Irrigation scheduling: Recycled water management in public open spaces

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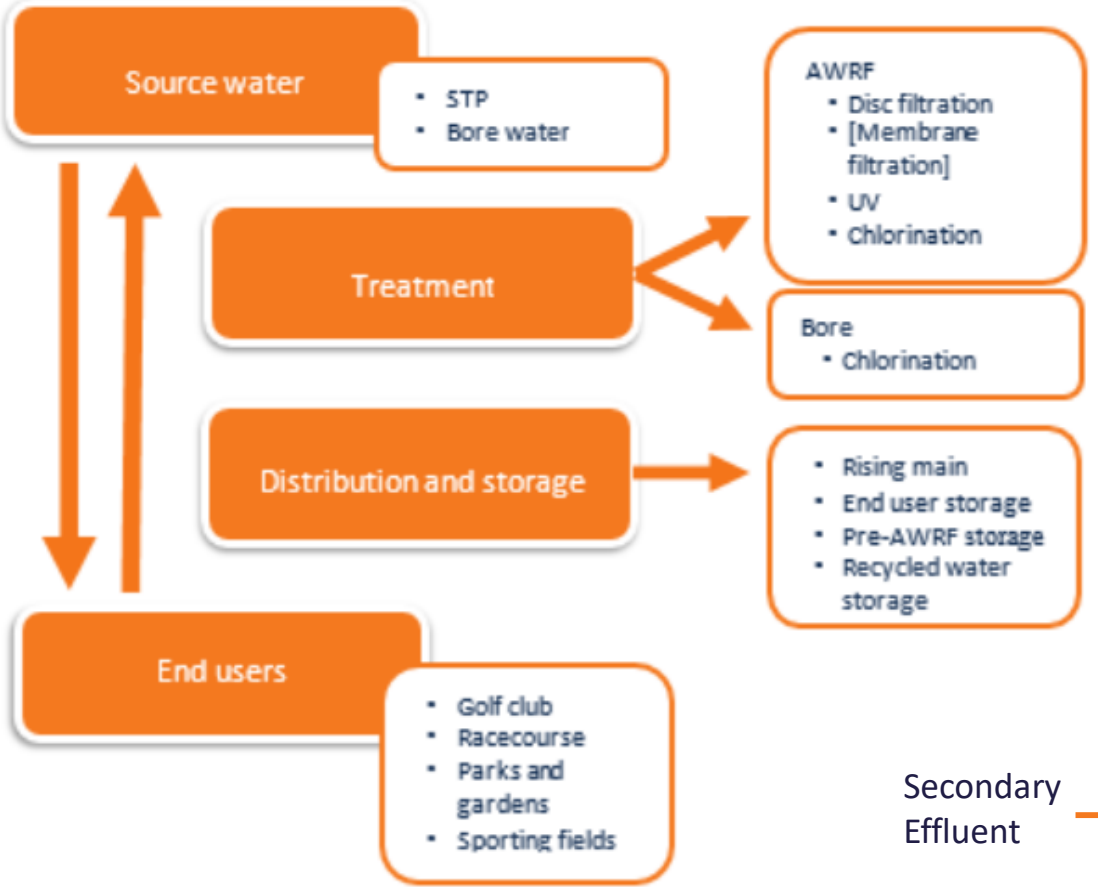
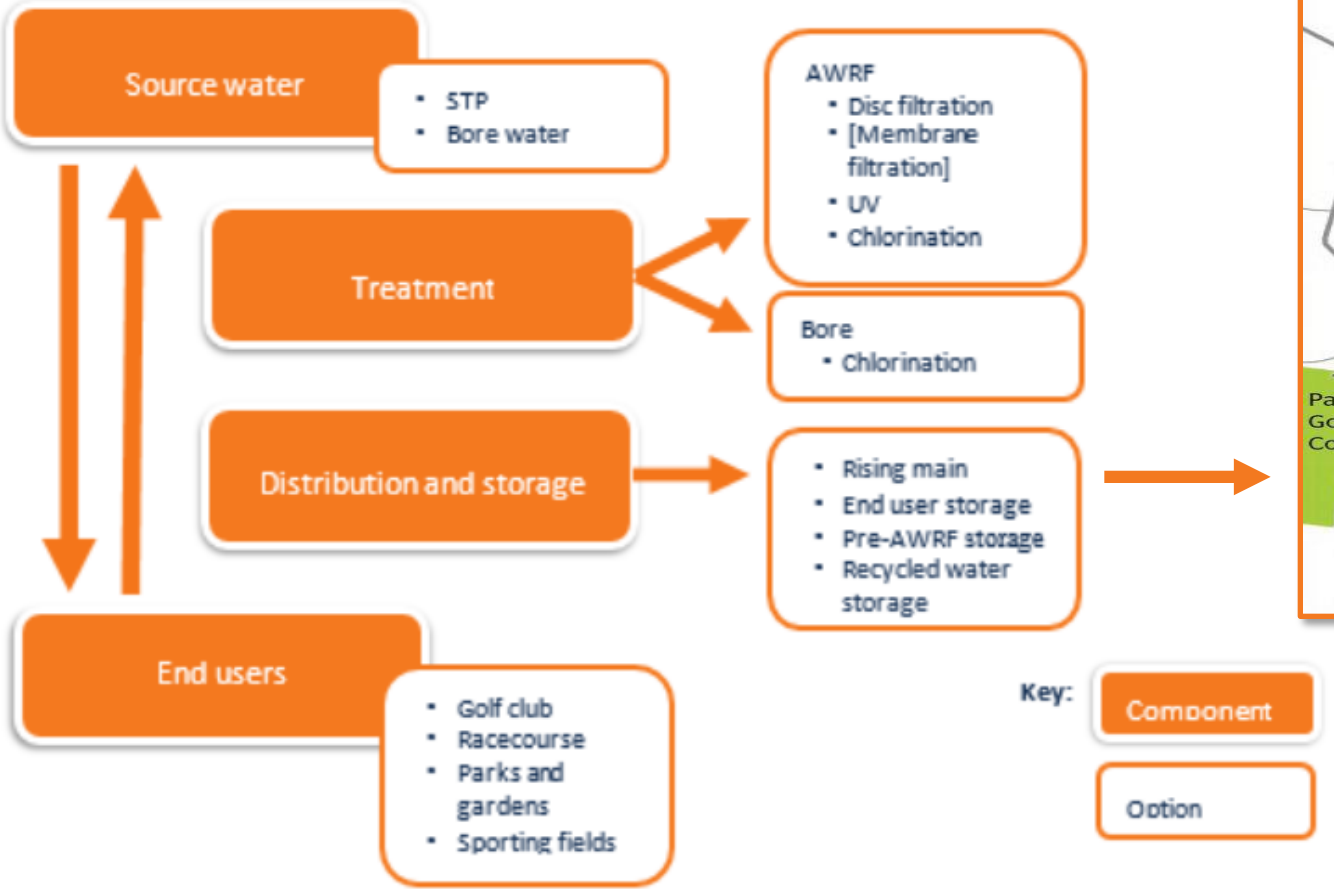
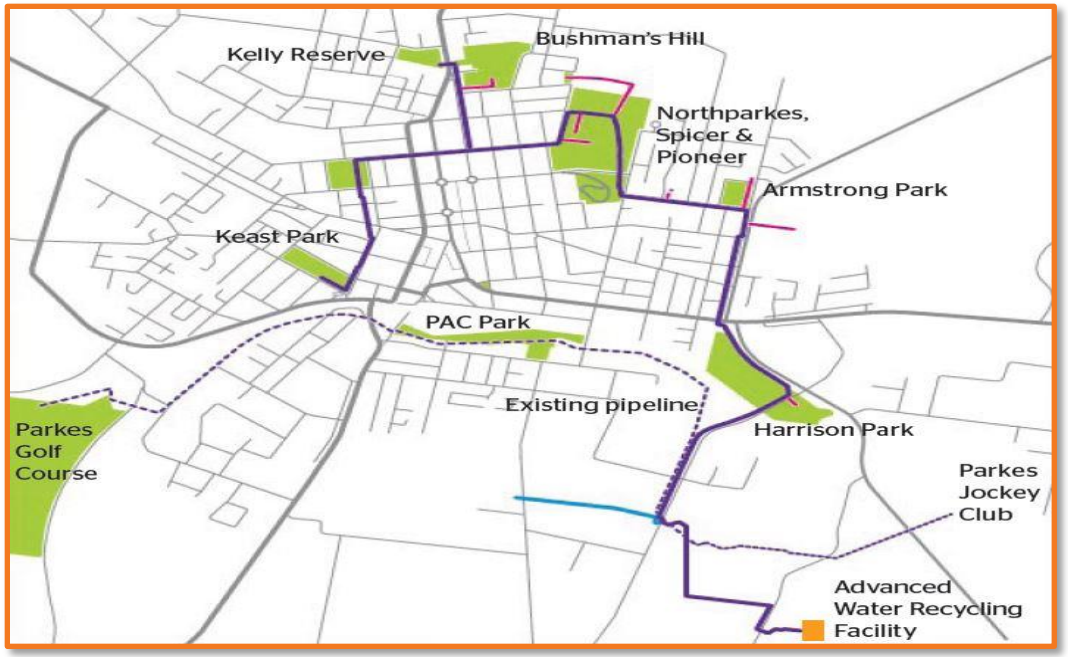
Recycled Water Scheme



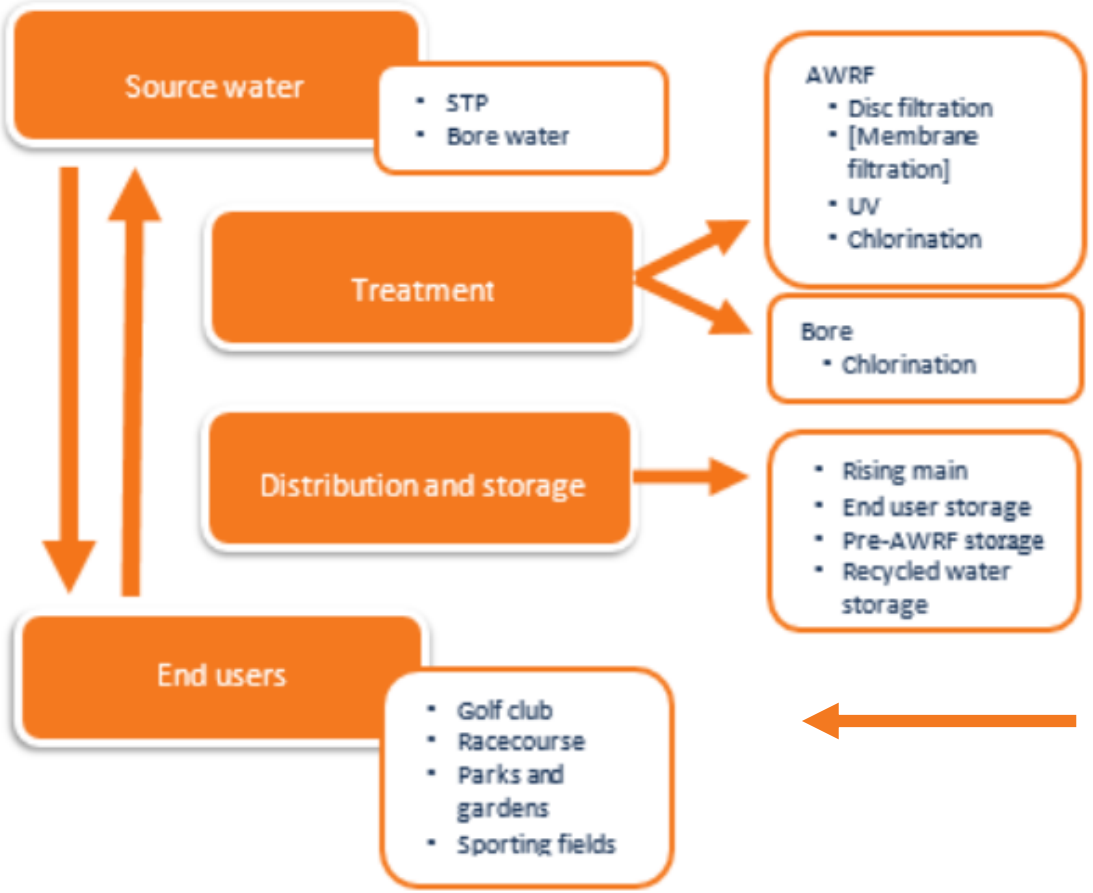
Secondary Effluent → Disc Filtration → UV → Chlorine → Storage → Distribution

Recycled Water Scheme





Recycled Water Scheme



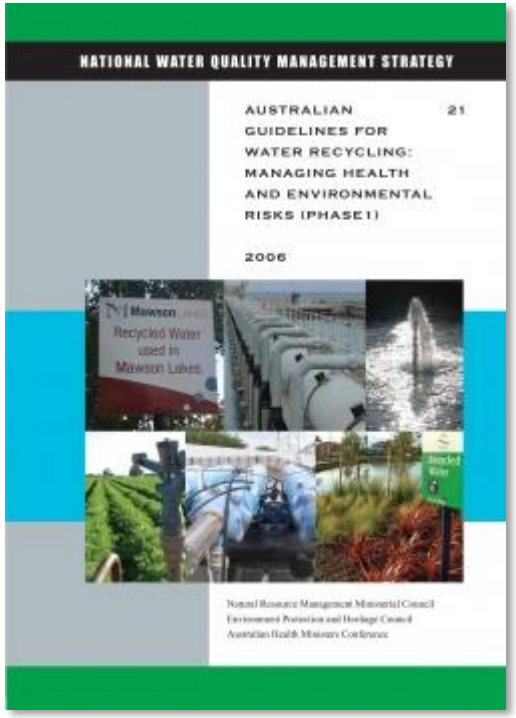
What could go wrong?

Hazard Identification

- Health hazard
  - Pathogens
    - Log reduction values (LRV) for municipal irrigation

Process	Protozoa	Virus	Bacteria
UV disinfection	4.0	2.0	4.0
Chlorination	0.5	4.0	4.0
Design LRVs	**4.5**	**6.0**	**8.0**
Municipal irrigation LRVs	3.7	5.2	4.0

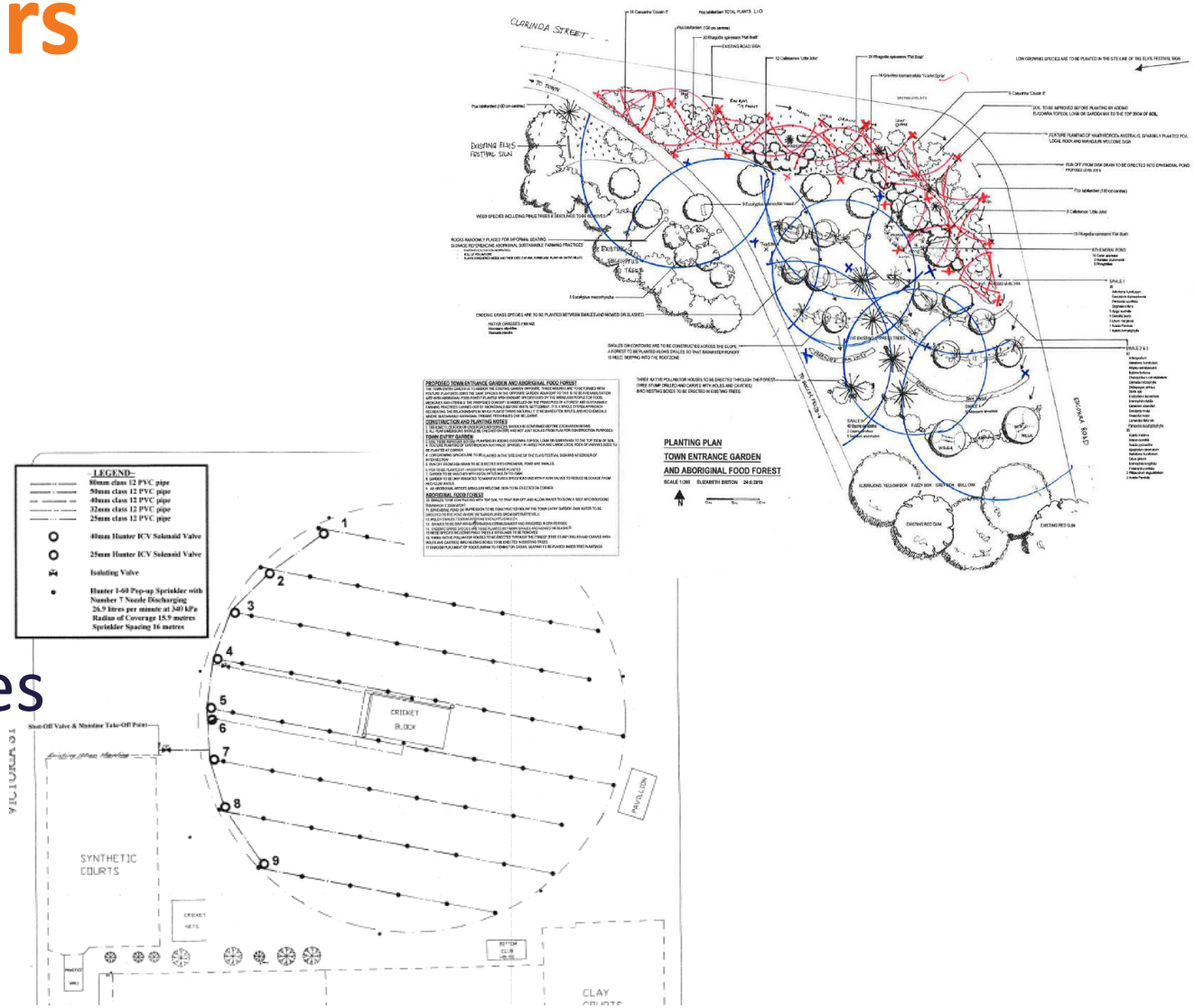
  - Chemicals
- Environmental hazard
  - Salt and nutrient



Controlled irrigation and scheduling

Scheduling Parameters

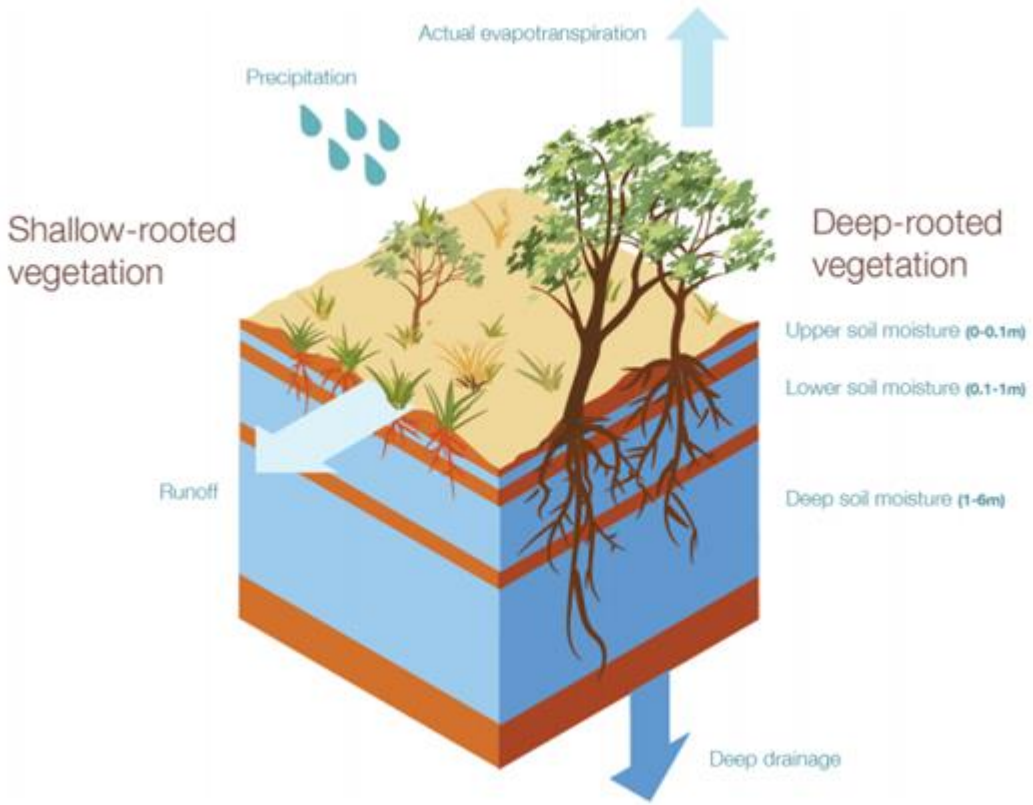
- Water quality
- Soil and plant
- Water demand
- Sprinkler precipitation rates
- Watering windows



Water quality

- Physicochemical
  - pH
  - Turbidity
  - Electrical conductivity (EC)
- Microbial
- Chemical
  - Sodium adsorption ratio (SAR)
  - Nutrients
- Metals

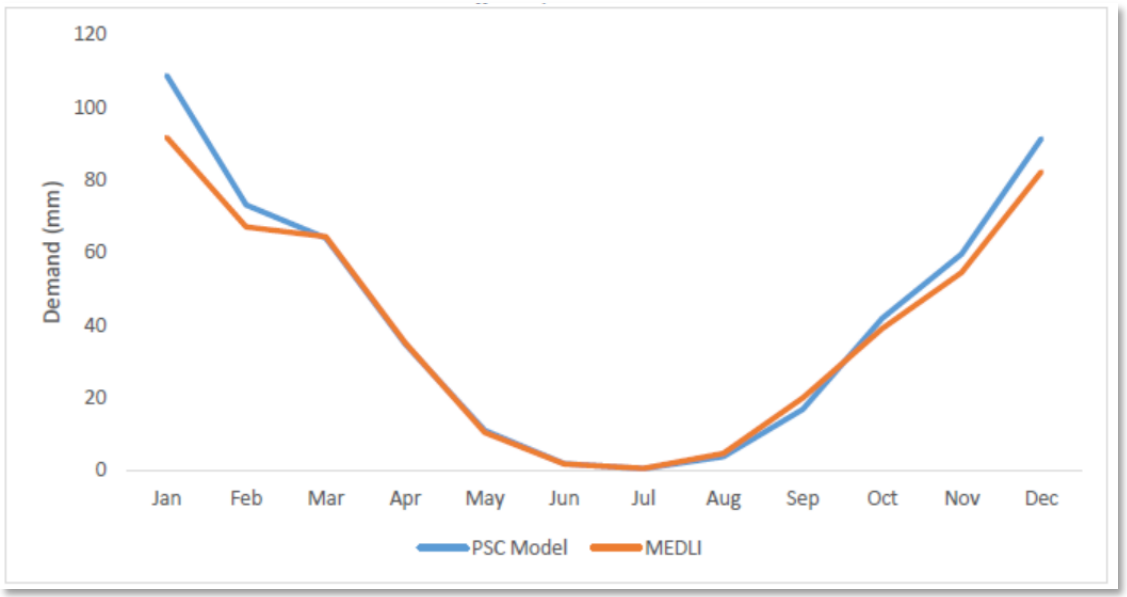
Soil moisture balance model



- Inlet
  - Rainfall
  - Irrigation
- Outlet
  - Plant Evapotranspiration (ET)
  - Soil holding capacity
  - Surface runoff
  - Deep drainage

Source: BoM AWRA-L model description (2016)

Demand model validation



Apply the right amount of water at the right time

Application rate

- Avoid plant water stress
- Avoid water logging and runoff

Infiltration rate (IR)

Soil Type	IR (mm/h)
Sand	>20
Sandy loam	10-18
Loam	10-15
Clay loam	5-10

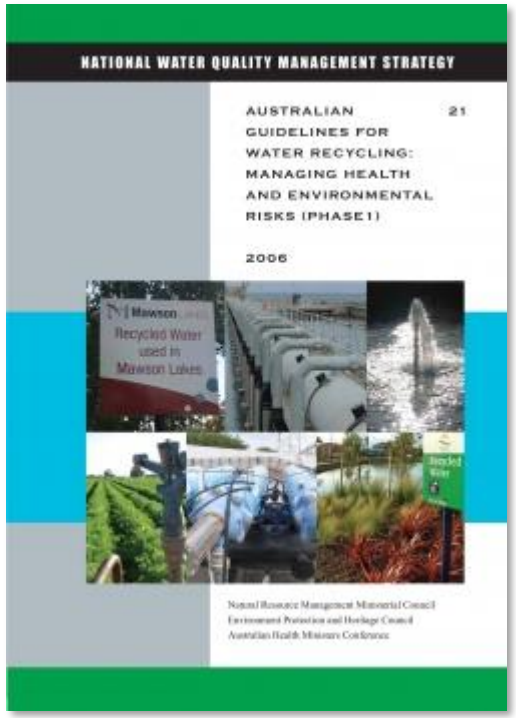
Source: Effluent reuse management (2010)

Irrigation time

- Watering window 10:00 PM-7:00 AM
- No public access during irrigation
  - Non-treatment barrier
  - LRVs
- Smart control
  - Weather stations
  - Soil moisture sensors

Managing residual risk

- Operational control (E4)
- Continuous monitoring (E5)
  - Critical limits
  - Soil sampling
- Corrective actions (E6)
- Evaluation and audit (E11)
- Improvement plan (E12)



AGWR (2006)

What’s next?

- Central control system
  - Soil moisture model
  - BoM data
  - Alarm and shut down

- Soil testing and conditioning
- Continuous improvement

Acknowledgements

Questions?

RECYCLED WATER SCHEME
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Parkes Recycled Water is:
Safe for irrigation
Drought proof
Sustainable
Cost-effective
Recycled water is treated to Australian guidelines and is considered safe for irrigation but not for human consumption. Wash hands before eating.
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