



Wyndham City Council

Wyndham Integrated Water Cycle Management Plan: *Summary Report*

Version 01 / JANUARY 2017

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Document Control Sheet	
Project	M1002-001 Wyndham City Council IWM Plan
Report Title	Wyndham Integrated Water Cycle Management Plan: Summary Report
Version	01
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Approved by	
Signed	
Date	18/01/2017
File Location	
Distribution	January 2017

Revision	Date	Approved	Details of Revision



CONTENTS

CONTENTS	iv
1. Introduction	1
1.1 What is Integrated Water Cycle Management?	1
1.2 What is a Water Sensitive City?	2
2. What have we done to date?	3
3. Where are we now?.....	4
4. Where are we heading?	6
5. Where do we want to be?	8
6. What actions are required?	14
6.1 Roadmap 1: Create a resilient and liveable city	15
6.2 Roadmap 2: Improve the health and amenity of waterways and coastal environments	16
6.3 Roadmap 3: Improve collaboration and engagement with all stakeholders	17
7. Summary.....	18
8. References.....	19

1. Introduction

This Integrated Water Cycle Management (IWCM) Plan is a unifying document that clearly articulates Wyndham City Council's (WCC) vision and objectives for water management.

The IWCM Plan is also designed to bring departments across Council together to collaborate better on water related projects and also support stronger links between Council, community and external stakeholders.

The IWCM Plan is a high level document that sits above WCC's existing Stormwater Management Plan and Water Action Plan.

The concepts of integrated water cycle management and water sensitive cities are central to this plan. A brief introduction to these terms and their meaning in the context of Wyndham's IWCM Plan is provided below.

1.1 What is Integrated Water Cycle Management?

Integrated Water Cycle Management (IWCM) recognises the social, economic and environmental objectives of water in our communities and the shared responsibilities in delivering these objectives. IWCM relates land use planning and development to water in terms of not only potable and alternative water supplies, wastewater management, stormwater management, but also its impacts on receiving waters (surface waters and groundwater), community health and longevity.

A diverse group of stakeholders are involved in the delivery of IWCM outcomes beyond WCC; these stakeholders include the general community, community groups, water utilities and state government. A collaborative process has been adopted in the development of this IWCM Plan to ensure that key project stakeholders have been involved throughout.

1.2 What is a Water Sensitive City?

Water sensitive cities are resilient, liveable, productive and sustainable. They adopt holistic and integrated water cycle management practices to meet a city's water and liveability needs. A water sensitive city enhances the urban hydrological cycle by:

- providing water security for economic prosperity through efficient use of diverse water resources;
- improving and protecting the health of watercourses and wetlands;
- mitigating flood risk and damage; and
- creating public spaces that harvest, clean and recycle water.

Organisational and community values also play an important role in a water sensitive city by influencing urban design decisions and water management practices.

There are six distinct developmental states that cities move through on their path toward increased water sensitivity (Figure 1). Currently, Wyndham is characterised as a Waterways City where the environmental impacts of water are starting to be considered and receiving waterways receive some protection. With its large amount of recycled water use, Wyndham also has some elements of a Water Cycle City. However, more is needed to expand alternative water use and fully embrace sustainability. This IWCM Plan helps put in place a range of measures that will support Council as it continues to transition towards the Water Sensitive City state.

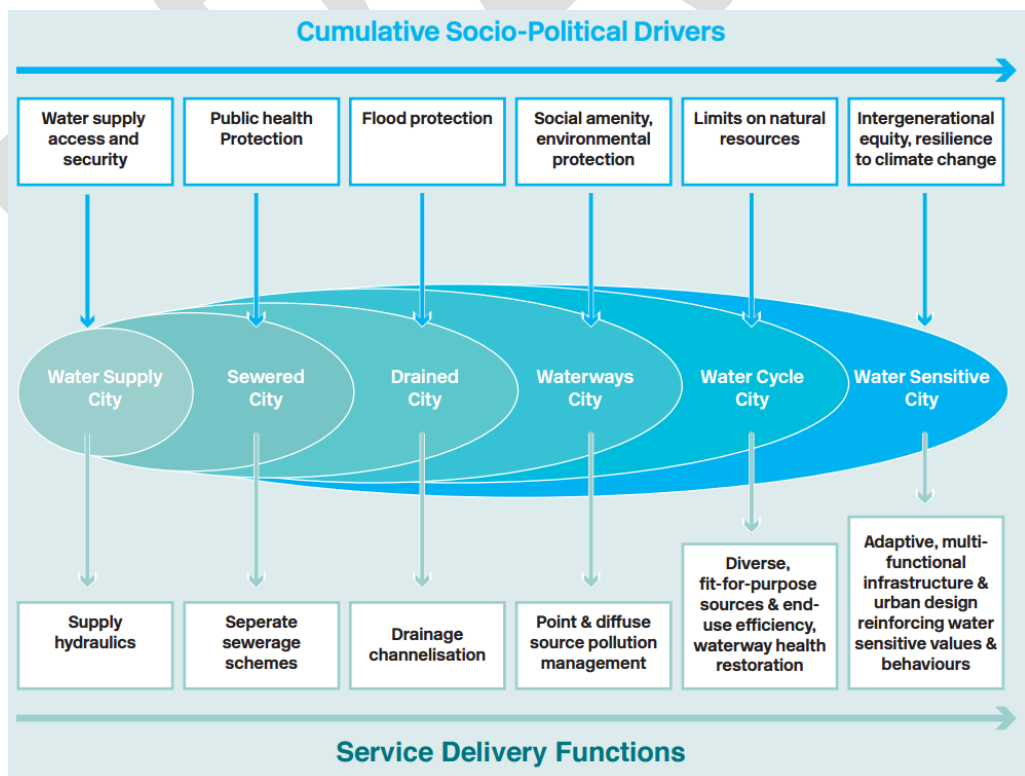


Figure 1 The Urban Water Transitions Framework (Brown, et al., 2009)

2. What have we done to date?

In recent years WCC has invested in a number of projects that directly or indirectly support integrated water cycle management outcomes. Notable initiatives and achievements are summarised in Table 1.

Table 1 WCC's IWCM initiatives and achievements

Topic	Outcomes
Strategy	<ul style="list-style-type: none"> Wyndham City Council Environment and Sustainability Strategy 2016-2040 Wyndham City Council's Waste and Litter Strategy 2016-2040 Wyndham's Stormwater Management Plan 2015 Water Action Plan 2015- 2020 Wyndham City Council's Onsite Wastewater Management Plan
Physical Assets	<ul style="list-style-type: none"> Over 80 WSUD assets constructed and / or maintained 20 sports reserves connected to the Class A recycled water network Stormwater harvesting and reuse system at Saltwater Promenade Sports Reserve 100KL of rainwater tank storage installed across 13 sites Keep Australia Beautiful National Association funding secured to install five public place recycling bins at Station Place in Werribee
Programs	<ul style="list-style-type: none"> Adoption of Planet Footprint Environmental Data Management Service Water audits undertaken in more than 30 buildings
Advocacy	<ul style="list-style-type: none"> Water for Victoria: Discussion Paper Submission Agricultural Competiveness: White Paper Submission
Stakeholder Engagement	<ul style="list-style-type: none"> More than 11,000 water efficient showerheads provided to Wyndham homes through the Showerhead Exchange Program in partnership with City West Water Greening the West projects: E.g. Thirty thousand trees for Wyndham and Greening the Pipeline: Williams Landing parkland development (underway) Funding secured to reduce the amount of fishing related litter along both the River and foreshore in partnership with Melbourne Water and the Werribee River Association
Investigations / Studies	<ul style="list-style-type: none"> Healthier Waterways Wyndham WSUD and GPT Review 2016 Health of the Werribee River Report 2015
Guidelines / Standards	<ul style="list-style-type: none"> Guidelines and Standards Manual for the preparation of Site Environmental Management Plans

3. Where are we now?

Wyndham's baseline water balance provides a snapshot of human and environmental water use and disposal across the municipality (see Figure 2 and Table 2 below). It also includes an estimate of stormwater pollutant loads across Wyndham and allows for a greater understanding of the municipalities complex water cycle. The water balance highlights the large import of potable water into Wyndham which is predominantly used for residential purposes. In terms of wastewater both residential and non-residential generate large volumes which are sent to the Western Treatment Plant. Recycled water use in the Werribee Irrigation District is high, there is also moderate use by Council and the non-residential sector. Substantial volumes of groundwater used in Wyndham, in comparison, river water use is low. Stormwater runoff is disproportionately high in Wyndham's urbanised catchments. This results in large pollutant loads entering local waterways and discharging to Port Phillip Bay.

Table 2 Wyndham's baseline water balance

			Volume in 2016 (ML/yr)
Water Use	Council	Potable	369
		Recycled Water	171
		Stormwater / Rainwater	1.0
	Residential	Potable	12,379
		Recycled Water	0
		Stormwater / Rainwater	unknown
	Non-residential	Potable	6,843
		Recycled Water	701
		Stormwater / Rainwater	unknown
		Groundwater	1,500
Werribee Irrigation District	River water	5	
	Recycled Water	4,000	
Total			25,968
Wastewater Generation	Council		130
	Residential		9,903
	Non-residential		6,789
	Total		16,822
Stormwater Runoff	Balliang Creek		813
	Cherry M.D.		2,229
	Kororoit Creek		270
	Laverton M.D.		5,461
	Little River (Lower)		7,940
	Lollypop Creek		10,115
	Skeleton Creek		10,663
	Werribee River (Lower)		19,181
Total			56,671

Baseline (2016)
WATER AND POLLUTANT BALANCE

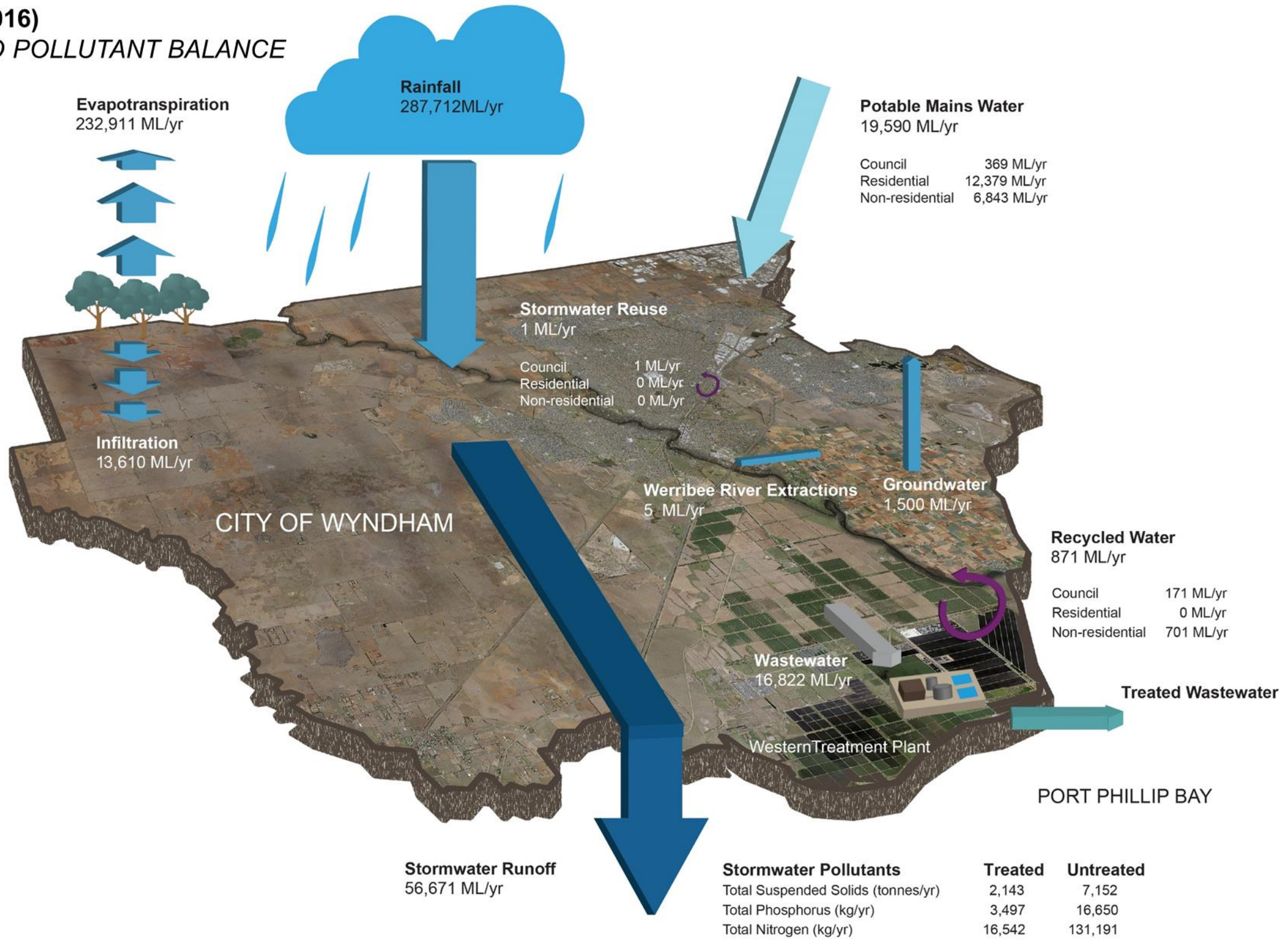


Figure 2 Wyndham's baseline water balance (year 2016)

4. Where are we heading?

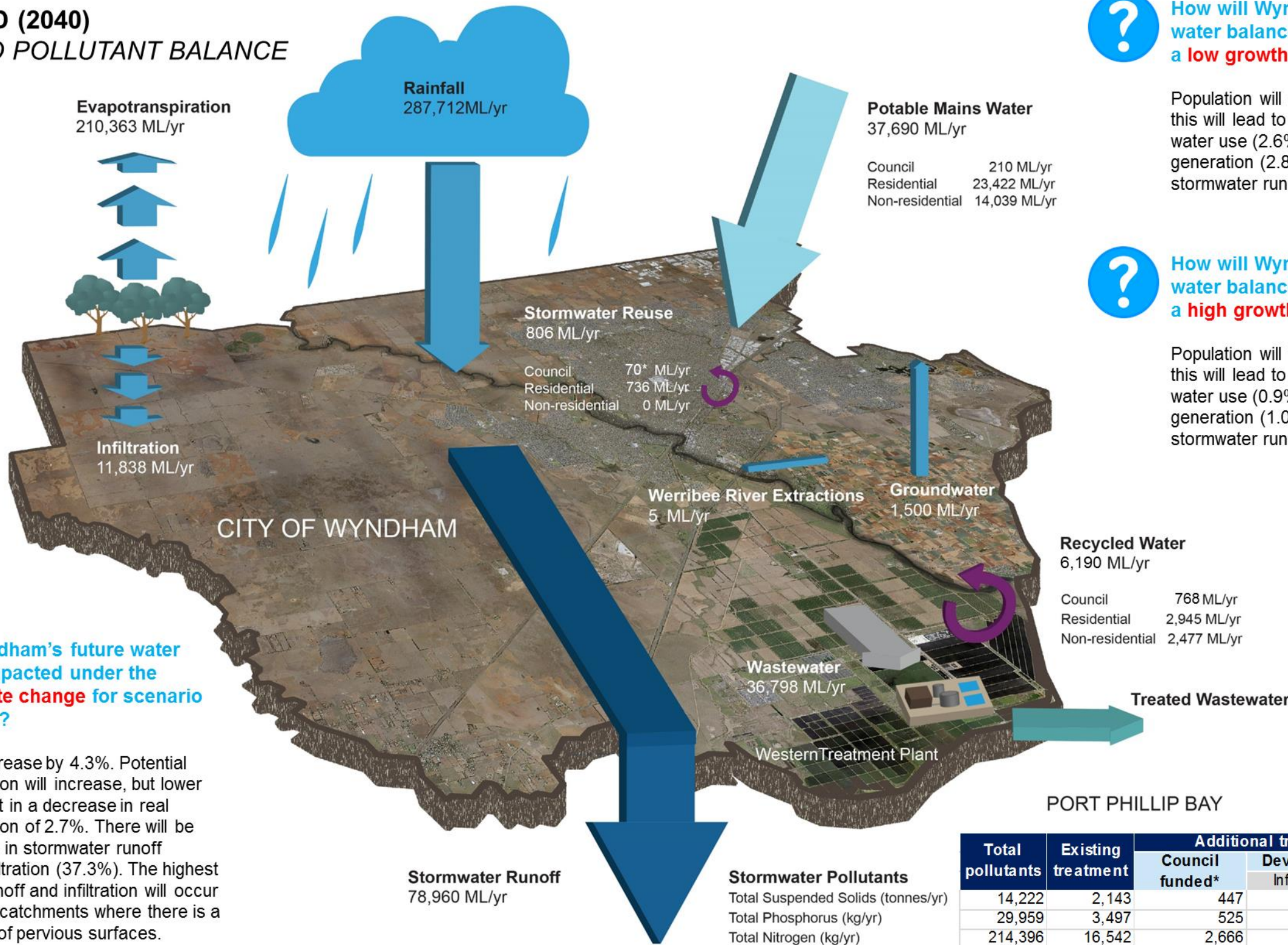
A projected water balance has been prepared for Wyndham based on expected conditions in 2040 (see Figure 3 and Table 3 below). The projected potable water use is set to almost double due to the large growth in the residential sector. Conversely, Council potable water use is expected to decrease as it sets out to meet ambitious targets for increased alternative water use. This will lead to a continued growth in recycled water use and a sharp rise in stormwater reuse. Growth in recycled water use is also expected to occur in the residential and non-residential sectors. Large scale development across Wyndham is expected to result in a large increase in impervious surface increases stormwater runoff and pollutants. These impacts will be felt mostly in the Laverton Main Drain, Lollypop Creek, Skeleton Creek and Werribee River (Lower) catchments.

Table 3 Wyndham's projected water balance

			Volume in 2040 (ML/yr)
Water Use	Council	Potable	210
		Recycled Water	768
		Stormwater / Rainwater	70
	Residential	Potable	23,422
		Recycled Water	2,945
		Stormwater / Rainwater	736
	Non-residential	Potable	14,039
		Recycled Water	2,477
		Stormwater / Rainwater	unknown
		Groundwater	1,500
Werribee Irrigation District	River water	5	
	Recycled Water	4,000	
Total			50,172
Wastewater Generation	Council		251
	Residential		21,682
	Non-residential		14,864
	Total		36,798
Stormwater Runoff	Balliang Creek		813
	Cherry M.D.		2,459
	Kororoit Creek		296
	Laverton M.D.		8,306
	Little River (Lower)		7,941
	Lollypop Creek		14,968
	Skeleton Creek		16,141
	Werribee River (Lower)		28,036
Total			78,960

* Substantial efforts were made to minimise the level of uncertainty in each water balance, however, a number of assumptions and approximations were required (particularly for the projected scenario) and the outputs should be interpreted in light of these simplifications.

PROJECTED (2040)
WATER AND POLLUTANT BALANCE



? How will Wyndham's future water balance be impacted by a **low growth scenario**?

Population will decrease by 2.8%, this will lead to a drop in potable water use (2.6%), wastewater generation (2.8%) and reduced stormwater runoff (1.5%).

? How will Wyndham's future water balance be impacted by a **high growth scenario**?

Population will increase by 1.0%, this will lead to a rise in potable water use (0.9%), wastewater generation (1.0%) and reduced stormwater runoff (0.5%).

? How will Wyndham's future water balance be impacted under the median **climate change** for scenario for the region?

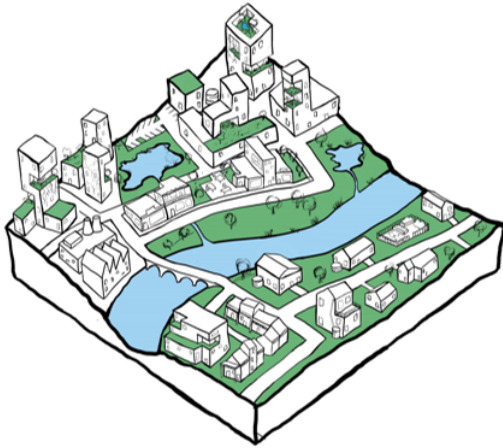
Rainfall will decrease by 4.3%. Potential evapotranspiration will increase, but lower rainfall will result in a decrease in real evapotranspiration of 2.7%. There will be large reductions in stormwater runoff (10.8%) and infiltration (37.3%). The highest reductions in runoff and infiltration will occur in undeveloped catchments where there is a high proportion of pervious surfaces.

Total pollutants	Existing treatment	Additional treatment		
		Council funded*	Developer funded Infill*	Greenfield
Total Suspended Solids (tonnes/yr)	2,143	447	8	3,601
Total Phosphorus (kg/yr)	3,497	525	46	4,039
Total Nitrogen (kg/yr)	16,542	2,666	670	27,931

*Based on performance scenario modelling. Council funded works based on Option B level of investment.

Figure 3 Wyndham's projected water balance (year 2040)

5. Where do we want to be?



Wyndham's 2040 Vision

Wyndham is celebrated as a water sensitive city with successful urban and rural environments where Council works collaboratively with its community and stakeholders to create healthy ecosystems and liveable communities.

Wyndham City Council's IWCM vision reflects the complex mix of environments found across the municipality and the community's desire to preserve the regions urban, rural and coastal feel.

A water sensitive Wyndham will deliver a raft of benefits to the community and environment, including:

- Fit-for-purpose water usage that preserves potable water and utilises the benefits of recycled water and treated stormwater.
- Cooler greener micro-climates that reduce temperatures during heatwaves
- Improved flood protection and response.
- Multi-functional open spaces that provide a treatment, flooding, amenity and space for play.
- Cleaner and healthier waterways delivered through improved stormwater treatment and community education programs.

Three key objectives for Wyndham have been identified to help deliver on Council's vision. Each objective is presented below in Table 4.

Table 4 Wyndham's IWCM objectives

OBJECTIVE 1	
Create a resilient and liveable city	WCC aims to deliver water services that are able to cope with expected future stressors, including drought, flood and climate change. This will be achieved by planning for change and designing adaptable and flexible infrastructure and urban places. Council also aims to provide the community with spaces that meet its growing and evolving needs (e.g. aesthetics, play, thermal comfort) as well as supporting positive environmental outcomes (e.g. fit-for-purpose water supply, increased biodiversity and decreased pollution).
OBJECTIVE 2	
Improve the health and amenity of waterways and coastal environments	WCC aims to address key ecological threats to local waterways and coastal environments whilst improving the social values of these natural assets. This requires protection of existing values (e.g. marine parks and wetlands) and expanded implementation of WSUD and stormwater harvesting to counteract the negative impacts of urban development. Restoration of riparian corridors is also needed to provide channel stabilisation, temperature control and habitat. Council will also continue to advocate for local water issues, including increased environmental flows for the Werribee River.
OBJECTIVE 3	
Improve collaboration and engagement with all stakeholders	WCC recognises the multi-disciplinary nature of IWCM requires collaboration and engagement with all stakeholders. WCC aims to give the community a greater voice in water management in Wyndham, improve inter-departmental collaboration within Council and engage with government and industry stakeholders. This renewed focus on improved engagement will help build awareness of IWCM, identify capacity needs and allow for the exploration and implementation of new opportunities.

The targets below indicate how Wyndham City Council will promote integrated water cycle management and achieve its vision of becoming a water sensitive city. Each target is categorised under one of Council's three IWM objectives and has been developed based on a consideration of:

- The water-related needs and desires of Council, community groups and external stakeholders as determined through consultation.
- Wyndham's water balance (baseline and projected) and performance scenario modelling that investigates how Council's investment, policy and staffing choices can drive change.
- Council's existing water-related skills and achievements to date.

OBJECTIVE 1: Create a resilient and liveable city		Timing	Reasoning
Target 1.1	Ensure that 100% of irrigated active open spaces are connected to an alternative water supply.	2020	Increased alternative water use and passive watering is feasible in Wyndham as: <ul style="list-style-type: none"> • The baseline water balance shows that Council has experience with recycled water and uptake has increased significantly in recent years. • Performance scenario modelling shows that with increased investment Council can harvest an additional 70 ML/yr of stormwater for irrigation by 2040. • The recycled water network in Wyndham will expand with development and there are also plans for local and regional stormwater harvesting (e.g. Blackforest Road). • Increased alternative water use is required for Wyndham to meet its existing targets (see Environment and Sustainability Strategy 2016 - 2040 and Water Action Plan 2015-2020).
Target 1.2	Invest in Council projects that supply 70 ML/yr of treated stormwater by 2040. This is equivalent to treated stormwater to ~19ha of active open space and 7ha of passive open space.	2040	
Target 1.3	Ensure that 100% of new or replacement trees planted are either (a) passively irrigated or (b) actively irrigated from alternative water sources.	2020	
Target 1.4	Lead the community to achieve an average water consumption of ≤155 litres per person per day (equivalent to 56.6 kL/yr/person).	2020	This is a target that is well understood by Melbourne's community. It was introduced during the millennium drought and recently re-instigated by the state government. In Wyndham,

			potable water use is currently close to 160 litres per person per day, so this represents a small decrease but given recent decreases, a reasonable one.
Target 1.5	Ensure that a minimum of 300 rainwater tanks for rainwater reuse for rainwater reuse are installed every year as part of infill residential developments in existing areas.	2020	Performance scenario modelling indicates that increased uptake of rainwater tanks for rainwater reuse in infill developments (estimated at 442 per year) can help the community save ~12.7 ML/yr. This equates to a potable water saving of 50 ML/yr by 2020 and over 300 ML/yr by 2040. A target of 300 rainwater tanks for rainwater reuse has been adopted as Council doesn't currently have a record of residential tanks and therefore cannot be certain how many tanks will be installed. This target should be reviewed once the register has been set-up and running for 1-2 years. This target will also help Wyndham's community meet Target 1.4.
Target 1.6	Council to support non-residential customers to source ≥15% of their total water use from alternative supplies.	2020	In recent years recycled water use in the non-residential sector has risen from 3% to 9% of total non-residential usage. This is assumed to grow to 15% by 2040 as City West Water and WCC continue to support, and advocate for, increased alternative water use.
OBJECTIVE 2: Improve the health and amenity of waterways and coastal environments		Timing	Reasoning
Target 2.1	Invest in Council projects that reduce the annual nitrogen load discharged from existing urban areas by an additional 2,691 kg/yr. This is equivalent to constructing 2 wetlands and 1 biofilter treating a 10 ha residential catchments each.	2020	Wyndham's baseline water balance shows that existing WSUD assets in Wyndham remove ~ 16,500 kg/yr of nitrogen. This target requires investment in new WSUD projects that remove an additional 2,691 kg/yr by 2040. Performance scenario modelling indicates that this is feasible if Council invest in a mixture of stormwater treatment, litter reduction and stormwater reuse infrastructure. The target of 2,691 kg/yr by 2040 is based

			on the 'Option B' level of investment, i.e. \$200,000 in 2016, increasing at \$100,000 per annum to a maximum of \$1,000,000. The target is set in terms of nitrogen for ease of tracking and reporting. By investing in projects that treat nitrogen Council will also be achieving reductions in flow, litter, suspended solids and phosphorus.
Target 2.2	Record 100% of WSUD assets on Council's asset management system.	2020	Deemed achievable and required to accurately track asset ownership, condition and performance.
Target 2.3	Ensure 100% of new water related capital works have allocated maintenance budget.	2020	Deemed achievable and required to ensure other targets are met and water infrastructure is operating as designed.
Target 2.4	Ensure 100% of existing WSUD assets are rectified and have sufficient maintenance budgets.	2020	Identified as required in the Healthier Waterways Wyndham WSUD and GPT Review 2016.
Target 2.5	Ensure that 100% of domestic wastewater generated is treated and contained within property boundaries or properties are serviced by sewer infrastructure.	2040	Deemed required due to the age and number of septic systems in operation in Wyndham City Council as identified in the Onsite Wastewater Management Plan.
Target 2.6	Install 40 new Gross Pollutant Traps (GPTs) or equivalent	2040	Performance modelling shows that by increasing the number of GPTs Council can reduce litter by 3.7 tonnes/yr in 2020 and 43.8 tonnes/yr in 2040 (see Table 37, Attachment 3).
OBJECTIVE 3: Improve collaboration and engagement with all stakeholders		Timing	Reasoning
Target 3.1	Hold a minimum of four Water Sensitive Wyndham Interdepartmental Working Group meetings per year.	2017-2040	Consultation with Council staff, including workshops and interviews, indicated that improved communication and stronger collaboration is required to deliver integrated water management solutions.
Target 3.2	Hold a minimum of four community consultation, engagement and education events each year with water issues as a focus or key component. Sub-targets: Directly invite the following groups to at one or more of	2017-2040	Workshops with Council staff and Wyndham's community groups highlighted the need for increased collaboration between Council and the community. For Wyndham to transition to a water sensitive city its community

	<p>these events:</p> <ul style="list-style-type: none"> a) Aboriginal community groups, b) Culturally and Linguistically Diverse (CALD) community groups c) Young people (e.g. school groups), d) Water-related community groups and State Government organisations (to the same event). 		<p>needs to be treated as a partner in decision-making, and their meaningful involvement and empowerment should be actively pursued (CRCWSC, 2017).</p>
Target 3.3	<p>Identify at least one structural (e.g. wetland or alternative water supply) or non-structural (e.g. guidelines, policy, engagement) project to work on in collaboration with neighbouring councils and/or State Government water-related organisations each year.</p>	2017-2040	<p>By taking this step Council will be formalising and further developing its existing collaboration with external stakeholders.</p>
Target 3.4	<p>Provide a minimum of one workshop per year for each department involved in water management projects.</p>	2017-2040	<p>Council interviews indicated that training in specific areas is required (e.g. WSUD audits and maintenance) and continued training is essential for staff development.</p>

6. What actions are required?

A set of roadmaps have been prepared to help Council achieve its IWCM objectives and targets. Each roadmap contains a list of short term actions (i.e. achievable over the next five years). Responsibility for coordinating the delivery of these actions rests with the Environment and Water department under the City Economy Innovation & Liveability directorate. However, a coordinated effort across multiple departments and directorates will be required to deliver on many of the targets and actions that have been identified.

Each action suggested in the road maps is accompanied by information that will support its implementation. This includes an assessment of the timing, priority, responsible directorates and departments as well as links with related targets.

6.1 Roadmap 1: Create a resilient and liveable city

No.	Actions	What it entails	Considerations	Timing	Priority	Responsibility	Related target(s)
1.1	Create a Stormwater Harvesting Master plan	<ul style="list-style-type: none"> - Review recycled water network and identify potential locations for stormwater harvesting for Open public spaces - Engage stakeholders in the creation of the master plan - Agree with stakeholders on how to manage alternative water supply assets - Agree on what should be irrigated and how to prioritise irrigation for all types of open space; - Consider Climate Change effect on the master plan 	<ul style="list-style-type: none"> - Performance scenario modelling shows that with increased investment Council can harvest an additional 70 ML/yr of stormwater for irrigation by 2040. To meet this aim, Council will need to invest each year in enough projects to supply 6 ML/yr of stormwater. This is equivalent to irrigation 1 to 2 sports ovals. - Stormwater reuse projects will also help WCC meet its nitrogen reduction target (see Action 1.2). - Work with City West Water and Melbourne Water to implement alternative Water supply strategies for Wyndham. 	2020	High	- Coast and Water , Assets Management, Engineering Design, Engineering Construction, Facilities and Open Space, and Vibrant City Centres Departments, Water Sensitive Wyndham Interdepartmental Working Group, and the Project Evaluation Panel	1.1, 1.2, 1.3, 1.6, 3.3
1.2	Create a WSUD Masterplan for existing urban areas	<ul style="list-style-type: none"> - Identify and prioritise existing catchments in Wyndham which require WSUD treatment - Perform MUSIC modelling for the high priority catchments - Prepare concept designs of WSUD treatments to meet best practice pollutant reduction targets - Prioritise WSUD treatments within these areas according to a set criteria defined by stakeholders - Link this plan with the Capital Works Program and find opportunities within upcoming projects - Consider Climate Change effect on the master plan - Use the Integrated Water Cycle Management Assessment and Tracking tools to develop and monitor this Masterplan. 	<ul style="list-style-type: none"> - WCC is targeting a nitrogen reduction of 2,691 kg/yr by 2040. To meet this target WCC will need to invest <u>each year</u> in new stormwater treatment and reuse project that provide an additional 110 kg/yr. - The WSUD Masterplan should create a clear action plan that outlines how Council can meet its 2040 nitrogen reduction target. - The action plan should consider the costs and benefits of each project and include a budget for Council expenditure (a 5 to 10 year timeframe is suggested). 	2020	High	- Coast and Water , Assets Management, Engineering Design, Engineering Construction, Facilities and Open Space, and Vibrant City Centres Departments, Water Sensitive Wyndham Interdepartmental Working Group, and the Project Evaluation Panel	2.1, 3.3
1.3	Improve climate change risk management in regards to water assets and flooding	<ul style="list-style-type: none"> - Monitor total annual budget expenditure on water use and trends over time; - Monitor total annual budget expenditure on drainage management and trends over time; - Evaluate funding, resource needs and workforce following a flood emergency and how this might change in future; - Work with MW and other Councils to model the impacts of climate change on the stormwater system and implement improvements; 	<ul style="list-style-type: none"> - Need to separate ongoing water use from new sports fields being established (1 year high use) - Stormwater model needs to consider future scenarios specific to WCC rainfall and look at both drought and high intensity events. 	2020	High	Coast and Water, and Sustainability teams	-
1.4	Prepare and implement a City Forrest and Habitat Strategy	<ul style="list-style-type: none"> - Improve urban public realm canopy cover - Standardised selection & management of tree assets suitable for Wyndham's climate and climate change - Defined tree planting program - Improve urban and rural habitat connectivity, resilience and health - Planning controls and a tree register to protect trees/habitat - Community engagement on urban forestry and valuing natural habitats - Use WSUD and other techniques to increase water availability for tree growth. 	<ul style="list-style-type: none"> - Increase vegetation coverage - Identifying existing canopy coverage and significant habitat - Consolidate learning from previous projects (Greening the west - use of tree pits) - Keep a register of existing trees and lifespan in Wyndham - Identify opportunities near urban heat islands 	2020	High	Environment team	1.3
1.5	Lead a campaign to reduce water demand in Wyndham's residential and non-residential areas and increase alternative water supply	<ul style="list-style-type: none"> - Track and keep a record of annual residential and non-residential water use in liaison with City West Water. - Lead by example through reducing Council water consumption and showcasing the reduction in Council's water consumption to public (use of social media) - Increase focus on water saving through running workshop as part of the Green Living Series to promote water efficient fixtures and products for households and businesses. - Provide incentives for residents and businesses to use rainwater tanks for rainwater reuse. - Introduction of ESD policy into the planning scheme. 	<ul style="list-style-type: none"> - ESD policy will aim to introduce ESD standard for new non-Council buildings. - Performance scenario modelling indicates that increased uptake of rainwater tanks for rainwater reuse in infill developments (estimated at 442 per year) can help the community save ~12.7 ML/yr. This equates to a potable water saving of 50 ML/yr by 2020 and over 300 ML/yr by 2040. 	2020	Medium	Coast and Water, and Sustainability teams (WCC)	1.4, 1.5, 1.6, 3.3
1.6	Advocate towards sustainable agriculture	<ul style="list-style-type: none"> - Council to keep being updated on what's happening in Werribee South through organising yearly catch up with Southern Rural Water. - Work with Southern Rural Water on managing runoff from rural areas & treating it before discharge to waterways or the coastline - Advocate for the provision of training to Werribee farmers on the efficient use of water. - Work with SRW to advocate for funding to complete the upgrade of all water supply infrastructure to the district to improve water efficiency - Advocate for the long term economic and environmental benefits of existing agricultural be considered in detail prior to any rezoning of the Werribee South Irrigation District. These results should be compared with the long term economic and environmental benefits of any alternatively zoned land. 	<ul style="list-style-type: none"> - n/a 	2040	Low	Environment and Water department (WCC) and Southern Rural Water	-
1.7	Initiate a process for registering rainwater tanks in residential developments.	<ul style="list-style-type: none"> - Start recording new rainwater tanks for new developments; - Create a voluntary register for residents to register existing rainwater tanks; - Share register between various departments; 	<ul style="list-style-type: none"> - Performance scenario modelling indicates that increased uptake of rainwater tanks for rainwater reuse in infill developments (estimated at 442 per year) can help the community save ~12.7 ML/yr. This equates to a potable water saving of 50 ML/yr by 2020 and over 300 ML/yr by 2040. 	2040	Low	Coast and Water, Town Planning, Environment and Health Services, Building Services teams	1.4, 1.5

6.2 Roadmap 2: Improve the health and amenity of waterways and coastal environments

No.	Actions	What it entails	Considerations	Timing	Priority	Responsibility	Related target(s)
2.1	Form a Coast and Water Management team	<ul style="list-style-type: none"> - Form a Coast and water management team with an assigned coordinator, water engineers, water technical officer and a coastal planner. - Nominate an officer responsible for the coordination of this IWCM Plan. 	<ul style="list-style-type: none"> - This will support the delivery of many of the targets and actions identified in this IWCM Plan. 	2020	High	Environment and Water department	-
2.2	Hire a Compliance Officer	<ul style="list-style-type: none"> - A proactive and experienced compliance officer is required to monitor construction sites, particularly prior to heavy rainfall, and consistently enforce Council's requirements to significantly reduce sediment loads discharged to receiving environments. Benefits of a compliance officer would include significant reduction in sediment loads from construction sites and potential mitigation of rectification works for streams and WSUD assets impacted by sediment. 	<ul style="list-style-type: none"> - The focus of this role is on major new developments. - Consider to applying for a grant from Melbourne Water to employ this officer. - Instead of funding a new position Council could train existing construction supervisors to consider sediment control during construction. 	2020	High	Environment and Water department	-
2.3	Increase Council initiatives in fighting litter	<ul style="list-style-type: none"> - By 2020 identify and monitor five Litter Hotspot locations near waterways and implement an educational program highlighting the impacts of litter in and around these local waterways. The program will include litter audits, signage, social media campaign, raising awareness on GPT functions, review of bin infrastructure & clean up events. - Identify the source of litter found in/around highly utilised or worst performing GPTs and target education relevant to those locations - Develop a plan and budget to retrofit old side entry pits into the more effective grated side entry pits and install new GPTs. 	<ul style="list-style-type: none"> - Target for waterways and beaches to be free from litter by 2040 as per the Waste & Litter Strategy 2016-2040 	2020	High	Waste Strategy and Coast and Water teams	-
2.4	Incorporate Integrated Water Cycle Management Objectives in Capital Projects	<ul style="list-style-type: none"> - Incorporate the plan for retrofitting side entry pits with grated pits and installing new GPTs into the Capital Works Program. In the interim impose for all new infrastructure rehabilitation capital projects to retrofit all existing old pits with new grated pits. - Review all Landscape Capital Projects and incorporate passive watering features. . - Integrate WSUD and Stormwater Harvesting Masterplan into Capital Works Program. - Develop a standard for WSUD features in different classes of capital works projects. Incorporate WSUD features in all new Capital Projects as per the standard; - Use the Integrated Water Cycle Management Assessment Tool, to assess the feasibility of treating and reusing water for different type of capital projects. 	<ul style="list-style-type: none"> - Integrating IWCM into new capital projects is an essential step in helping WCC meet its targets to: <ul style="list-style-type: none"> - Increase stormwater reuse to 70 ML/yr by 2040. - Reduce nitrogen by 2,691 kg/yr by 2040. - Waterways and beaches to be free from litter by 2040 as per the Waste & Litter Strategy 2016-2040 	2020	High	Coast and Water, Assets Management, Engineering Design, Engineering Construction, Facilities and Open Space , and Vibrant City Centres Departments , Water Sensitive Wyndham Interdepartmental Working Group, and the Capital Project Evaluation Panel	2.1, 2.3
2.5	Improve developments and subdivision approval process	<ul style="list-style-type: none"> - Produce standard drawings for stormwater harvesting and treatment systems. - Consider the developments of a stormwater quality contribution scheme. In the interim request stormwater treatment and/or reuse for all developments or payment into Melbourne Water's contribution scheme. - Advocate for increased recycled water use and/or stormwater harvesting for all new residential infill developments and subdivisions. Establish rainwater tanks with reuse as the 'deemed to comply' method of meeting Clause 56 requirements (VPP). 	<ul style="list-style-type: none"> - Performance scenario modelling shows that uptake of rainwater tanks for rainwater reuse in infill developments (estimated at 442 per year) can save ~12.7 ML/yr and reduce nitrogen by 28 kg/yr. In terms of potable water, this equates to a saving of 50 ML/yr by 2020 and over 300 ML/yr by 2040. In terms of nitrogen, this equates to a reduction of 110 kg/yr by 2020 and over 650 ML/yr by 2040. 	2020	High	Water and Coast and Town Planning teams	-
2.6	Ensure WSUD Assets Record Keeping	<ul style="list-style-type: none"> - Finalisation of the Asset Corporate Register to include WSUD assets. In the interim consolidate WSUD assets for existing and new developments on GIS and in a register. 	<ul style="list-style-type: none"> - n/a 	2020	High	Assets and Roads and Coast and Water teams	2.2, 2.3, 2.4
2.7	Review internal processes in WSUD assets approval	<ul style="list-style-type: none"> - Work with Melbourne Water to establish Council's approval process for the design of WSUD assets and determine any hold points and any requirements from the developers. (Requirements can be for the developer to show Melbourne water's assets in the landscape and engineering design plans.) - Review Council's construction approval process of WSUD assets and specify hold points. - Establish a handover process for the WSUD assets from the Open Space to the Maintenance team, and specify requirements from developers such as ensuring they provide a maintenance schedule 	<ul style="list-style-type: none"> - Review Planning referral standard conditions in line of this process - Design the process to be compatible with Council's asset management system. - Ensure planning for IWCM assets provides for adequate space for maintenance access and sediment drying areas. - Enable maintenance crews to provide early input into design and planning - Create strict protocols for handover to avoid taking on liability 	2020	High	Design Engineering, Engineering Construction, Asset Management, Water and Coast, Subdivisions Urban Design and Engineering Development teams	2.2, 2.4
2.8	Push for the development of a Sewer Management Plan	<ul style="list-style-type: none"> - Advocate for an updated sewer backlog program to be developed by the water authority which includes Wyndham City Council as part of a Sewer Management Plan as identified in the State environmental protection policy (Waters of Victoria). 	<ul style="list-style-type: none"> - City West Water is the key stakeholder. - Refer to the Onsite Wastewater Management Plan 	2020	High	Environment and Health Services team	2.5
2.9	Improve WSUD Inspection Process	<ul style="list-style-type: none"> - Provide training for approval personnel on WSUD functions to improve inspection Process. And continue to provide training for maintenance staff on how WSUD assets operate. - Provide an inspection guideline for Council construction and maintenance staff. - Introduce a test for WSUD assets before handover to Council occurs to verify system functionality and performance (including wet weather check). 	<ul style="list-style-type: none"> - Improve sediment management during construction phase. Focus on preventing sediment damage to WSUD assets (e.g. sacrificial layer in bio-retention) 	2040	Medium	Engineering Construction, Asset Management, Water and Coast, Roads and Parks teams and Facilities and Assets and Roads and Open Space Departments	-
2.10	Complete and implement the review of WSUD assets in Wyndham	<ul style="list-style-type: none"> - Complete the review of the condition of all existing WSUD assets (including bio-retention Systems). Commit to and provide funding for the annual maintenance and rectification works for all WSUD assets as per the Healthier Waterways Wyndham WSUD and GPT Review 2016. 	<ul style="list-style-type: none"> - This is essential to meet Target 2.4: Ensure 100% of existing WSUD assets are rectified and have sufficient maintenance budgets. 	2020	Medium	Environment and Water, Assets and Roads , Vibrant City Centres, and Open Space departments (WCC)	2.4

6.3 Roadmap 3: Improve collaboration and engagement with all stakeholders

No.	Actions	What it entails	Considerations	Timing	Priority	Responsibility	Related target(s)
3.1	Establish an Interdepartmental Working Group	<ul style="list-style-type: none"> - Establish a Water Sensitive Wyndham interdepartmental working group (with representatives from different departments) to assist with implementation, evaluation and reporting of the IWCM Plan with input from community engagement initiatives. - Working group to report annually to Council and be responsible for forward planning and strategic oversight of integrated design approaches. 	- n/a	2017-2040	High	Environment and Water, Assets and Roads, Town Planning, Urban Futures, Planning and Building, Assets and Roads, and Open Space departments (WCC).	3.1, 3.3
3.2	Develop an IWCM Engagement Plan	<ul style="list-style-type: none"> - Audit existing consultation programs to assess their effectiveness and identify where IWCM engagement can be included. - Assess equity in engagement and aim to achieve a broad reach Consider current engagement with CALD (cultural and linguistic diversity) communities and a mixture of other key groups within the community. - Create a register of interested community groups / individuals. - Present progress of the IWCM to these groups on a yearly basis, through social media, emails, workshops, activities and/or consultations in some of the actions coming out of this plan. - Organise workshops through the Green Living Series on Council's practises in water management. Open the invitation to general public and reach out for Aboriginal communities 	- n/a	2017-2040	High	Water and Coast team (WCC)	3.2
3.3	Share indigenous knowledge on water and integrate this knowledge into Council projects	<ul style="list-style-type: none"> - Explore opportunities for sharing indigenous knowledge on water management. - For projects near waterways, work with Indigenous groups to incorporate cultural learning through designing signage and art, re-establishing indigenous vegetation and participating in the landscape design. - Identify opportunities to work with Indigenous communities on the rehabilitation of creeks and river beds. 	<ul style="list-style-type: none"> - Use the Reconciliation Action Plan to commit the right departments to adopt these actions - Approach Aboriginal Victoria and other Aboriginal Organisations involved in water management to run workshops for Council staff. 	2017-2040	High	Community Planning and Development, and Coast and Water team	3.2
3.4	Advocate for the development and future implementation of external strategies that aim to protect and improve Wyndham's water resources and waterways.	<ul style="list-style-type: none"> - Submission to Melbourne Water and DELWP demonstrating how water benefits the community with the aim of securing increased environmental water in the Werribee River. - Advocate to Melbourne Water and DELWP for increased flows and improved water quality in the Werribee River as part of the Werribee CBD redevelopment project. - Contribution to the State Government's review of its Regional Waterway Strategy for the Port Phillip and Western Port catchment and the future large scale, long term project for the Werribee River as one of the 36 priority waterways in the State Water Plan Strategy (Water for Victoria Discussion Paper). - Improve knowledge of the water quality along the entire length of the Werribee River with the goal of better targeting improvement works and advocacy to relevant authorities (including for the catchment outside of Wyndham). - Maintaining an awareness of water security needs for the Werribee Irrigation District and environmental water needs in the Werribee River. 	- Those actions are supported by the community through the Wyndham 2040 Vision	2017-2040	High	Environment and Water department (WCC)	3.3
3.5	Identify areas requiring Cultural Heritage Management Plans (CHMPs).	<ul style="list-style-type: none"> - Assess Wyndham's waterways in their entirety to identify and understand areas of high Aboriginal cultural heritage value and work closely with Aboriginal Cultural Heritage Groups to consolidate heritage listed sites on Council's GIS system where appropriate. 	<ul style="list-style-type: none"> - Leverage off existing Melbourne Water investigations - Liaise with Aboriginal Victoria 	2020	Medium	Environment and Water, and Assets and Roads department	3.2
3.6	Organise meeting with neighbouring Councils and Water Authorities	<ul style="list-style-type: none"> - Initiate a collaborative group with other councils and water authorities to develop, share and improve water management strategies across the region. - Work with adjoining councils to manage catchments as a whole (e.g. City of Greater Geelong on improving outcomes for the Little River catchment and Western Water for the upper Werribee Catchment) and consider regional water management and open space opportunities (e.g. declaration of Werribee River as a linear park). 	<ul style="list-style-type: none"> - Utilise the quarterly meetings between Council, City West Water, and Melbourne Water to discuss outcomes from the internal Water Sensitive Wyndham Interdepartmental Working Group and identify potential pilot projects. - Explore potential opportunities for Managed Aquifer Storage (e.g. Blackforest Road). 	2017-2040	Medium	Water and Coast team (WCC)	3.3

7. Summary

The IWCM Plan will help Wyndham manage the large scale urban growth forecast across the region. Careful management of development will limit the impact of urbanisation on local waterways and coastline. Early consideration of alternative water supplies and treatment opportunities will ensure opportunities are maximised. Improved planning and asset management processes will ensure that the full benefits of stormwater treatment and reuse projects are realised. Integrated urban design and prioritised investment in capital works will help deliver the environmental and social outcomes that Wyndham's community desires.

Bringing this all together will help Wyndham transition to a water sensitive city with:

- Alternative water projects that preserve the regions precious potable water supplies.
- Stormwater treatment systems that protect waterways and improve biodiversity.
- Irrigated open spaces that support quality recreation and healthy communities.
- Resilient infrastructure designed to cope with weather extremes.
- Greater collaboration between Council, community and stakeholders that leads to integrated management of key waterways and landscapes.



Figure 4 K Road Cliffs on the Werribee River (Western Melbourne Tourism Inc., 2016)

8. References

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