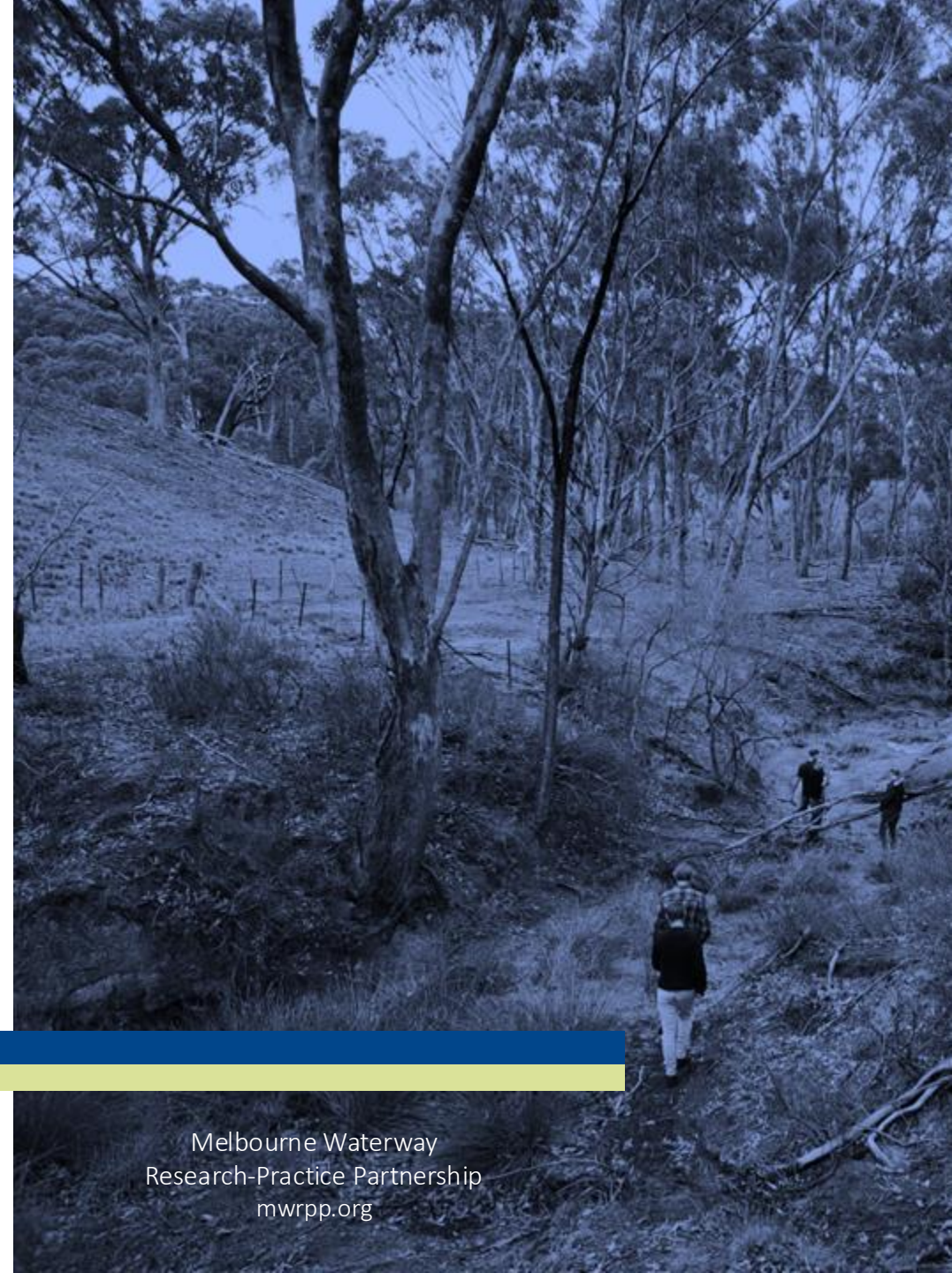


# Towards effective Water Sensitive Urban Design assets on private land: lessons from a case study review

Belinda Hatt, Darren Bos & Stephanie Lavau

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# Why operate WSUD assets on private land?

- Makes up a large proportion of urban areas, e.g.
  - ~ 1/2 of directly connected impervious surfaces in Mt Evelyn is on private land
  - ~ 1/3 annual runoff volume generated by private roofs in Merri-bek City Council
- Space constraints on public land
- More feasible to achieve stormwater flow targets if stormwater managed at- or close-to source

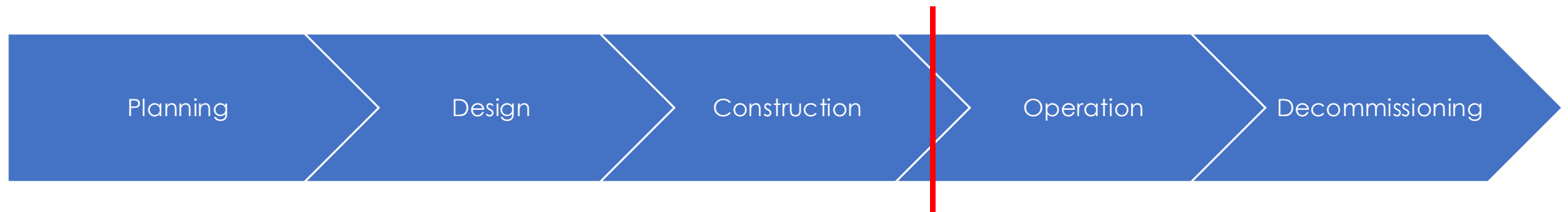
# Barriers to successful WSUD assets

## General:

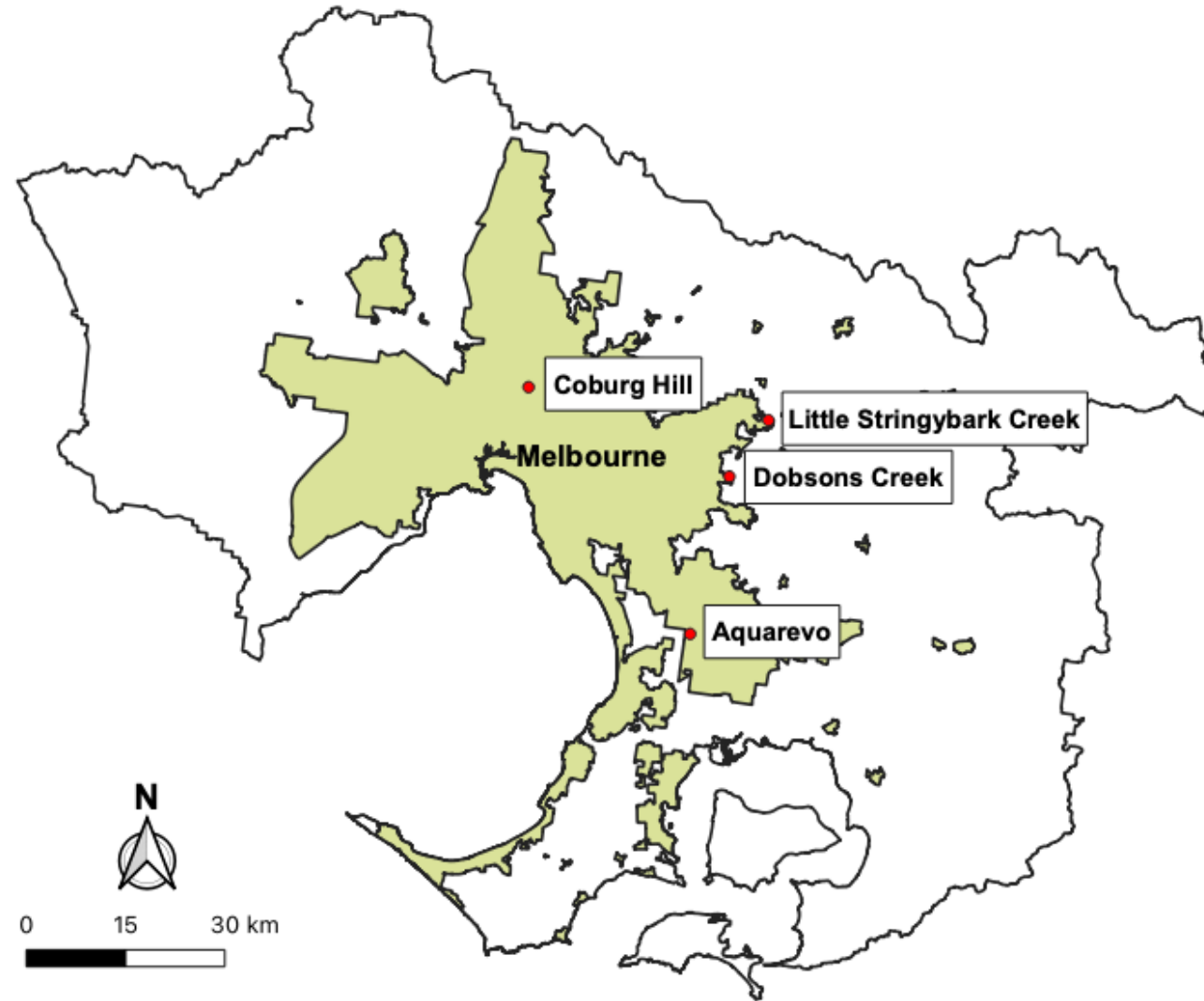
- Planning and institutional practices
- Technological capability
- Tendency to focus only up to technological installation
- Insufficient maintenance

## Private land:

- Lack of oversight beyond the planning process
- Reliant on community participation
- Change in ownership



# What factors influence the success of WSUD assets on private land?





# Coburg Hill

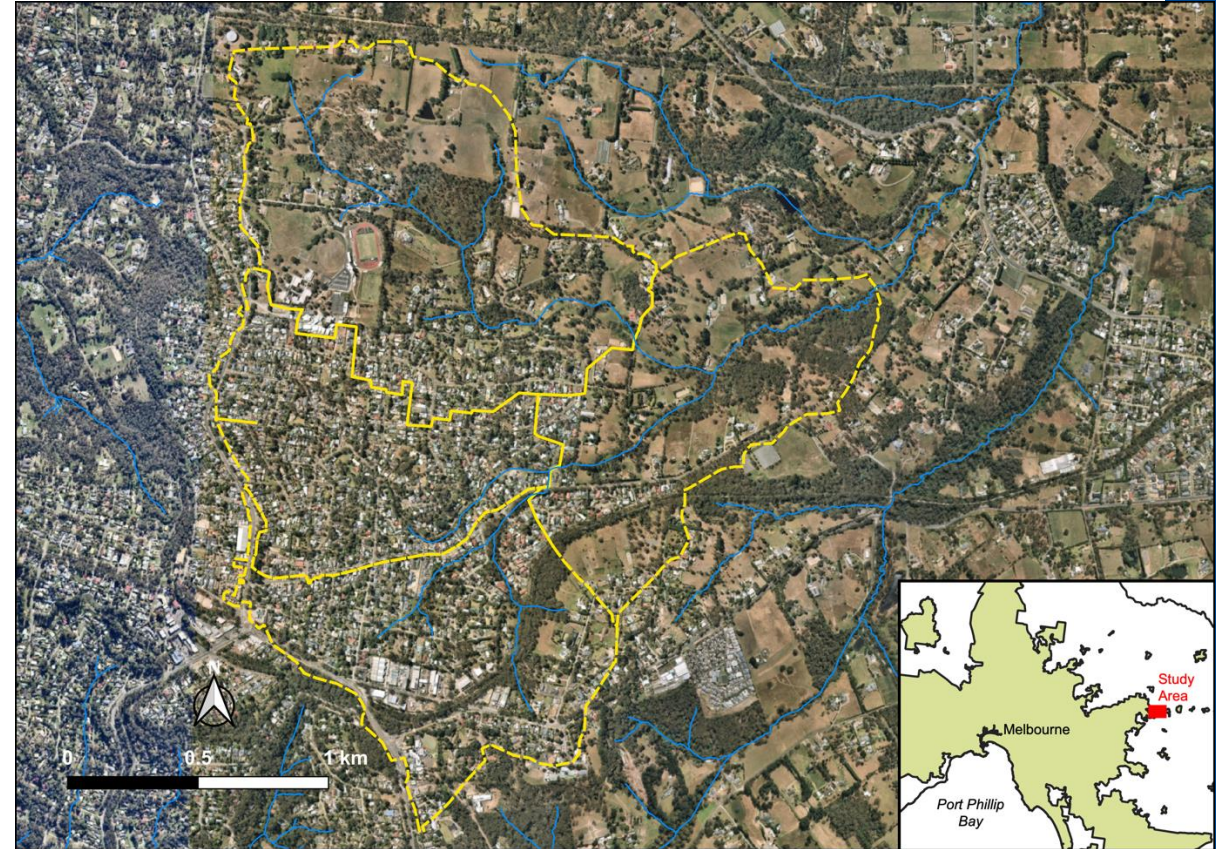
- Urban renewal project
- 21 ha residential development
- 520 dwellings
- Standard and medium density
- 2-3 kL tanks on 80% of properties
- Streetscape WSUD assets
- Tank audit conducted part-way through construction





# Little Stringybark Creek

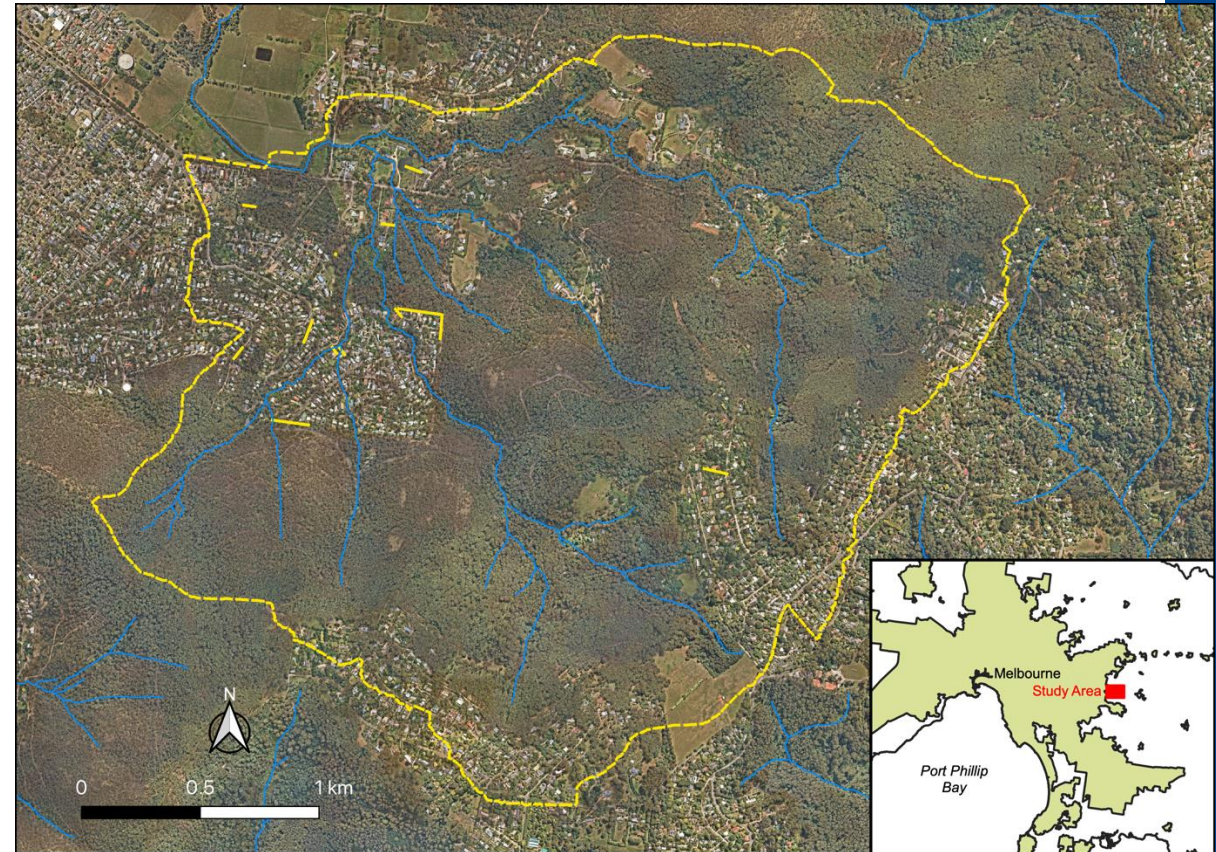
- Catchment-scale experiment
- Retrofit
- ~830 residential properties
- Raingardens & tanks on private land
  - Connected to toilet and laundry
- Streetscape WSUD assets
- Participation encouraged through incentives
- Monitoring of asset performance, stream health, community participation
  - Self-assessment survey of tank owners





# Dobsons Creek

- Catchment-scale experiment
- Retrofit
- ~530 residential properties
- 1-3 x 4.5 kL tanks
  - Connected to toilet and laundry
  - Dripper hose for passive irrigation
- Streetscape works
- Participation encouraged through incentives
- Maintenance audits, monitoring of stream health and community participation





# Aquarevo

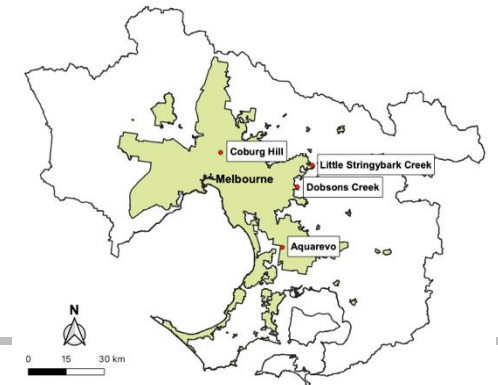
- Residential redevelopment
- ~470 residential properties
- Pilot IWM and energy saving initiatives
- 2 kL tank
  - Connected to showers, baths and laundry
  - Real-time monitoring and control
- South East Water responsible for operation and maintenance





# Case studies

Case study	Organisations	Timing for tank installation	Mode of installation	Maintenance responsibility	Tank operation
<b>Coburg Hill</b>	Satterley Property Group Spiire Merri-bek City Council	Initial construction	Compulsory	Owner	Passive
<b>Little Stringybark Creek</b>	University of Melbourne Melbourne Water Yarra Ranges Council Yarra Valley Water	Retrofit	Voluntary	Owner	Passive
<b>Dobsons Creek</b>	Melbourne Water South East Water Knox City Council	Retrofit	Voluntary	Owner	Passive
<b>Aquarevo</b>	South East Water Villawood Properties	Initial construction	Compulsory	Third party	Active



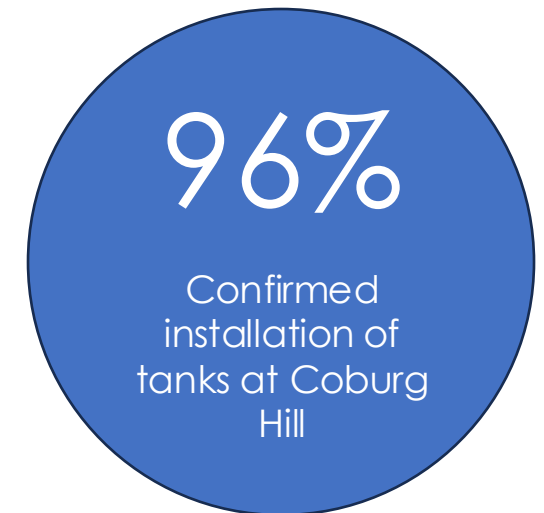
# Lesson 1: Local government planning schemes are effective for enacting stormwater management on private land

Planning schemes were used in two different ways:

- Coburg Hill – requiring tank installation as part of initial development
- LSC – managing ongoing development >10 m<sup>2</sup> (e.g. road sealing, house extensions)

Considerations:

- Potential to influence maintenance?
- Supporting instruments
- Oversight beyond the planning stage





# Lesson 2: Keep the community engagement and participation process simple

- Community engagement essential for raising awareness and encouraging participation, especially in retrofit situations
- Cost and time are key barriers to participation

## Considerations:

- Know your audience
- Use of a range of clear, integrated communications
- Face-to-face most effective method
- Co-funding might save \$ in theory...  
... but at what cost to participation?



*Image credit: Prosser et al, 2012*

# Lesson 3: Trust is important for gaining and maintaining interest

- Initial distrust can be a key barrier  
e.g. unsolicited mail, unfamiliar agencies/organisations,  
offers that are “too good to be true”

## Considerations:

- Use professional, official communications
- Address perceptions of risk upfront
- Have a trusted “face of the project”
- Harness community advocacy



*Image credit: Waterway Ecosystem Research Group*



# Lesson 4: There is efficiency in having a consistent design

- Standard design = time and cost savings
  - Information on operation and maintenance
  - Inspection and maintenance

## Considerations:

- Lack of choice might be a barrier to participation
- Some flexibility to accommodate
  - Site constraints e.g. space, slope, access
  - Individual preferences e.g. aesthetics

# Lesson 5: Relying on residents to look after systems is risky

- Real-time monitoring and control ≈ always fully operational
- At LSC, a third of tanks had malfunctioned at some point
- Low uptake of free inspection and maintenance services

## Considerations:

- Resident attitudes to public good assets on private land
- Fee for service approach?
- Willingness to pay?

80%

Operational tank systems at LSC at time of survey

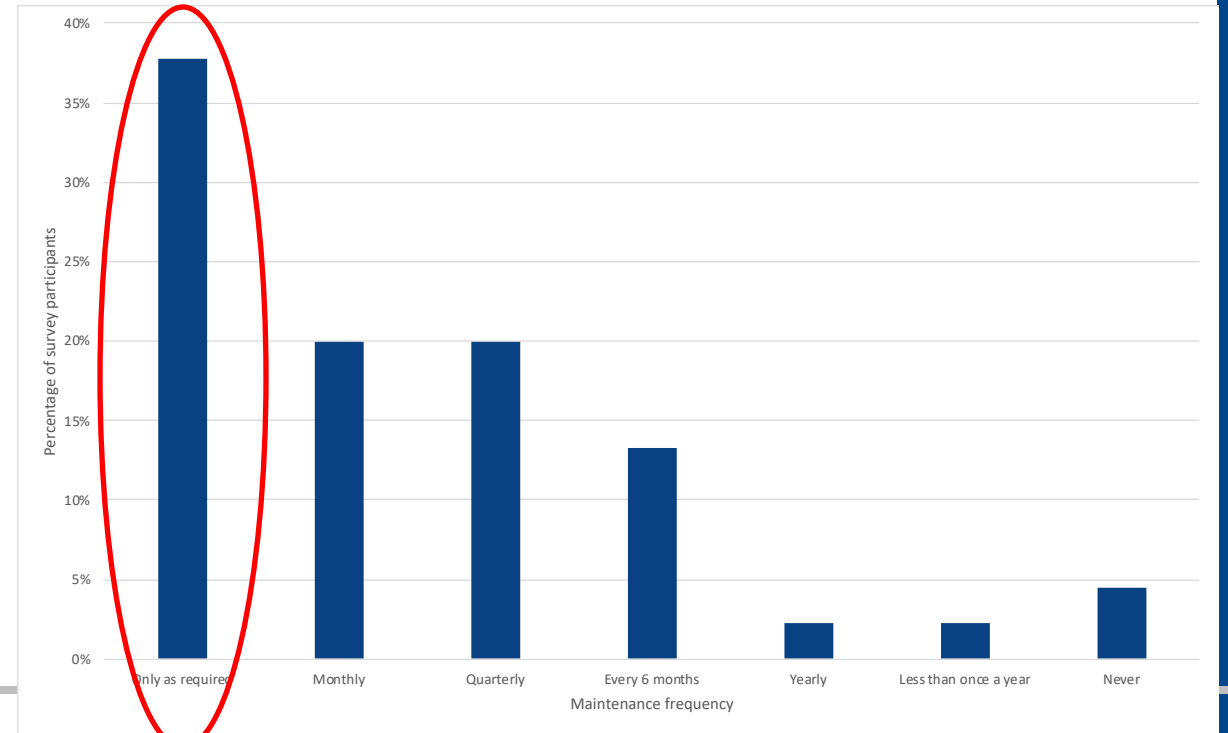
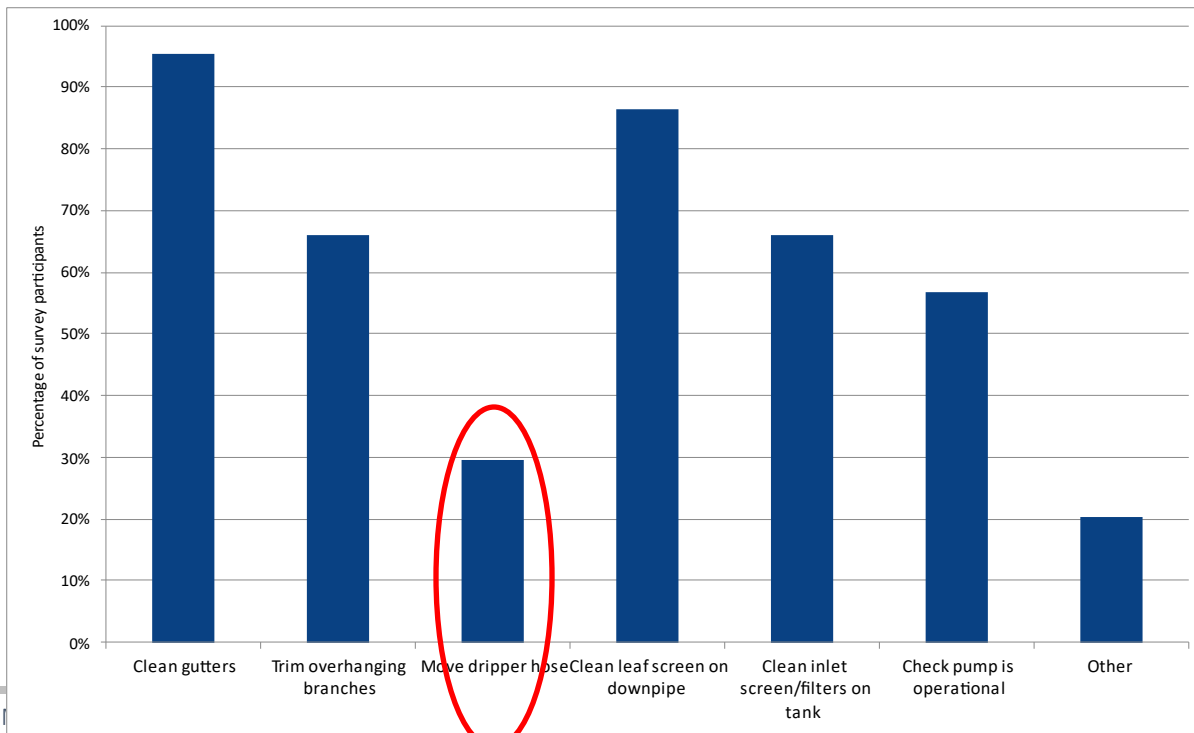
Pump malfunction

Most common cause of failure



# Lesson 6: Good intentions do not always translate into owner action

- Residents generally had good intentions to keep their tank systems functional
- Types and frequency of maintenance activities broadly appropriate



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- Frequency and types of maintenance activities broadly appropriate

## Considerations:

- Competing demands for time and money → repair lag
- Design a network with built-in redundancies

93%

Proportion of LSC residents who said it was important their tank was operational

15

Days to seek a repair to tank system

# Lesson 7: Build maintenance literacy

- Residents need to know how to look after their tank system, including frequency and cost of maintenance tasks

## Considerations:

- Common issues to arise
- Typical indicators of failure
- When and where to seek professional advice



# Lesson 8: Higher capital costs likely support more effective function

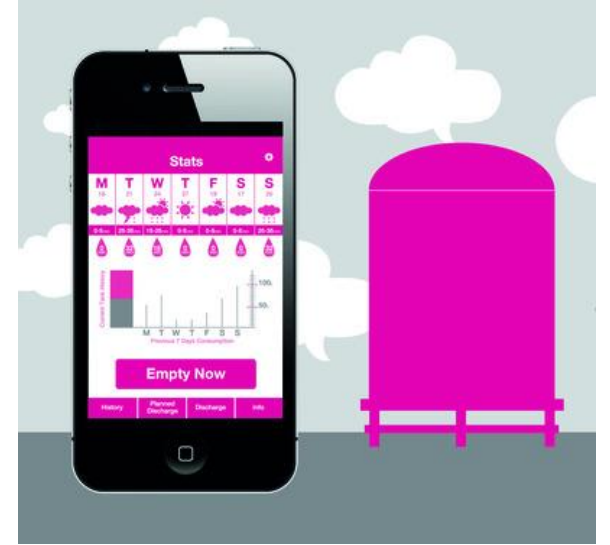
- Quality components → reliable operation and fewer inconveniences
- Savings in terms of repair & replacement
- Greater resident satisfaction

# Lesson 9: Make accommodations for the long-term engagement of asset owners

- Systems need to operate in perpetuity for waterway health
- Think beyond installation

## Considerations:

- Central repository of operation and maintenance information
- Updates on system performance and waterway health outcomes
- What happens when property ownership changes?



*Image credit: iota*

# Summary

- Community participation in urban water management increases complexity
- Voluntary participants tend to be motivated by environmental outcomes rather than financial benefits
- Cost, time and trust are key barriers
- Community advocacy can be powerful
- Residents need support to help them look after their WSUD assets
- Effective long-term operation relies on long-term engagement



# Looking ahead: Monbulk Creek Smart Water Network

1. Does real-time control translate to better system performance?
2. Does having a strong local connection to place or an iconic species increase community participation?
3. How can technology support greater resident engagement?

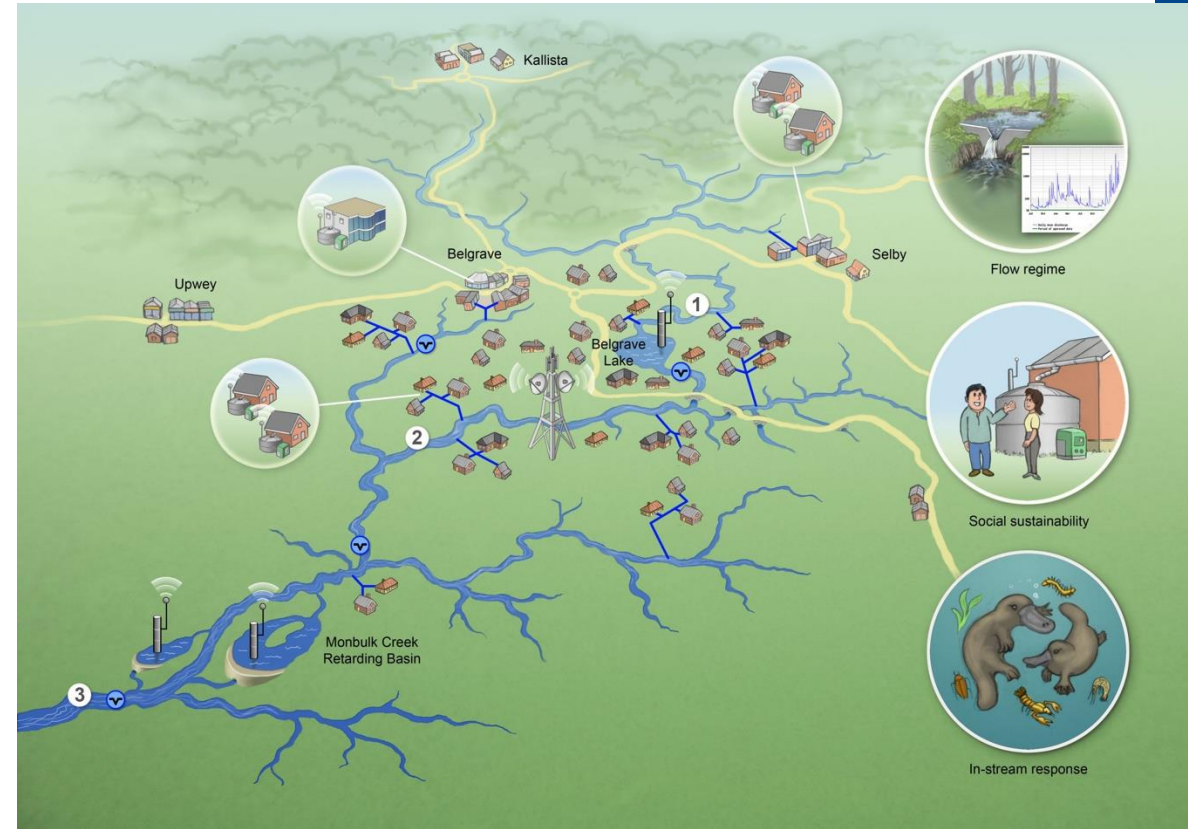


Image credit: Waterway Ecosystem Research Group

# Thank you!

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South East Water: Steve Muir & David Jones

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Melbourne Waterway  
Research-Practice Partnership

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