

CWW

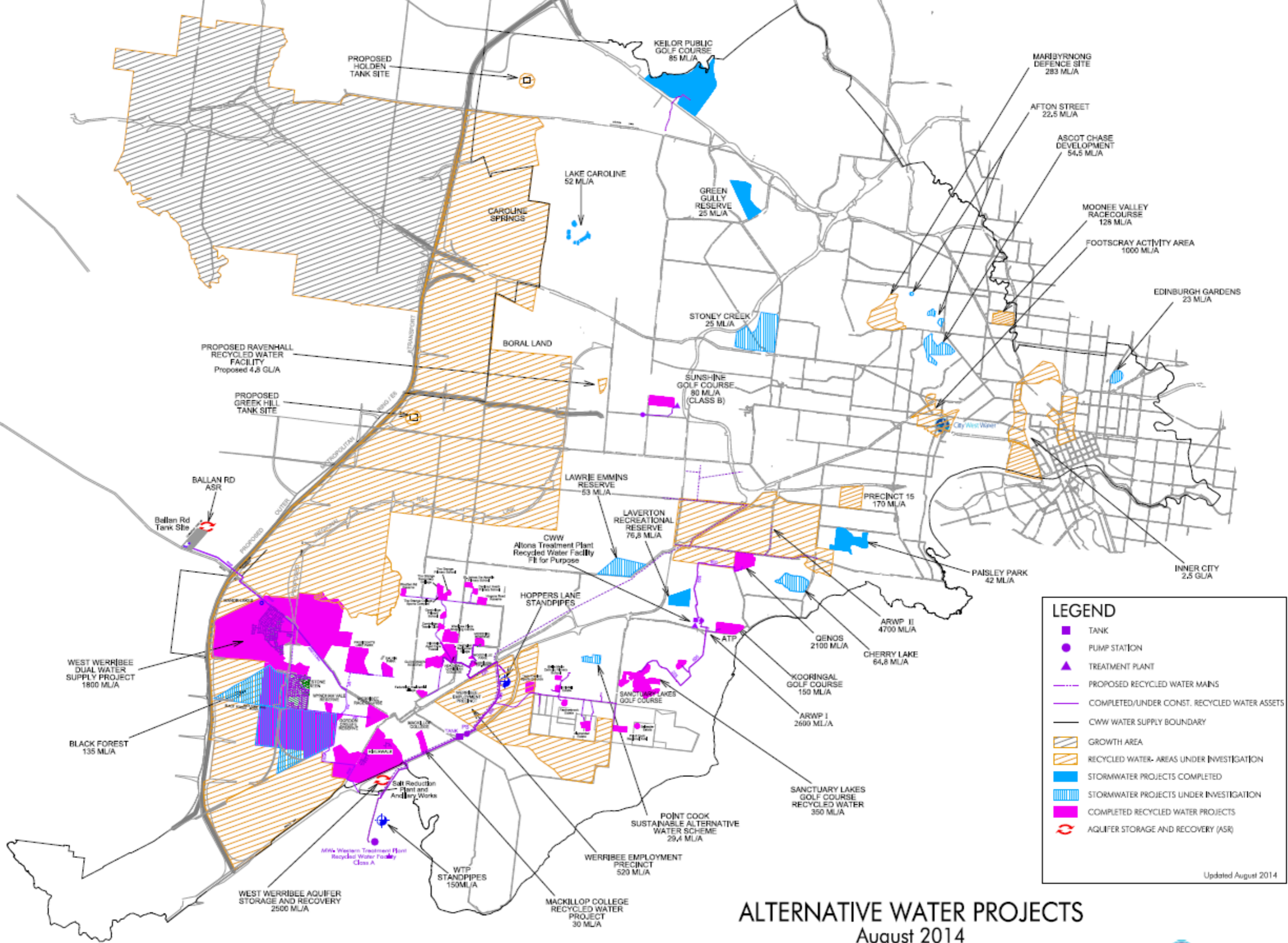
Utilising Recycled Water

24 September 2014

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City West Water

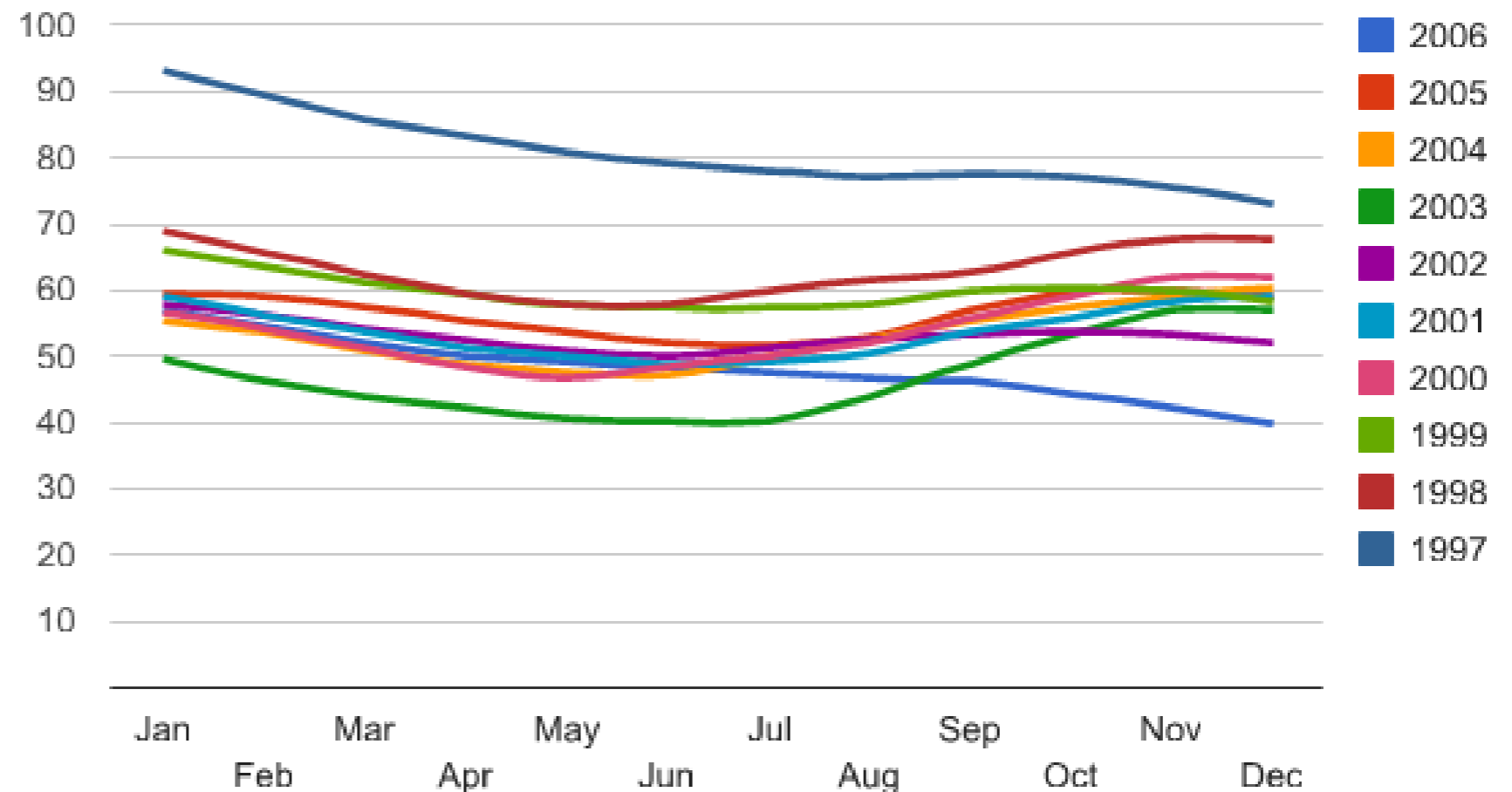


ALTERNATIVE WATER PROJECTS

August 2014

The Millennium Drought

- ^ Over ten years storages reduced from ~95% to less than 40%
- ^ Response of water efficiency and recycled water



Govt Target

“15% reduction in potable water use”

“20% reuse of treated wastewater”



City West Water

Recycled Water

“Water that has been derived from sewerage systems or industry processes and treated to a standard that is appropriate for its intended use” EPA Victoria

- ^ Four Classes of Recycled Water
 - Class A, B, C and D
 - Fit-for-purpose



City West Water

Altona Treatment Plant

- ^ The Altona Treatment Plant was first opened in the 1960s to provide sewage treatment services to the Altona area
- ^ Today, the plant services over 20,000 residential and business properties in the Altona, Altona Meadows, Laverton and Point Cook areas and treats close to 13 ML of sewage a day

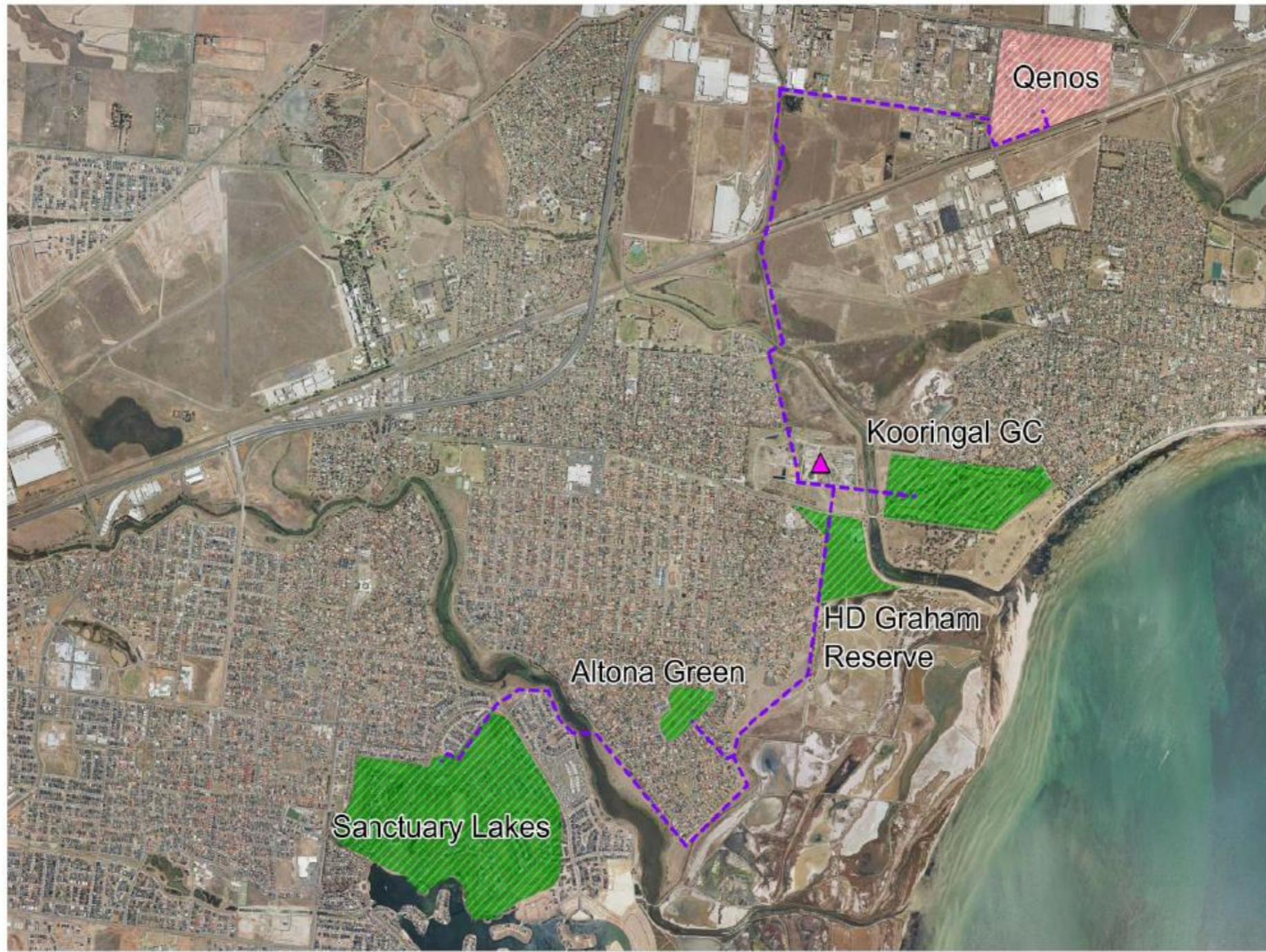


Altona RW Plant

- ^ 9 ML per day recycled water plant
- ^ MF/RO used to produce desalinated recycled water for irrigation and industrial uses
- ^ Two qualities produced for the two different end uses



Altona Treatment Plant



Sunshine Golf Course

- ^ Supplies 90 ML per annum for Golf Course Irrigation
- ^ Utilises extended aeration to treat raw sewage to Class B recycled water



Western Treatment Plant

- ^ Located in Werribee, the 10,500 hectare Western Treatment Plant is Melbourne's largest sewage treatment plant
- ^ It processes around half of Melbourne's sewage and produces almost 40 billion litres of recycled water a year
- ^ The plant provides recycled water with Stage 1 to supply 1.7 GL per annum in 2015, followed in 2035 by a 3.2 GL per annum augmentation
- ^ The plant is owned and operated by Melbourne water, who sell Class A recycled water to City West Water as well as other customers

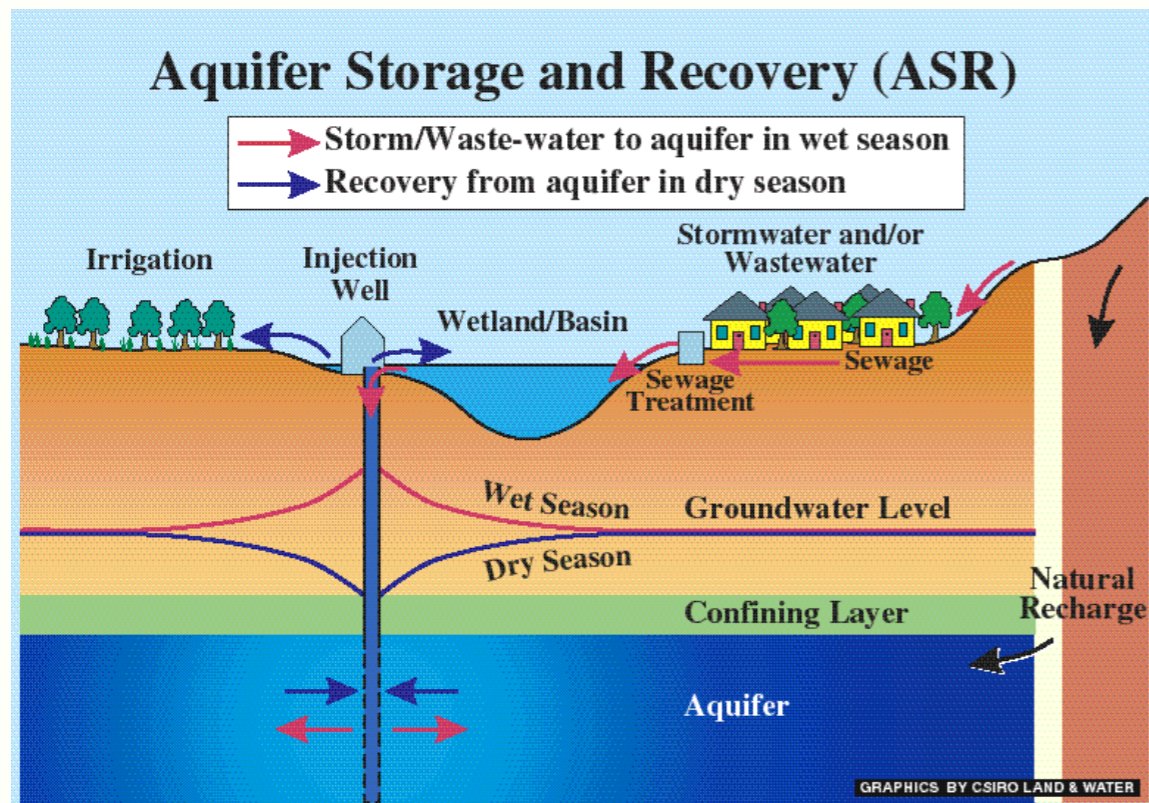


West Werribee Dual Supply

- ^ Utilising treated wastewater from Melbourne's largest wastewater treatment plant
- ^ Reducing the salt concentration using reverse osmosis to provide customers with fit-for-purpose recycled water through dual supply reticulation
- ^ Stage 1 to supply 1.7 GL per annum in 2015, followed in 2035 by a 3.2 GL per annum augmentation



ASR



- Storage of recycled water from the West Werribee SRP in an aquifer over winter for recovery in summer to supply peak irrigation demands

Regulation

Regulations		CWW Approach
Recycled water	<p>Construction Standards:</p> <ul style="list-style-type: none"> ^ WSAA Code- Dual Water Supply Systems 	<p>Dual Supply:</p> <ul style="list-style-type: none"> ^ Daily compliance auditing and quality assurance system
	<p>EPA/DHS:</p> <ul style="list-style-type: none"> ^ GEM - Dual Pipe Water Recycling: Health and Environmental Management Plan ^ GEM: Use of Reclaimed Water 	<p>Preparation of relevant management plans:</p> <ul style="list-style-type: none"> ^ Dual pipe – RWQMP, HEMP and LCA ^ Irrigation – EIPs ^ Service agreement for each customer <p>Annual report to EPA on scheme operation</p> <p>Annual statutory audit of scheme</p>
	<p>Plumbing Standards:</p> <ul style="list-style-type: none"> ^ PIC (now Victorian Building Authority) Recycled Water Plumbing Guide 2005 	<p>Lot scale:</p> <ul style="list-style-type: none"> ^ Inspection R1 – Main to meter inspection ^ Inspection R2 – Rough-in-stage ^ Inspection R3 – Commissioning Inspection ^ Annual inspections based on usage data
Stormwater	<ul style="list-style-type: none"> ^ Australian Guidelines for Water Recycling: Managing Health And Environmental Risks (Phase 2) Stormwater Harvesting and Reuse 	<p>Stormwater Unregulated, CWW adopt:</p> <ul style="list-style-type: none"> ^ Internal dual pipe use – QMRA ^ Irrigation – EIP ^ Service agreement for each customer ^ Water quality monitoring (1 sample per year) ^ Annual review of scheme EIP



Construction Standards

Pipes in road reserves and common land:

- ^ 100% audits by water authority



Plumbing Standards

Lot scale – house plumbing:

- ^ All work complies with AS 3500, Recycled Water Plumbing Guide 2005
- ^ All plumbers trained prior to working on dual supply system
- ^ PIC undertake a 3 stage audit on all connections



On-site Requirements

On-site – Lot-scale

- ^ Purple fittings including taps and meters
- ^ Prohibitive sign above any taps
- ^ Appropriate signage around irrigated area for open spaces
- ^ Cross-connection tests
- ^ Monitor customer usage patterns



Managing Risks

Pipe identification

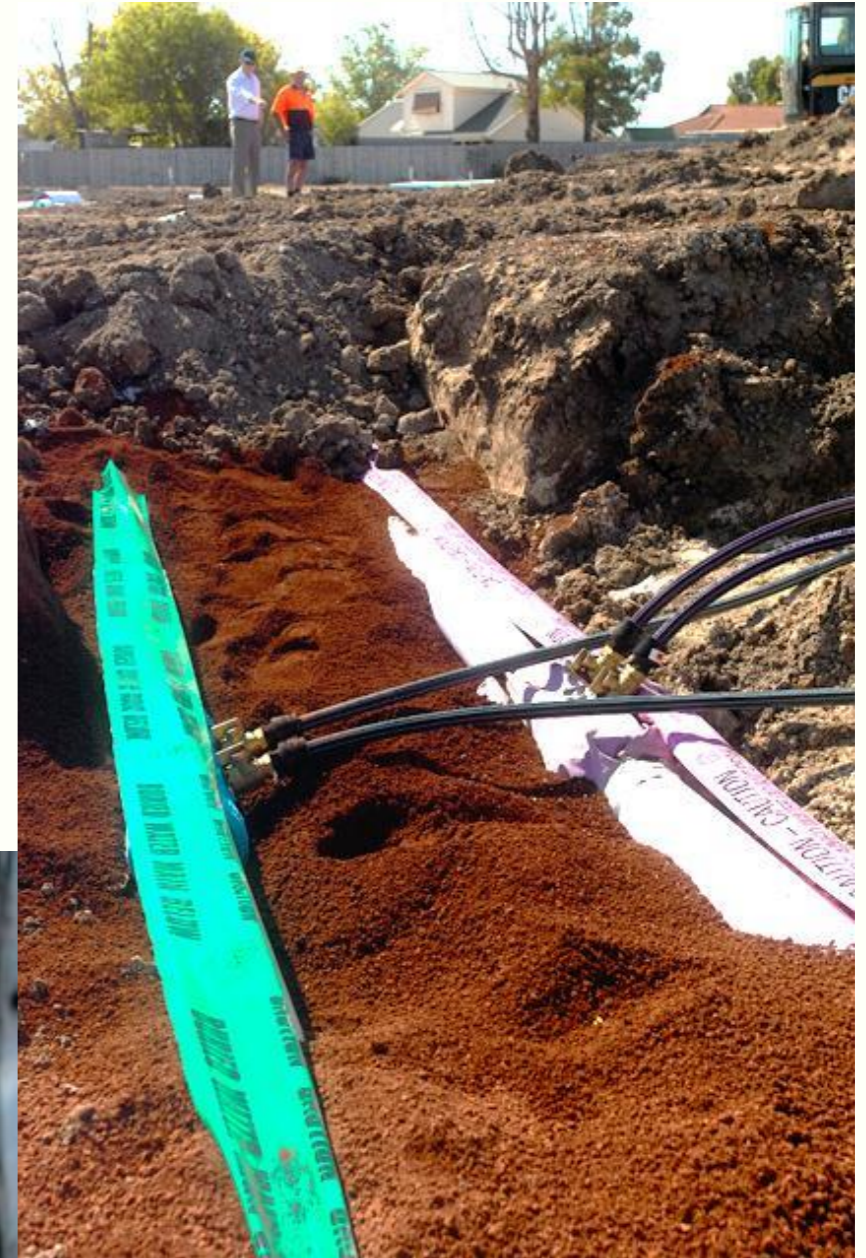
100% PIC inspections:

- ^ Inspection R1 – Main to meter inspection
- ^ Inspection R2 – Rough-in-stage
- ^ Inspection R3 – Commissioning Inspection

Annual CWW inspections based on usage data

CWW auditing

Plumber certification



City West Water

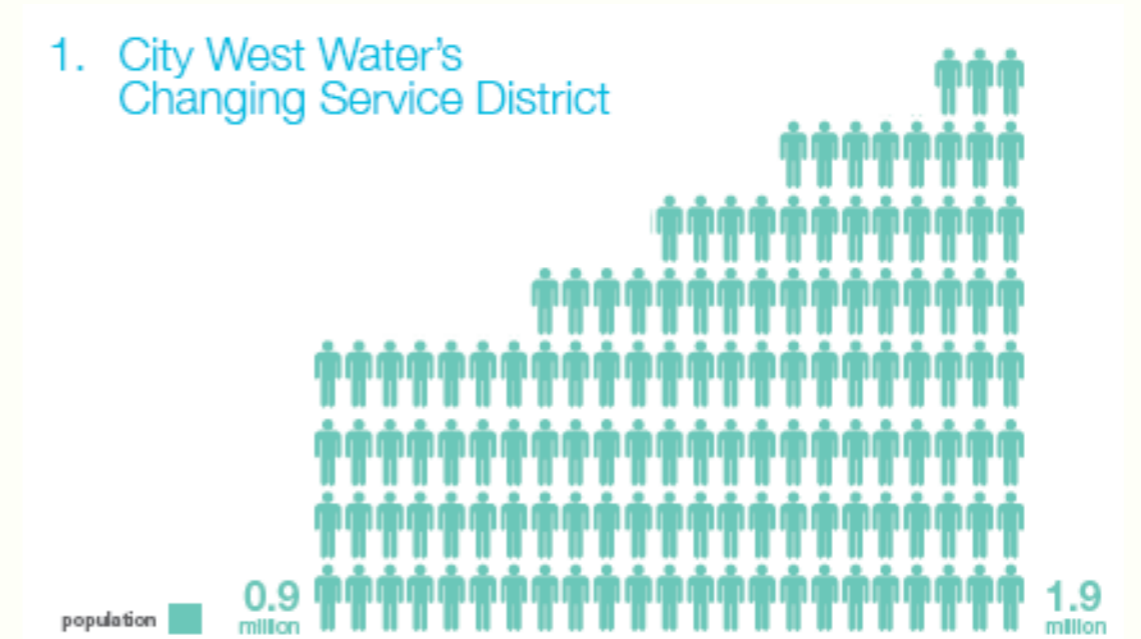
Lessons Learned

- ^ Understand demand, breakdown of end uses and seasonal variation
- ^ Understand system benefits, how these projects and offset or delay system augmentations or reduce OPEX
- ^ Understand end user quality requirements and do not over treat the water supplied
- ^ Strong engagement with customers and regulators to ensure a smooth transition



Managing Growth

- ^ Fastest growing region in Australia
- ^ Growth offers both challenges and opportunities



50 Population Year Growth

IWCM Vision

“A smart and resilient water system for a liveable, sustainable and productive Melbourne”



City West Water

Options to Manage Growth

^ Reduce Demand

CWW has strong and active Water Efficiency and Business Resource Efficiency programs designed to improve the efficiency of water use.

^ Increase Potable Water Supplies

Melbourne now has access to up to 150 GL per annum of potable water from the Wonthaggi seawater desalination plant. This produces expensive water and may need augmenting in 30 years time

^ Increase Alternative Water Supplies

Western Treatment Plant is a potentially huge resource. Water must still be desalinated to be used for residents. Resource is limited.

Other options such as supply through sewer mining and stormwater harvesting are being considered



CWW's Integrated Water Cycle Management Strategy



City West Water

Melbourne's Water Future

^ **The Vision:** A smart, resilient water system for a livable, sustainable and productive Melbourne.

^ **The New Approach:** Water cycle planning will be founded upon knowledge and understanding of the entire water cycle and its drivers: geography, topography, location of community assets, economics, climate and demography.

^ **Outcome:** Costs will be reduced and resilience improved.

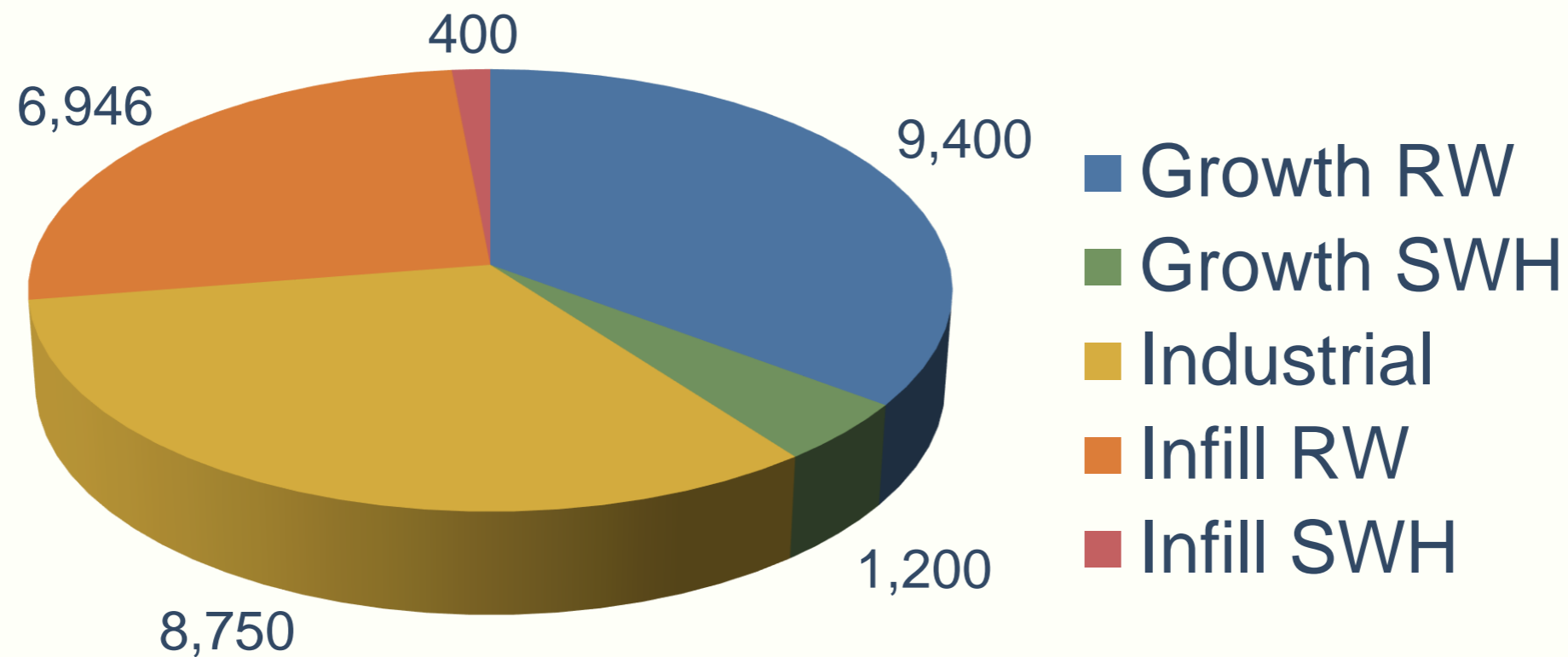


CWW's IWCM Objectives

- ^ Accommodate future growth without major supply augmentations
- ^ Maintain water within the urban environment and provide environmental flows to waterways
- ^ Integrate water cycle infrastructure – water supply, drainage, recycled water
- ^ Ensure cost effective solutions
- ^ Stakeholder engagement and community involvement in decision making



Potential Alt Water Supply



**Total potential of 27 GL per annum
in 2063**



CWW's Strategy – Western Growth

^ Water Supply

- ✓ Local Stormwater Harvesting for POS
- ✓ Recycled Water for residential irrigation, toilets and laundries
- ✓ Recycled Water for suitable non-residential demands
- ✓ Potable Water for remaining demands
- ✓ Seasonal variation managed through ASR
- ✓ Explore potential for large scale SWH for reinjection into dual reticulation

^ Sewerage

- ✓ Sewer Mining at Ravenhall to produce Recycled Water
- ✓ Remaining sewage and solids treated at WTP

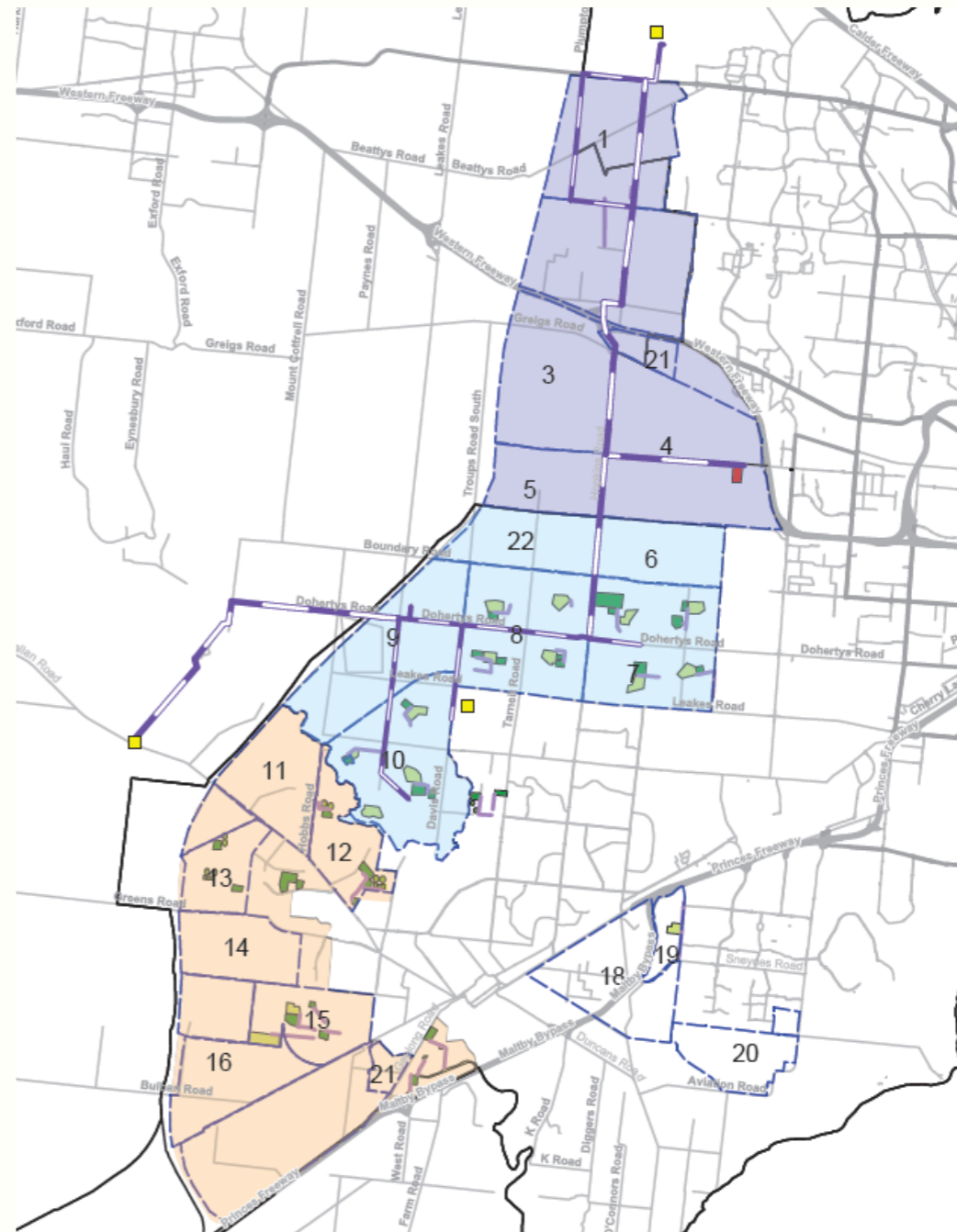


CWW's Strategy – Western Growth

- ^ Potable Water Demand
 - ✓ ~15,600 ML per annum
- ^ Non-Potable Water Demand
 - ✓ ~9,100 ML per annum
- ^ Stormwater Water Supply
 - ✓ ~1,100 ML per annum
- ^ Recycled Water from Ravenhall
 - ✓ ~3,100 ML per annum
- ^ Recycled Water from WTP
 - ✓ ~4,900 ML per annum
- ^ ASR Storage Capacity
 - ✓ ~2,000 ML



City West Water



CWW's Strategy – Infill

^ Opportunities

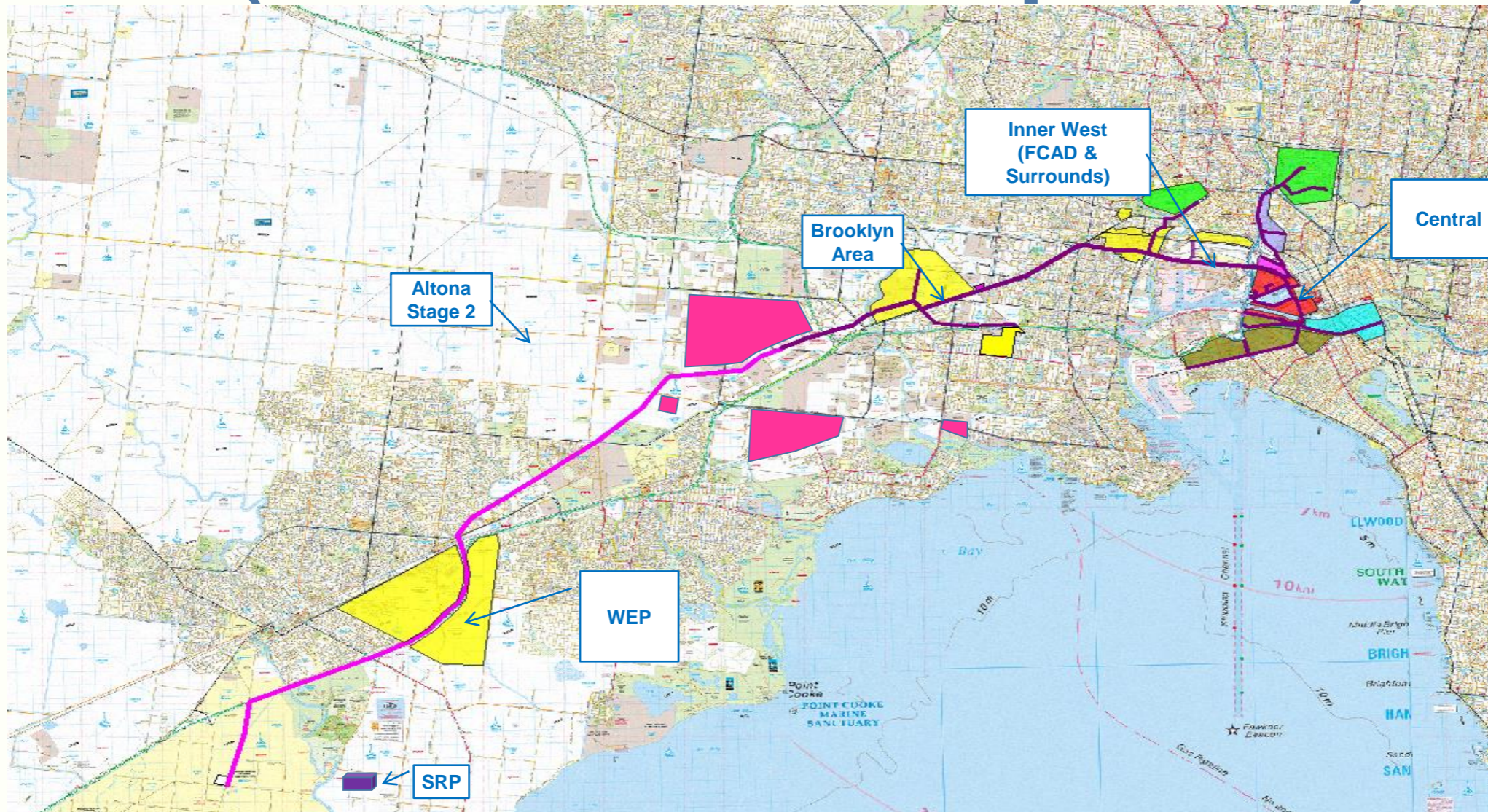
- ✓ Industrial Substitution – Altona Recycled Water Project Stage 2
- ✓ Central Zone Redevelopment – City North, Arden/Macauley, E-Gate, CBD
- ✓ Dispersed Redevelopment – East Werribee, Moonee Valley Racecourse, Maribyrnong Defense Site, Precinct 15, FCAD
- ✓ Retrofit Local Stormwater Harvesting for POS

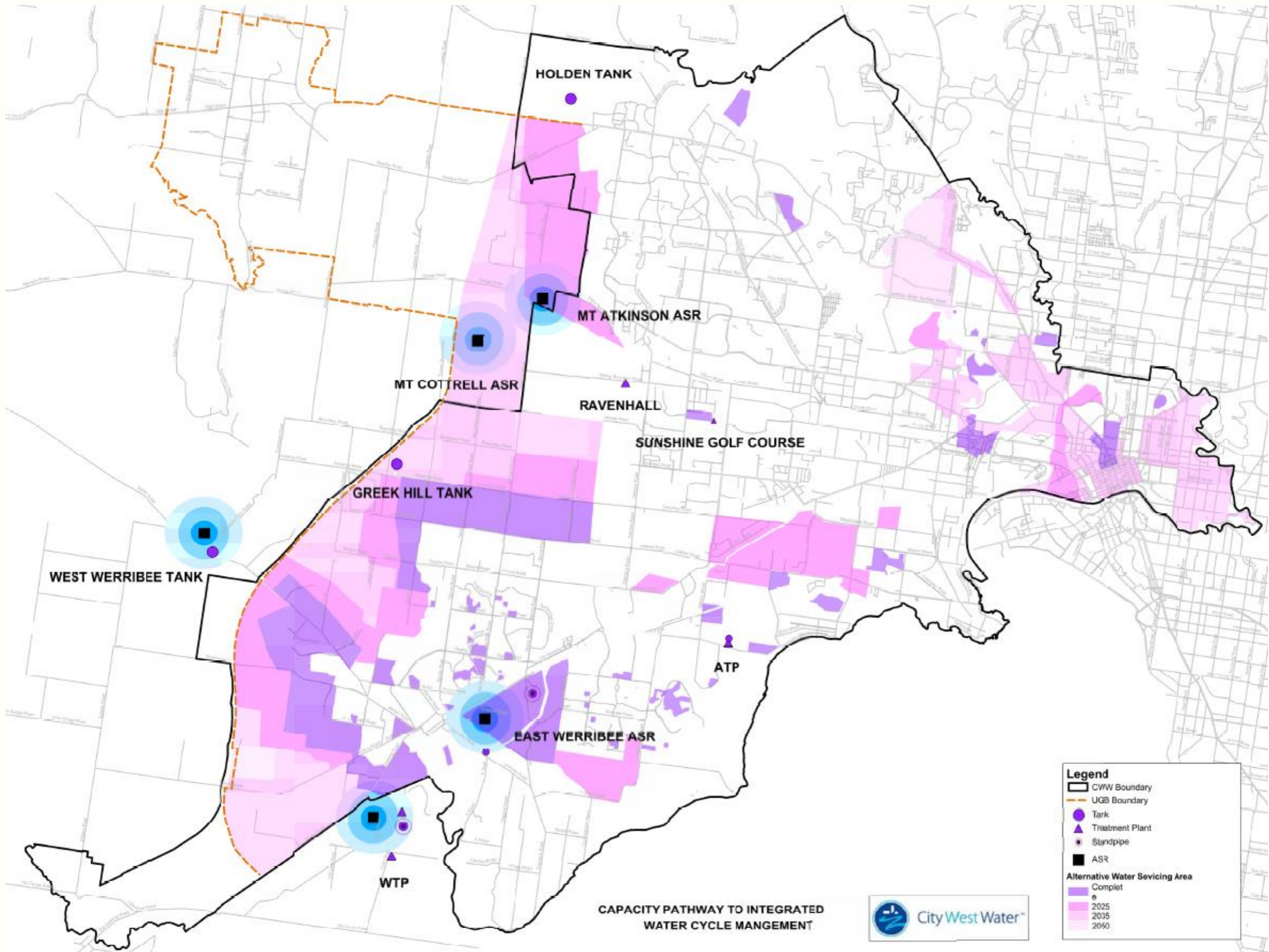
^ Water Supply

- ✓ Local water supply from Sewer Mining or SWH
- ✓ Recycled Water for irrigation, toilets, laundries and cooling towers
- ✓ Exploring bringing water from WTP to the city



CWW's Strategy – Infill (Potential Option)





CWW Utilising Stormwater

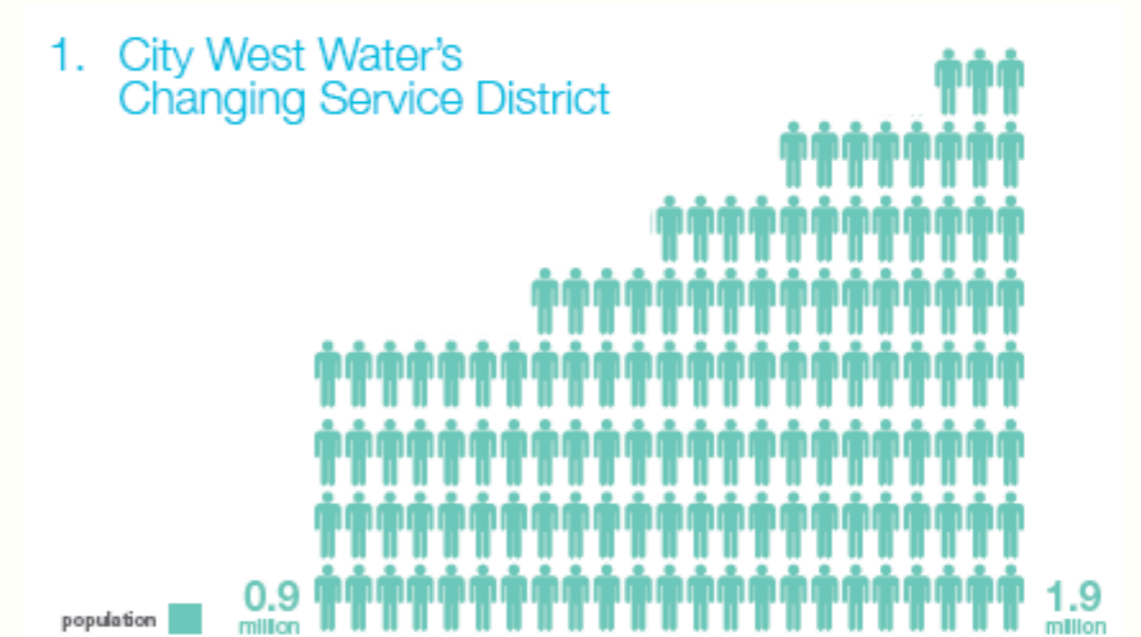
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Managing Growth

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50 Population Year Growth

IWCM Vision

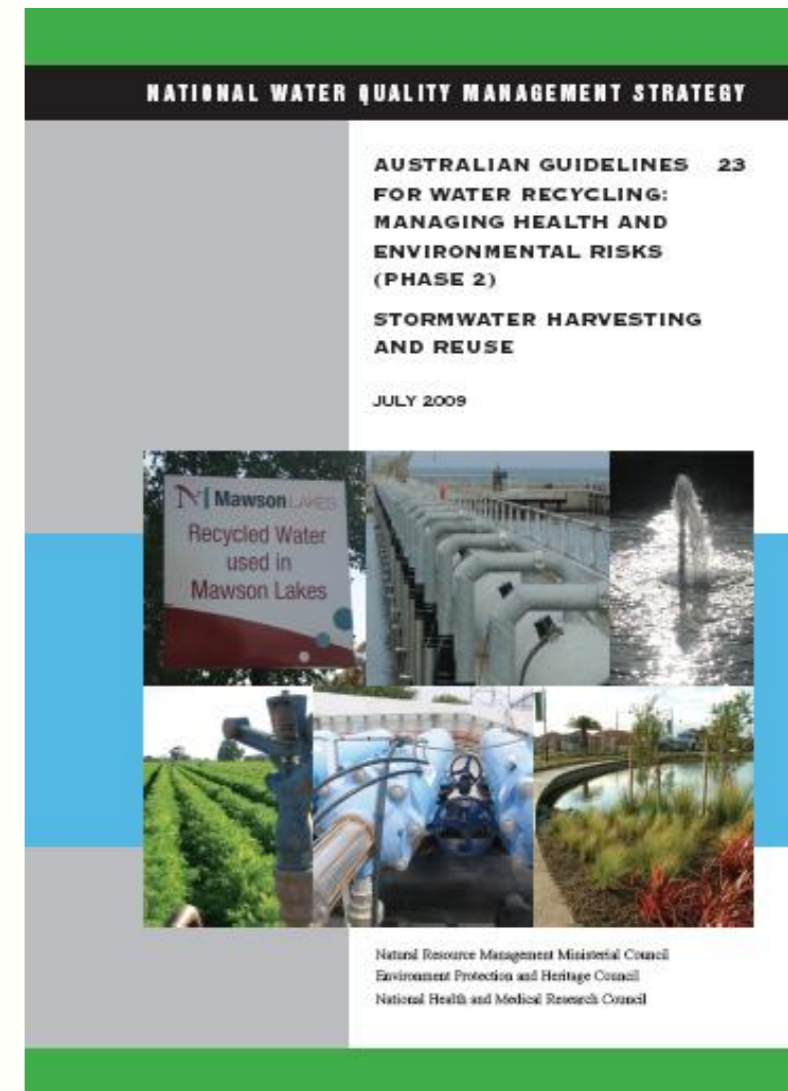
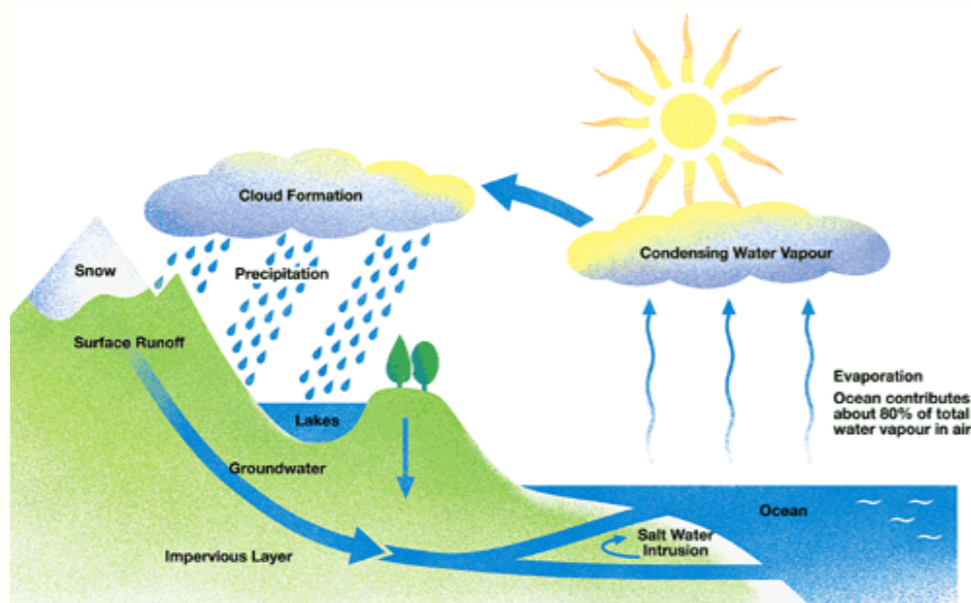
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City West Water

2009 Catalyst for IWCM

- ^ CWW Alternative Water Strategy Review - *Strategy*
- ^ National Guidelines for Water Reuse - *Regulation*
- ^ National Urban Water Desalination Plan - *Funding*
- ^ All the elements required to try something new



Stormwater to play an important role



City West Water

CWW as a Catchment

$$\text{Volume} = \text{Runoff Coeff} \times \text{Area} \times \text{Rainfall}$$

- ^ CWW's service area has an average rainfall of 525 mm per annum (10 year average)
- ^ With an urbanised catchment a Runoff Coefficient of 0.4 may be assumed
- ^ The average runoff over CWW's catchment is 134 GL per annum
- ^ Assuming 10% of this water should continue to be made available for the environment – 121 GL per annum available for harvesting
- ^ The challenge arises when we consider how to store this water within the urban environment and to ensure risks are managed

Water Sensitive Urban Design

- ^ WSUD has been effective especially since 2006 (Clause 56)
- ^ Developers demonstrating Leadership
- ^ Councils familiar with wetlands seek alternative water supply
- ^ Disconnect between stormwater and traditional regulated water



Opportunity

- ^ Councils want to demonstrate sustainability however are capital and expertise constrained
- ^ Stormwater is unregulated
- ^ CWW may invest in systems and achieve
 - Diversification in water supply systems
 - Potable Water Demand Reductions
 - Increased awareness of alternative water
 - Partnership approach



Governance

Principle 1 – Cost Recovery

- ^ CWW will make an investment and recover costs over a 25 year period through an annual service charge (capex and fixed opex) and a volumetric charge (variable opex). Charges equate to levelised break-even costs. Additional funding from external agencies improves the project costs.

Principle 2 – Owning Assets

- ^ CWW will only financially contribute to assets CWW will own and maintain. This includes all infrastructure except passive WSUD treatment, e.g. wetlands, swales, etc

Principle 3 – Agreement

- ^ Responsibilities outlined in a water transfer agreement. CWW typically will not own the water, but will provide a service to treat and/or transfer the water. Typically no guarantee of quantity or quality.

Principle 4 – Ongoing Management

- ^ All projects must follow relevant guidelines. Management plans, such as EIPs, will be developed and implemented



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Integrated Water Supply Plans - HBCC



- ^ Councils investigating projects, very little had been implemented
- ^ Working with councils under a new model
- ^ Council wide assessment of water security options undertaken internally at CWW
- ^ Open spaces need only fit-for-purpose water
- ^ Assessment of 37 sports fields for alternative water source from;
- ^ 5 Priority sites identified, Laverton Rec Reserve largest and most economic



Laverton Recreation Reserve



- ^ Supplies 80 ML per annum for irrigation of council ovals
- ^ Water treated through a wetland before supply from a 2 ML storage
- ^ Project also solved a major flooding issue for council



Green Gully Reserve

- ^ Supplies 42 ML of stormwater for the irrigation of Brimbank City Council ovals
- ^ Water is extracted from a MWC drain and also from a council drain
- ^ Water is stored in a 3ML storage and is transferred through 3 different pump stations



Afton St

- ^ MVCC Have constructed wetlands and a 3 ML open storage
- ^ CWW will own and operate the pump station and pipeline
- ^ The system will harvest 21 ML per annum for use on 5 ovals



CWW's Strategy – Western Growth

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