extent to which the City is currently meeting its objectives is indicated by an overall priority rating of "High", "Medium" and "Low". The larger the gap between current performance and the desired performance set by the objective, the higher the service priority for action.

The allocation of the overall priority rating is a relative score across the City. A "Low" score does not mean that a problem or opportunity does not exist. Rather, it implies that there are other areas of the City where the gaps in basic levels of services are greater, i.e. problems are worse, or opportunities for improvement are greater.

The type and priority of action has directed the recommended actions for each catchment management unit, and the timing of the development of each Catchment Management Strategy.

The name and location of each catchment management unit is set out below in Table 10, and illustrated in Figure 10. The overall prioritisation rating for each catchment management unit in Table 10 is colour coded:

Overall Priority Rating	Colour Coding
Low	
Medium	
High	

Table 10 – Overall Priority Rating and Catchment Management Strategy Development Timeframe by Catchment Management Unit

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
1	Little River	Low	By 2025	The catchment management unit of Little River is in the north of the City's service area, and generally includes the suburbs of Little River, Balliang and Staughton Vale.	The City has identified the importance of managing water quality in this Management Unit. The City's knowledge of waterway risks is limited and investigation and engagement with Melbourne Water is required to understand actual risk.
2	Avalon	Low	By 2030	The catchment management unit of Avalon is in the north east of the City's service area, and generally includes the suburbs of Avalon and Point Wilson, sections of	No priority actions identified. Catchment will be monitored for changes.

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
				Little River and Lara and the Avalon Airport.	
3	Hovells Creek	High	By 2021	The catchment management unit of Hovells Creek is in the north of the City's service area, and generally includes the suburb of Lara and sections of Little River, Anakie and Lovely Banks.	The City has assigned a high priority for the management of water quality. The City's knowledge of waterways is currently limited, and investigation/partnership with CCMA is required to understand and monitor actual risk. There is a high priority for flood management to manage existing risk and the impacts of future development. Following the 2018 Flood study, flooding risks are now better understood, enabling solutions to be developed over the coming years which account for current service shortfalls and future catchment changes. Opportunities for IWM have been identified and will be explored as part of solutions for Waterways, Flooding or improvement in urban amenity.
4	Sutherland Creek	Low	By 2030	The catchment management unit of Sutherland Creek is in the north west of the City's service area, and generally includes the suburbs of Anakie and Lovely Banks.	No priority actions identified. The City will monitor the catchment for change.
5	Corio	High	By 2021	The catchment management unit of Corio is located towards the north of the City's service area, and generally includes the suburb of Corio	The City has assigned a high priority to improve IWM actions in the Management Unit, including through increased tree canopy coverage and irrigated open space. The management of flooding risk is a high priority given current flooding performance and expected future growth in the Management Unit. The City's understanding of flooding risk will be enhanced through flood modelling.
6	Cowies Creek	High	By 2021	The catchment management unit of Cowies Creek is located towards the north of the City's service area, and generally includes the	Improved management of water quality is a high priority in this catchment management unit. Additional investigations will be conducted with

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
				suburbs of North Shore, North Geelong, Bell Park, Bell Post Hill, Lovely Banks and Moorabool.	partners to improve knowledge of water quality risk. Flood management is a high priority given current levels of flooding and the potential for future problems due to additional growth. The City's understanding of flooding risk will be enhanced through flood modelling. Significant opportunities exist for integrated water management outcomes to be delivered. These may include increasing tree canopy coverage and improving the irrigation of open space. Furthermore, opportunities exist to link integrated water management improvements with improved cultural values, through partnership with the Wadawurrung community.
7	Fyansford	Medium	By 2021	The catchment management unit of Fyansford is located towards the north west of the City's service area, and generally includes the suburb of Fyansford and part of Batesford	The City will prioritise an effective planning process, implementation of building controls and appropriate, timely, delivery of stormwater assets to manage the significant level of future growth expected within this catchment management unit.
8	Rippleside	Medium	By 2021	The catchment management unit of Rippleside is in the central area the City's service area, and generally includes the suburbs Rippleside, Drumcondra, Geelong West, Herne Hill, Manifold Heights and Hamlyn Heights.	The catchment management unit has an existing flooding risk that is being investigated through a flood study (2019). This is expected to yield several improvement actions such as changes to planning overlays and/or development of assets in and around the Saleyards precinct in North Geelong. These actions should provide flexibility for future catchment changes as growth continues.
9	Central Geelong	Medium	By 2030	The catchment management unit of Central Geelong is located within the central area the City's service area, and generally includes the suburbs of Geelong and parts of Newtown and Geelong West.	The City has a medium priority for flood management in the area, with actions underway to manage historical flooding issues. Given the highly urbanized character of the management Unit, the City will establish IWM actions which can be implemented when opportunities arise.
10	Ceres North	Low	By 2030	The catchment management unit of Ceres North is	There is no history of flooding or growth expected to require the City to act to

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
				located towards the west of the City's service area, and generally includes the suburb of Ceres.	better understand the catchment. The City will continue to monitor changes in the Management Unit.
11	Highton	Medium	By 2025	The catchment management unit of Highton is located within the central area the City's service area, and generally includes the suburbs of Highton, Wandana Heights and Belmont.	The catchment management unit of Highton drains into the Barwon River, which in turn flows into Lake Connewarre. Existing knowledge of water quality outcomes will be improved to better understand risks to this sensitive environment. Flooding risks require ongoing management, but these risks are well understood. Several high criticality retention basins located within the catchment require review. IWM opportunities have been identified within the catchment and will be explored as part of Waterway and Flooding works
12	South Geelong	Medium	By 2025	The catchment management unit of South Geelong is located within the central area the City's service area, and generally includes the suburbs of South Geelong, Newtown, Breakwater and Thomson.	The catchment management unit of South Geelong drains into the Barwon River, which in turn flows into Lake Connewarre. Existing knowledge of waterway outcomes will be improved to better understand risks to this sensitive environment. Flooding risks require ongoing management, but these risks are well understood.
13	Moolap	Medium	By 2030	The catchment management unit of Moolap is located within the central area the City's service area, and generally includes the suburbs of Moolap, Newcomb and Whittington	The City recognises the need to continue to monitor water quality from the catchment, given the sensitivity of the receiving environment. The City will focus on the exploration of IWM opportunities through partnership projects within the catchment
14	Waurn Ponds	Medium	By 2025	The catchment management unit of Waurn Ponds Creek is located towards the south and west of the City's service area, and generally includes the suburbs of	The City has a focus on the exploration and delivery of IWM opportunities. The City will take action to manage flooding, with emphasis to be placed on mitigating localised flooding issues.

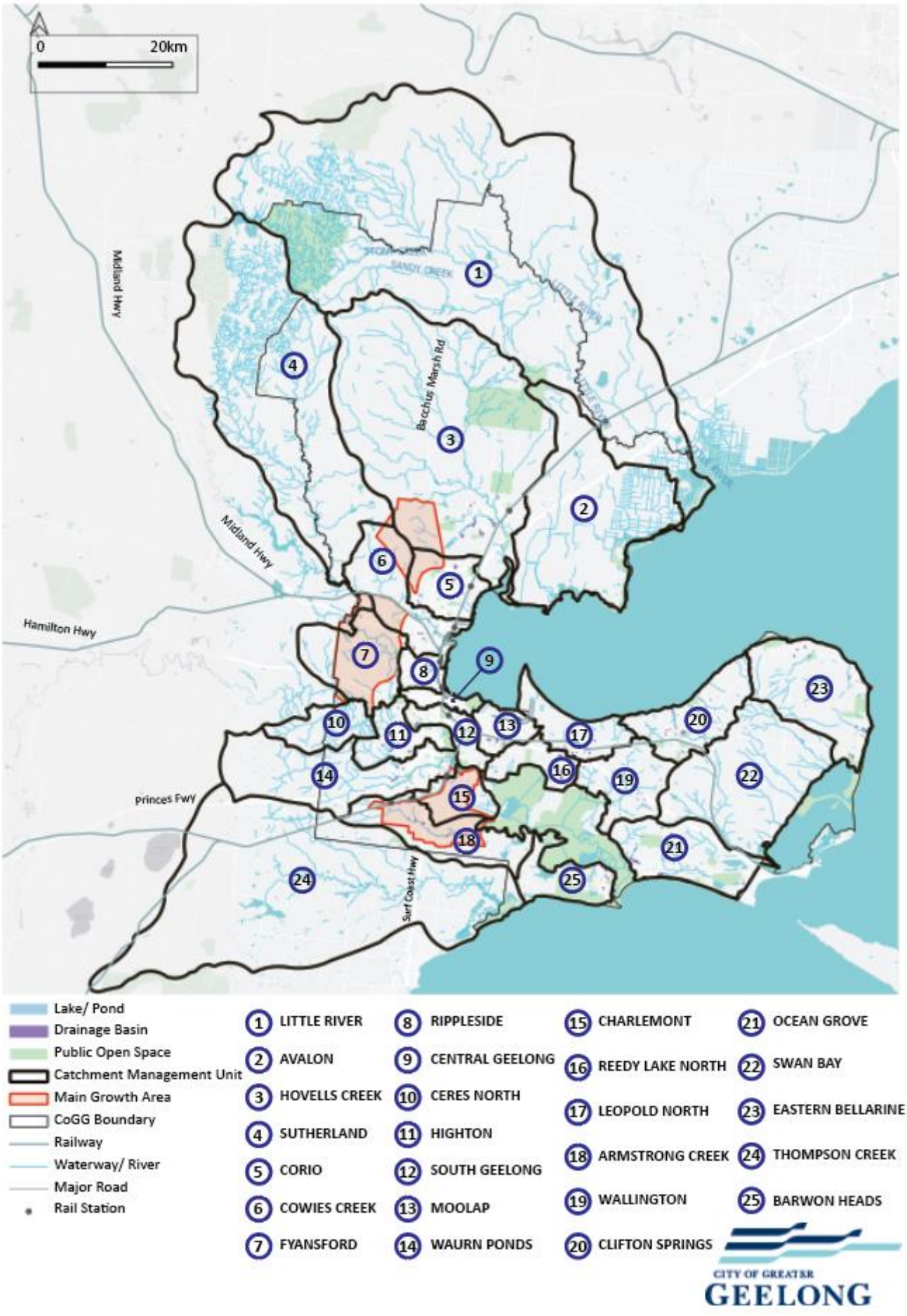
Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
				Waurn Ponds and Grovedale.	
15	Charlemont	High	By 2022	The catchment management unit of Charlemont is located towards the south of the City's service area, and generally includes the suburbs of Charlemont and Marshall.	The catchment management unit of Charlemont is covered largely by the Armstrong Creek Growth Area, which is planned and constructed to modern standards. Development of Charlemont catchment is slightly lagging the extent of development in the Armstrong Creek Catchment. Nevertheless, as the catchment drains into the Lake Connewarre system, the City places a high priority on understanding and managing water quality within the catchment. The development and management of the Sparrovale Wetlands will support water quality outcomes in the catchment. Additional investigation / partnerships as the catchment develops will improve understanding of waterway risks. The management of flooding is a high priority due to the flat topography and urban development of the area. Flood risks need to be understood and carefully managed as the catchment develops Significant opportunities exist for partnership and IWM actions to be delivered as Charlemont continues to develop. These will be particularly important to manage urban heating through tree canopy coverage in an area where residential garden space is expected to be less than in older residential areas of Greater Geelong.
16	Reedy Lake North	Medium	By 2025	The catchment management unit of Reedy Lake North is in towards the east of the City's service area, and generally includes sections of the suburbs of St Albans Park, Moolap and Leopold.	The City will focus on the assessment and management of water quality in this Management Unit. This will involve partnerships and ongoing water quality investigations. A medium priority is assigned to implement IWM actions, and integrate stormwater into urban environments, which may include some irrigation of existing open space and delivery of identified IWM priorities

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
17	Leopold North	Low	By 2030	The catchment management unit of Leopold North is in towards the east of the City's service area, and generally includes the suburbs of Leopold and parts of Moolap and Curlewis	The catchment management unit of Leopold generally exhibits low priority for action by the City. Ongoing monitoring of stormwater service performance and rates of growth will occur over time.
18	Armstrong Creek	High	By 2022	The catchment management unit of Armstrong Creek is in the west of the City's service area, and generally includes the suburbs of Armstrong Creek, Mount Duneed and Connewarre.	The catchment management unit of Armstrong Creek is planned and constructed to modern standards. Nevertheless, it is considered a high priority to ensure that the systems and assets (including the Sparrovale Wetlands located in the Charlemont catchment management unit) are installed correctly and in a timely fashion to protect water quality outcomes for Lake Connewarre. Armstrong Creek is identified to hold significant cultural value to the Wadawurrung Aboriginal community. Its natural flow paths should be carefully managed and protected as the catchment develops. The city will work to ensure that flood mitigation assets are installed as designed to protect existing residents from the impacts of future development.
19	Wallington	Low	By 2030	The catchment management unit of Wallington is in the east of the City's service area, and generally includes parts of the suburbs of Wallington, Leopold and Curlewis.	The City will focus on identifying and delivering opportunities to integrate stormwater into the towns of the Bellarine. Otherwise, the City will maintain an ongoing monitoring of stormwater services performance.
20	Clifton Springs	Medium	By 2021	The catchment management unit of Clifton Springs is in the east of the City's service area, and generally includes the suburbs of Clifton Springs and Drysdale.	Managing flooding risk in the Clifton Springs catchment management unit is a focus for the City, particularly given expected future growth in the community. This includes the development of asset and non-asset solutions, for example a formal drainage network and building overlays.
21	Ocean Grove	High	By 2021	The catchment management unit of Ocean Grove is in the east of the City's service	The City considers it a high priority to understand and manage water quality

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
				area, and generally includes the suburbs of Ocean Grove and parts of Wallington, Point Lonsdale and Marcus Hill.	from the Ocean Grove catchment management unit Existing and expected additional future flooding issues, exacerbated by future growth make a focus on flood management a priority. Furthermore, the City's understanding of flooding risk should be updated Some opportunities identified to deliver improved IWM outcomes through irrigation of open space and development of biodiversity corridors (as part of the flagship project for the Bellarine)
22	Swan Bay	Medium	By 2025	The catchment management unit of Swan Bay is in the east of the City's service area, and generally includes the suburbs of Swan Bay and Mannerim and parts of Drysdale and St Leonards.	The City will focus on ongoing management of water quality into Swan Bay.
23	Eastern Bellarine	Low	By 2030	The catchment management unit of Eastern Bellarine is in the east of the City's service area, and generally includes the suburbs of Portarlington, Indented Head and St Leonards	No priority actions identified. The City will monitor the catchment for change.
24	Thompson Creek	Low	By 2030	The catchment management unit of Thompson Creek is in the south west of the City's service area, and generally includes the suburbs of Breamlea and Mount Duneed.	Thompson Creek is identified to hold significant cultural value. Any development within the catchment should seek to protect the Creek's natural flow paths. The City will monitor the catchment for change.
25	Barwon Heads	Medium	By 2030	The catchment management unit of Barwon Heads is in the south of the City's service area, and generally includes the suburbs of Barwon Heads and Connewarre.	The City will explore the creation of multifunctional assets for the catchment management unit of Barwon Heads. These are likely to be opportunistic if/when they occur. No other actions identified, other than ensuring that existing stormwater assets such as pumps and levies are maintained appropriately. The impacts of coastal inundation and erosion may

Reference Number	Catchment Management Unit	Overall Priority Rating	CMS Development Timeframe	Location	Commentary
					increase risk in the catchment management unit. Consequently, the City will monitor the catchment management unit for change and service performance.

Figure 10 - Catchment management units



LITTLE RIVER CATCHMENT MANAGEMENT UNIT

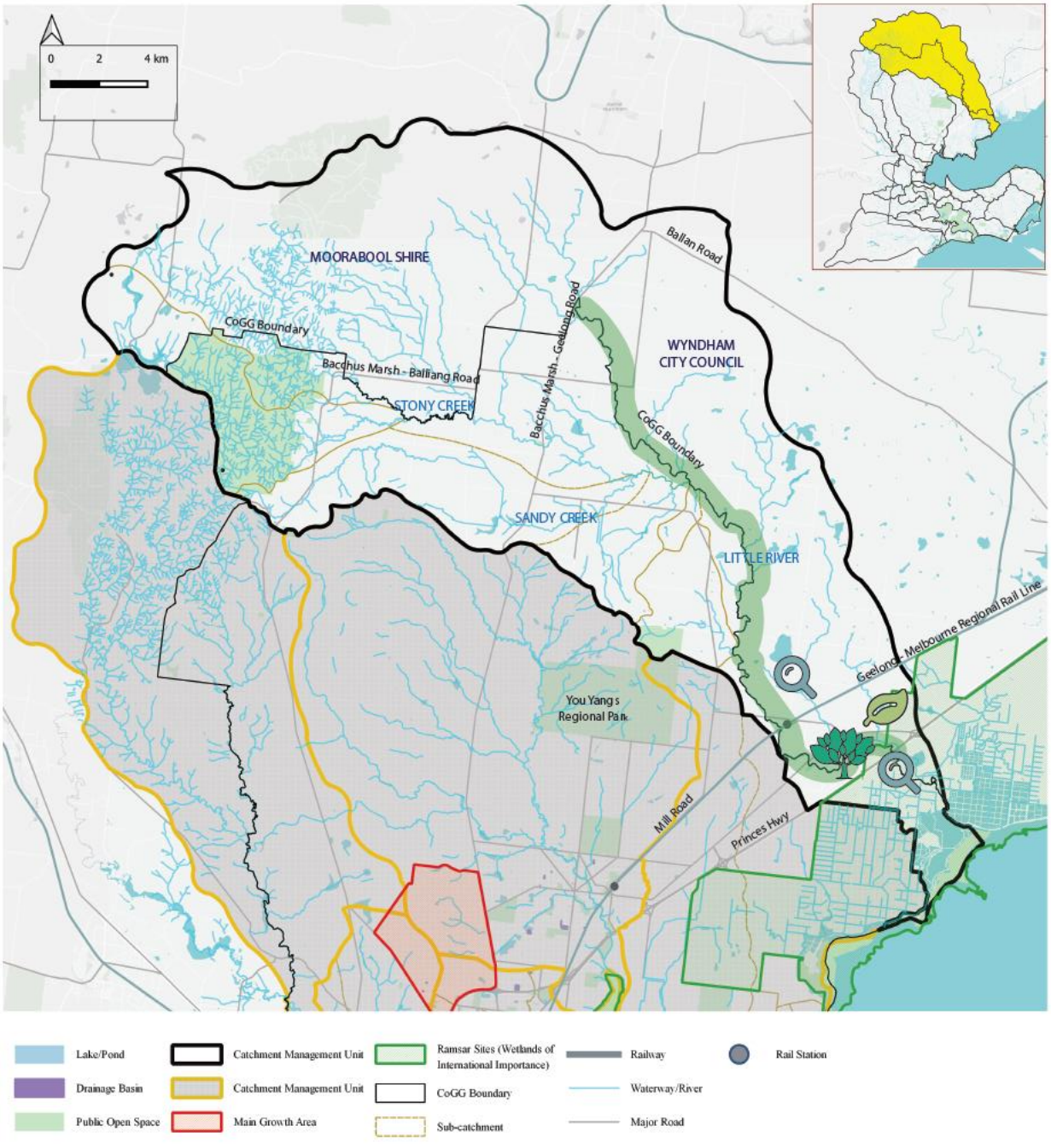
The catchment management unit of Little River is in the north of the City's service area, and generally includes the suburbs of Little River, Balliang and Staughton Vale.

Prioritisation Summary

Overall Priority Rating	Summary
Low	The City will focus on the management of water quality in this Management Unit. The City's knowledge of waterway risks is limited and investigation and engagement with Melbourne Water is required to understand actual risk.

Delivery Schedule

The Little River Catchment Management Strategy will be delivered by 2025.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage
	Integrate stormwater systems to enhance the use of community spaces.	Low	Rural catchment. Low priority for open space irrigation and multifunctional spaces
	Implement catchment wide practices that guide growth.	High	High priority for enhanced water quality as the catchment drains to the lower reaches of Little River and to environmentally sensitive areas of Port Philip Bay
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low level of current and future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No current partnership projects identified. The catchment management unit is partially located within the Moorabool Shire and Wyndham City Council area. The Council will engage with Melbourne Water, environmental groups and neighboring councils to understand the issues throughout the catchment
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited. Investigation to focus on flood risk within township and water quality entering the lower reaches of Little River

Actions

0–2 years

Partnership: Partner with relevant environmental groups, CCMA, and Melbourne Water to ensure Council understands emerging waterway issues

Partnership: Partner with neighbouring councils to ensure Council understand catchment wide issues

2–5 years

Investigation: If required, complete sampling for water quality and establish a waterway and estuarine health baseline. Capture outcomes in Catchment Management Strategy to inform required actions and funding

5–10 years

Investigation: Continue to monitor water quality

AVALON CATCHMENT MANAGEMENT UNIT

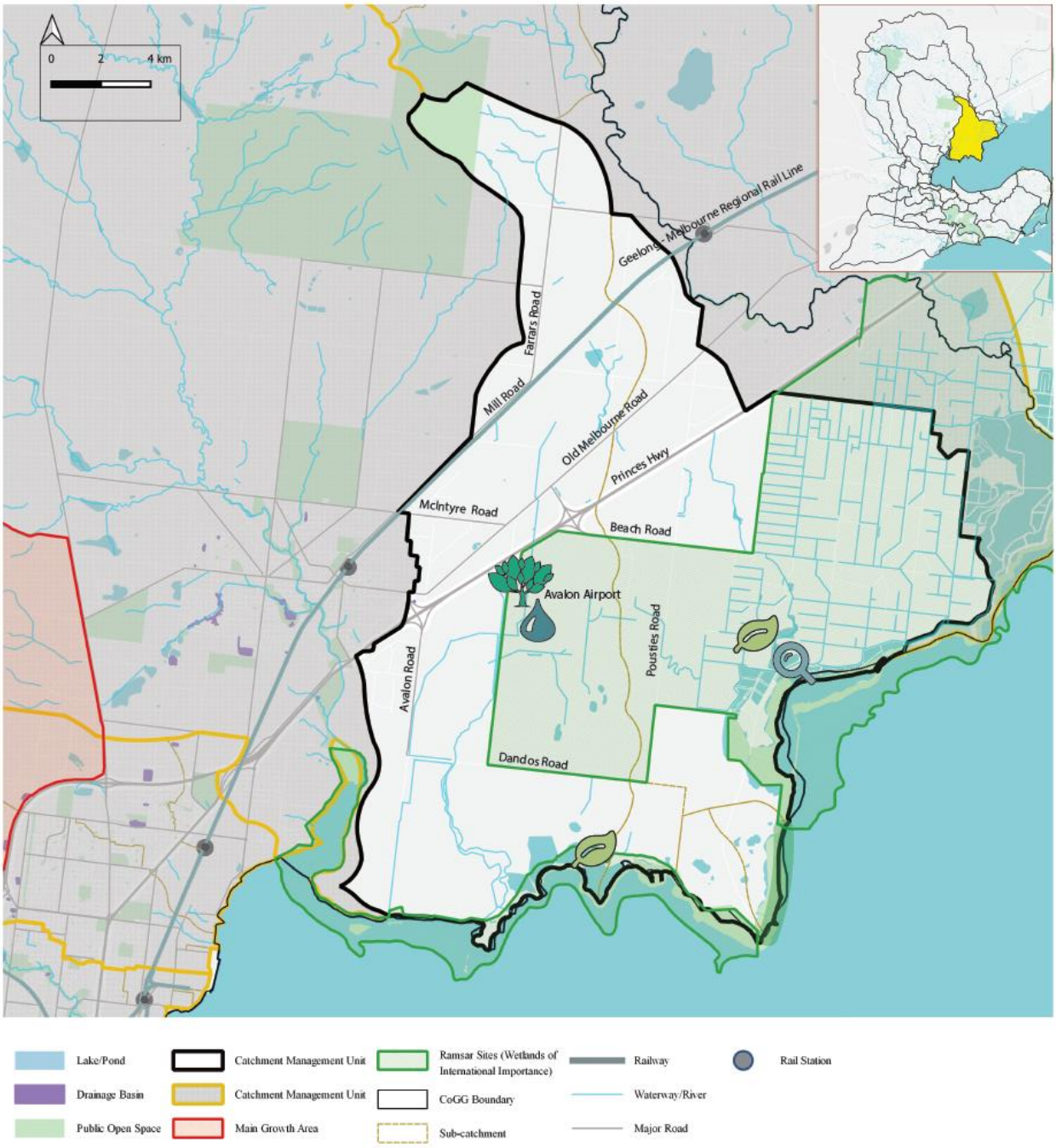
The catchment management unit of Avalon is in the north east of the City's service area, and generally includes the suburbs of Avalon and Point Wilson, sections of Little River and Lara and the Avalon Airport.

Prioritisation Summary

Overall Priority Rating	Summary
Low	No priority actions identified. Catchment will be monitored for changes.

Delivery Schedule

The Avalon Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage
	Integrate stormwater systems to enhance the use of community spaces.	Low	Rural catchment. Low priority for irrigated open space or multifunctional community spaces
	Implement catchment wide practices that guide growth.	Medium	Medium priority for water quality based on importance of receiving waterway and nature / extent of development in the catchment
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low level of current and future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	Low opportunity for partnership projects currently identified
	Implement stormwater systems that can adapt to future needs.	Medium	Formal knowledge of catchment (flood risk) is moderate

Actions

0–2 years	2–5 years	5–10 years
Continue to monitor for change	Continue to monitor for change	Continue to monitor for change

HOVELLS CREEK CATCHMENT MANAGEMENT UNIT

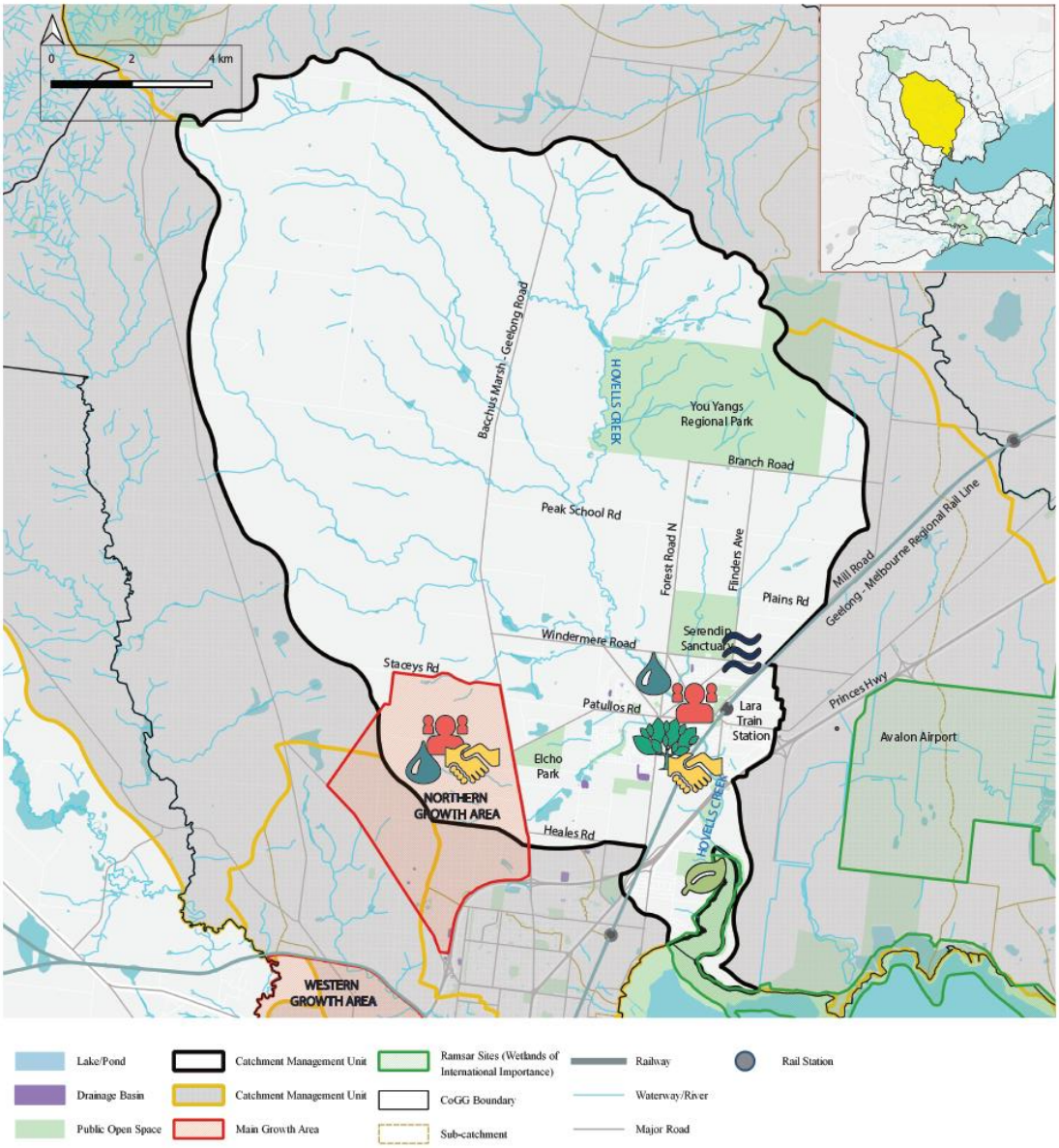
The catchment management unit of Hovells Creek is in the north of the City's service area, and generally includes the suburb of Lara and sections of Little River, Anakie and Lovely Banks.

Prioritisation Summary

Overall Priority	Summary
High	The City has assigned a high priority for the management of water quality. The City's knowledge of waterways is currently limited, and investigation/partnership with CCMA is required to understand and monitor actual risk. There is a high priority for flood management to manage existing risk and the impacts of future development. Following the 2018 Flood Study, flooding risks are now better understood, so solutions can be developed over the coming years which account for current service shortfalls and future catchment changes. Opportunities for IWM have been identified and will be explored as part of solutions for Waterways, Flooding or improvement in urban amenity.

Delivery Schedule

The Hovells Creek Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Medium	Moderate number of historical flooding events relative to other catchments in the City
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage than other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Moderate opportunity for irrigation of open space and the creation of multifunctional community space
	Implement catchment wide practices that guide growth.	High	High priority for water quality management as the catchment drains to Limeburners Bay (Ramsar listed). Development and industry within the catchment may impact water quality
	Develop partnerships to plan and deliver stormwater solutions.	High	Moderate level of current development and significant expected future development associated with the Northern Growth Area
	Protect the health of receiving waterways, maximising their value and amenity.	High	Opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is contemporary and comprehensive, and hence flood management solutions can be designed for future flexibility

Actions

0–2 years

Partnership: Partner with relevant environmental groups and CCMA to ensure the City understands waterway issues

CMS Development: Capture recent flood study recommendations in Catchment Management Strategy to inform required actions and funding

Investigation: Complete Northern Growth Area Precinct Planning

2–5 years

Investigation: Complete a detailed water quality investigation to confirm actual risk to receiving waterways and environment and capture recommendations in Catchment Management Strategy

Asset / Non-Asset Solution: Subject to funding, implement actions identified through the flood study

Asset Solution: Seek to incorporate identified IWM opportunities with flood management works

5–10 years

Investigation: Continue to monitor water quality

Investigation: Assess need to renew the 2018 flood study to ensure impacts of development are appropriately managed

Asset Solution: Review and deliver IWM opportunities

Investigation: Demonstrate better health and amenity outcomes in the catchment

SUTHERLAND CREEK CATCHMENT MANAGEMENT UNIT

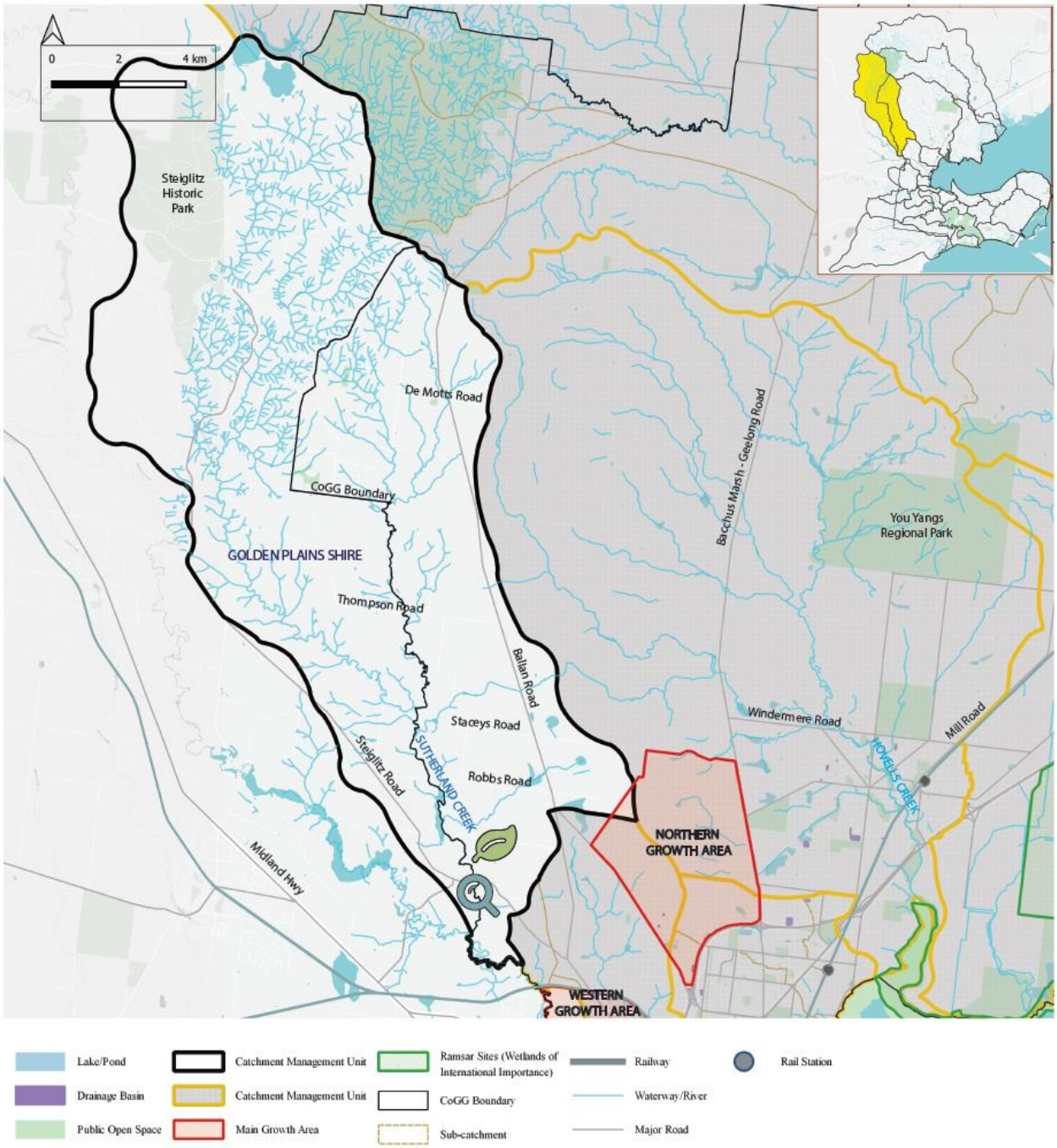
The catchment management unit of Sutherland Creek is in the north west of the City's service area, and generally includes the suburbs of Anakie and Lovely Banks.

Prioritisation Summary

Overall Priority	Summary
Low	No priority actions identified. The City will monitor the catchment for change.

Delivery Schedule

The Sutherland Creek Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage
	Integrate stormwater systems to enhance the use of community spaces.	Low	Rural catchment. Low priority for open space or the creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Medium	Medium priority for water quality management based on the nature / extent of development and values of waterways within the catchment
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low level of current and future development, however future Northern Growth Area development will encroach on the Sutherland Creek Management Unit in the future
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No current partnership projects identified The catchment management unit is partially located within the Golden Plains Shire area. The Council will engage with the neighboring council to understand issues throughout the catchment
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years	2–5 years	5–10 years
Partnership: Partner with neighbouring council and CCMA to ensure Council understand catchment wide issues	Continue to monitor for change	Continue to monitor for change

CORIO CATCHMENT MANAGEMENT UNIT

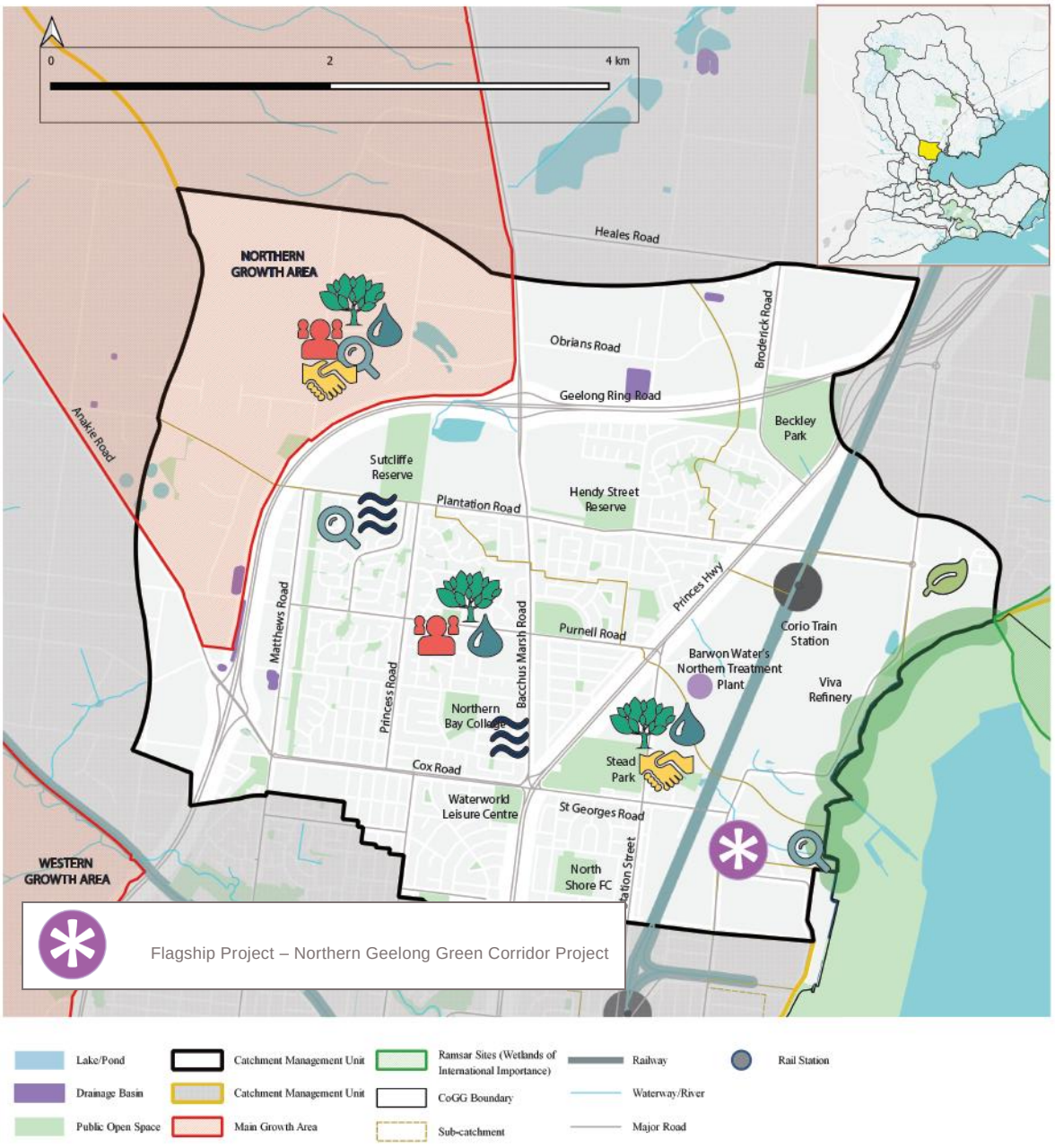
The catchment management unit of Corio is located towards the north of the City's service area, and generally includes the suburb of Corio.

Prioritisation Summary

Overall Priority	Summary
High	The City has assigned a high priority to improve IWM actions in the Management Unit, including through increased tree canopy coverage and irrigated open space. The management of flooding risk is a high priority given current flooding performance and expected future growth in the Management Unit. The City's understanding of flooding risk will be enhanced through flood modelling.

Delivery Schedule

The Corio Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Medium	Moderate number of historical flooding events
	Support urban greening through integrated water management.	High	Low level of tree canopy coverage relative to other areas of the City. Coverage is well below the City's target
	Integrate stormwater systems to enhance the use of community spaces.	High	High opportunity for irrigation of open space and creation of multifunctional community spaces. Including recycled water supply from Barwon Water's Northern Treatment Plant
	Implement catchment wide practices that guide growth.	Medium	Medium priority for water quality management based on the nature / extent of development and values of waterways within the catchment
	Develop partnerships to plan and deliver stormwater solutions.	High	The Management Unit is already highly urbanized, and is expected to see significant infill development and new development in the Northern Growth Area
	Protect the health of receiving waterways, maximising their value and amenity.	High	High level of opportunity for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years

Investigation: Complete flood study of the catchment to understand the current flood risks and capture recommendations in Catchment Management Strategy to inform required actions and funding

Investigation: Complete Northern Growth Area Precinct Planning

2–5 years

Asset / Non-Asset Solution: Subject to funding, implement actions identified through the flood study

Asset / Non-Asset Solution: Plan for widespread street scaping (to improve canopy cover) and passive open space irrigation across the catchment with linkage to stormwater storage and recycled water supplies from Barwon Water

Asset Solution: Support delivery of identified IWM partnership projects within the catchment

5–10 years

Investigation: Assess need to repeat or renew the flood study to ensure the impacts of development are appropriately managed

Asset Solution: Review and deliver IWM opportunities

Investigation: Demonstrate better health and amenity outcomes in the catchment

COWIES CREEK CATCHMENT MANAGEMENT UNIT

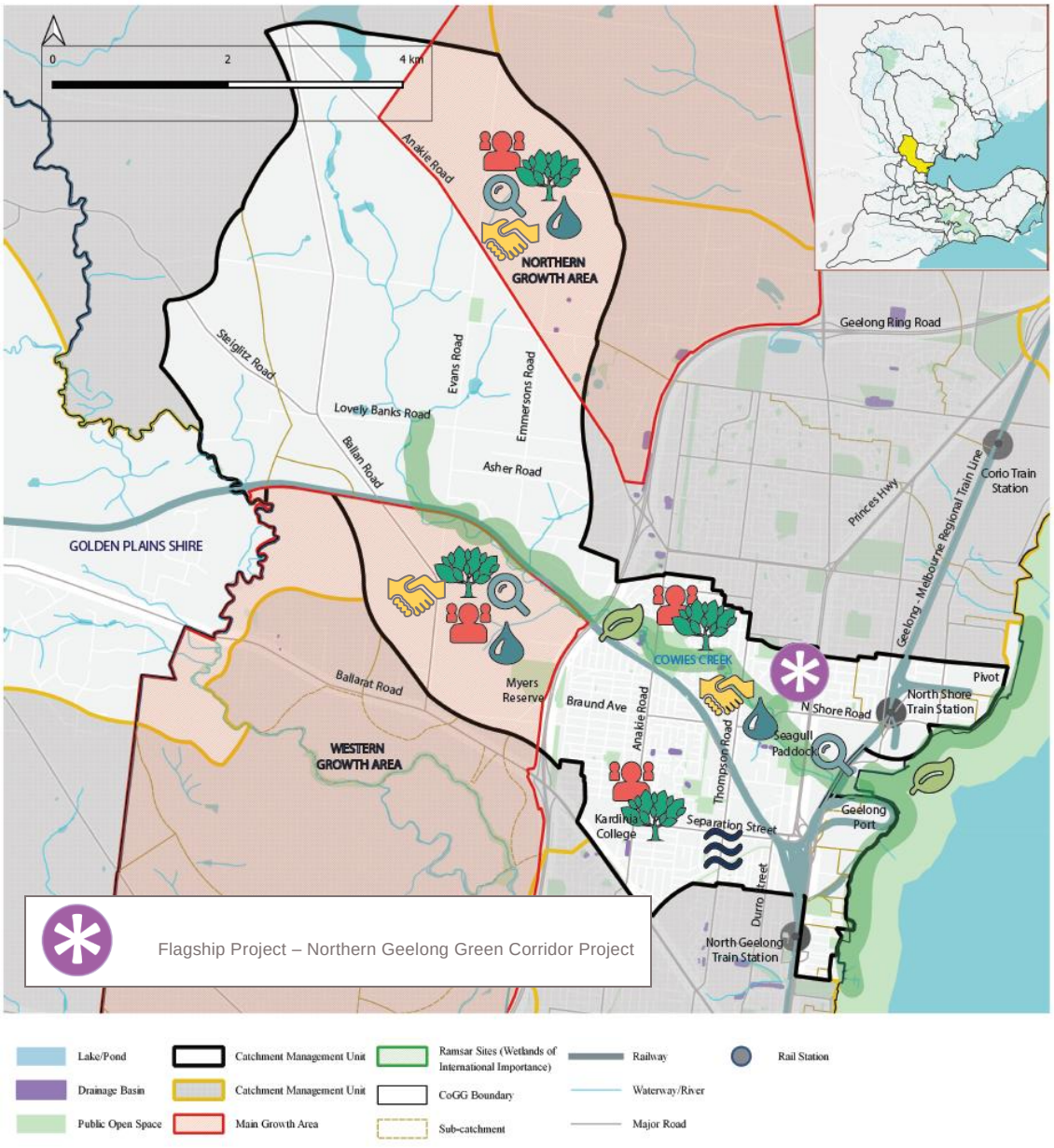
The catchment management unit of Cowies Creek is located towards the north of the City's service area, and generally includes the suburbs of North Shore, North Geelong, Bell Park, Bell Post Hill, Lovely Banks and Moorabool.

Prioritisation Summary

Overall Priority	Summary
High	Improved management of water quality is a high priority in this catchment management unit. Additional investigations will be conducted with partners to improve knowledge of waterway risk. Flood management is a high priority given current levels of flooding and the potential for future problems due to additional growth. The City's understanding of flooding risk will be enhanced through flood modelling. Significant opportunities exist for IWM outcomes to be delivered. These may include increasing tree canopy coverage and improving the irrigation of open space. Furthermore, opportunities exist to link IWM improvements with improved cultural values via partnership with the Wadawurrung Aboriginal Co-operative.

Delivery Schedule

The Cowies Creek Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Medium	Moderate number of historical flooding events
	Support urban greening through integrated water management.	High	Low level of tree canopy coverage than other areas of the City. Coverage is well below the City's target
	Integrate stormwater systems to enhance the use of community spaces.	High	High opportunity for irrigation of open space and creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	High	High priority to manage water quality as the catchment drains, via Cowies Creek, to Corio Bay. There is a requirement to extend the catchment outfall around the new marina
	Develop partnerships to plan and deliver stormwater solutions.	High	The catchment is already well developed. Future infill development is expected, as well as significant new development in the Northern and Western Growth Areas
	Protect the health of receiving waterways, maximising their value and amenity.	High	High level of opportunity for partnership projects identified. Opportunities include those associated with the Northern Geelong Green Corridor flagship project and the Northern and Western Growth Areas
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years

Partnership: Partner with relevant environmental groups, CCMA, and Wadawurrung Aboriginal Co-operative to ensure Council understands emerging waterway issues

Investigation: Complete flood study of the catchment to understand the current flood risks and capture recommendations in Catchment Management Strategy to inform required actions and funding

Investigation: Complete Northern and Western Growth Area Precinct Planning

2–5 years

Investigation: Complete a detailed water quality investigation to confirm actual risk to receiving waterways and environment and capture recommendations in Catchment Management Strategy

Asset / Non-Asset Solution: Subject to funding, implement actions identified through flood study

Non-Asset Solution: Plan for widespread street scaping (to improve canopy cover) and passive open space irrigation across the catchment with linkage to stormwater storage and recycled water supplies from Barwon Water

5–10 years

Investigation: Continue to monitor water quality

Investigation: Assess need to renew/repeat flood study to ensure impacts of development are managed

Asset / Non-Asset Solution: Subject to funding, continue to implement actions identified through the flood study

Asset Solution: Continue to review and deliver IWM opportunities

FYANSFORD CATCHMENT MANAGEMENT UNIT

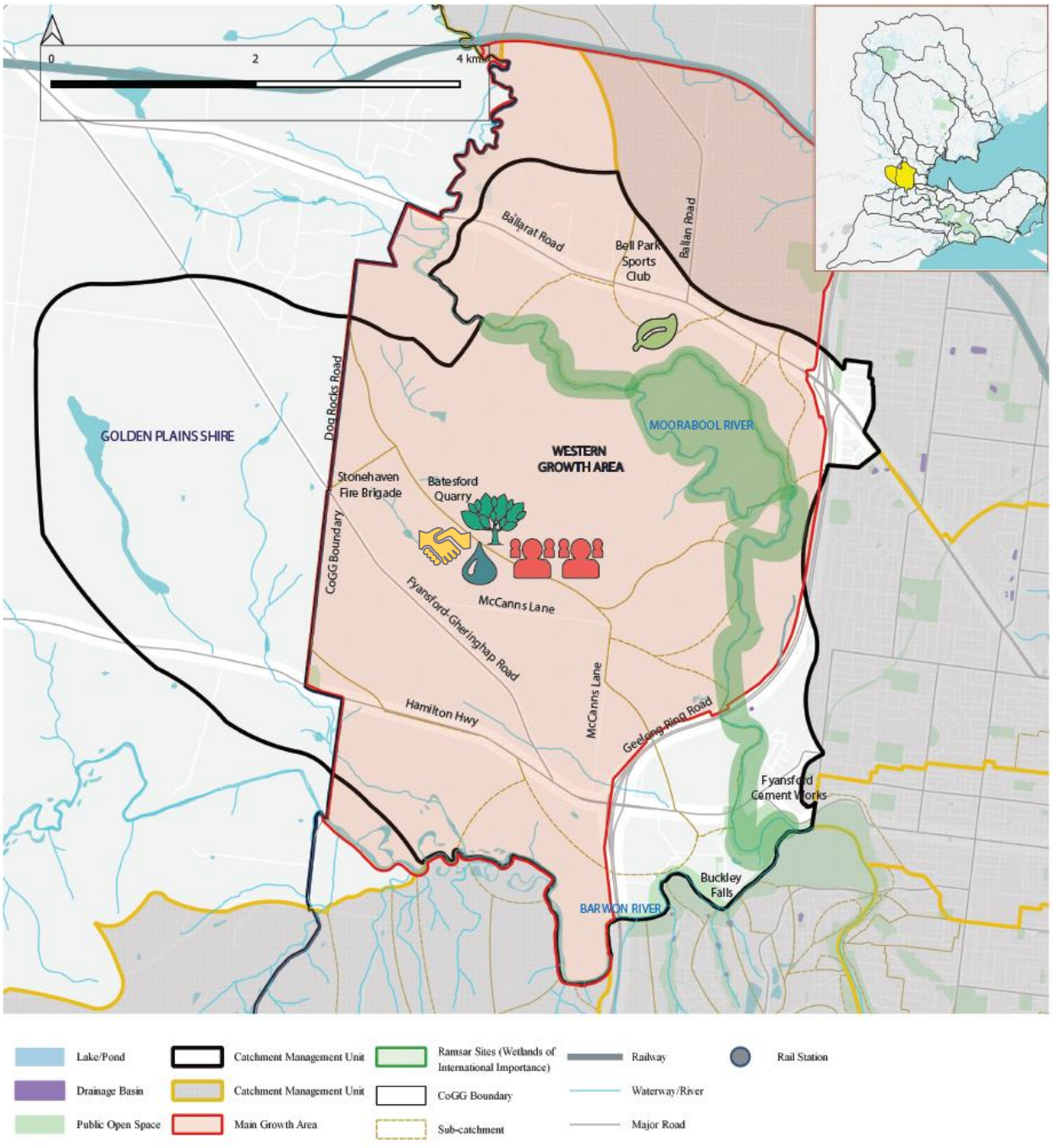
The catchment management unit of Fyansford is located towards the north west of the City's service area, and generally includes the suburb of Fyansford and part of Batesford.

Prioritisation Summary

Overall Priority	Summary
Medium	The City will prioritise an effective planning process, implementation of building controls and appropriate, timely, delivery of stormwater assets to manage the significant level of future growth expected within this catchment management unit.

Delivery Schedule

The Fyansford Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Low	Low priority for open space irrigation at present. However, it is acknowledged that the Western Growth Area Precinct Structure Plan will place heavy emphasis on future IWM opportunities as growth commences
	Implement catchment wide practices that guide growth.	Medium	The catchment drains into the Barwon river. Given the nature of catchment development, a medium priority for water quality management is appropriate
	Develop partnerships to plan and deliver stormwater solutions.	High	Very high expected future development means that the City must be vigilant to ensure stormwater is managed appropriately over the next 10 to 20 years
	Protect the health of receiving waterways, maximising their value and amenity.	High	High level of opportunity for partnership projects expected in the Western Growth Area to achieve best practice outcomes The catchment management unit is partially located within the Golden Plains Shire area. The Council will engage with the neighboring council to understand issues throughout the catchment
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is high

Actions

0–2 years

Investigation: Ensure downstream impacts to the Fyansford catchment are considered in the Western Growth Area flood studies

Investigation: Complete Western Growth Area Precinct Planning

Partnership: Partner with neighbouring council and CCMA to ensure Council understand catchment wide issues

2–5 years

Investigation: Monitor health of the Barwon and Moorabool Rivers

5–10 years

Asset Solution: Implement any stormwater improvement actions within the catchment to manage future growth

Investigation: Monitor health of the Barwon and Moorabool Rivers

RIPPLESIDE CATCHMENT MANAGEMENT UNIT

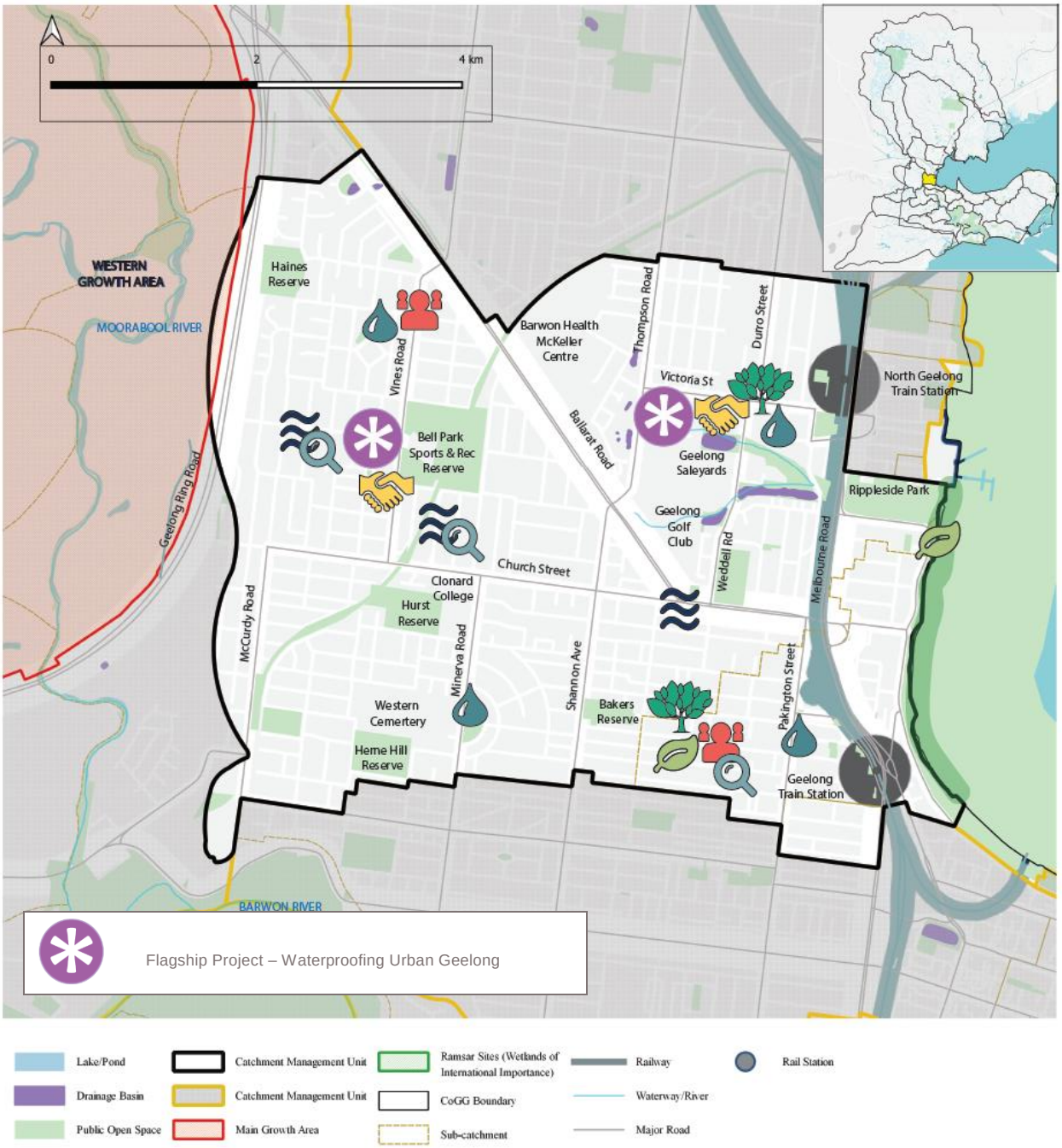
The catchment management unit of Rippleside is in the central area the City's service area, and generally includes the suburbs Rippleside, Drumcondra, Geelong West, Herne Hill, Manifold Heights and Hamlyn Heights.

Prioritisation Summary

Overall Priority	Summary
Medium	The catchment management unit has an existing flooding risk that is being investigated through a flood study (2019). This is expected to yield several improvement actions such as changes to planning overlays and/or development of assets in and around the Saleyards precinct in North Geelong. These actions should provide flexibility for future catchment changes as growth continues.

Delivery Schedule

The Rippleside Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Moderate opportunity for irrigation of open space or creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Medium	Medium priority for water quality management based on the nature / extent of development in the catchment, and the sensitivity of receiving environments
	Develop partnerships to plan and deliver stormwater solutions.	High	Moderate level of current development. Infill development is expected to be significant, and will affect stormwater management requirements
	Protect the health of receiving waterways, maximising their value and amenity.	High	Significant opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years

Investigation: Capture flood study recommendations (once complete).

2–5 years

Asset / Non-Asset Solution: Subject to funding, implement actions identified through the flood study

Asset Solution: Identify and deliver IWM opportunities within the catchment aligned with flood study actions

5–10 years

Asset Solution: Identify and deliver IWM opportunities within the catchment

CENTRAL GEELONG CATCHMENT MANAGEMENT UNIT

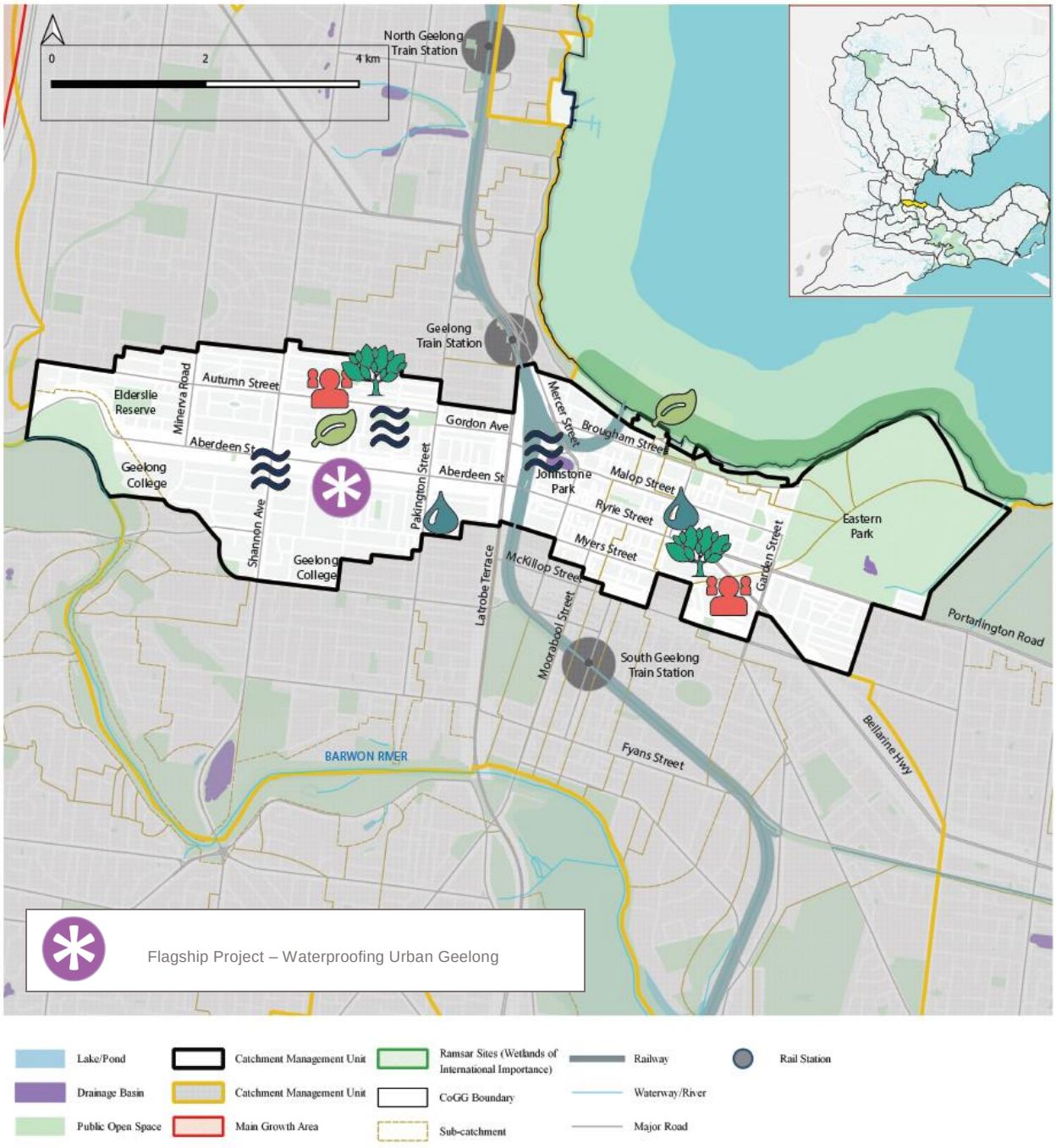
The catchment management unit of Central Geelong is located within the central area the City's service area, and generally includes the suburbs of Geelong and parts of Newtown and Geelong West.

Prioritisation Summary

Overall Priority	Summary
Medium	The City has a medium priority for flood management in the area, with actions underway to manage historical flooding issues. Given the highly urbanized character of the catchment management unit, the City will establish IWM actions which can be implemented when opportunities arise.

Delivery Schedule

The Central Geelong Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events in a densely populated area, due in large part to the high impervious area of the catchment, and older infrastructure not designed to current standards
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage, less than the City's objective
	Integrate stormwater systems to enhance the use of community spaces.	Low	Numerous existing open spaces that are irrigated. Opportunities do exist to further integrate stormwater management into these areas
	Implement catchment wide practices that guide growth.	Medium	Medium priority for water quality based on the nature / extent of development and the value of receiving environments
	Develop partnerships to plan and deliver stormwater solutions.	Medium	The suburbs of Geelong, Geelong West and Newtown are already densely populated. This trend is expected to intensify, creating changes to stormwater management in the area
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No current partnership projects identified
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is high

Actions

0–2 years	2–5 years	5–10 years
Asset Solution: Complete flood mitigation works underway	**Asset Solution:** Identify and deliver IWM opportunities within the catchment	**Asset Solution:** Identify and deliver IWM opportunities within the catchment
Asset Solution: Identify and deliver IWM opportunities within the catchment	**Investigation:** Monitor health of Corio Bay	**Investigation:** Monitor health of Corio Bay
Investigation: Monitor health of Corio Bay		

CERES NORTH CATCHMENT MANAGEMENT UNIT

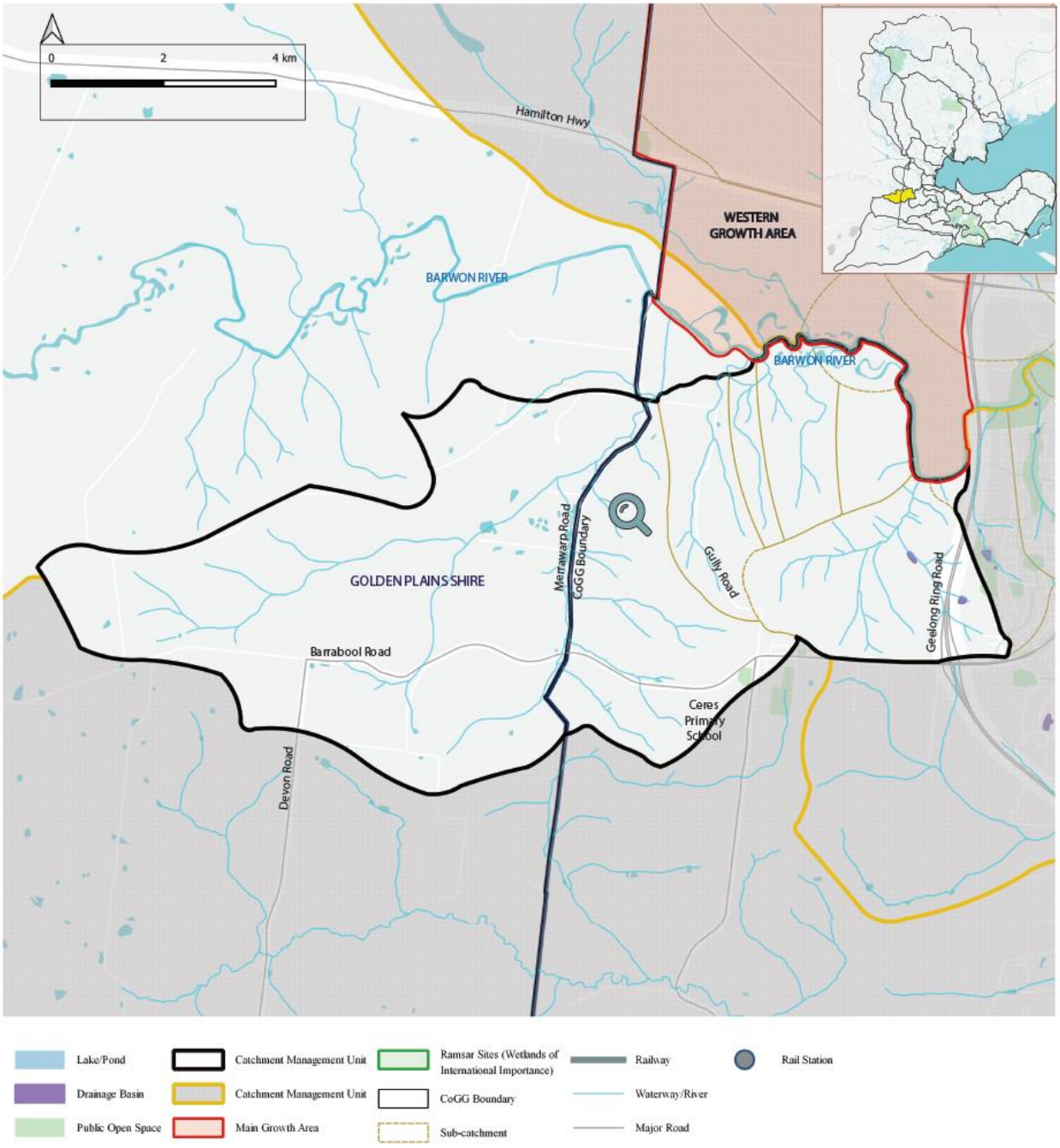
The catchment management unit of Ceres North is located towards the west of the City's service area, and generally includes the suburb of Ceres.

Prioritisation Summary

Overall Priority	Summary
Low	There is no history of flooding or growth expected to require the City to act to better understand the catchment. The City will continue to monitor changes in the Management Unit.

Delivery Schedule

The Ceres North Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage, relative to other areas of the City. Also, the area is predominantly rural
	Integrate stormwater systems to enhance the use of community spaces.	Low	Rural catchment. Low priority for open space or creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Low	Low priority for water quality based on the nature / extent of development and values of the receiving waterway
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low level of current and expected low rates of future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No current partnership projects identified The catchment management unit is partially located within the Golden Plains Shire area. The Council will engage with the neighboring council to understand issues throughout the catchment
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 Years	2–5 years	5–10 years
Partnership: Partner with neighbouring council and CCMA to ensure Council understand catchment wide issues	Continue to monitor for change	Continue to monitor for change

HIGHTON CATCHMENT MANAGEMENT UNIT

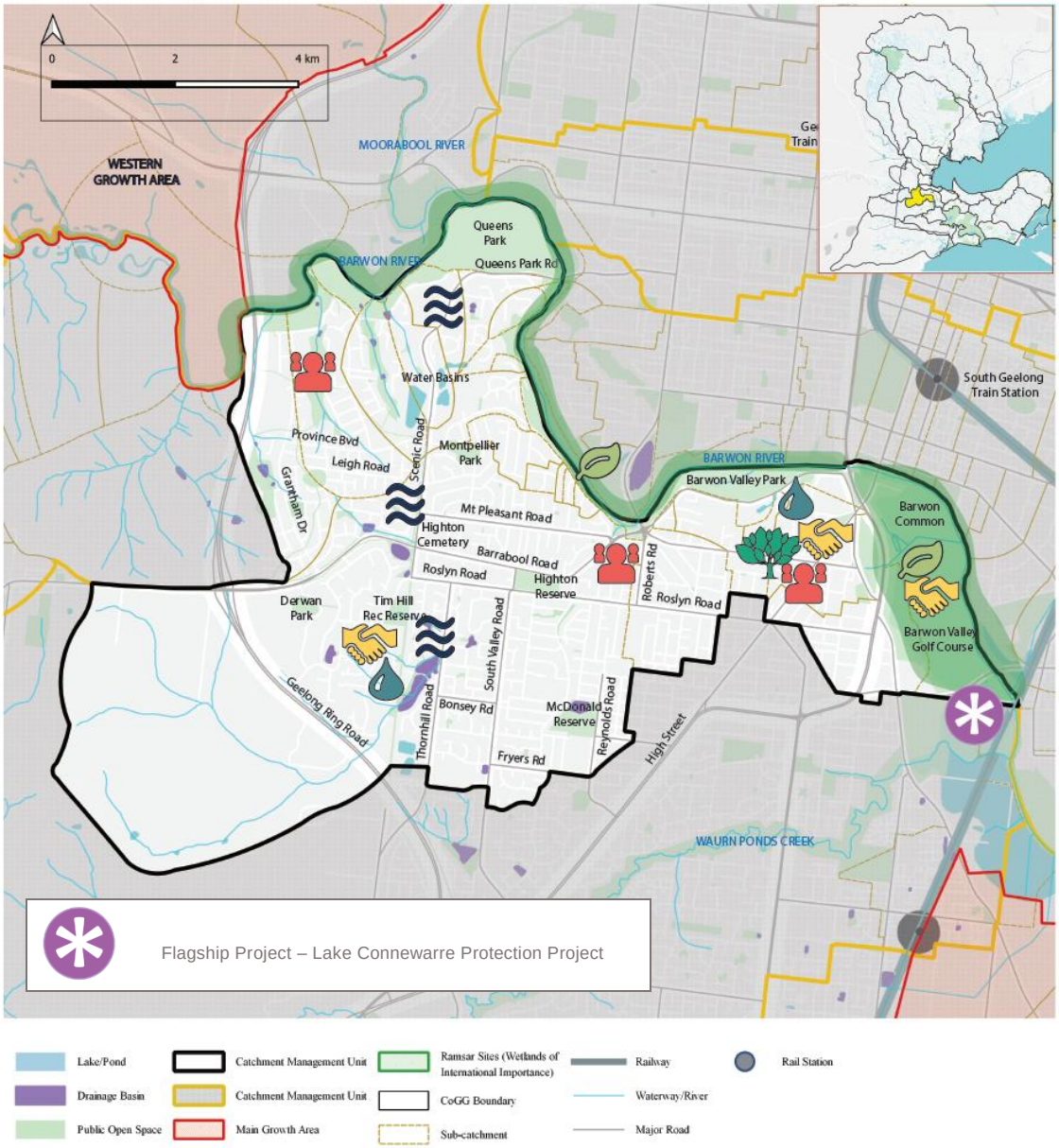
The catchment management unit of Highton is located within the central area the City's service area, and generally includes the suburbs of Highton, Wandana Heights and Belmont.

Prioritisation Summary

Overall Priority	Summary
Medium	The management unit of Highton drains into the Barwon River, which in turn flows into Lake Connewarre. Existing knowledge of water quality outcomes will be improved to better understand risks to this sensitive environment. Flooding risks require ongoing management, but these risks are well understood. Several high criticality retention basins located within the catchment require review. IWM opportunities have been identified within the catchment and will be explored as part of Waterway and Flooding works

Delivery Schedule

The Highton Catchment Management Strategy will be delivered by 2025.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Moderate opportunity for irrigation of open space and creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	High	High priority for ongoing water quality management as the catchment drains through Lake Connewarre (Ramsar listed). Development within catchment may impact water quality
	Develop partnerships to plan and deliver stormwater solutions.	Medium	Moderate level of current development, with ongoing future infill expected in some areas
	Protect the health of receiving waterways, maximising their value and amenity.	High	Opportunities for partnership projects identified. Partnerships required where projects manage discharge into Barwon River
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is contemporary and comprehensive following recent flooding studies

Actions

0–2 years

Partnership: Partner with relevant environmental groups and CCMA to ensure Council understands emerging waterway issues

Investigation: Capture flood study recommendations

Investigation: Review retention basins against Australian National Committee on Large Dams (ANCOLD) Standard

2–5 years

Investigation: Complete sampling for water quality and establish a waterway and estuarine health baseline. Capture outcomes in Catchment Management Strategy

Asset Solution: Implement identified IWM opportunities within the catchment

Asset / Non-Asset Solution: Subject to funding, implement actions identified through the flood study to manage flood risk and localised customer impact

Investigation: Review retention basins against ANCOLD Standard

5–10 years

Investigation: Continue to monitor water quality and flood risk

Investigation: Review retention basins against ANCOLD Standard

SOUTH GEELONG CATCHMENT MANAGEMENT UNIT

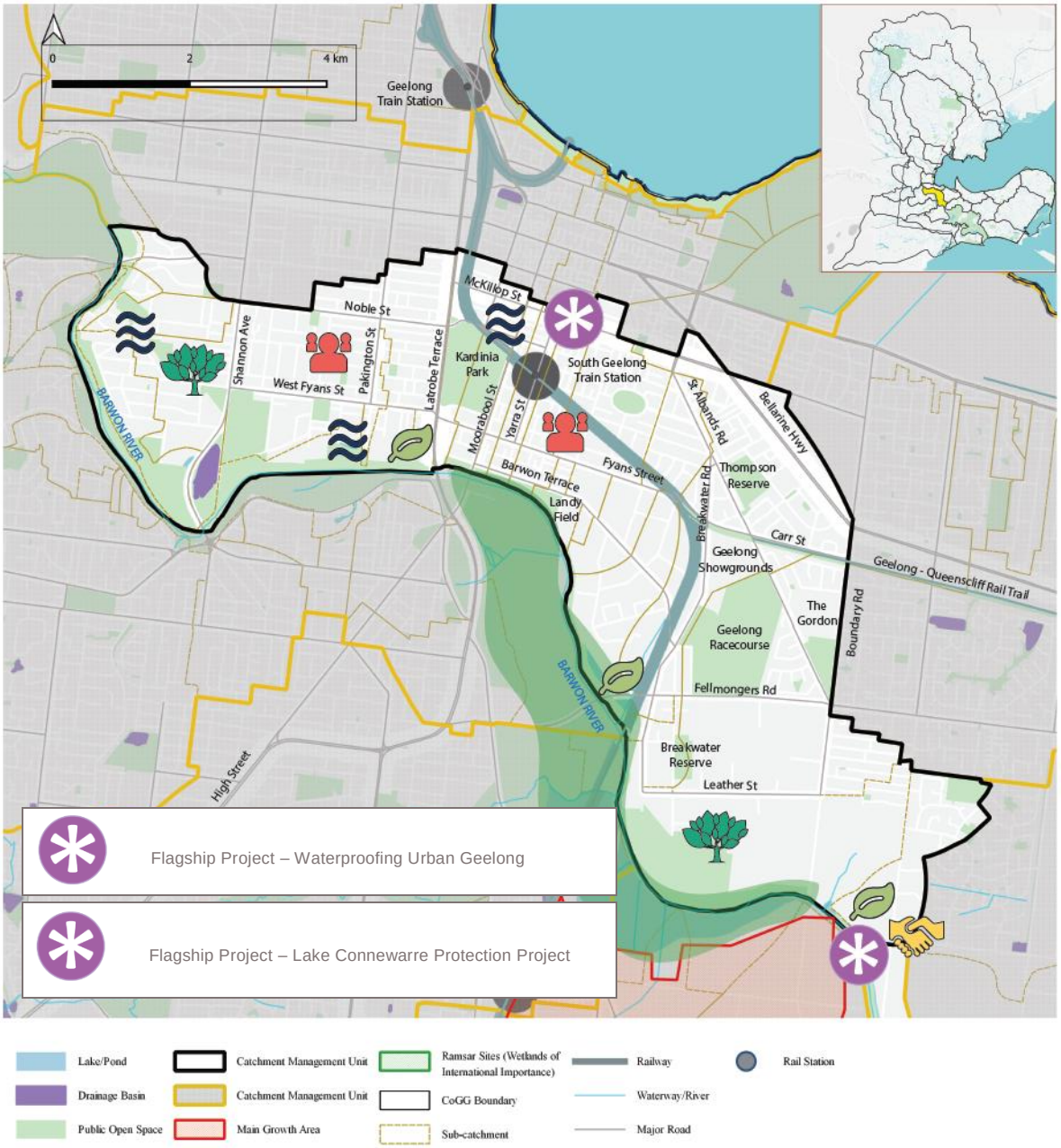
The catchment management unit of South Geelong is located within the central area the City's service area, and generally includes the suburbs of South Geelong, Newtown, Breakwater and Thomson.

Prioritisation Summary

Overall Priority	Summary
Medium	The catchment management unit of South Geelong drains into the Barwon River, which in turn flows into Lake Connewarre. Existing knowledge of waterway outcomes will be improved to better understand risks to this sensitive environment. Flooding risks require ongoing management, but these risks are well understood.

Delivery Schedule

The South Geelong Catchment Management Strategy will be delivered by 2025.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Low	Low priority for irrigation of open space or creation of multifunctional community spaces, given existing extensive river-side areas
	Implement catchment wide practices that guide growth.	High	High priority for water quality management as catchment drains through Lake Connewarre (Ramsar listed). Stormwater discharges into the Barwon River may impact water quality
	Develop partnerships to plan and deliver stormwater solutions.	Medium	Further development is likely in the Management Unit
	Protect the health of receiving waterways, maximising their value and amenity.	Medium	Opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is contemporary and comprehensive

Actions

0–2 years	2–5 years	5–10 years
Partnership: Partner with relevant environmental groups and CCMA to ensure Council understands emerging	**Investigation:** Complete a detailed study into water quality outcomes for the Barwon River and capture recommendations in Catchment Management Strategy to inform required actions and funding	**Asset / Non-Asset Solution:** Subject to funding, implement actions identified through the water quality study **Investigation:** Continue to monitor water quality

MOOLAP CATCHMENT MANAGEMENT UNIT

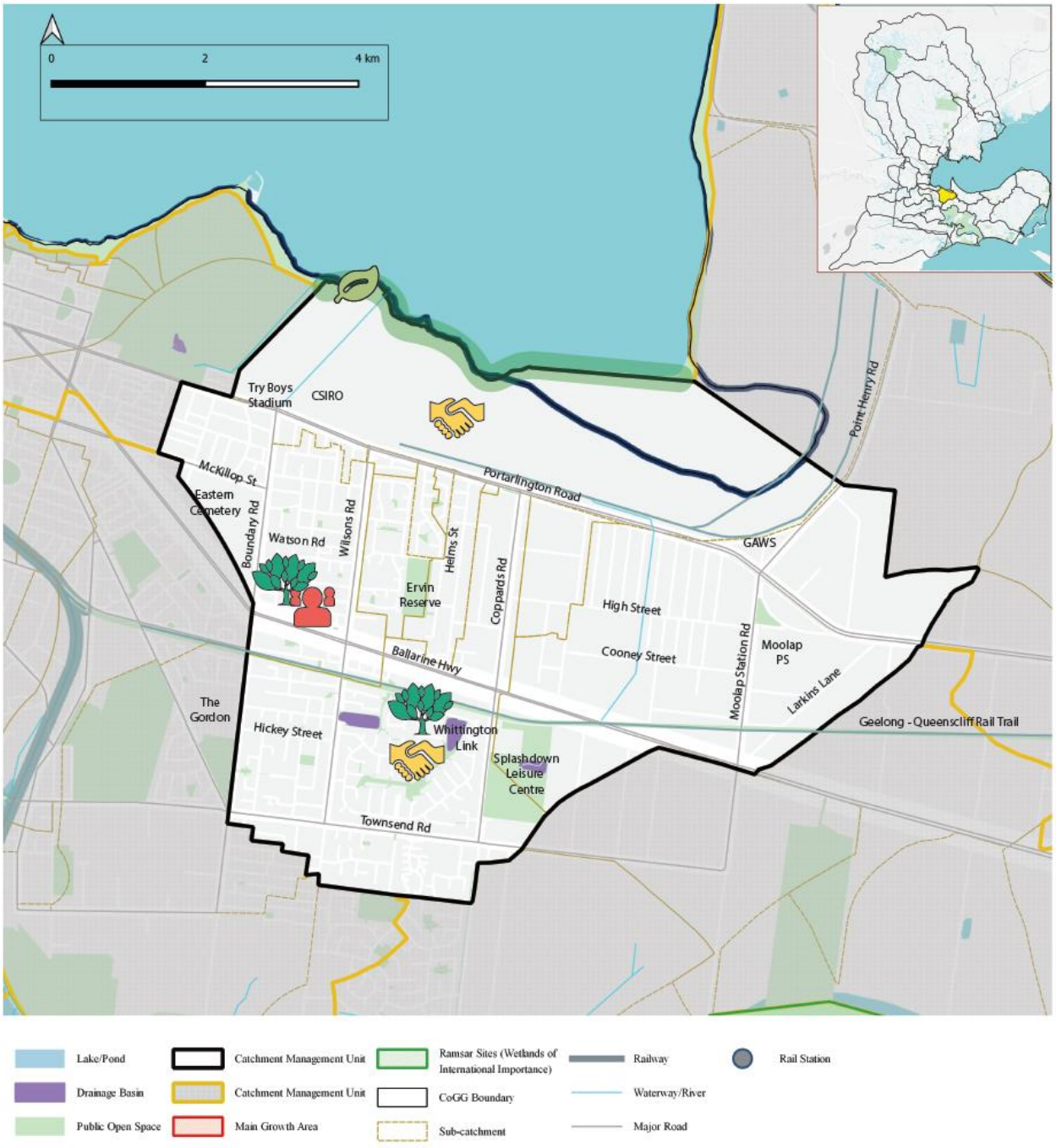
The catchment management unit of Moolap is located within the central area the City's service area, and generally includes the suburbs of Moolap, Newcomb and Whittington.

Prioritisation Summary

Overall Priority	Summary
Medium	The City has assigned a medium priority to continue to monitor water quality from the catchment, given the sensitivity of the receiving environment. The City has a focus on the exploration of IWM opportunities through partnership projects within the catchment

Delivery Schedule

The Moolap Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events, but known flooding sites across the management unit
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Low	Low priority for irrigation of open space or creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Medium	Medium priority for enhanced management of water quality based on the nature / extent of development and the quality of receiving environments (which include RAMSAR sites)
	Develop partnerships to plan and deliver stormwater solutions.	Medium	Moderate level of current and future development as infill continues in some areas
	Protect the health of receiving waterways, maximising their value and amenity.	High	Several opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is contemporary and comprehensive

Actions

0–2 years	2–5 years	5–10 years
Asset Solution: Deliver identified IWM opportunities within the catchment	**Asset Solution:** Continue to deliver IWM opportunities within the catchment	**Asset Solution:** Continue to deliver IWM opportunities within the catchment
Investigation: Monitor water quality	**Investigation:** Monitor water quality	**Investigation:** Monitor water quality

WAURN PONDS CREEK CATCHMENT MANAGEMENT UNIT

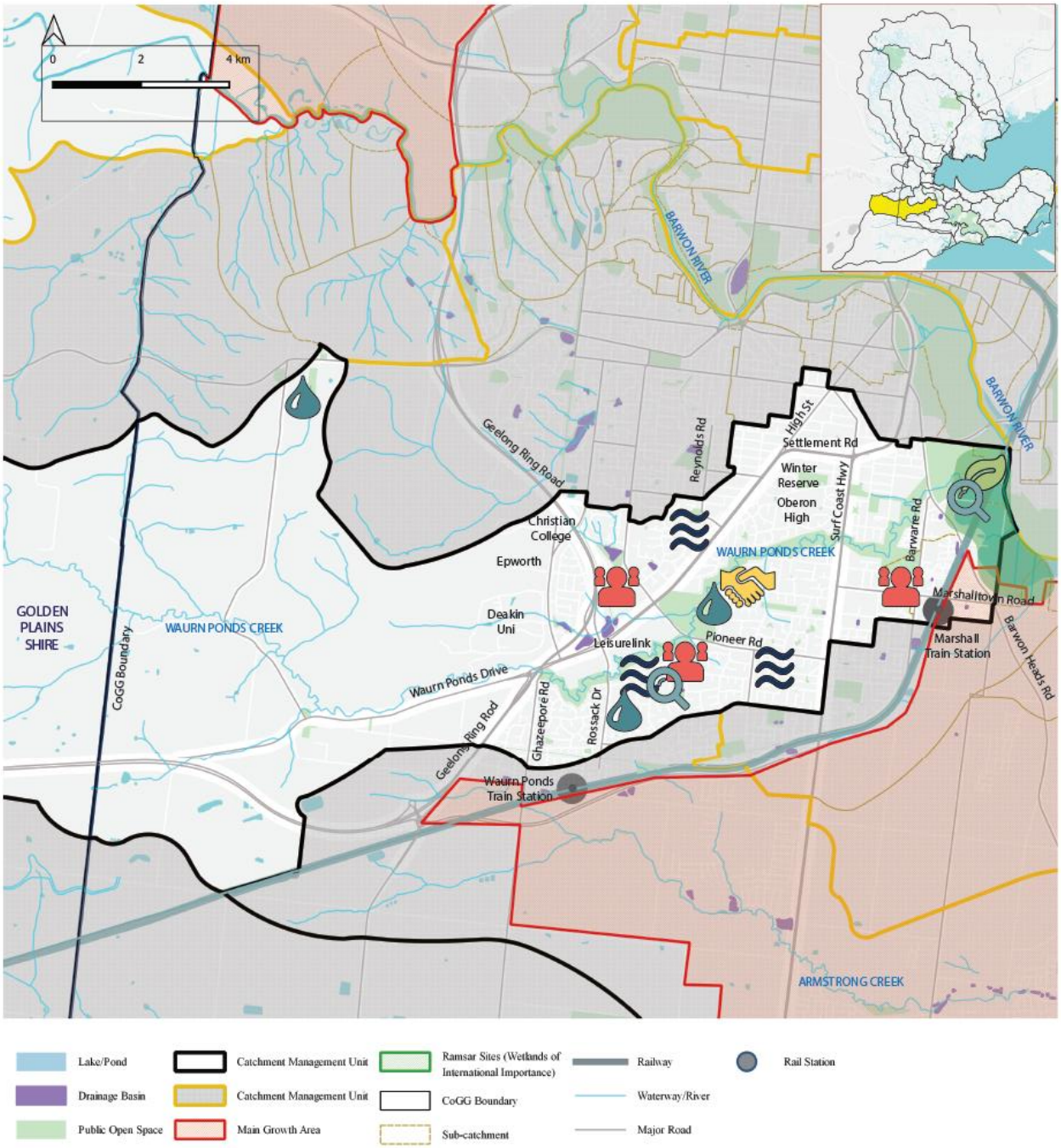
The catchment management unit of Waurn Ponds Creek is located towards the south and west of the City's service area, and generally includes the suburbs of Waurn Ponds and Grovedale.

Prioritisation Summary

Overall Priority	Summary
Medium	The City has a focus on the exploration and delivery of IWM opportunities. The City has a medium priority on actions to manage flooding, with emphasis to be placed on mitigating localised flooding issues.

Delivery Schedule

The Waurn Ponds Catchment Management Strategy will be delivered by 2025.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	High	High priority for irrigation of open space and the creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Medium	Medium priority for enhanced water quality management based on the nature / extent of development and values of receiving environment
	Develop partnerships to plan and deliver stormwater solutions.	Medium	Moderate level of current and future development
	Protect the health of receiving waterways, maximising their value and amenity.	High	Opportunities for partnership projects identified The catchment management unit is partially located within the Golden Plains Shire area. The Council will engage with the neighboring council to understand issues throughout the catchment
	Implement stormwater systems that can adapt to future needs.	Medium	Partial knowledge of catchment (flood risk)

Actions

0–2 years

Partnership: Partner with neighbouring council and CCMA to ensure Council understand catchment wide issues

Investigation: Capture flood management recommendations.

2–5 years

Asset / Non-Asset Solutions: Subject to funding, implement flood management actions to manage flood risk and localised customer impact

Asset / Non-Asset Solutions: Seek opportunities to integrate stormwater solutions into public open space when implementing flood management actions

5–10 years

Investigation: Continue to monitor repeat/renew flood risk and assess need to complete flood study to ensure impact of surrounding development is appropriately management

CHARLEMONT CATCHMENT MANAGEMENT UNIT

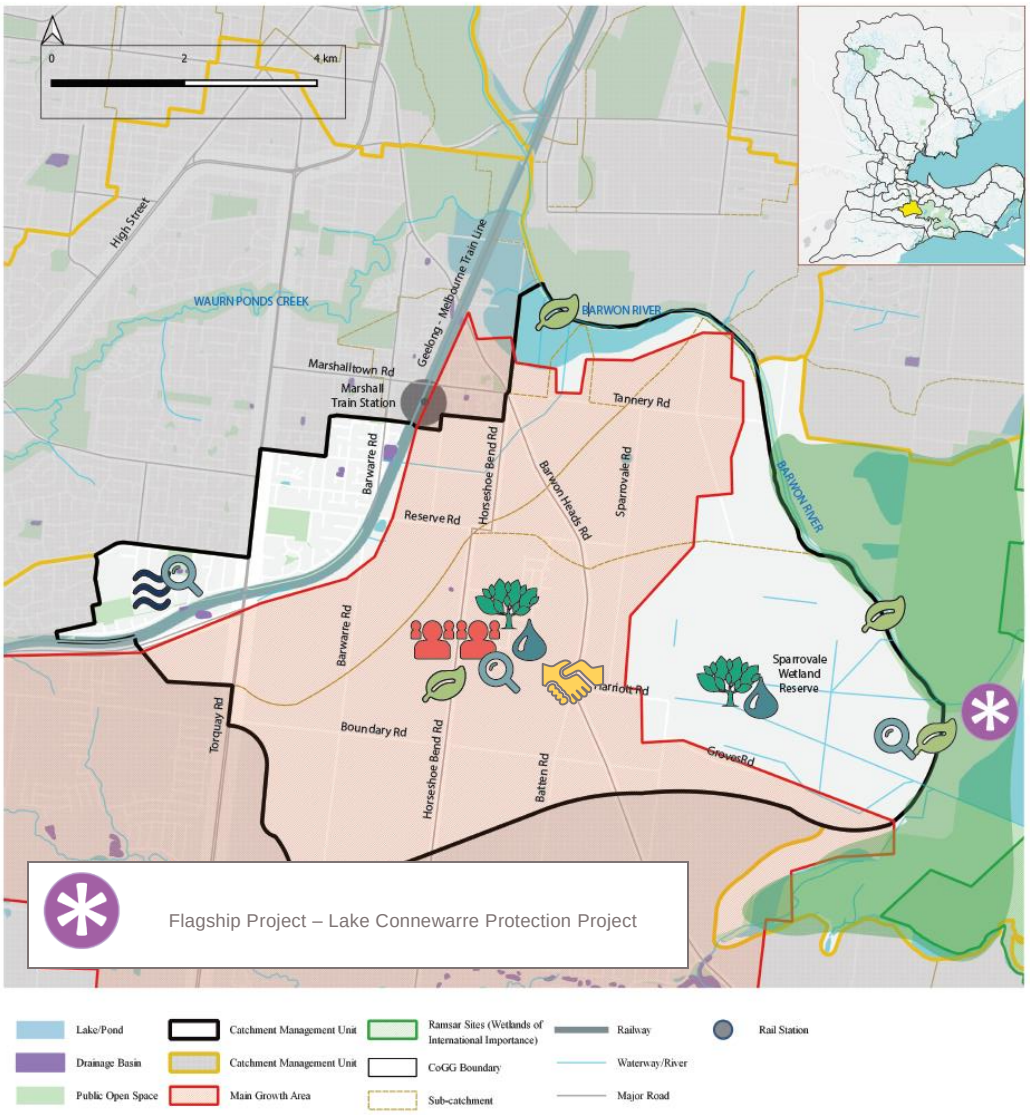
The catchment management unit of Charlemont is located towards the south of the City's service area, and generally includes the suburbs of Charlemont and Marshall.

Prioritisation Summary

Overall Priority	Summary
High	The Catchment Management Unit of Charlemont is covered largely by the Armstrong Creek Growth Area, As the catchment drains into the Lake Connewarre system, the City places a high priority on understanding and managing water quality within the catchment The management of flooding is a high priority due to the flat topography and urban development of the area. Significant opportunities exist for partnership and IWM actions to be delivered as Charlemont continues to develop.

Delivery Schedule

The Charlemont Management Strategy will be delivered by 2022.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Medium	Medium number of historical flooding events
	Support urban greening through integrated water management.	High	Lower level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Medium priority for irrigation of open space and creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	High	High priority to manage water quality as the catchment drains through Lake Connewarre (Ramsar listed). Development within catchment may impact water quality, emphasis will be placed on the development and management of the Sparrovale Wetlands
	Develop partnerships to plan and deliver stormwater solutions.	High	Moderate level of current development and significant rates of future development are expected as the Armstrong Creek / Charlemont area develops
	Protect the health of receiving waterways, maximising their value and amenity.	High	High level of opportunity for partnership projects expected in the Armstrong Creek Growth Area to achieve best practice outcomes
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited. The City has pre-development knowledge, but the performance of as-build infrastructure needs to be reviewed

Actions

0–2 years

Partnership: Partner with relevant environmental groups, CCMA, and Wadawurrung Aboriginal Co-operative to ensure Council understands emerging waterway issues

Investigation: Complete flood study of the catchment to understand the flood risks and capture recommendations in Catchment Management Strategy to inform required actions and funding

2–5 years

Investigation: Commence a detailed study into water quality outcomes for the Barwon River

Investigation: Complete planning for infrastructure required to service development and plan how that infrastructure will be delivered

Investigation: Funding arrangements to be reviewed for potential special charge

5–10 years

Asset Solution: Deliver infrastructure to support development while seeking to incorporate IWM opportunities

Investigation: Continue to monitor water quality outcomes

Investigation: Assess the need to renew/repeat a flood study to ensure infrastructure is appropriate to service development

REEDY LAKE NORTH CATCHMENT MANAGEMENT UNIT

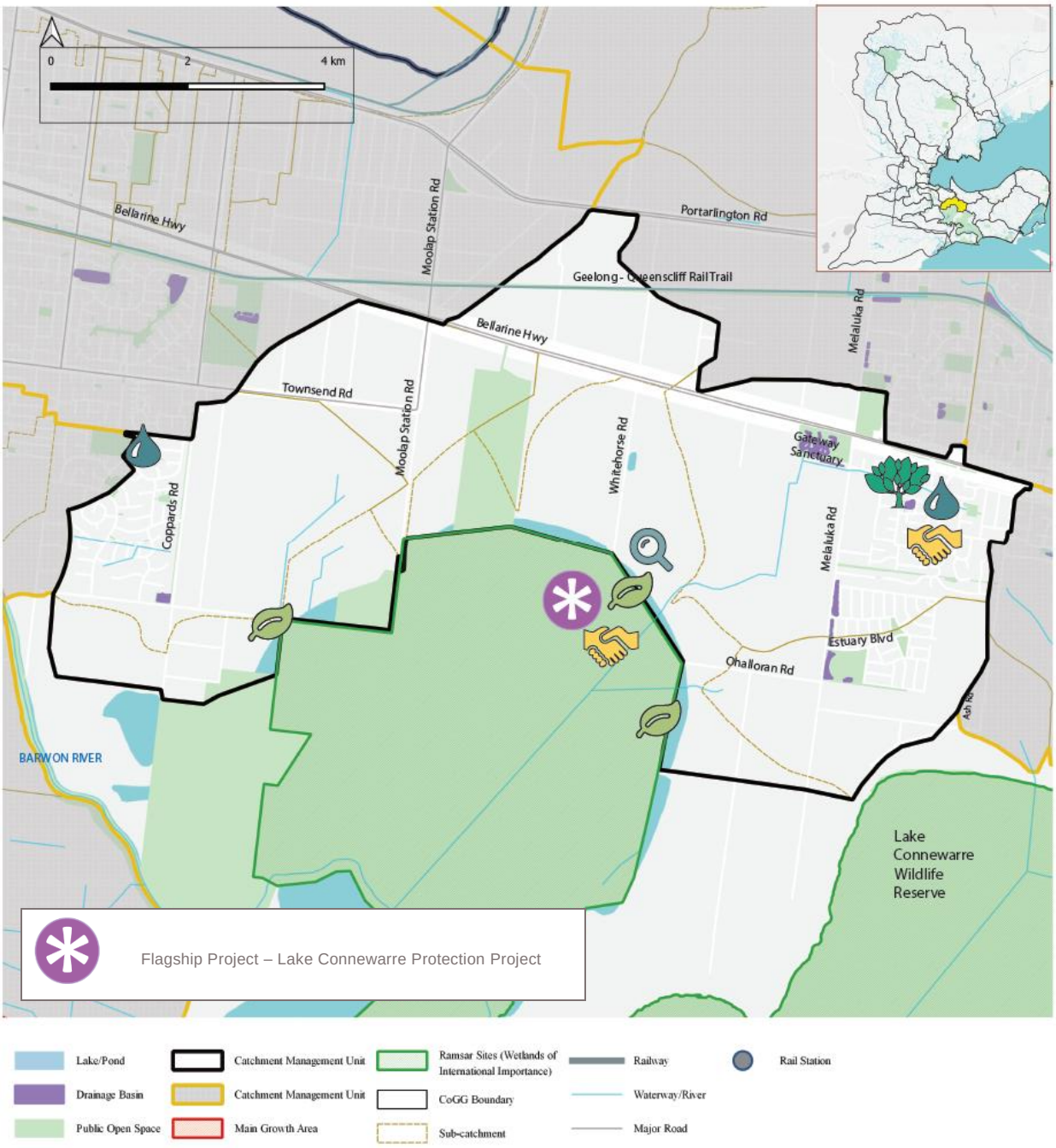
The catchment management unit of Reedy Lake North is in towards the east of the City's service area, and generally includes sections of the suburbs of St Albans Park, Moolap and Leopold.

Prioritisation Summary

Overall Priority	Summary
Medium	The City has a focus on the management of water quality in this Management Unit. This will involve partnerships and ongoing water quality investigations. A medium priority is assigned to implement IWM actions, and integrate stormwater into urban environments, which may include some irrigation of existing open space and delivery of identified IWM priorities

Delivery Schedule

The Reedy Lake Catchment Management Strategy will be delivered by 2025.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	High	High priority for irrigation of open space and creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	High	High priority for maintaining water quality as the catchment drains through Lake Connewarre (Ramsar listed). Development within catchment may impact water quality
	Develop partnerships to plan and deliver stormwater solutions.	Low	Limited current development and low rates of expected future development
	Protect the health of receiving waterways, maximising their value and amenity.	Medium	Opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years

Partnership: Partner with relevant environmental groups and CCMA to ensure Council understands emerging waterway issues

2–5 years

Investigation: Complete a water quality investigation to confirm actual risk to receiving environment and capture recommendations in Catchment Management Strategy to inform required actions and funding

Asset Solution: Deliver identified IWM opportunities within the catchment

5–10 years

Investigation: Continue to monitor water quality

Asset Solution: Continue to identify and deliver IWM opportunities within the catchment

LEOPOLD NORTH CATCHMENT MANAGEMENT UNIT

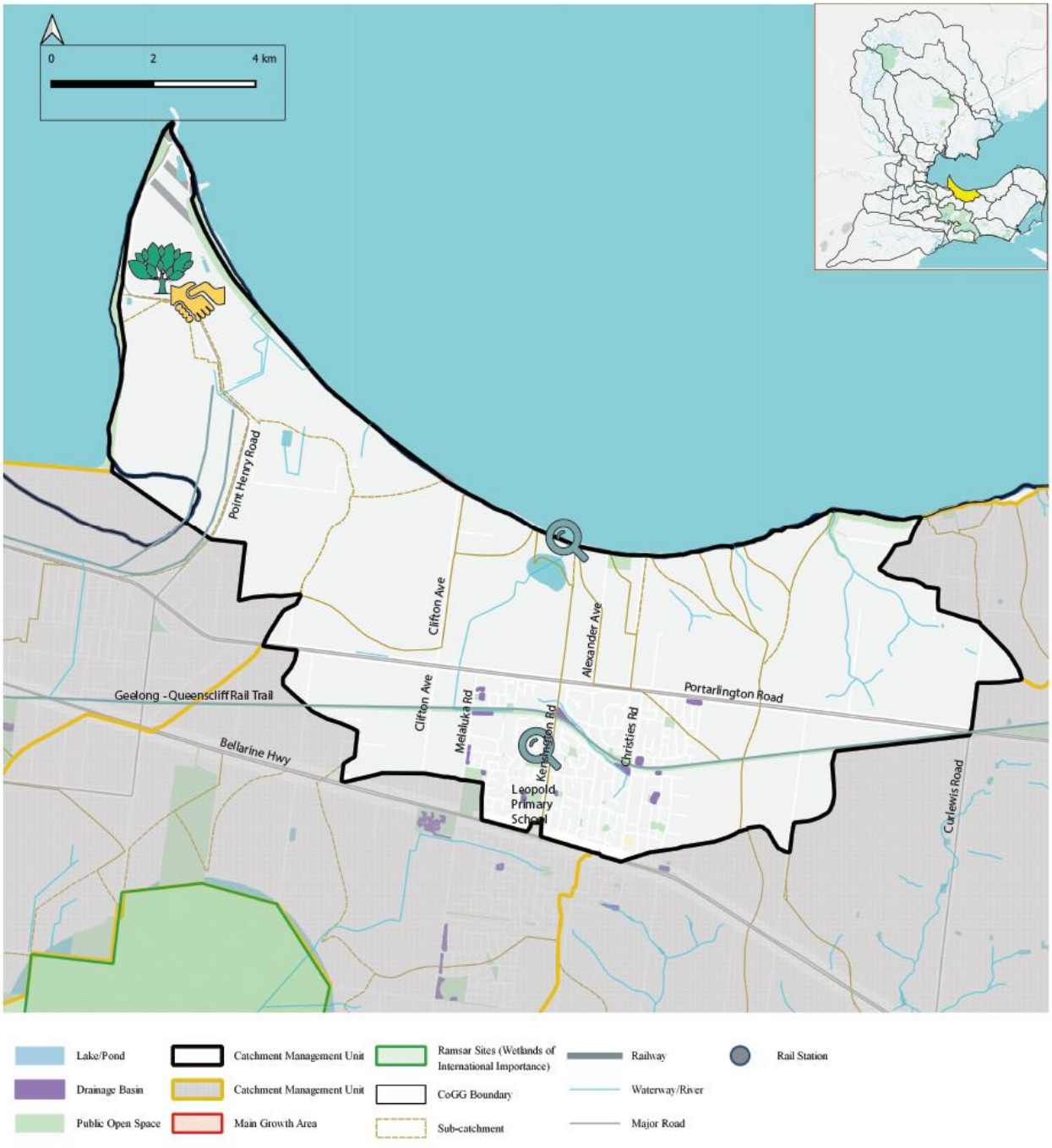
The catchment management unit of Leopold North is in towards the east of the City's service area, and generally includes the suburbs of Leopold and parts of Moolap and Curlewis.

Prioritisation Summary

Overall Priority	Summary
Low	The catchment management unit of Leopold generally exhibits low priority for action by the City. Ongoing monitoring of stormwater service performance and rates of growth will occur over time.

Delivery Schedule

The Leopold North Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Low	Low priority for irrigation of open space
	Implement catchment wide practices that guide growth.	Low	Low priority for enhanced water quality management based on the nature / extent of existing development and waterway values
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low rates of projected future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	Limited opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years	2–5 years	5–10 years
Continue to monitor for change	Continue to monitor for change	Continue to monitor for change

ARMSTRONG CREEK CATCHMENT MANAGEMENT UNIT

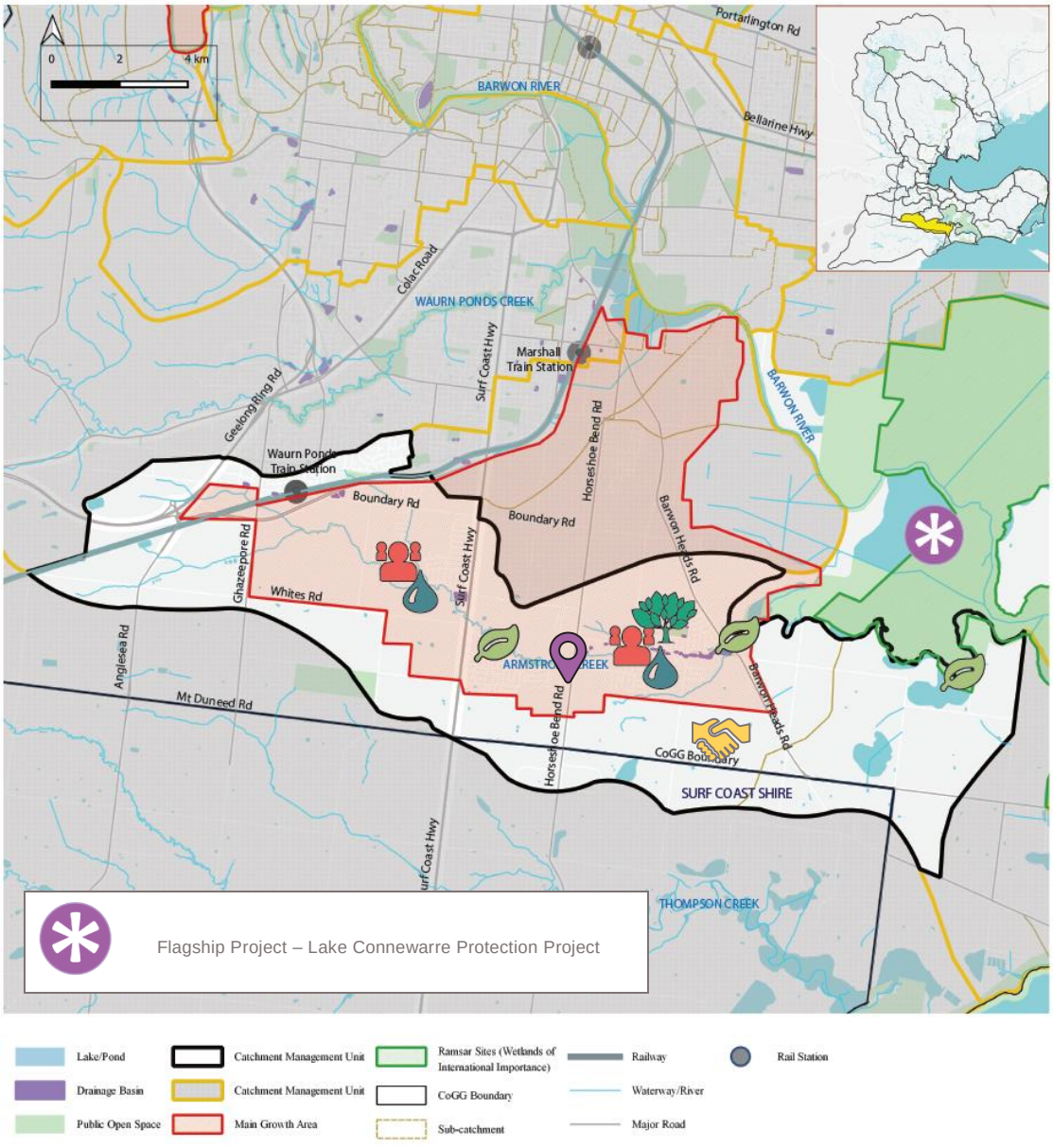
The catchment management unit of Armstrong Creek is in the west of the City's service area, and generally includes the suburbs of Armstrong Creek, Mount Duneed and Connewarre.

Prioritisation Summary

Overall Priority	Summary
High	The catchment management unit of Armstrong Creek is planned and constructed to modern standards. Nevertheless, it is considered a high priority to ensure that the systems and assets (including the Sparrovale Wetlands located in the Charlemont catchment management unit) are installed correctly and in a timely fashion to protect water quality outcomes for Lake Connewarre. Armstrong Creek is identified to hold significant cultural value, its natural flow paths should be carefully managed and protected as the catchment develops.

Delivery Schedule

The Armstrong Creek Catchment Management Strategy will be delivered by 2022.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Medium priority for irrigation of open space, and creation of multifunctional spaces. Many of these spaces are already planned or in place across the catchment
	Implement catchment wide practices that guide growth.	High	High priority to manage water quality as the catchment drains through Lake Connewarre (Ramsar listed). Emphasis will be placed on the development and management of the Sparrovale Wetlands (Located in the Charlemont catchment management unit)
	Develop partnerships to plan and deliver stormwater solutions.	High	Extensive existing development and high rates of expected future development
	Protect the health of receiving waterways, maximising their value and amenity.	High	High level of opportunity for partnership projects expected in the Armstrong Creek Growth Area to achieve best practice outcomes
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is contemporary and comprehensive. The City has pre-development knowledge, but performance of as-built infrastructure will need to be reviewed
	Protect cultural values along waterways.	High	Armstrong Creek identified to have significant cultural values that need to be protected

Actions

0–2 years

Partnership: Partner with relevant environmental groups, CCMA, and Wadawurrung Aboriginal Co-operative to ensure Council understands emerging waterway issues

2–5 years

Investigation: Assess the need to repeat or renew a flood study to ensure infrastructure is appropriate to manage flood risk associated with development

Investigation: Commence a detailed study into water quality outcomes for the Barwon River and capture recommendations in Catchment Management Strategy to inform required actions and funding

5–10 years

Investigation: Continue to monitor water quality

WALLINGTON CATCHMENT MANAGEMENT UNIT

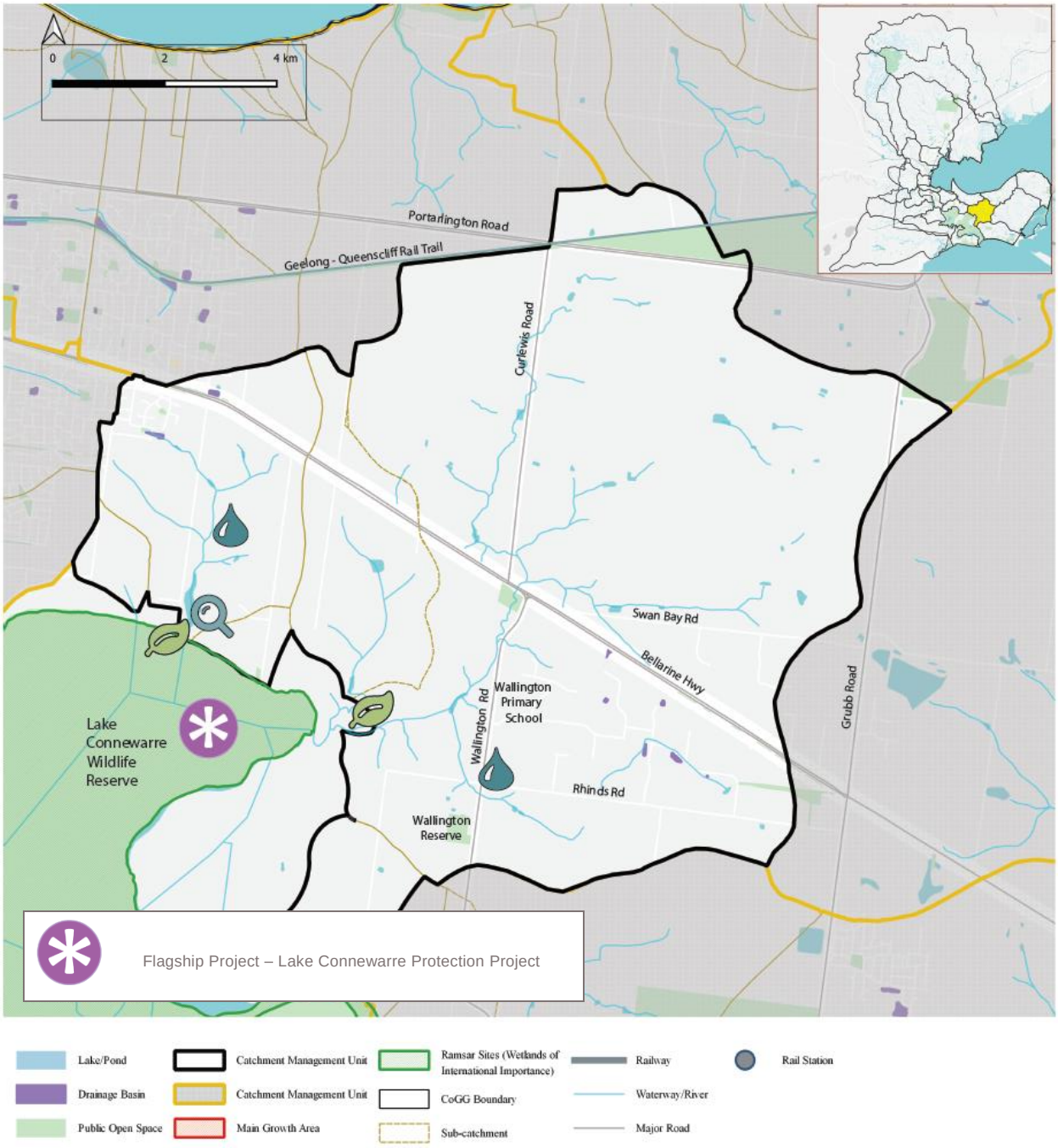
The catchment management unit of Wallington is in the east of the City's service area, and generally includes parts of the suburbs of Wallington, Leopold and Curlewis.

Prioritisation Summary

Overall Priority	Summary
Low	The City has a focus on identifying and delivering opportunities to integrate stormwater into the towns of the Bellarine. Otherwise, the City will maintain an ongoing monitoring of stormwater services performance.

Delivery Schedule

The Wallington Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	High	High priority for irrigation of open space and creation of multifunctional community spaces given the lack of current irrigated parks, and opportunities for biodiversity / tourism corridors
	Implement catchment wide practices that guide growth.	Medium	Medium priority for water quality based on the nature / extent of existing development and the values of receiving waterways
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low rates of future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No partnership projects identified.
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years	2–5 years	5–10 years
Investigation: Explore opportunities to integrate stormwater into natural and built environment.	Continue to monitor for change	Continue to monitor for change

CLIFTON SPRINGS CATCHMENT MANAGEMENT UNIT

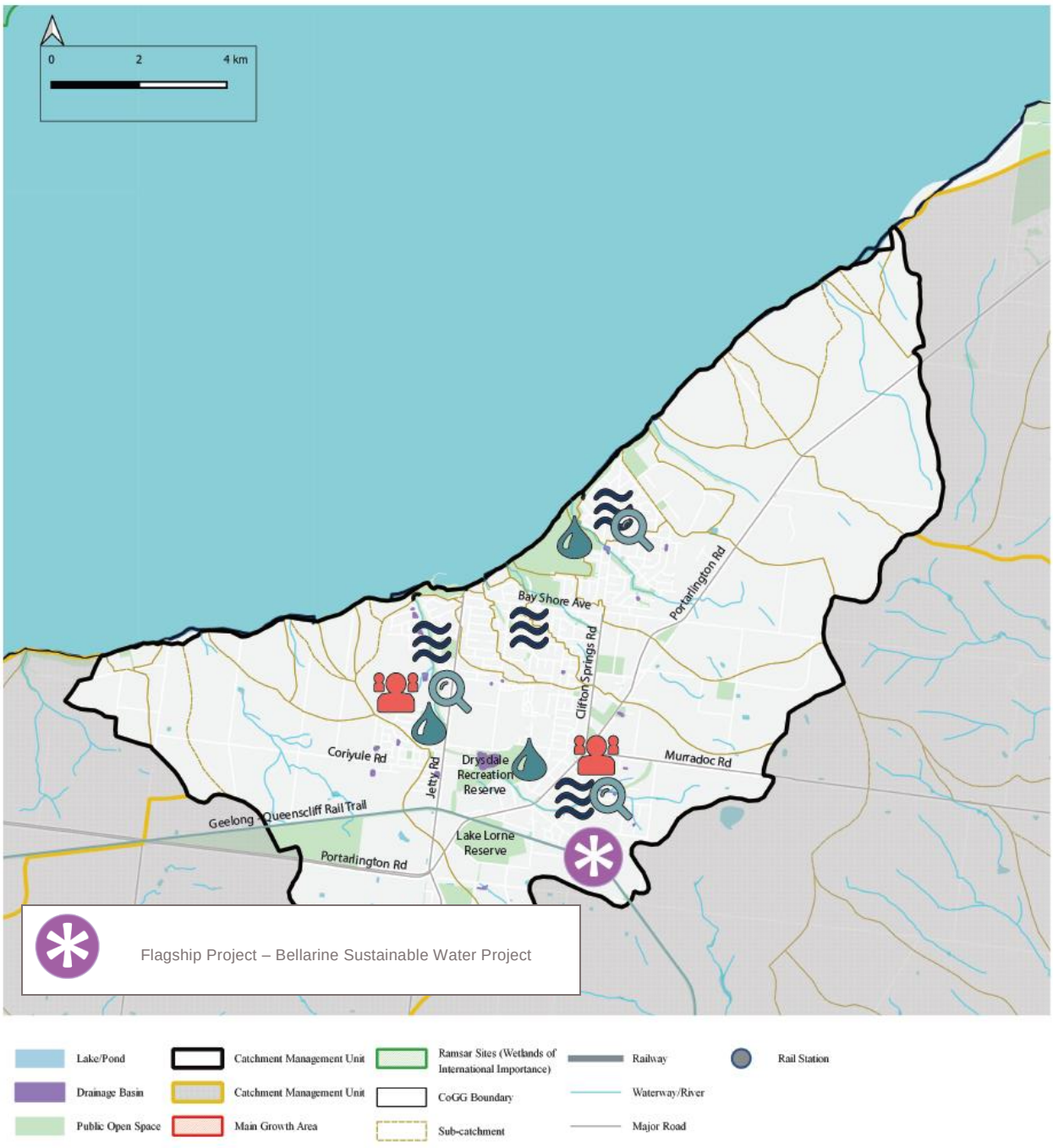
The catchment management unit of Clifton Springs is in the east of the City's service area, and generally includes the suburbs of Clifton Springs and Drysdale.

Prioritisation Summary

Overall Priority	Summary
Medium	Managing flooding risk in the Clifton Springs catchment management unit is a focus for the City, particularly given expected future growth in the community. This includes the development of asset and non-asset solutions, for example a formal drainage network and building overlays.

Delivery Schedule

The Clifton Springs Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Medium priority for irrigation of open space and creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Low	Low priority for water quality based on the nature / extent of current development and the importance of the receiving waterway
	Develop partnerships to plan and deliver stormwater solutions.	High	Significant urban development in some areas and moderate rate of ongoing expected future development
	Protect the health of receiving waterways, maximising their value and amenity.	Medium	Recycled water supply from Barwon Water's Treatment Plant in Portarlington may provide partnership opportunity
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years

Investigation: Complete flood study of the catchment to understand the flood risks

2–5 years

Asset / Non-Asset Solution: Subject to funding, implement actions identified through the flood study to manage flood risk and localised issues

Investigation: Review opportunities for recycled water supply from Barwon Water's Treatment Plant in Portarlington

5–10 years

Asset / Non-Asset Solution: Subject to funding, continue to implement actions identified through the flood study to manage flood risk and localised issues

OCEAN GROVE CATCHMENT MANAGEMENT UNIT

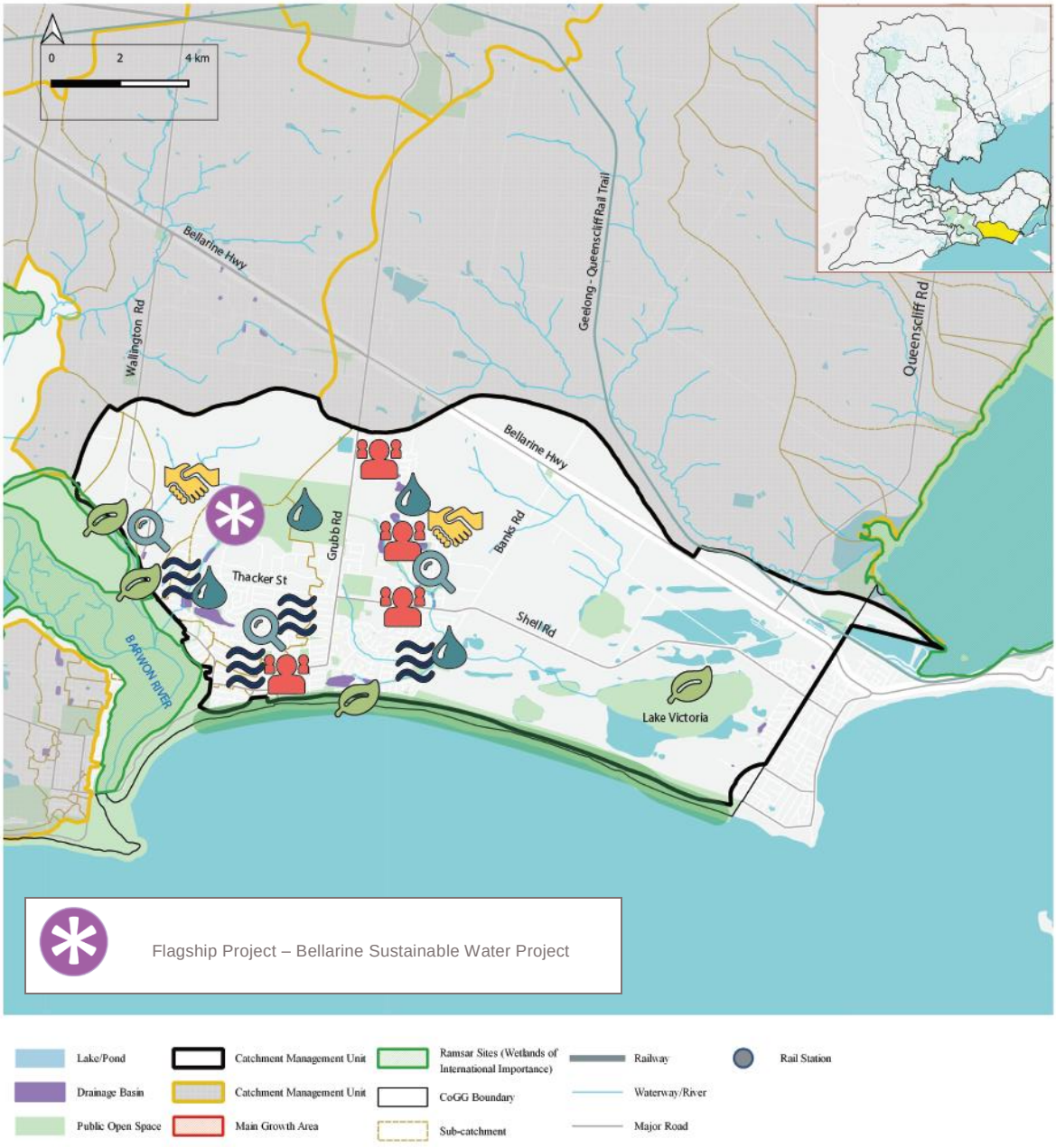
The catchment management unit of Ocean Grove is in the east of the City's service area, and generally includes the suburbs of Ocean Grove and parts of Wallington, Point Lonsdale and Marcus Hill.

Prioritisation Summary

Overall Priority	Summary
High	The City considers it a high priority to understand and manage water quality from the catchment management unit of Ocean Grove. Existing and expected additional future flooding issues, exacerbated by future growth make a focus on flood management a priority. Furthermore, the City's understanding of flooding risk should be updated Some opportunities identified to deliver improved IWM outcomes through irrigation of open space and development of biodiversity corridors (as part of the flagship project for the Bellarine)

Delivery Schedule

The Ocean Grove Catchment Management Strategy will be delivered by 2021.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	High	High number of historical flooding events
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	High	High priority for irrigation of open space and creation of multifunctional community spaces due to relative lack of these assets at present
	Implement catchment wide practices that guide growth.	High	High priority to manage water quality risks as the catchment drains through Swan Bay (Ramsar listed). Development and industry within the catchment may impact water quality unless controls are implemented
	Develop partnerships to plan and deliver stormwater solutions.	High	Significant development of the catchment management unit has already occurred. Moderate levels of future development expected
	Protect the health of receiving waterways, maximising their value and amenity.	Medium	Opportunities for partnership projects identified
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years

Partnership: Partner with relevant environmental groups and CCMA to ensure Council understands emerging waterway issues

Investigation: Complete flood study of the catchment to understand the flood risks and capture recommendations in Catchment Management Strategy to inform required actions and funding

2–5 years

Investigation: Complete a water quality investigation to confirm actual risk to receiving environment and capture recommendations in Catchment Management Strategy

Asset / Non-Asset Solution: Subject to funding, implement actions identified through the flood study to manage flood risk and localised issues

Non-Asset Solution: Plan for passive open space irrigation with linkage to stormwater storage and recycled water supplies from Barwon Water

5–10 years

Asset / Non-Asset Solution: Subject to funding, continue to implement actions identified through the flood study to manage flood risk and localised issues

Investigation: Continue to monitor water quality

SWAN BAY CATCHMENT MANAGEMENT UNIT

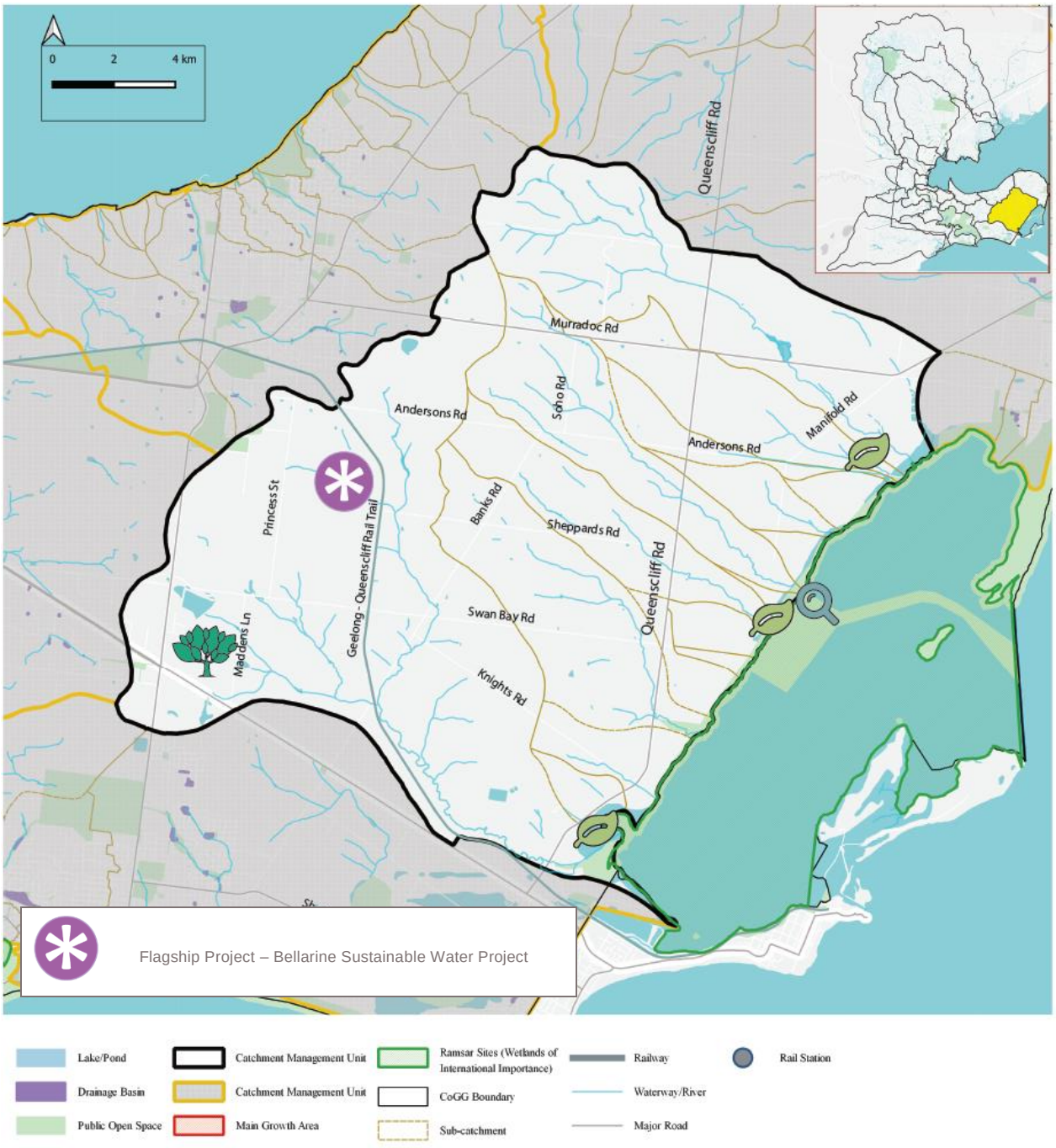
The catchment management unit of Swan Bay is in the east of the City's service area, and generally includes the suburbs of Swan Bay and Mannerim and parts of Drysdale and St Leonards.

Prioritisation Summary

Overall Priority	Summary
Medium	The City has a focus on the ongoing management of water quality into Swan Bay.

Delivery Schedule

The Swan Bay Catchment Management Strategy will be delivered by 2025.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage in relation to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Low	Low priority for irrigation of open space or creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	High	High priority for maintaining water quality as the catchment drains through Swan Bay (Ramsar listed)
	Develop partnerships to plan and deliver stormwater solutions.	Low	Low level of current development and limited expected future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No partnership projects identified
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years	2–5 years	5–10 years
Partnership: Partner with relevant environmental groups and CCMA to ensure Council understands emerging	**Investigation:** Complete sampling for water quality and establish a waterway and estuarine health baseline. Capture outcomes in Catchment Management Strategy to inform required actions and funding	**Investigation:** Continue to monitor water quality

EASTERN BELLARINE CATCHMENT MANAGEMENT UNIT

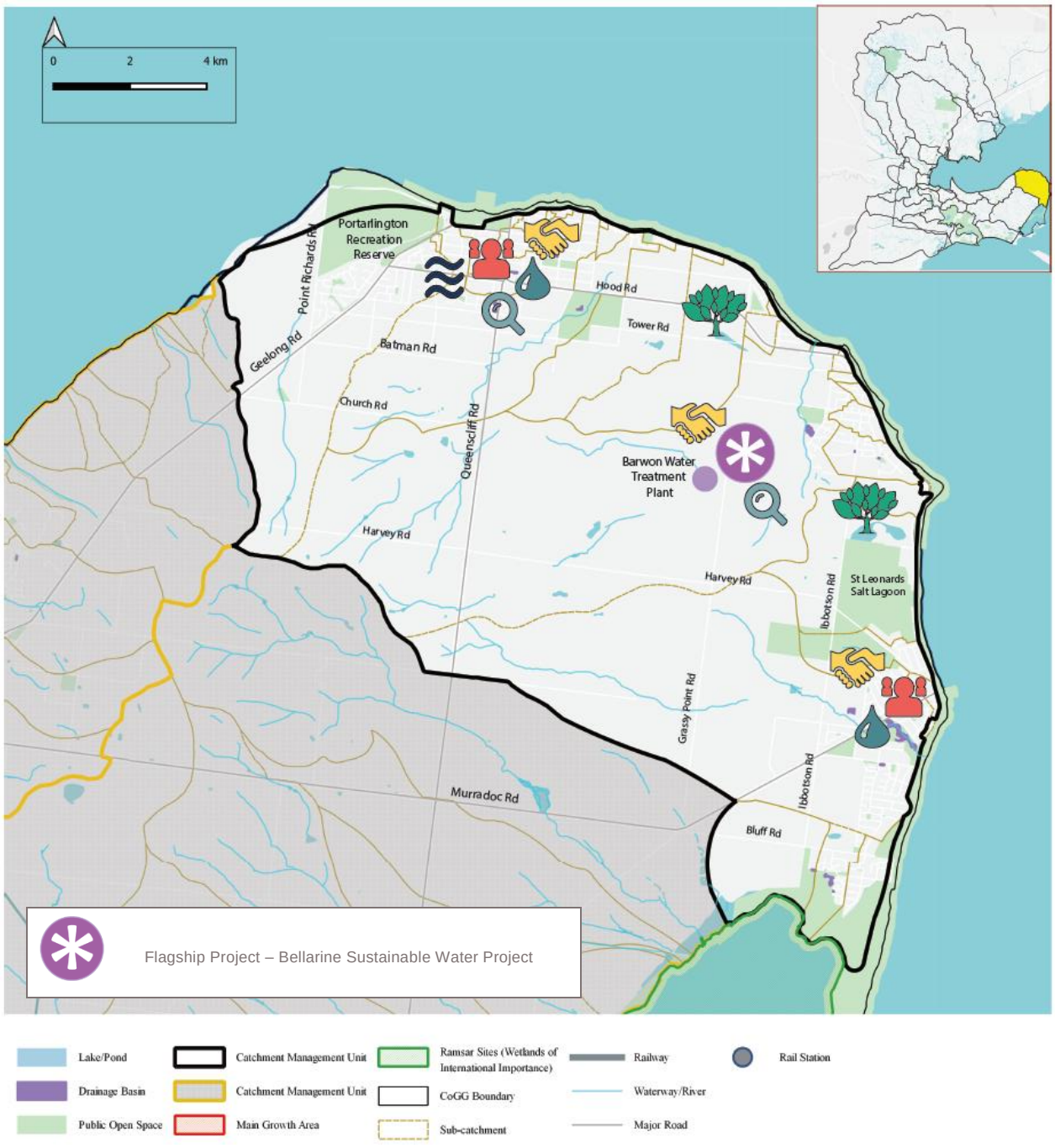
The catchment management unit of Eastern Bellarine is in the east of the City's service area, and generally includes the suburbs of Portarlington, Indented Head and St Leonards.

Prioritisation Summary

Overall Priority	Summary
Low	No priority actions identified. The City will monitor the catchment for change.

Delivery Schedule

The Eastern Bellarine Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Medium	Medium number of historical flooding events
	Support urban greening through integrated water management.	Medium	Medium level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Medium	Medium priority for irrigation of open space or creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Low	Low priority for enhanced water quality management actions based on the nature / extent of existing development and values of receiving waterways
	Develop partnerships to plan and deliver stormwater solutions.	Medium	Medium level of current development in the catchment management unit, with medium levels of expected future development
	Protect the health of receiving waterways, maximising their value and amenity.	Medium	Recycled water supply from Barwon Water's Treatment Plant in Portarlington may provide partnership opportunity
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited

Actions

0–2 years	2–5 years	5–10 years
Continue to monitor for change	Continue to monitor for change	Continue to monitor for change

THOMPSON CREEK CATCHMENT MANAGEMENT UNIT

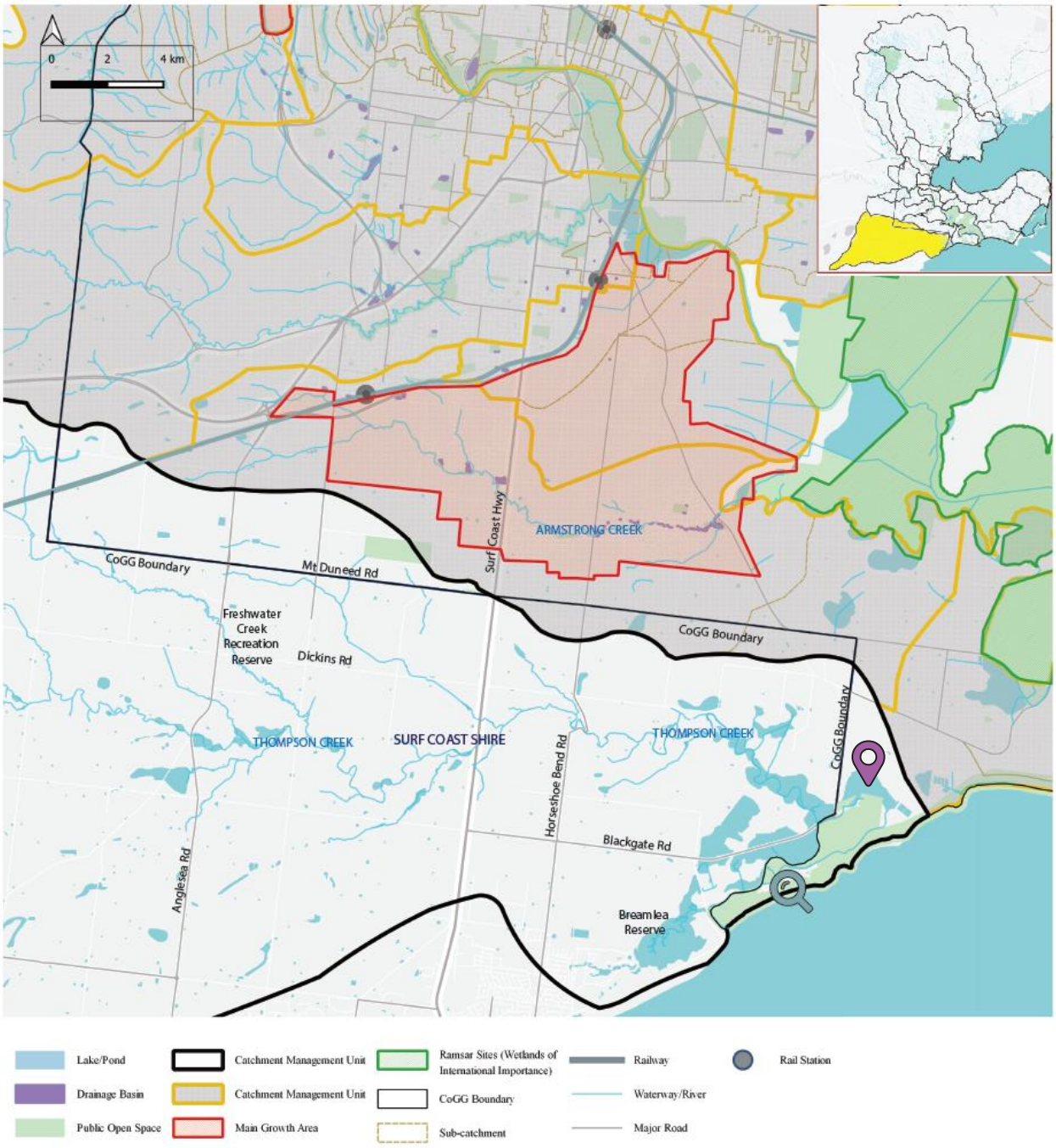
The catchment management unit of Thompson Creek is in the south west of the City's service area, and generally includes the suburbs of Breamlea and Mount Duneed.

Prioritisation Summary

Overall Priority	Summary
Low	Thompson Creek is identified to hold significant cultural value. Any development within the catchment should seek to protect the Creek's natural flow paths. The City will monitor the catchment for change.

Delivery Schedule

The Thompson Creek Catchment Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	Low	Low priority for irrigation of open space given existing rural environment
	Implement catchment wide practices that guide growth.	Low	Low priority for enhanced water quality management based on the nature / extent of development and expected quality of flow to the Thompson Creek
	Develop partnerships to plan and deliver stormwater solutions.	Low	Limited existing development and low level of expected future development
	Protect the health of receiving waterways, maximising their value and amenity.	Low	No partnership projects identified The catchment management unit is partially located within the Surf Coast Shire area. The Council will engage with the neighboring council to understand issues throughout the catchment
	Implement stormwater systems that can adapt to future needs.	High	Formal knowledge of catchment (flood risk) is limited
	Protect cultural values along waterways.	High	Thompson Creek identified to have significant cultural values that need to be protected

Actions

0–2 years	2–5 years	5–10 years
Partnership: Partner with neighbouring council, CCMA and Wadawurrung Aboriginal Co-operative to ensure Council understand catchment wide issues	Continue to monitor for change	Continue to monitor for change

BARWON HEADS CATCHMENT MANAGEMENT UNIT

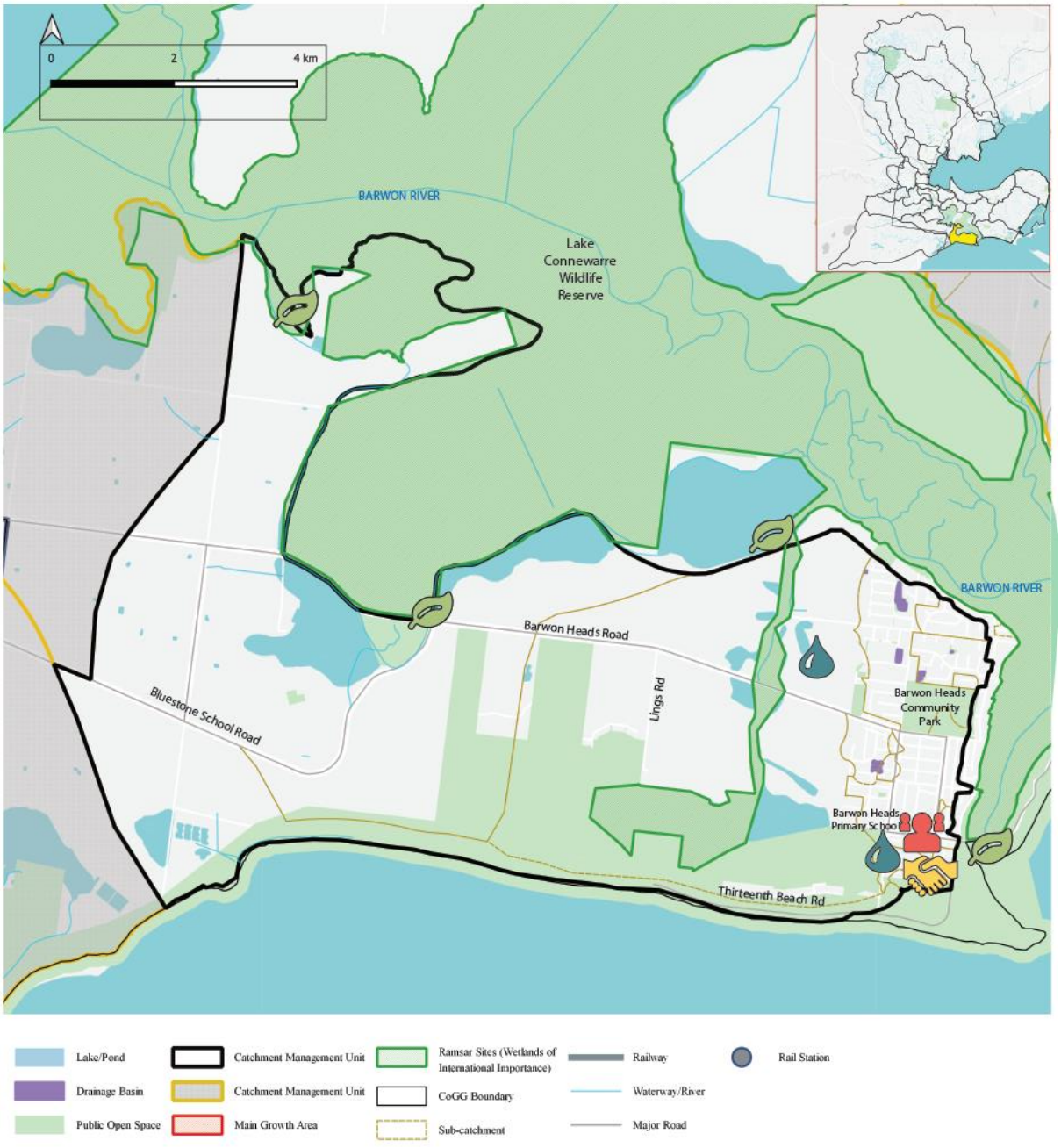
The catchment management unit of Barwon Heads is in the south of the City's service area, and generally includes the suburbs of Barwon Heads and Connewarre.

Prioritisation Summary

Overall Priority	Summary
Medium	The City will explore the creation of multifunctional assets for the catchment management unit of Barwon Heads. These are likely to be opportunistic if/when they occur. No other actions identified, other than ensuring that existing stormwater assets such as pumps and levies are maintained appropriately. The impacts of coastal inundation and erosion may increase risk in the catchment management unit. Consequently, the City will monitor the catchment management unit for change and service performance.

Delivery Schedule

The Barwon Heads Management Strategy will be delivered by 2030.



Status

Icon	Objective	Priority	Commentary
	Reduce the impacts of dangerous stormwater flooding.	Low	Low number of historical flooding events
	Support urban greening through integrated water management.	Low	Higher level of tree canopy coverage relative to other areas of the City
	Integrate stormwater systems to enhance the use of community spaces.	High	High priority for the City to explore irrigation of open space and creation of multifunctional community spaces
	Implement catchment wide practices that guide growth.	Medium	Medium priority to manage water quality risks based on the nature / extent of current development and the sensitive receiving environments of the Barwon River estuary
	Develop partnerships to plan and deliver stormwater solutions.	Medium	Medium level of current development which may be affected by ongoing growth
	Protect the health of receiving waterways, maximising their value and amenity.	Medium	Small scale partnership opportunities identified for IWM
	Implement stormwater systems that can adapt to future needs.	Low	Formal knowledge of catchment (flood risk) is contemporary and comprehensive

Actions

0–2 Years

Non-Asset Solution: Explore opportunities to irrigate public open spaces and multifunctional facilities

Asset Solution: Ensure active infrastructure is appropriately maintained (e.g. pumps)

2–5 years

Asset Solution: Ensure active infrastructure is appropriately maintained (e.g. pumps)

5–10 years

Asset Solution: Ensure active infrastructure is appropriately maintained (e.g. pumps)

Appendix D – Catchment Management Strategy Outline

A Catchment Management Strategy outlines key service outcomes and the current state of the City's **Catchment Management Unit.** The strategy documents the investigation and improvement actions required to manage the performance of the catchment to achieve the service outcomes over the next 10 years.

Each Catchment Management Strategy is an integral component of the delivery of the City's Stormwater Services Strategy (2020).

The development of a Catchment Management Strategy will require:

- Review of existing information which identifies gaps current and desired performance against the Stormwater Service Strategy's objectives.
- Completion of studies, as required by the City, to inform the assessment of the Catchment Management Unit's performance against the Stormwater Services Strategy objectives.
- Engagement with stakeholders and communities to identify service expectations and opportunities for improvement.
- Development of asset and non-asset solutions required to deliver service expectations.
- Documentation of 10-year action pathway and 5-year funding requirements agreed with the City, stakeholders, and community.
- Preparation of a high quality, publicly available Strategy report (up to 10 pages) and Strategy Summary (2 pages) to support final engagement with stakeholders and communities.
- Final engagement with stakeholders and communities to confirm the Catchment Management Strategy.
- Endorsement of the final Catchment Management Strategy by the City.

The structure of a Catchment Management Strategy is provided below.

Catchment Management Unit Stormwater Management Strategy

City of Greater Geelong

Table of Contents

1. Introduction

Define the purpose of the document and provide an overview of the catchment management unit, including key items that may impact the performance of the catchment in the future. Provide a summary of the key catchment actions as identified through the document.

   a. Purpose of the Catchment Management Unit
   b. Catchment Overview
   c. Summary of Key Catchment Actions

2. Stormwater Services

Provide an overview of the stormwater service objectives

   a. Stormwater Service Objectives

3. Performance Summary

Provide an overview and assessment of the current performance of the catchment against each stormwater service objective across Flood, Waterway and Integrated Management. Also detail the status of service objectives relating to community engagement.

a. Flood Management
b. Waterway Management
c. Integrated Water Management
d. Community Engagement

4. Catchment Actions

Detail the actions to be taken over the next 10 years to deliver service outcomes and address shortfalls in service capability.

5. Funding Summary

Detail the required investment to manage the catchment management unit over the next five years across Investigation, Non-Asset Improvement and Asset Improvement Programs.

6. Monitoring and Review

Provide detail on the document review cycle and community engagement approach to ensure community expectations are understood and captured

a. Management Strategy Review Cycle
b. Community Engagement and Meetings