

The New Role for Councils: Driving an integrated green-blue approach

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What's wrong with this picture?

Conventional drainage =
missed
opportunity for
passive irrigation
and stormwater
treatment

**Constrained tree
pit and sealed
surface =**
unhealthy tree
and limited
canopy



Our existing urban design paradigm isn't working

Bringing together urban forest (**green**) and stormwater management (**blue**) thinking could help to solve the problems of both

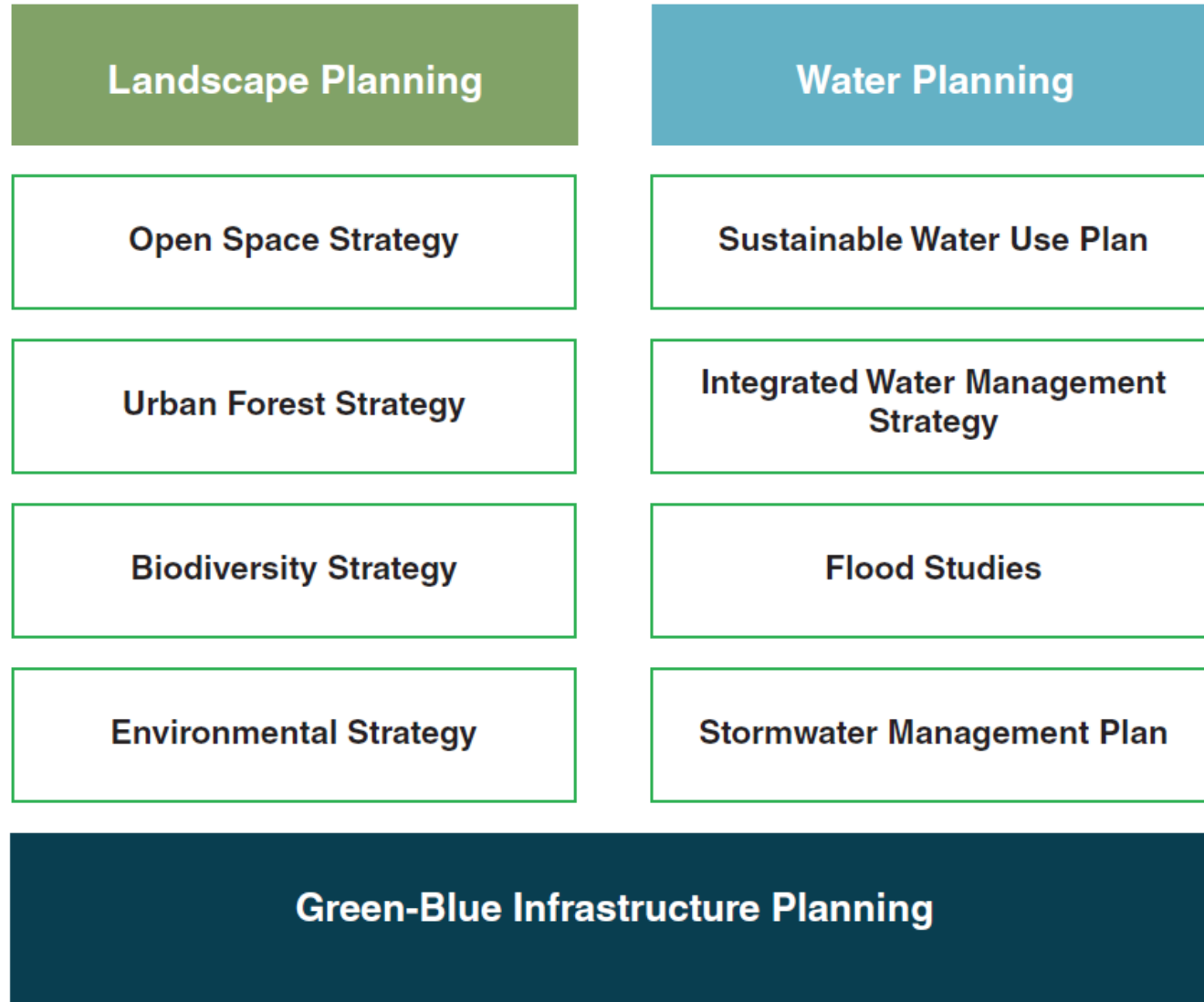
Green infrastructure,

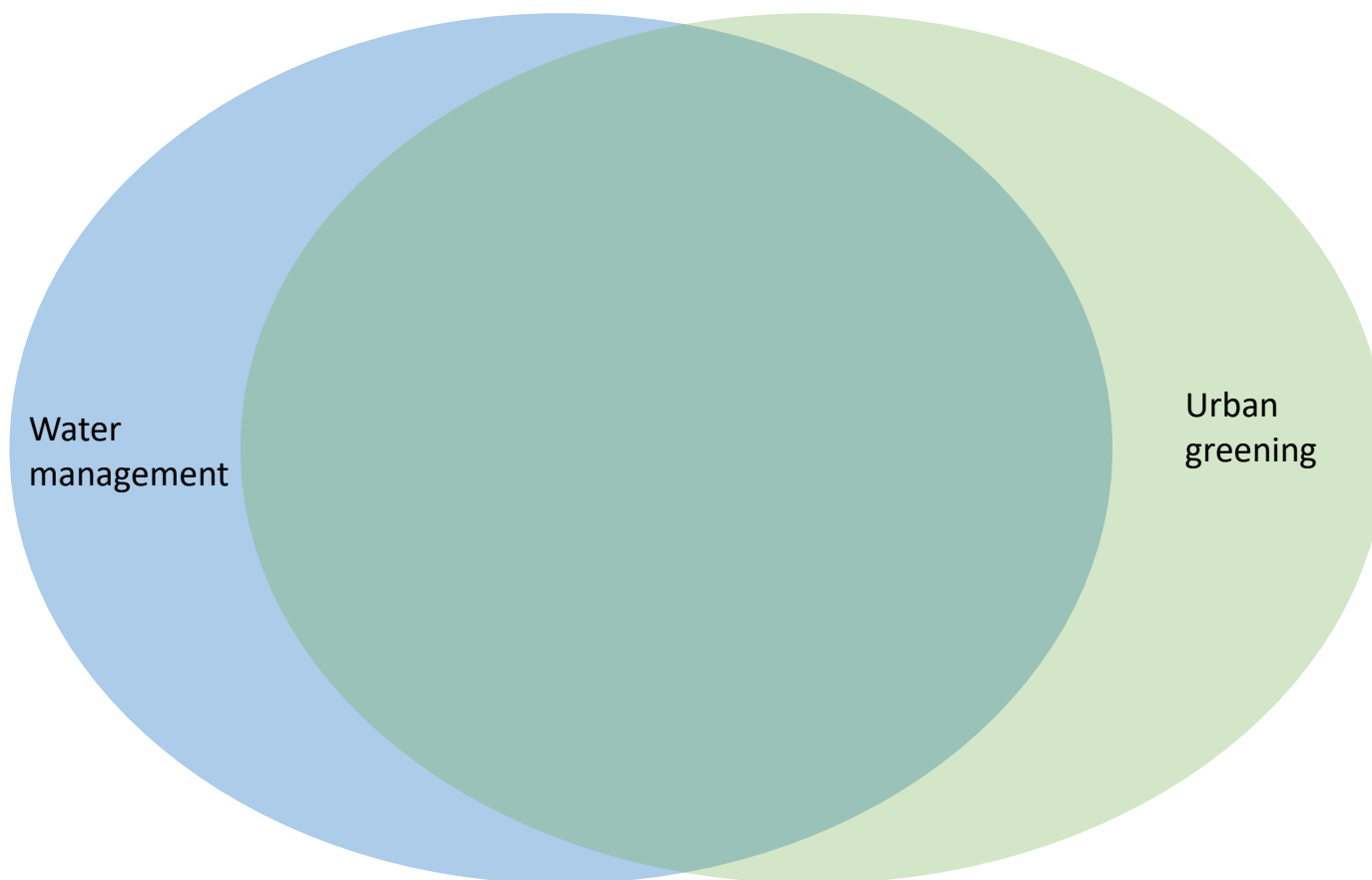
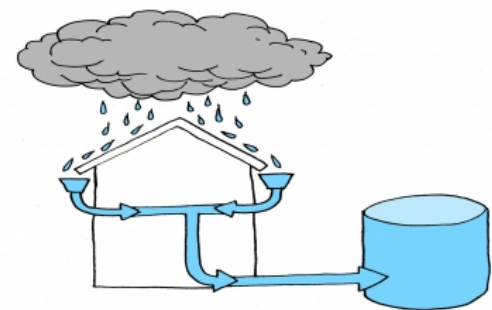
meet...

Blue infrastructure

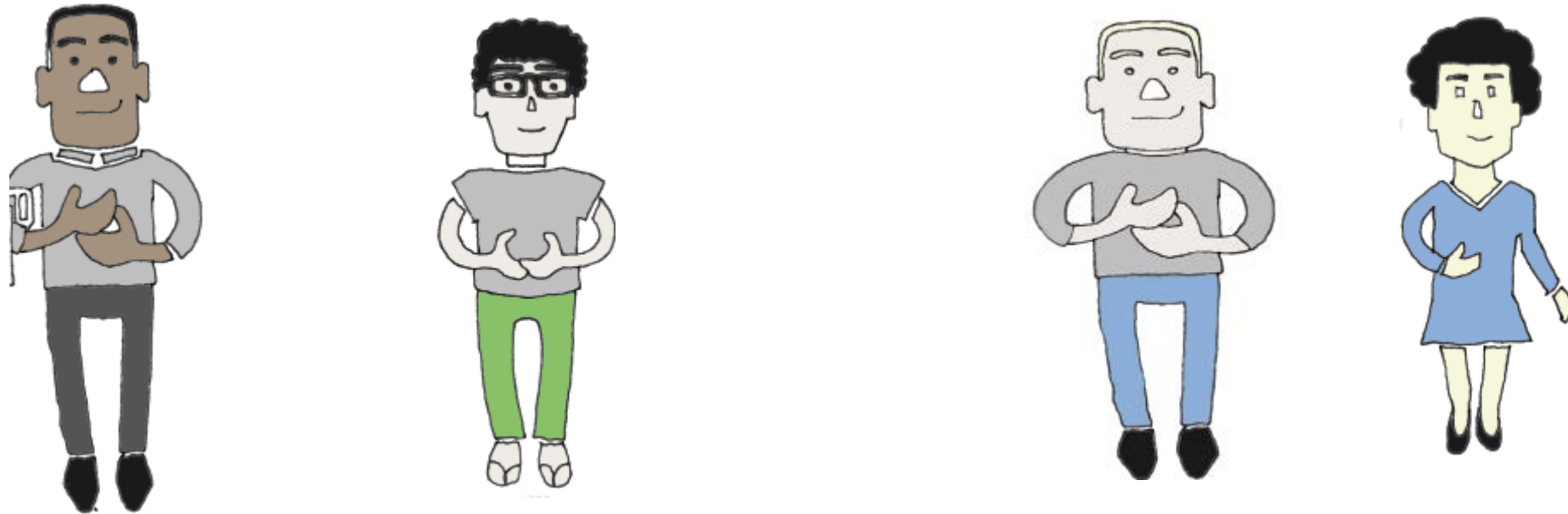


Mind the gap...



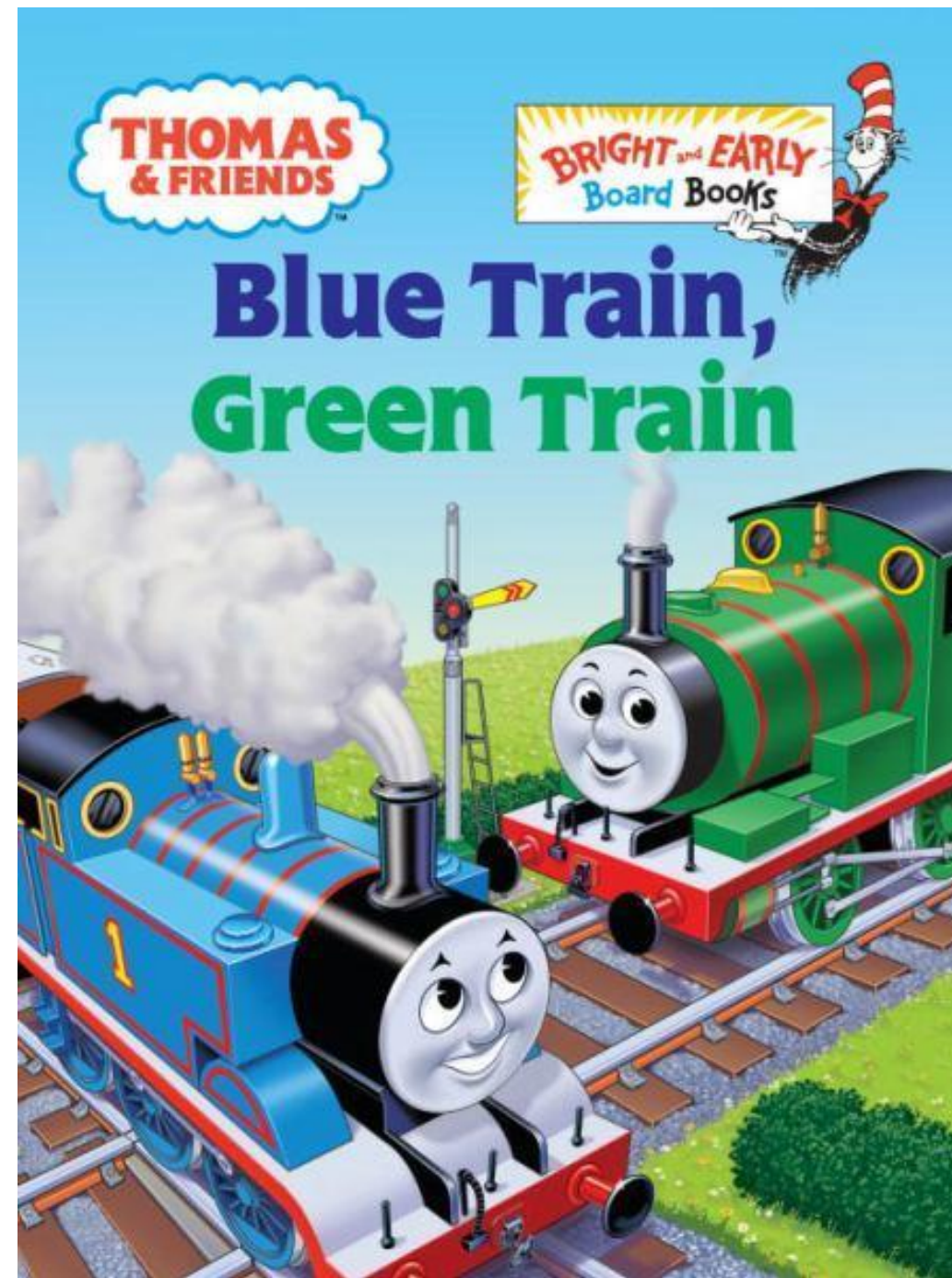


The key champions for green-blue thinking are within and between local government



On the same journey...

- 'Green' benefits offered by stormwater
 - Irrigation supply
 - Improved tree health and canopy cover
 - Enhanced microclimate benefit
- 'Blue' benefits offered by vegetation
 - Stormwater treatment
 - Flow attenuation
 - Local use of 'urban excess'



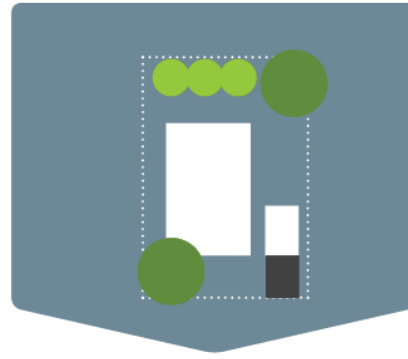
Quick stats on the power of green + blue

- **Microclimate** - Irrigated grass can be up to 15°C cooler than unwatered grass during the day.
- **Tree health and lifespan** - Access to good soil and water can increase the life expectancy of an urban tree from 13 years to 50 years.
- **Great landscapes** - Increases in property prices ranging from 1-15% have been observed in areas with tree lined streets or views of green space or water

Range of applications



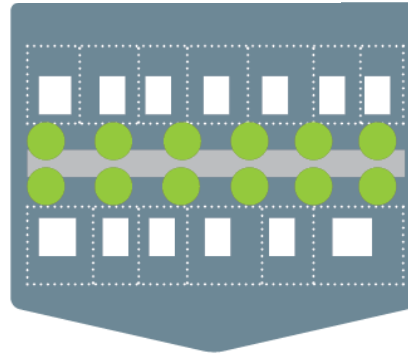
Private Realm



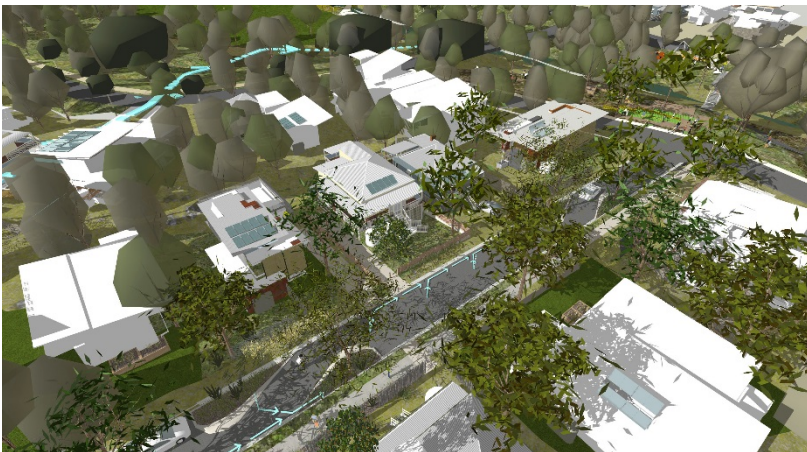
- Rainwater harvesting for garden irrigation
- Private raingardens
- Green roofs and green walls supported by harvested rainwater



Street and public space



- Passive irrigation of trees and gardens
- Raingardens
- Roadside swales
- Permeable paving supporting trees



Precinct / Suburb



- Ponds and lakes fed by stormwater
- Wetlands
- Sunken sports fields retarding flood waters
- Stormwater harvesting for open space irrigation
- Green corridors
- Community gardens with rainwater harvesting

Integrated Water Management Framework for Victoria

An IWM approach to urban water planning and shared decision making throughout Victoria



Working Draft for Consultation
November 2016

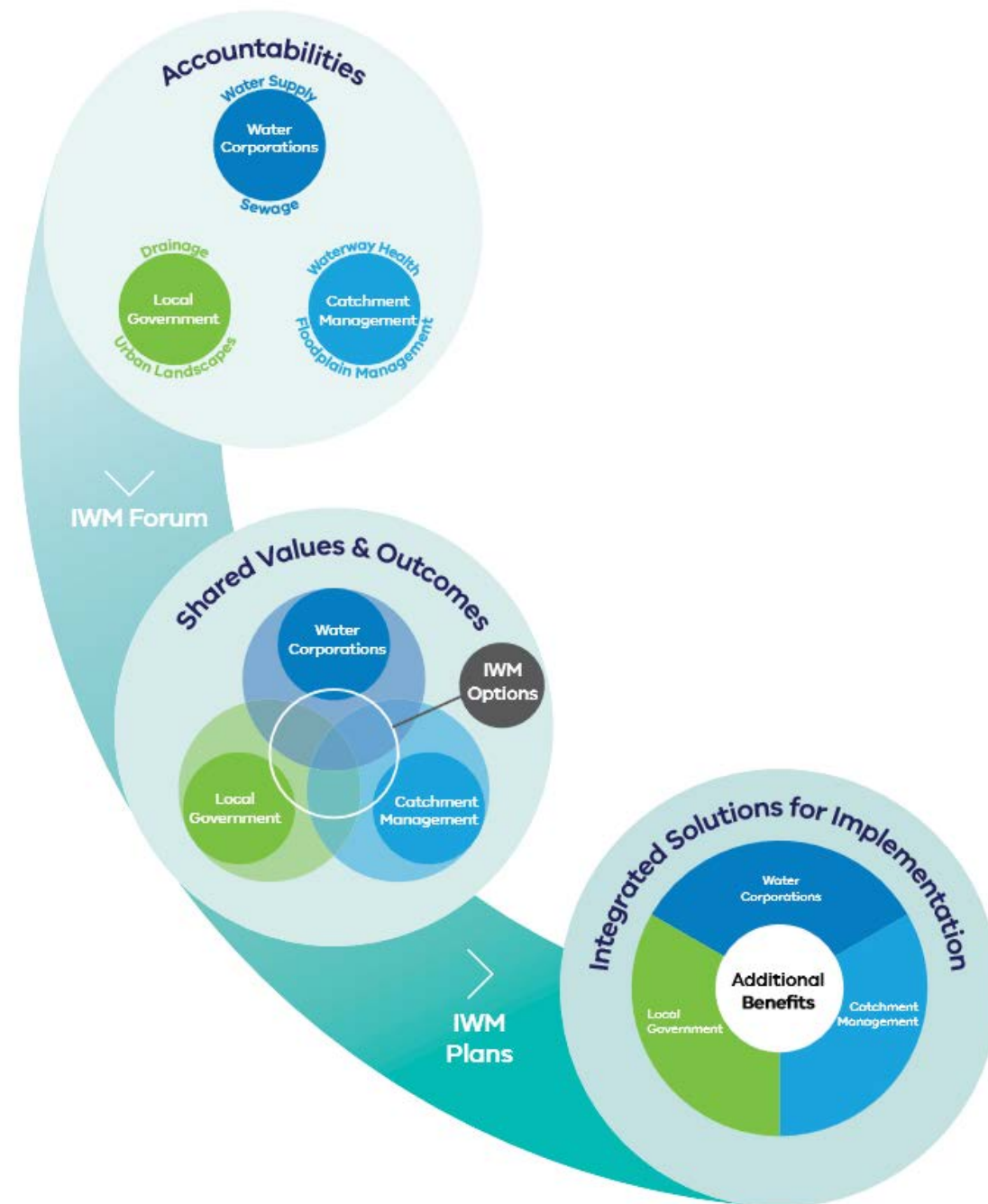
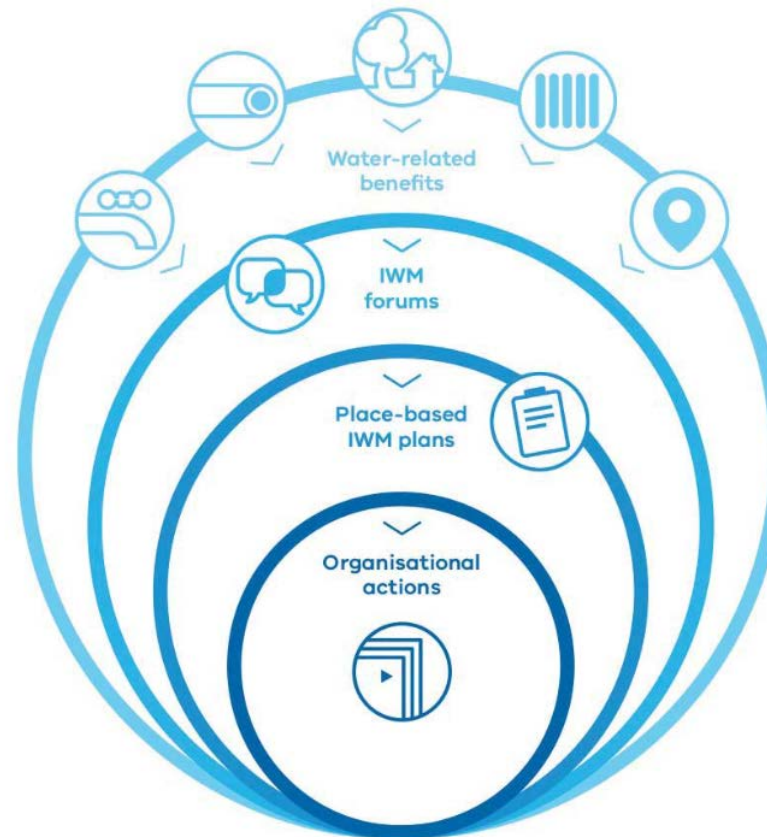


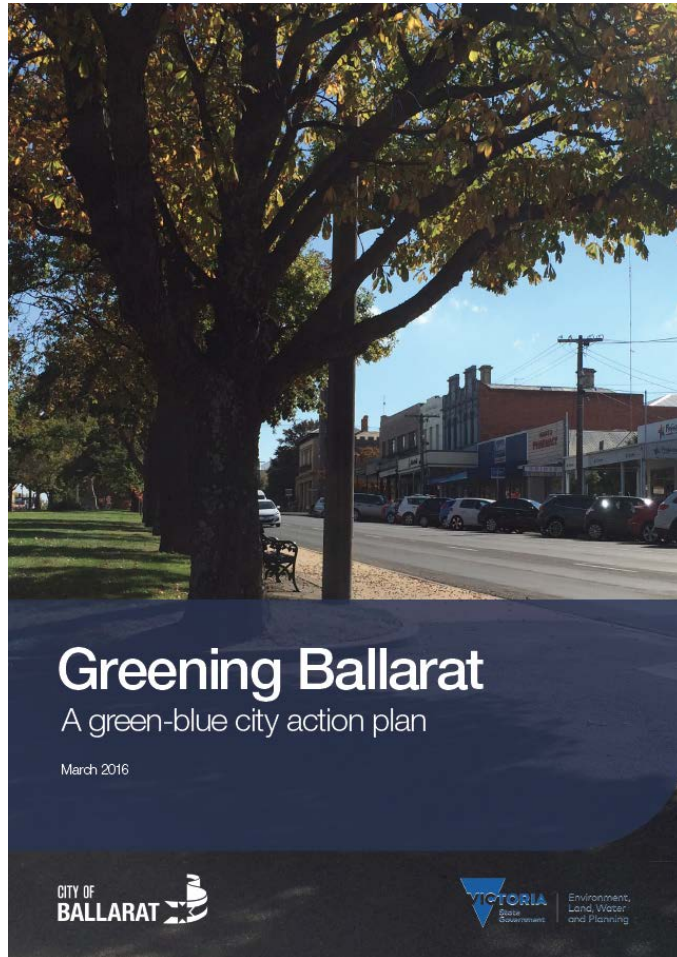
Figure 2: Water-related outcomes to deliver resilient and liveable cities and towns. *Source: Water for Victoria*



Figure 3: Integrated water management planning. *Source: Water for Victoria*



Three in one: Summary of three studies



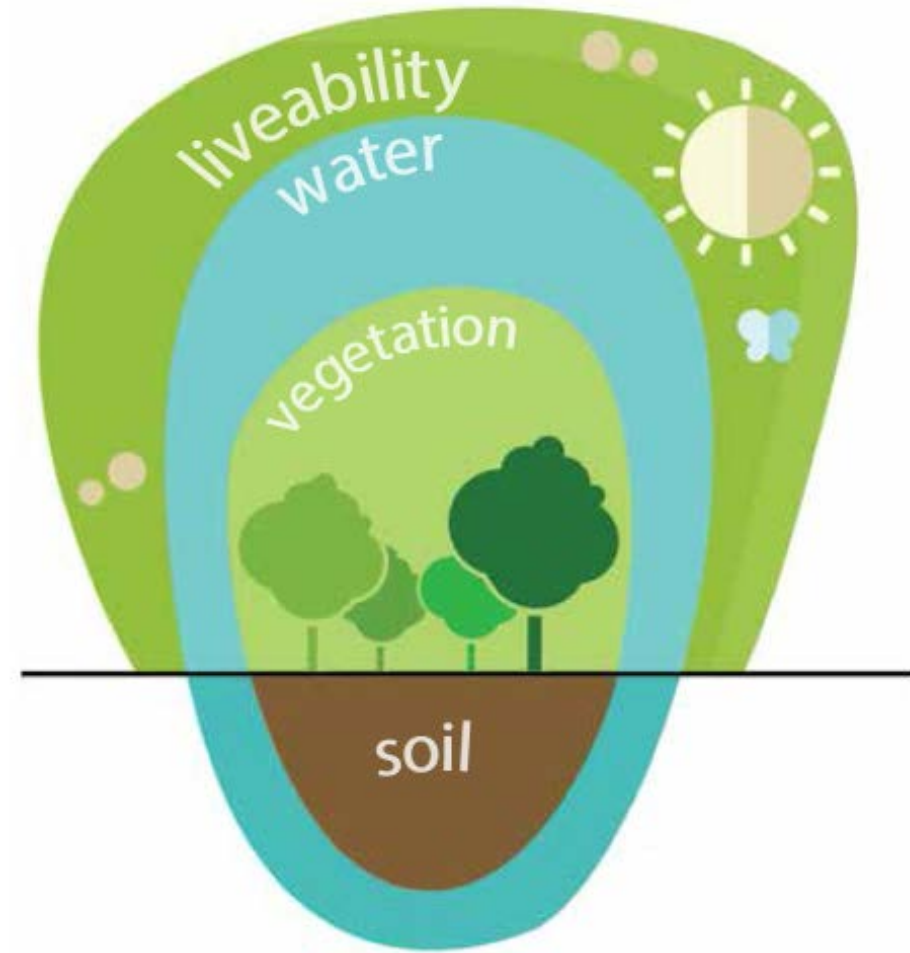
Case study 1: Ballarat CBD streets

City of Ballarat was the first council to explicitly develop a strategy to implement green-blue solutions:

A plan to reduce, slow down and treat stormwater runoff as part of an urban water catchment approach

and

support the implementation of an urban forestry and living corridors approach in Ballarat.



Urban street trees – facing a range of problems



Limited soil volume restricting tree growth



Clash of tree canopy with powerlines resulting in substantial cut back of canopy and an unbalanced tree



'Island' around tree prevents entry of water from the adjoining road, restricting passive irrigation and limiting soil moisture

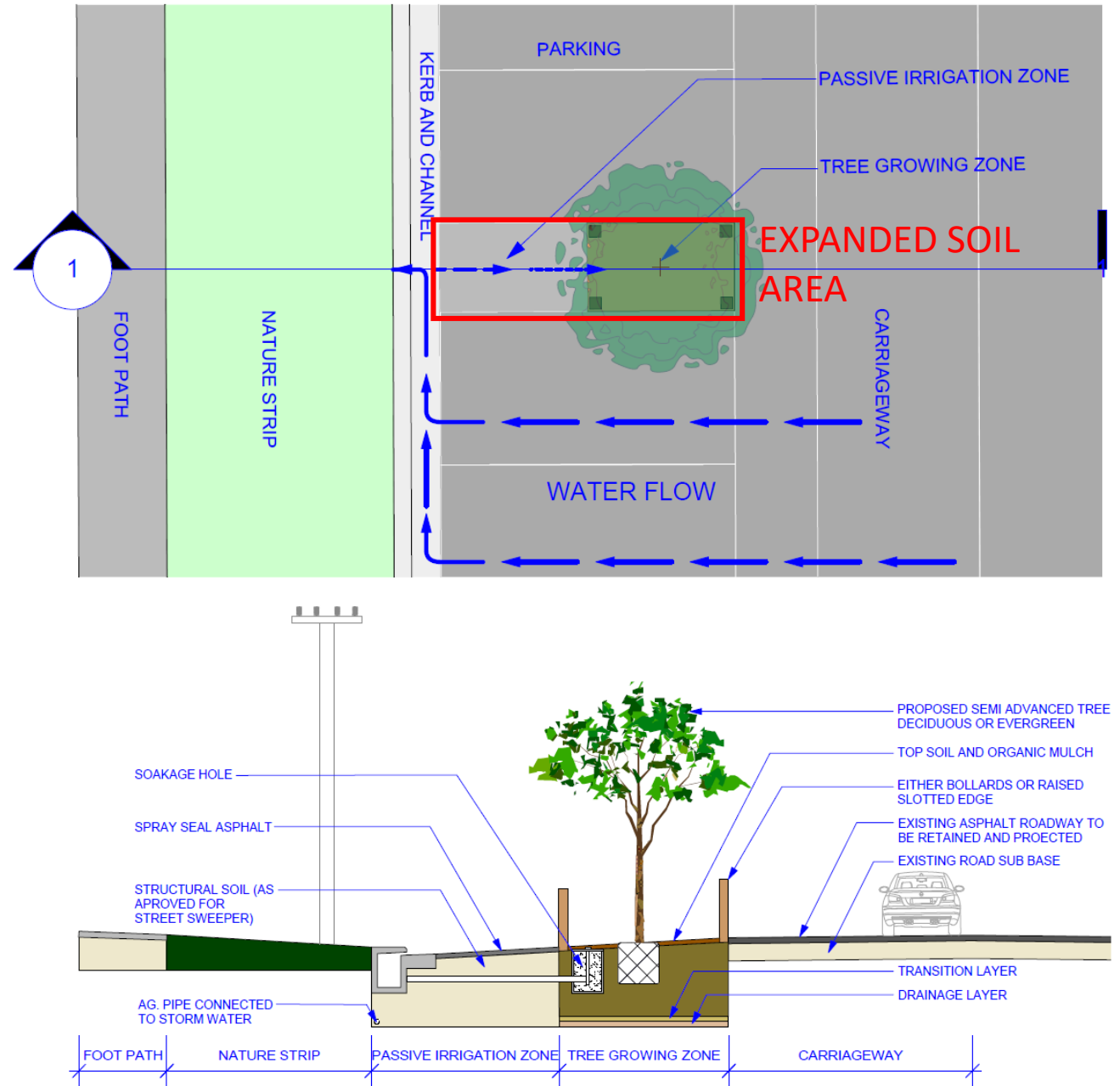


Difficulties in managing leaf litter as street sweepers cannot access gap between tree 'island' and kerb

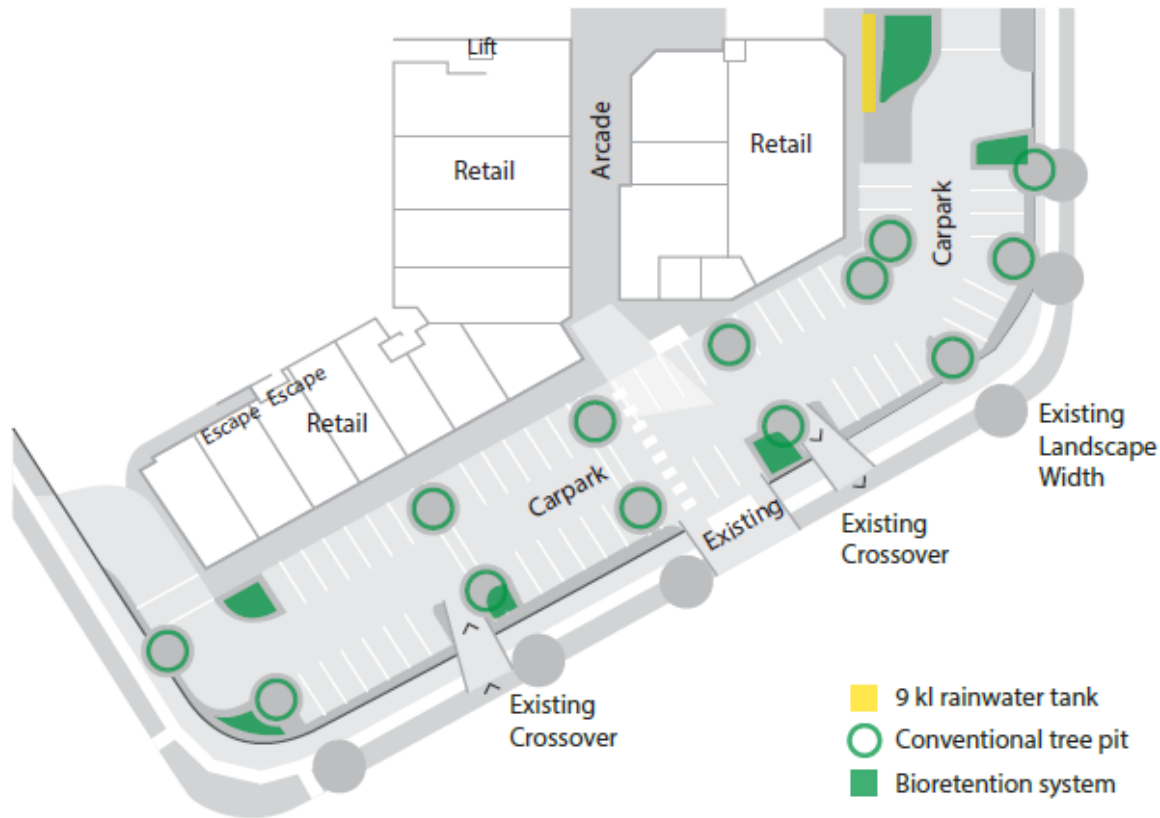
Green-Blue proposal

Stormwater channelled from kerb into infiltration well within expanded soil area

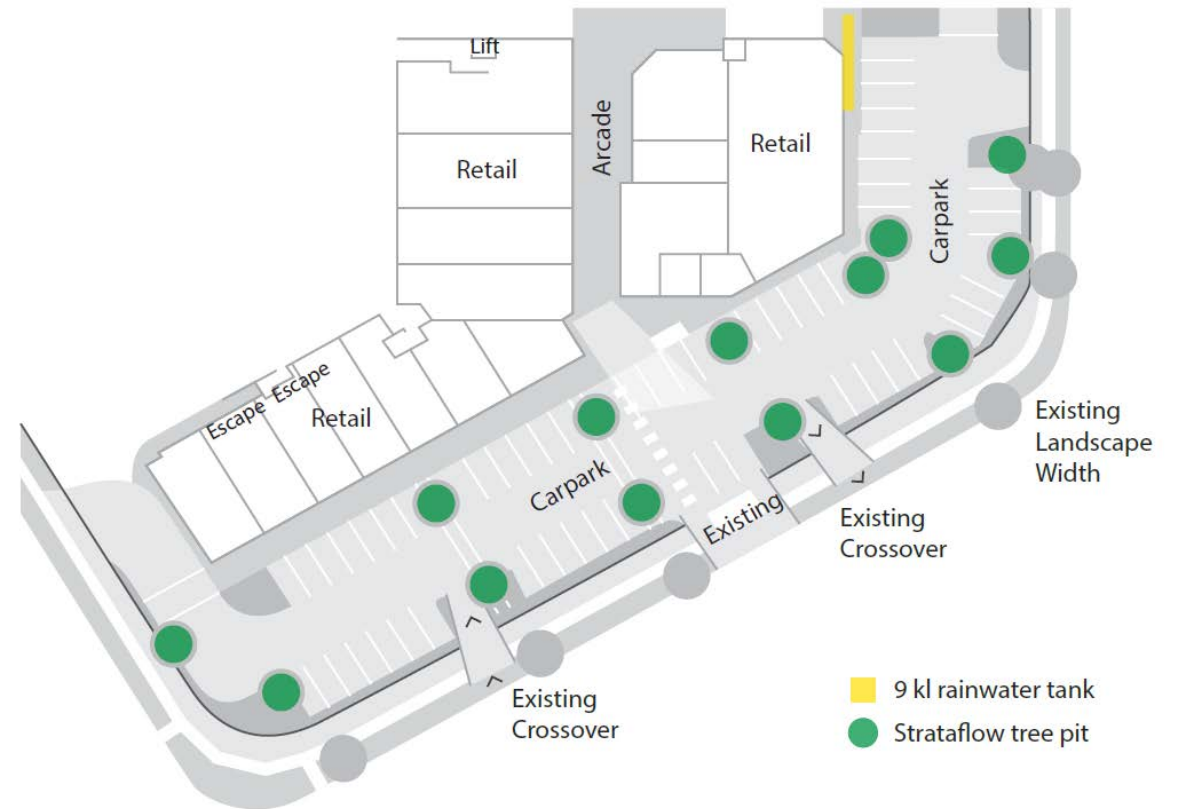
- ✓ Creates a larger soil area for the tree, preventing pavement uplift
- ✓ Could create additional parking
- ✓ Provides irrigation water to support the new tree
- ✓ Intercepts stormwater runoff and meets best practice stormwater treatment standards
- ✓ Moves tree away from kerb to aid street sweeping
- ✓ Reduces clash of tree canopy with power lines



Case study 2: Combining stormwater management with tree pit design in Brisbane retail carpark



Base case: Conventional trees with separate bioretention areas to meet stormwater treatment requirements



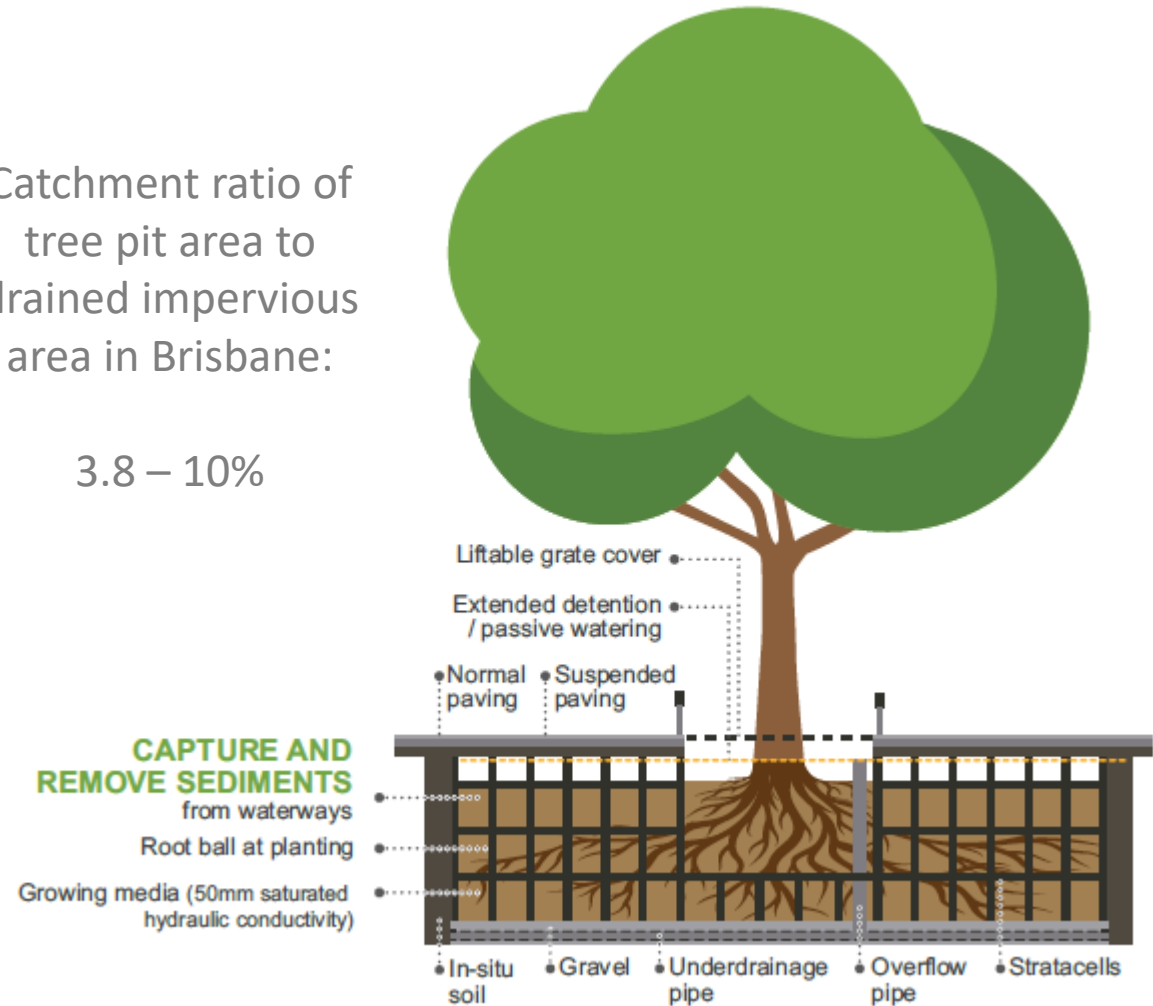
Test case: Trees with 'strataflow' tree pits that have enlarged soil areas designed for stormwater

How can tree pits be used to manage stormwater?

- An advanced structural tree pit with a large soil volume can be modified to capture stormwater.
- Soil volume sized to match needs of tree and size of stormwater catchment.
- Soil media, underdrainage and extended detention depth designed to optimise treatment.

Catchment ratio of tree pit area to drained impervious area in Brisbane:

3.8 – 10%

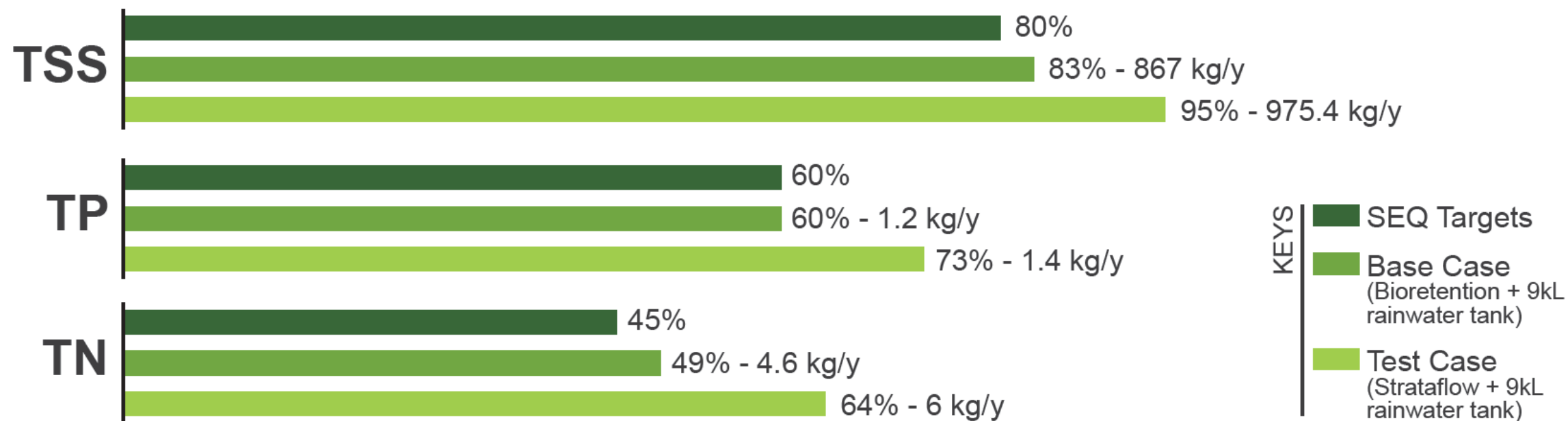


Strataflow system by CityGreen

STORMWATER TREATMENT PERFORMANCE

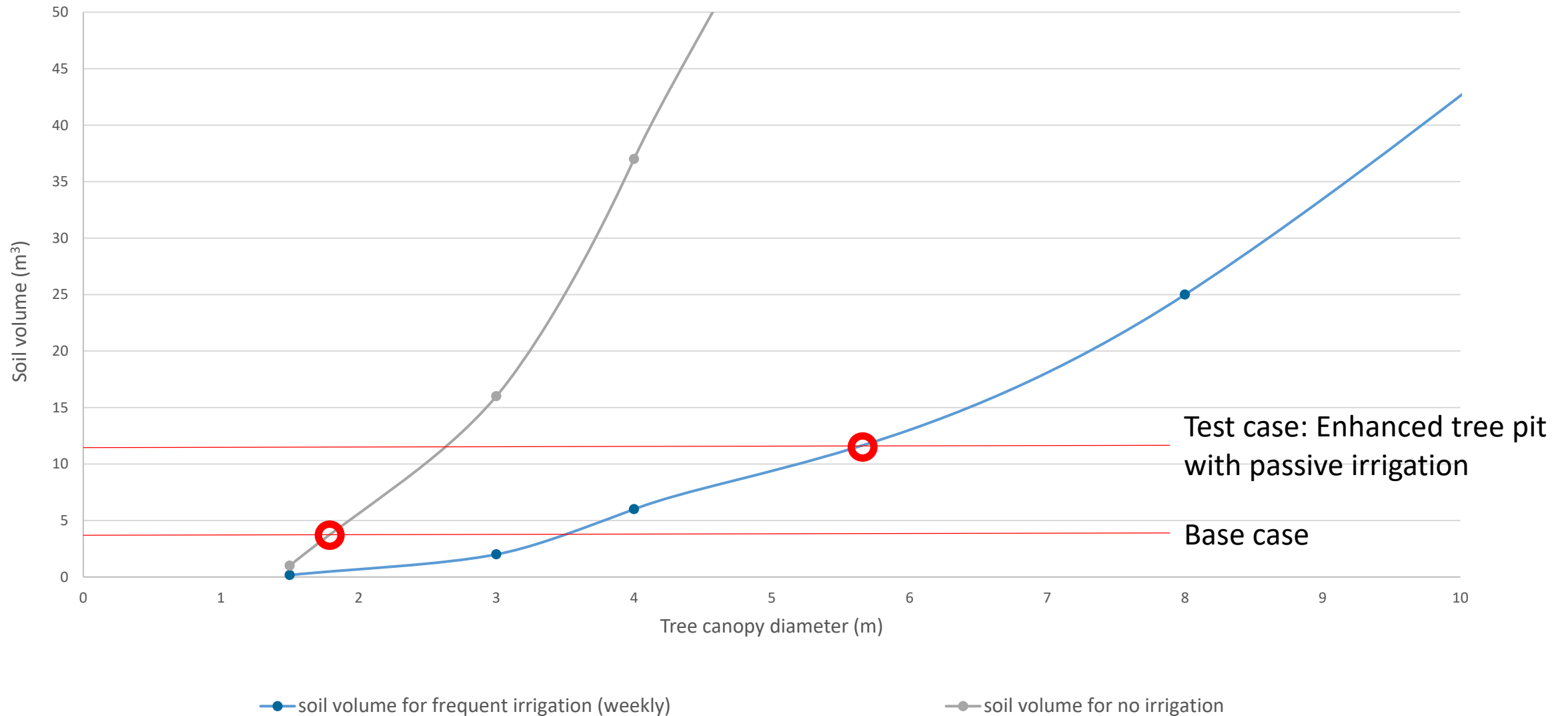
DEVELOPMENT TYPE: Small scale commercial with carpark

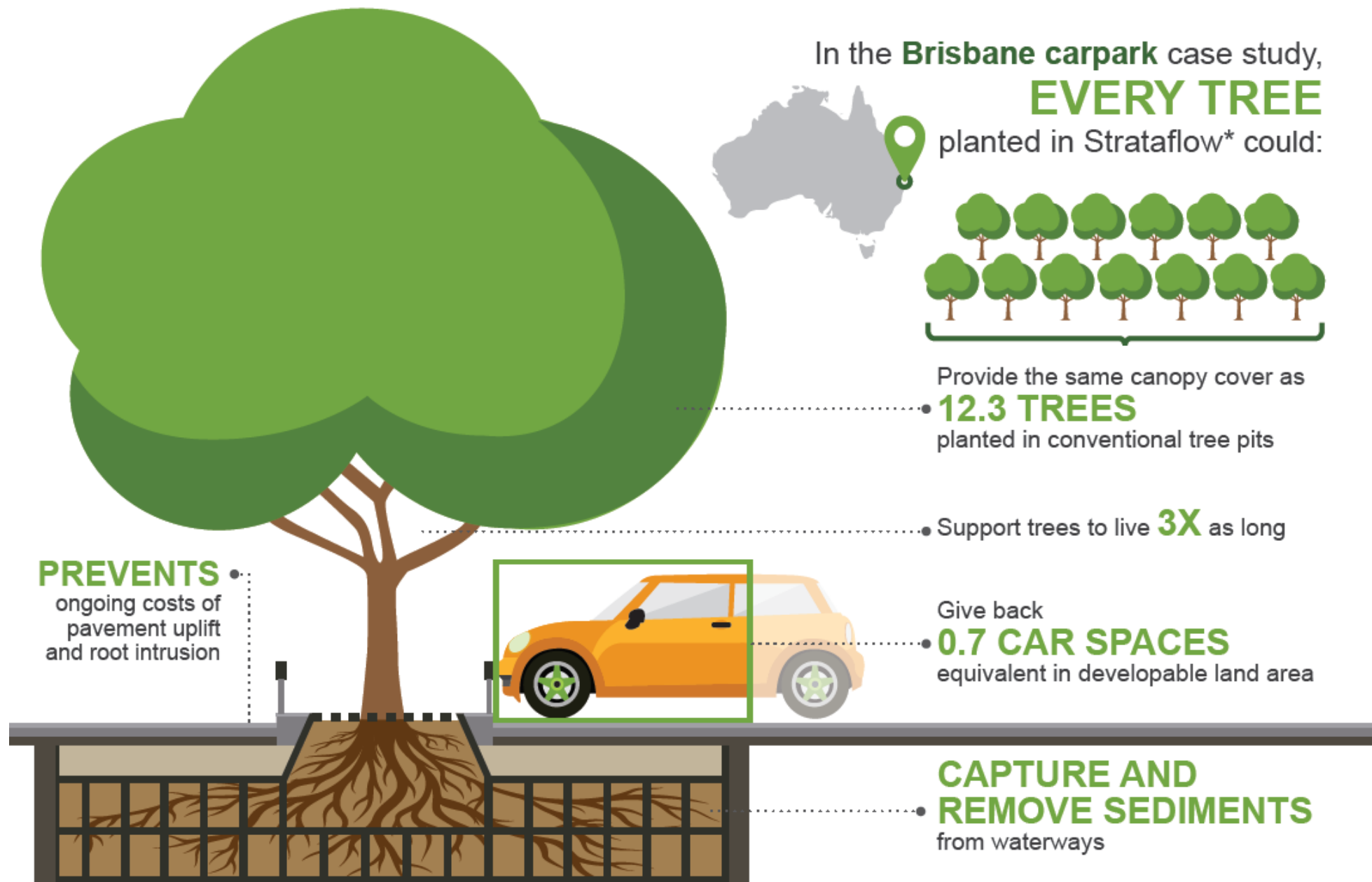
SITE AREA: 0.42 ha - 98% Impervious



Step-change in expected tree canopy cover

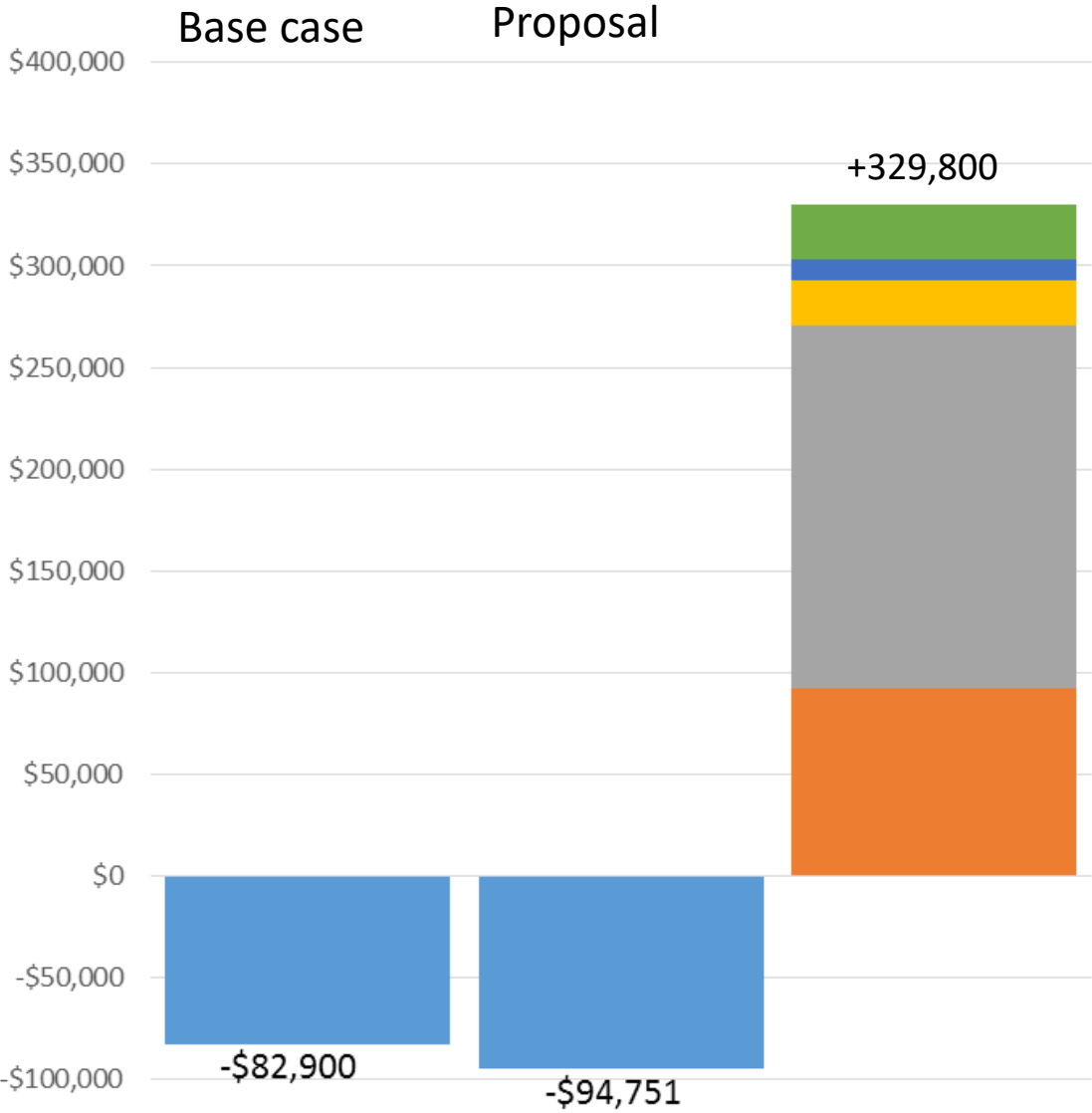
Comparison of soil volume, canopy and diameter for a containerised tree pit - Brisbane





*sized for both tree health and stormwater management

Comparative cost-benefit of base case and City Green proposal -
Brisbane Carpark



	Base case cost	Proposal cost	Proposal benefit
Avoided maintenance costs			\$27,000
Avoided tree replacement costs			\$10,000
Additional stormwater treatment			\$22,400
Additional tree canopy benefit			\$178,400
Land value benefit			\$92,000
Capital cost	-\$82,900	-\$94,751	

Net benefit for proposal: +\$235,049

Case study 3: Ballarat - Victoria Park



Key recreational and tourism asset



Increasing demand for irrigation water is expected (up to 10ML/year) as improved ovals and sporting grounds are introduced to the park. Provision of water to existing trees is also a priority.



The park experiences flooding of roadways and some green areas in significant rainfall events.



Maintenance of the amenity of existing ponds is a concern, as algal blooms have been known to occur on occasion due to the inflow of untreated stormwater.



Existing drainage channels could be enhanced to provide better amenity and biodiversity value while also aiding stormwater treatment.

Green-Blue proposal

Wetland treatment and stormwater harvesting for oval irrigation

- ✓ Stormwater treatment through wetland and swale, providing a 96% reduction in suspended solids from catchment
- ✓ Flood mitigation provided, avoiding construction of retention valued at \$250,000
- ✓ 10ML of irrigation water provided to new ovals, saving \$18,000/year for council
- ✓ Added amenity by supporting green landscapes and protecting against algal blooms





So what do councils need to do?

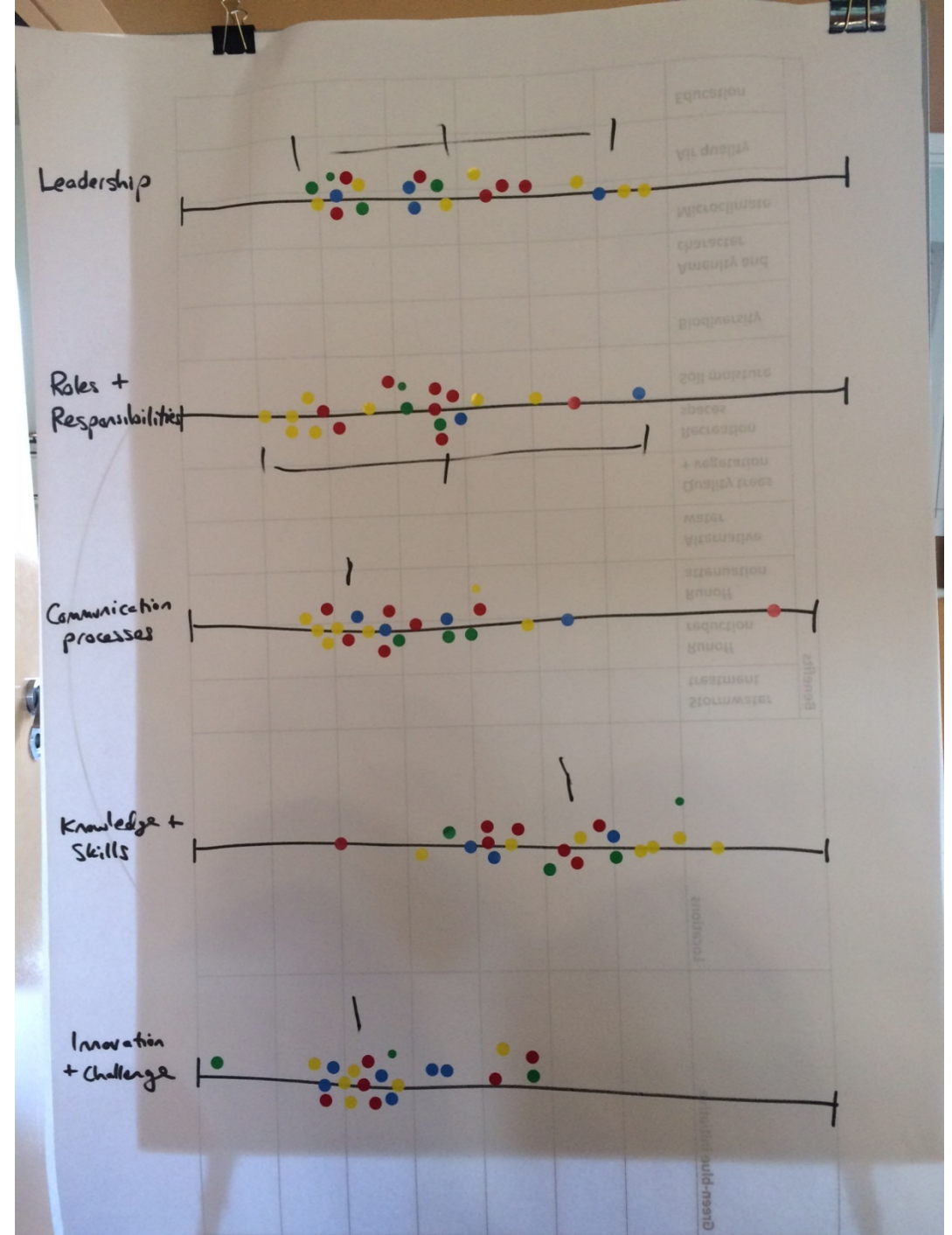
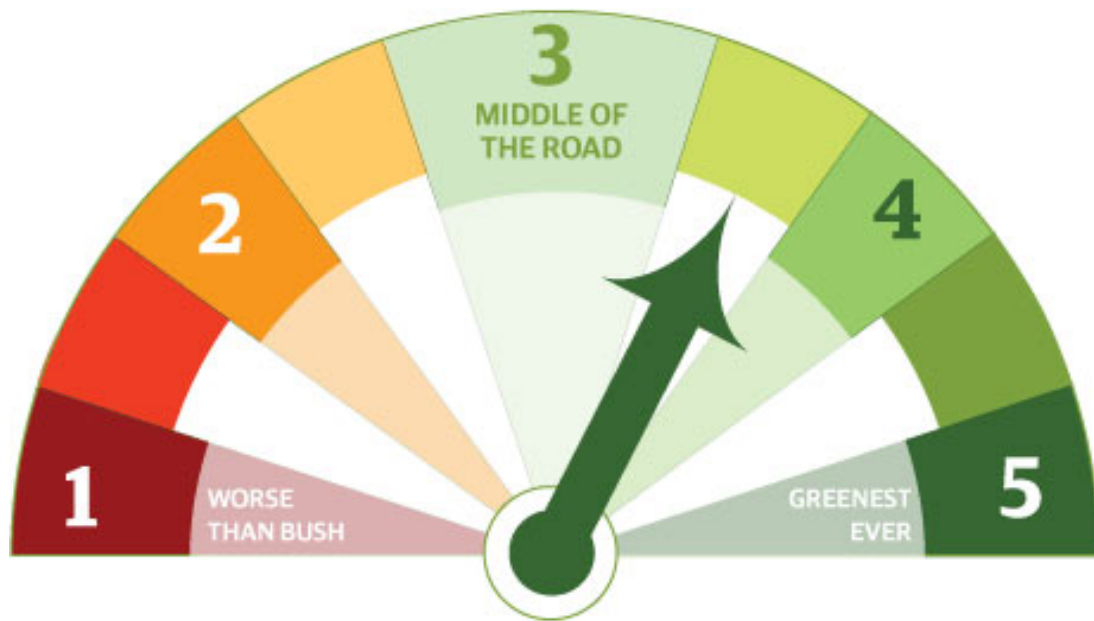
Best value opportunities for Ballarat

- **Seek multiple benefits:** Case studies show that integrated design solutions 'stack-up' when based on multiple objectives
- **Ensure greening initiatives don't forget water:** Strong 40% canopy target could be delivered in many ways – the least cost way won't be the best value
- **Link with place-making:** The best initiatives will play a core role in the Ballarat Strategy – focussing on places that are key for community and economic value
- **Culture will drive practice:** A lot of opportunities just require re-consideration of standard practice, but are simple solutions.
- **Make renewal and new development work hard:** Growth areas are an opportunity to set new standards of expectation and to deliver cost-effective infrastructure.

Action needs to tackle 5 factors

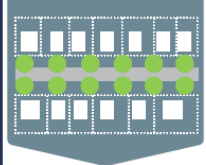
























1. Leadership
2. Requirements and responsibilities
3. Communication processes
4. Knowledge and skills
5. Innovation and challenge

Each journey is different



Ballarat Action Plan – Top Five Commitments

1. 5-year capital investment plan (\$1 million+) in key public areas, including roads, open space and carparks
2. Commitment to 50% of new trees provided with passive irrigation
3. Amendment of planning scheme to broaden water management requirements for new development
4. Instalment of a new council staff member to drive new approach
5. Develop practice notes for new standard designs for public and approved works.

Scale		Recommendation total 5-year additional allocation								
<div>Streets, squares and carparks</div> 		\$750,000								
		KEY:								
		New capital allocation required								
		Top-up may be required to existing allocation								
		Investment can likely be made through existing allocation								
Recommended annual capital works allocation (\$000)										
Project Type	Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Performance		
Passive irrigation of trees and gardens	Creswick Rd (with Vic Roads)		120	120			240			
	Howitt St (with Vic Roads)				120	120	240			
	Armstrong St		30				30			
	Dawson St				30		30			
Raingarden tree-pits	Wendouree sport prec. carpark	n/a	n/a				70			
	Lucas Hub carpark		n/a	n/a			15			
	Bonshaw Creek Hub carpark				n/a	n/a	15			
	30 CBD Nibs	70	70	70			210			

No need to reinvent the wheel...

- How-to guide to planning green-blue cities for regional cities
- Equally applicable to metro areas
- Includes case studies from Ballarat and elsewhere
- Available from:

iwm.branch@delwp.vic.gov.au



1. Set the scene

Context review
Identify your local drivers
Set a vision

2. Scope the possibilities

Map the data
Explore the options
Identify a selection of typologies
Test the selected typologies

3. Plan delivery

Prioritise green-blue infrastructure projects
Review delivery factors
Set actions
Monitor success



Questions?