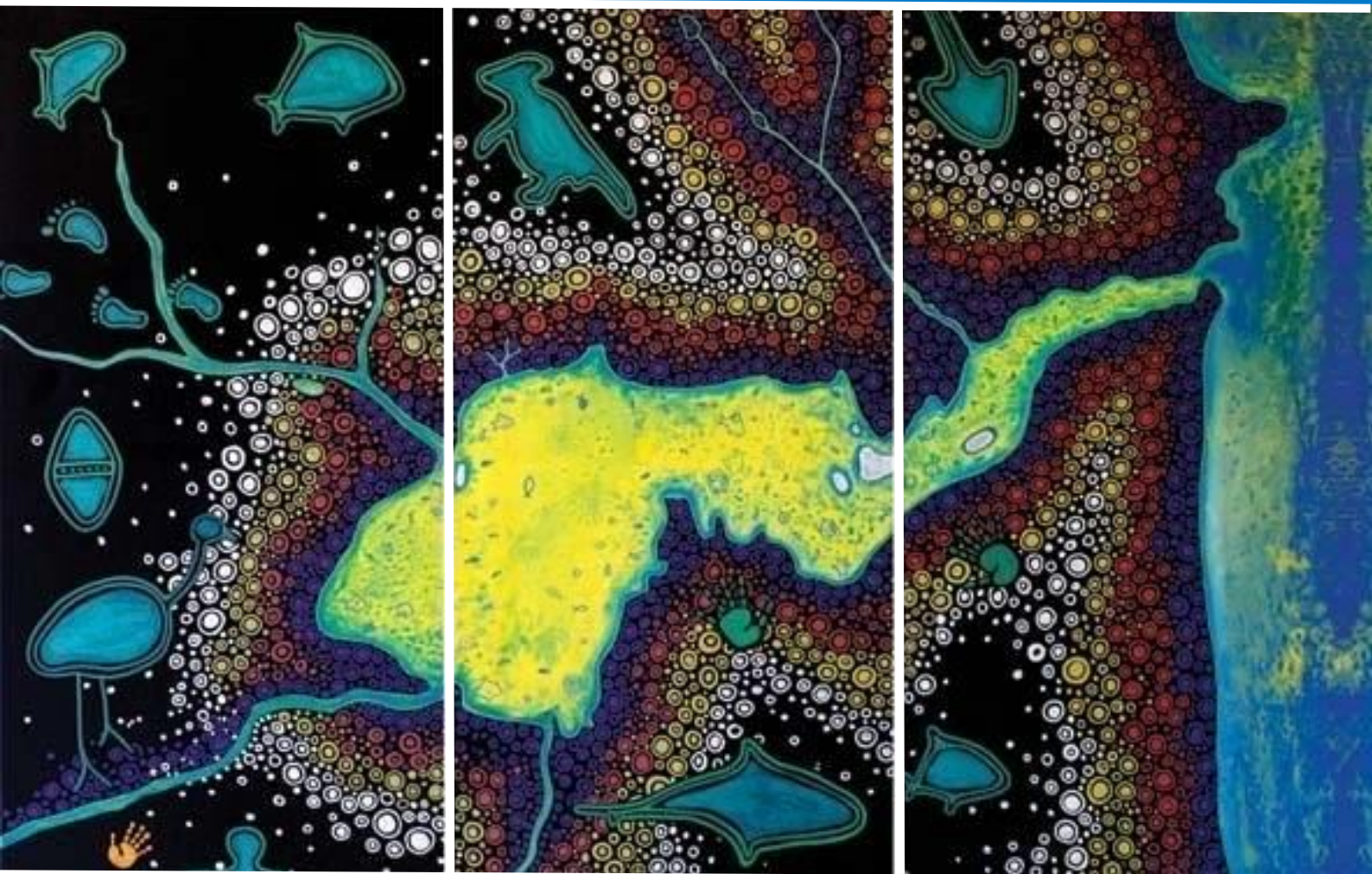


Water Sensitive Warringah Strategic Plan



WARRINGAH
COUNCIL



Authorship & Acknowledgements

The Water Sensitive Warringah Strategic Plan was authored by Adrian Turnbull and Ben Fallowfield of the Natural Environment Unit, Warringah Council.

Warringah Council has benefited from active participation in the Cities as Water Supply Catchments and the CRC for Water Sensitive Cities research programs, as well as membership of the Regional Water Cycle Management Working Group, and the Sydney Coastal Councils Group.

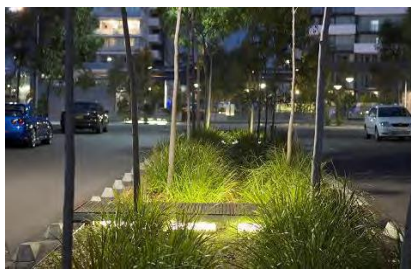
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Purpose: This Strategy is an internal document to guide Council's approach to water management across Warringah and should be read in conjunction with the Water Sensitive Warringah Technical Paper.

Cover Image - Narrabeen Lagoon, Jessica Birk, courtesy of the Coastal Environment Centre.

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The Vision of a Water Sensitive Warringah

Our goal is to harness the potential of alternative water sources, increase resilience in times of drought, improve waterway health and amenity, reduce urban temperatures, and promote the “liveability” of Warringah’s urban areas.



Objectives

The Water Sensitive Warringah Strategic Plan seeks to:

- Improve water security through conservation, demand management and alternative water sources
- Maintain and enhance waterway function and indigenous biodiversity
- Minimise flood risk and damage
- Reduce urban heat island effects
- Enable adaptive, integrated and sustainable management of the total water cycle
- Improve amenity and “liveability” of Warringah’s urban areas
- Engage, inspire and motivate the community to protect and conserve our environment.

Focus Areas

This plan focuses on a number of key areas in order to realise the objectives:

- Strengthened Policy and governance frameworks
- Effective community engagement to enable change
- Support robust research and industry partnerships
- Capacity building to develop skills, knowledge and resilience
- Promotion of sustainable water management practices
- Advancement of “green” infrastructure.



Introduction

The way we manage urban water influences almost every aspect of our environment and quality of life. Water is an essential element of placemaking: it provides cultural and spiritual connection, defines the identity of a locality, provides significant economic value, improves community health and wellbeing while supporting vital habitat for native plants and animals.

The traditional owners of the land acknowledged, respected and highly valued the water resources of the area, a sentiment the Warringah community continue to hold close to this day. Our coastline and beaches are rated as the best part of the local environment, and water quality is considered the most important environmental issue for Warringah residents¹. Management of our waterways and lagoons is a key service area that only just meets community satisfaction levels².

The impacts of future population growth and climate change are a significant challenge that we need to start addressing now. This Plan is fundamentally about strengthening Council's policies and decision making processes in order to realise the outcomes and aspirations of our community, maintaining Warringah as a healthy, vibrant and desirable location. The path to becoming a Water Sensitive Warringah may be challenging but absolutely necessary to maintain our quality of life.



Future Challenges

Building resilience to the impacts of climate change, and in particular ensuring secure water supplies, the safe conveyance of flood waters and the ecological protection of water environments, is an emerging challenge as we seek to minimise the impact of Warringah's growing urban communities on already stressed water resources.

Population Growth

Warringah's projected population is expected to grow by 31,000 people to an estimated 179,000 by 2031 – a 21% increase.

As the population grows there will be increased stress on existing urban zones, and our remaining natural areas will come under more pressure to be developed for housing. Impacts on our natural environment include:

- Decline in catchment water quality and resultant flow on effects on aquatic and terrestrial ecology, receiving waters and recreational assets
- Increased erosion of private and public lands due to the changes in catchment hydrology
- Increased risk of flooding as a result of amplified levels and velocities of stormwater
- Elevated urban heat island effects, particularly in areas containing vulnerable populations
- Loss of native vegetation and increased weed infestation



Climate Change

Climate change, although a global issue, will impact on our community particularly due to our coastal location with significant low lying areas that are prone to flooding and inundation. Extreme weather events pose risks such as flooding and bushfires that directly impact on the wellbeing of our community, as well as more insidious changes to Warringah's ecology from prolonged fluctuations in temperature and rainfall.

Many of the impacts of climate change are shared with population growth, therefore solutions have the potential to address both causes.

The fundamental impacts of climate change that this plan seeks to address include:

- Water supply and security - Ensure the security of water supplies and the social equity issues related to the increased cost and availability of water
- Urban heat - manage the health and wellbeing risks associated with rising temperatures and urban heat retention
- Storm events - flood risk and property damage including erosion of private and public lands due to increased intensity and frequency of storms
- Rising sea levels – changes to the shape and ecology of Warringah's lagoons, increased influence on the water table including groundwater reserves

Legacy Issues

While seeking to manage these future impacts, we are still dealing with the consequences of past decision making. Contamination from earlier activities is an all too common issue, and it is often our lagoons and waterways that feel the worst effects. Inappropriate land filling practices, legal (and illegal) dumping of waste, contaminating land uses ranging from dry cleaners, heavy industry, petrol stations, automotive repair stations and chemical producers continue to impact on our local environment, and may even contaminate our groundwater.

Council is a large user of groundwater to irrigate our parks, ovals and reserves. Should our groundwater resources become either compromised due to contamination or unviable due to unavailability, there is a direct financial impact to supplement this supply with potable water. These costs are expected to increase substantially into the future when water availability becomes further strained during drought conditions, and as demand increases due to population growth. Council and the community must look to invest in alternative supply options to offset these ongoing costs and supply issues.

Moving Forward

In order to maintain our high quality of life into the future, it is essential that we embrace a 'Water Sensitive Warringah' mindset which maximises the integration of urban planning with the management, protection and conservation of our water resources. This will involve moving beyond the traditional water supply approach, and establishes diverse, safe and reliable water resources, incorporating effective stormwater and groundwater management, and protecting the unique waterways and lifestyle of Warringah.

“The vision and concepts of the Water Sensitive City are emerging directly in city-shaping policies”³



What is a Water Sensitive City?

Urban communities are a highly complex web of socio-physical systems that are continually evolving. The strength of any community is determined by its ability to balance the needs of the built, economic, social and natural environments. Effective water management is a foundation for each of these factors, and a key influence on the quality of life of the community.

The idea of a Water Sensitive City was first coined by the Australian Government's National Water Initiative and further refined by the Cooperative Research Centre (CRC) for Water Sensitive Cities as the framework to drive "liveability" through intelligent management of water. A Water Sensitive City connects the urban water cycle in ways that: provide water security through efficient use of diverse water resources; enhance and protect the health of watercourses and wetlands; mitigate flood risk and damage; reduce urban heat island effects and create public spaces that harvest, clean and recycle water.

The CRC for Water Sensitive Cities, of which Warringah Council is a foundation partner, explores the various water management states in which cities can exist (Figure 1). These states are directly influenced by drivers starting with basic rights of access to and security of water supply, expanding to public health and flood protection, and evolving to address intergenerational equity and resilience to climate change.

Technical solutions and community willpower are often the limiting factors in the transition to higher states. Significant commitment, research and investment from the community and all levels of government is required to overcome these challenges, in order to preserve and enhance our lifestyles and environment into the future.

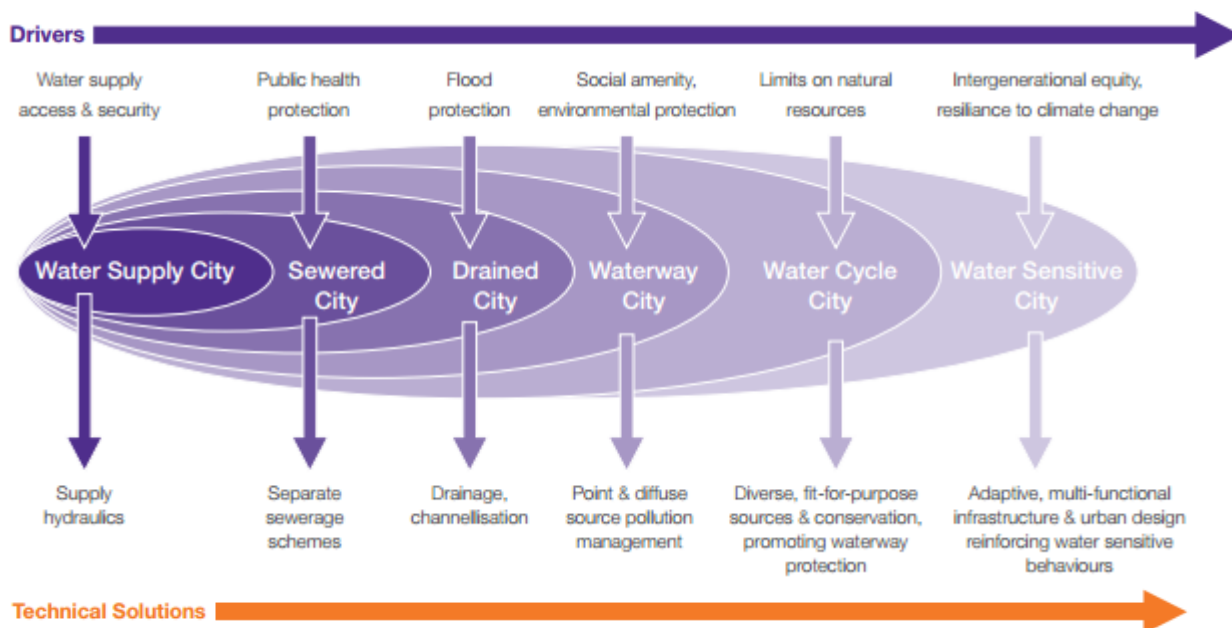


Figure 1: Relationship between city States and Societal Urban Water Needs (adapted from Brown et al, 2008⁴)

Three key principles set the foundations for this vision of a Water Sensitive City⁵:

Cities as Water Supply Catchments

- Infrastructure is a mix of centralised systems (potable mains water from outside the catchment), and decentralised and distributed systems (often referred to as Integrated Water Cycle Management). Water quality matches the intended water use; e.g., rainwater is used for flushing toilets, and stormwater for irrigating ovals etc.
- Water sources include rainwater, stormwater, wastewater, desalinated water, and groundwater.

Cities Providing Ecosystem Services

- The built environment functions to complement and support the function of the natural environment through Water Sensitive Urban Design.
- Stormwater is harvested, treated for use, and cleaned before entering waterways, e.g. by rain gardens and wetlands.
- Infrastructure is designed for more infiltration and evaporation, improving microclimates, helping reduce effects of local flooding, e.g. vegetated roofs and permeable paving.
- The movement, distribution, and quality of water are managed so it mimics the natural water cycle.
- Urban waterways are rehabilitated to support local biodiversity and influence microclimate.

Cities Comprising Water Sensitive Communities

- The community is actively involved in the decision making process and is self-motivated to undertake sustainable water actions.
- Citizens, businesses, community and government organisations promote and maintain an ecologically sustainable lifestyle.
- Water planners and managers of public and private land are skilled at managing urban water sustainably.
- Local, state and national government policies strengthen inter-government collaboration and public/private engagement.

The delivery mechanisms of a Water Sensitive City encompass both Integrated Water Cycle Management (IWCM) and Water Sensitive Urban Design (WSUD).

Integrated Water Cycle Management

IWCM refers to the collective management of all water sources in the urban environment including water supply, sewerage, groundwater and stormwater. This is a whole-of-lifecycle approach empowers government and the community to effectively manage valuable and sometimes scarce water resources.

Figure 2 shows the complex relationships and interactions of a range of alternative water sources available in the urban environment. Within the Sydney metropolitan area, the function of potable water supply and sewerage infrastructure is provided by Sydney Water, while waterways and groundwater are generally governed by the Office of Water. Warringah Council is not proposing to change these responsibilities, but seeks to facilitate future planning that enables long term water security and healthy ecosystems by supporting alternative water supply and management options.

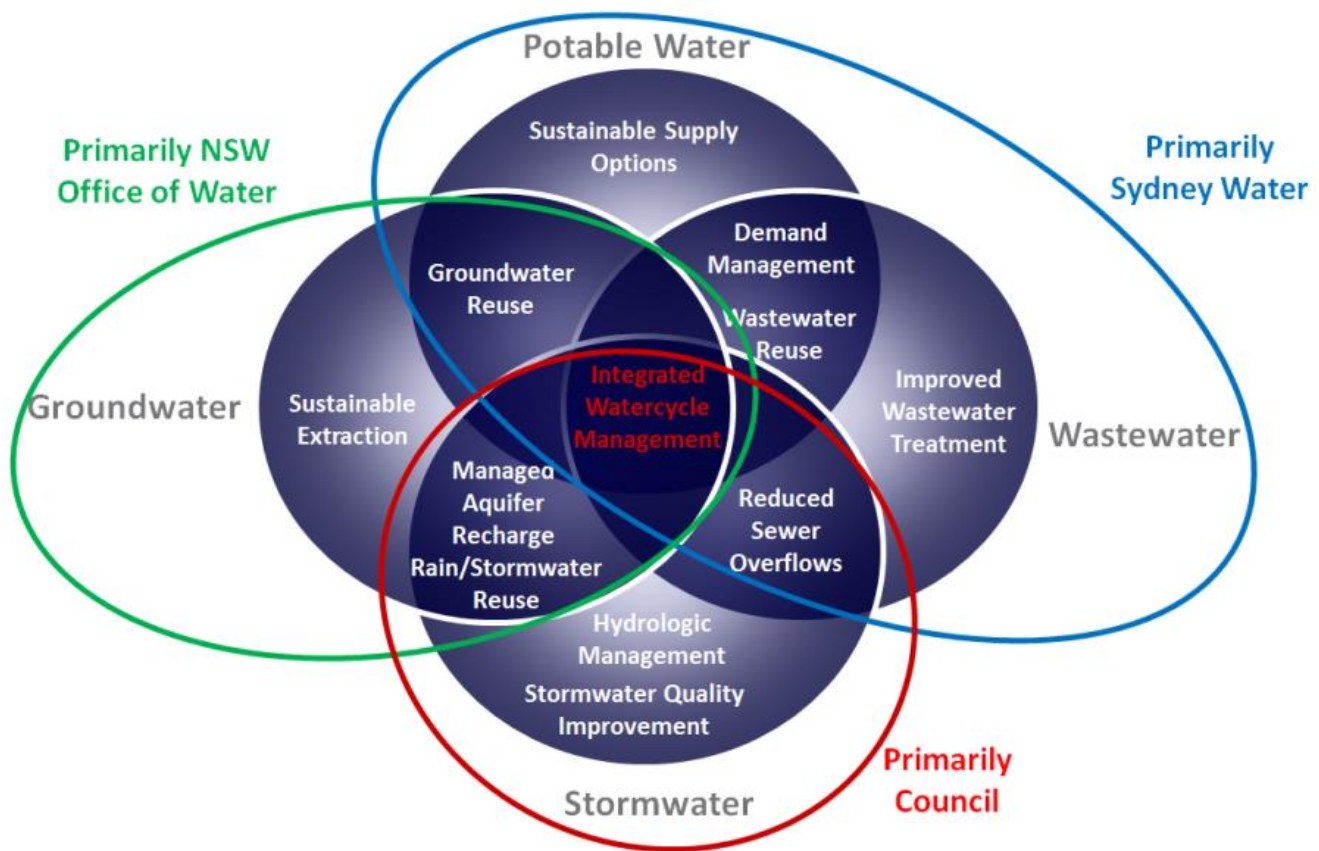


Figure 2: Integrated Water Cycle Management (adapted from Hoban & Wong, 2006⁶)

Water Sensitive Urban Design

WSUD is a holistic approach to the planning and design of urban development which aims to minimise the impacts on the natural water cycle and protect the health of aquatic ecosystems.

Water sensitive urban design provides a proven approach to ameliorate the impact of urbanisation on the water cycle, and is underpinned by the following principles:

- protecting and enhancing the natural aspects of Warringah's receiving environments
- treating urban stormwater to best practice standards for reuse and/or discharge to receiving waters
- reducing potable water demand through water efficiency, stormwater harvesting and wastewater reuse
- minimising wastewater generation and treating wastewater so it can be reused
- integrating vegetated stormwater treatment and harvesting systems into the landscape, so as to provide increased biodiversity, amenity and micro-climate benefits which can reduce the heat island effect, and
- providing green infrastructure and green links.⁷

Figure 3 represents how the urban environment has changed the landscape, atmosphere and hydrology, and how stormwater harvesting and water sensitive urban design can help restore a more natural and comfortable environment.

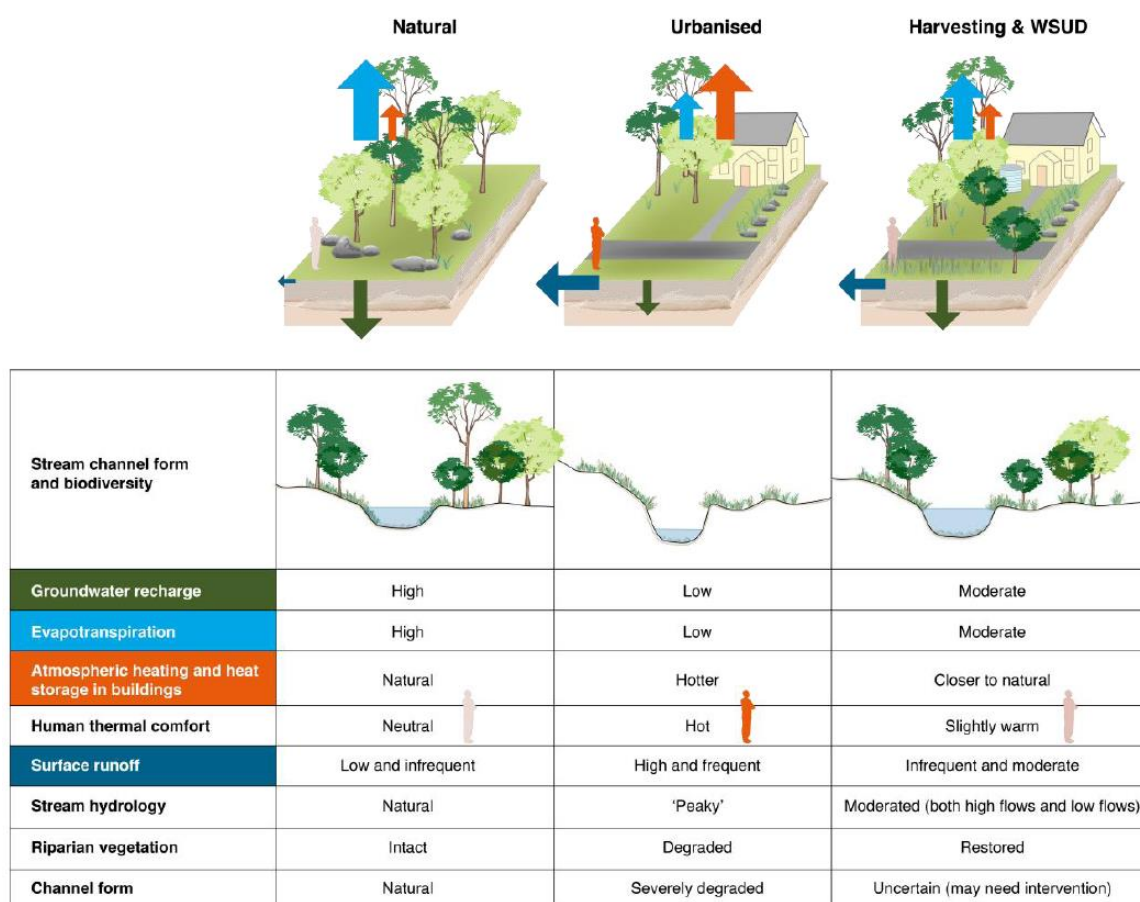


Figure 3: Urban impacts and the benefits of water management⁸.

The fundamental principle of water sensitive urban design is its integration with the urban environment. Figure 4 illustrates some easily implemented measures available within the urban environment to treat and reuse stormwater, which provide improved amenity and built urban form through functional landscapes – “liveable” communities.

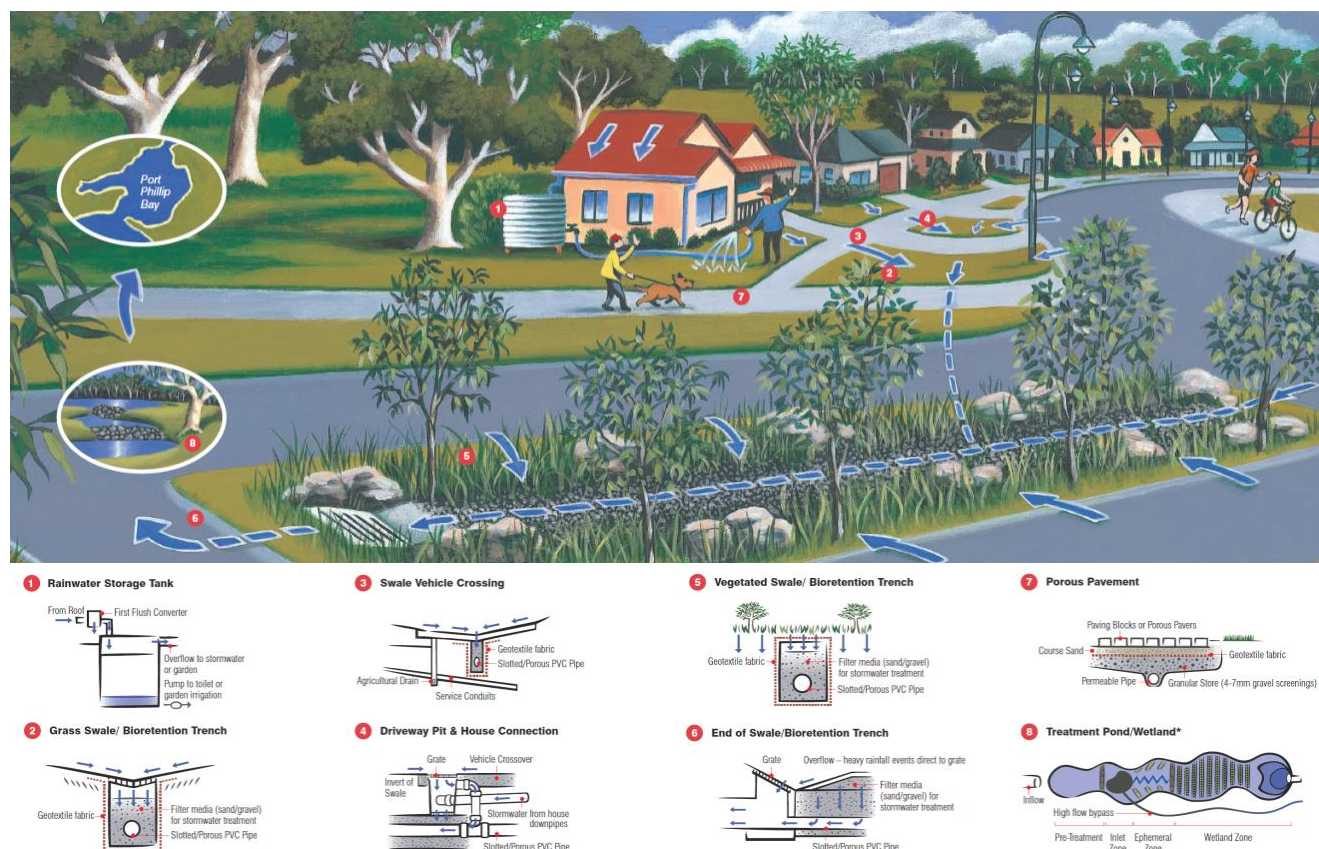


Figure 4: WSUD in the Urban Landscape (Source: [Melbourne Water](http://melbournewater.vic.gov.au))

Changes in the movement of water through the landscape and into the atmosphere underlie many of the impacts of urbanisation, and can be restored through stormwater harvesting to support ecosystem services”⁹



Pathway to a Water Sensitive Warringah

The delivery this vision must be underpinned by a water cycle aware community and organisation. This Plan is founded on developing a culture of ownership, knowledge, awareness, appreciation and innovation, while instilling a sense of responsibility within all levels of the organisation and community.

Figure 5 illustrates the how the Water Sensitive Warringah Strategic Plan is aligned with Council's guiding documents including the Warringah Community Strategic Plan, Environmental Sustainability Strategy, Asset Management Plans and Policies.



Figure 5: Relationship of this plan to Council's guiding governance structures

Community Strategic Plan 2023 – Our Vision

“A vibrant, caring community, thriving in a unique beach and bush environment, supporting a balance of lifestyle, business and recreation.”

Recognising and addressing strong community sentiments, the Community Strategic Plan 2023¹⁰ sets out the long term aspirations for Warringah and our residents. It reflects where we want to be in eight years, and is the key reference point for decision making during this period. The plan was prepared by Council on behalf of Warringah’s residents, business and land owners, Councillors and community groups, and with regard to State and Regional policy direction.

Key Community Outcomes relevant to the Water Sensitive Warringah Strategic Plan include:

A Healthy Environment:

- 3.1 We value the health of our beaches, foreshores and waterways as natural habitats and for our enjoyment
- 3.2 We protect and sustain our diverse bushland as valuable habitats, and provide for a variety of wildlife to thrive and migrate
- 3.3 We strive to live and work more sustainably to reduce our environmental footprint
- 3.4 We effectively plan for and respond to natural hazards and climate change in a sustainable way



Lifestyle and Recreation

- 2.2 We have access to attractive parks and natural areas that encourage and support a safe healthy lifestyle
- 2.3 We have inviting public spaces that are clean, green and well designed

A Vibrant Community

- 1.1 We have the services to promote and deliver health and wellbeing

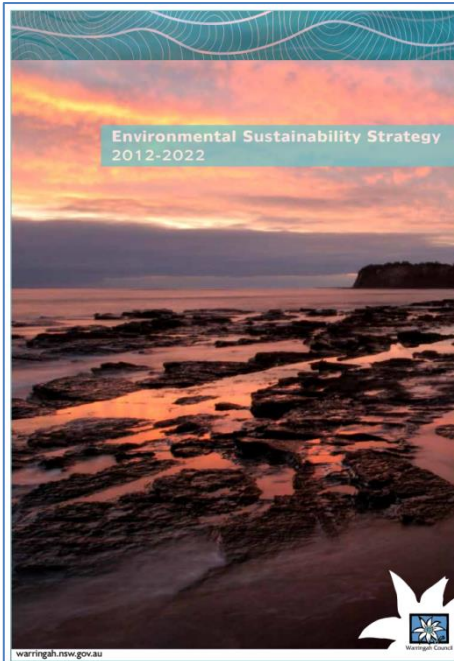




Liveable Neighbourhoods

- 5.1 We have attractive and functional urban and commercial centres that adapt to the needs of residents and business
- 5.3 We offer a variety of housing choices that meet the needs of our community and complements local neighbourhoods and the Warringah lifestyle

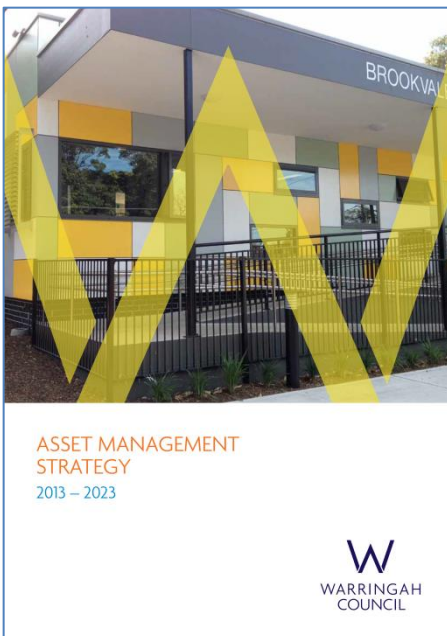
Environmental Sustainability Strategy



The intent of the Community Strategic Plan is further supported by Warringah's Environmental Sustainability Strategy¹¹, which sets a long-term direction for how best to balance growth with the environmental, economic and social values of the Warringah community. The Strategy aspires to "*maintain and enhance waterway function and maintain and enhance locally indigenous biodiversity*".

This Plan responds to the Environmental Sustainability Strategy by providing a clear pathway to realise the desired outcomes and aspirations.

Asset Management Strategy 2013 - 2023



The Warringah Asset Management Strategy articulates how Council will manage its assets now and into the future by providing objectives, actions for improvement, timeframes and responsibilities. This holistic approach to asset management provides greater certainty and limits Council's exposure to financial risk and asset failure by planning for the future.

The actions outlined in the Water Sensitive Warringah Strategic Plan will link into Asset Management Plans that are prepared for specific service areas including Roads, Parks and Reserves, Buildings, Stormwater and Natural Areas.



Implementation

The following actions have been identified in order to realise the objectives of the Strategic Plan to continue the transition to a Water Sensitive Warringah:

Policy and Governance

- Embed and improve sustainable water management outcomes into Council's planning controls.
- Establish planning controls that enable sustainable water management outcomes and innovation.
- Embed the responsibility of water management with all asset owners.
- Integrate the outcomes of this plan within the natural and stormwater asset management plans.

Community Engagement

- Run an incentives/outreach program for existing developments to increase the uptake of sustainable water actions.
- Utilise the Community-Based Education & Involvement (CBEI) framework in Council's environmental education initiatives.
- Involvement in Council's environmental education initiatives such as Hilltop to Headland and other Green Events and external initiatives such as World Water Day, World Wetlands Day etc.

- Provide technical assistance to residential and business sector to improve water management practices.
- Regularly undertake the Environmental Perception Survey to identify community sentiment towards water management themes.

Research and Partnerships

- Develop effective partnerships with education and research bodies to improve understanding of aquatic ecosystems and water cycle management.
- Apply and adapt research outcomes to ensure local context and applicability. Embed these findings within Council's core functions and guiding documents.
- Enhance understanding of aquatic biodiversity, birds, pest species and recreational usage of waterways and integrate ecological monitoring with other condition monitoring programs, such as water quality.
- Evaluate climate risks, adaptive capacity and mitigation opportunities for waterways.

Capacity Building

- Continue to support capacity building frameworks in order to create resilience and commitment within the organisation.
- Support learning of Council officers involved in the assessment, design, construction and maintenance of WSUD elements.
- Establish a mentoring program of Council design staff/project managers from concept design to detailed design of WSUD projects. This mentoring would involve consultants and other local government practitioners to ensure best management practices are being achieved.
- Provide training to Council staff in order to ensure adequacy of designs and compliance with Council's development controls.

Demand and Conservation Management

- Facilitate the implementation of water saving actions across Council.
- Investigate the feasibility of implementing a real-time water use monitoring system across Council's highest water using facilities.
- Embed the responsibility of water use with all asset owners.

Groundwater Management

- Improve Council's understanding of groundwater characterisation, and allow detection of impacts from groundwater use.
- Implement planning controls that aim to protect groundwater systems and improve surface water interactions.
- Seek opportunities to supplant groundwater usage with stormwater harvesting schemes, particularly at Council's open spaces.

Stormwater Management

- Ensure the feasibility of WSUD is considered in all Council's open space projects in accordance with the Warringah Design Guidelines.
- Ensure Council's development controls are periodically updated to reflect best practice management.
- Conduct periodic audits of stormwater quality devices to ensure assets are performing to standard.
- Seek opportunities to implement stormwater harvesting schemes, particularly at Council's open spaces.

Rainwater

- Run an incentives/outreach program for existing developments to increase the uptake of rainwater tanks.
- Educate existing rainwater users to ensure their systems are operating efficiently and effectively.
- Ensure rainwater tanks are considered for Council's building upgrades/replacement.
- Run an education program to inform the community on the multiple benefits of using rainwater.

Wastewater Management

- Investigate the feasibility of utilising alternative sources including wastewater through sewer mining activities.
- Support Council's Onsite Wastewater Strategy to ensure the management of wastewater systems on environmentally sensitive land.
- Support Sydney Water's Sewerfix Program to reduce sewer overflows in our catchments particularly during wet weather.



References

¹ Warringah Environmental Perception Survey, 2014

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⁹ Stormwater Management in a Water Sensitive City; Cities as Water Supply Catchments; March 2012, p37

¹⁰ Warringah Community Strategic Plan 2023. Available at <https://eservices1.warringah.nsw.gov.au/ePlanning/live/Public/XC.Community/Default.aspx>

¹¹ Warringah Environmental Sustainability Strategy (2012). Available at <http://www.warringah.nsw.gov.au/sites/default/files/documents/general-information/environmental-sustainability-strategy/environmentalsustainabilitystrategy2012.pdf>