



WSUD Policy and monetising the benefits

Mellissa Bradley, Program Manager

Environmental Engineering Society
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What we provide:

- WSUD policy development and implementation pathways
- specialist training
- networking opportunities and peer-to-peer
- more accessible WSUD research for practitioners
- guidelines and tools
- information sharing through our website, e-newsletter, blog articles and forums.



Angas Street, Adelaide adjacent SAPOL
Photo: Water Sensitive SA

Water Sensitive SA Program Partners WATER SENSITIVE SA



Natural Resources
Adelaide and Mt Lofty Ranges

LOCAL GOVERNMENT RESEARCH & DEVELOPMENT SCHEME



Water sensitive communities



Liveable

Green and blue natural landscapes enhancing human health and wellbeing

1°C

↑ in daytime temp. ↑ can increase cooling demand in Adelaide's CBD by 1.5 million kWh per year = 1000 tonnes in CO₂ emissions

10%

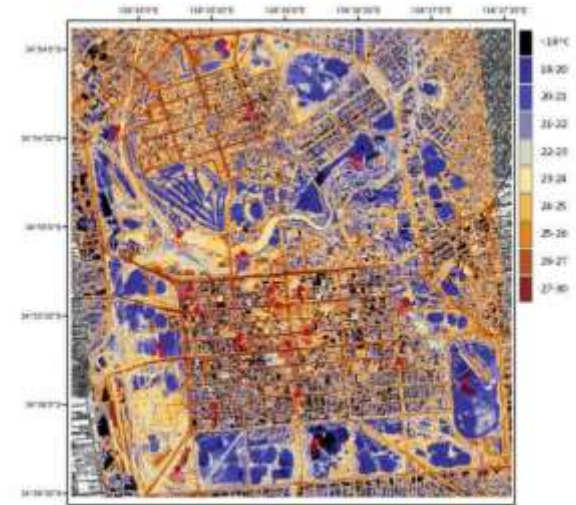
↑ in tree cover gives a reduction in land surface temp of between 0.5 – 1.0°C

43°C

threshold temperature for Adelaide above which mortality rates increase by 2- 10%

40%

community less likely to be overweight living in greener neighbourhoods (European study)



Surface brightness temperatures of the CBD and North Adelaide in the early hours of 7 March 2011 – Source: Flinders University

Liveable



Lightsview infill development

Source map: www.lightsview.com.au



Water sensitive communities



Resilient

- integrated infrastructure provides protection against flooding
- diversity of water sources = security
- freedom from water restrictions.
- treated sewage effluent - a non-climate dependent resource.



No easing yet for SA watering bans

Updated 10 Nov 2009, 8:11am

Water sensitive communities



Sustainable

More healthy natural ecosystems in urban environments

77%

Stormwater contribution to total annual load of sediments to marine waters = 6,180 tonnes.

150t

Stormwater contribution of stormwater to the marine environment p.a.

56

No. of ASR schemes operating in the Greater Adelaide area as at 2012, recharging groundwater.

10%

Impervious cover at which stream health is impacted



Bowden Urban Village.



Source: clear.uconn.edu. Centre for Land use education and research, Connecticut.

30 Year Plan for Greater Adelaide



- 70% of new housing stock from infill development and
- remaining 30% from greenfield sites
- 258,000 net additional dwellings in Greater Adelaide (including Murray Bridge) by 2040.
- population increase of 560,000
- downward trend in median allotment sizes
 - 375 m2 in 2011-13 compared with
 - 520m2 2002-03 (UDIA, 2013)



Dana McCauley Stonnington Leader

Water sensitive communities



Productive

Enhance productivity and economic prosperity

- food production, and irrigated crops,
- deferring / eliminating infrastructure augmentation
- avoiding operating costs for potable supply schemes
- Enhancing tourism and commercial centres
- strategic and opportunistic investment in infrastructure renewals
- market advantages for residential developers



Adelaide Zoo entrance

SA WSUD Policy



- Is it being implemented?
- What more could be done?
- Where does Water Sensitive SA fit?



Dunstone Grove, Linde Reserve Source: Baden Myers



Franklin Street Photo: City of Adelaide

Water Conservation

Demonstrated compliance with South Australian residential building requirements for water efficiency.

Non-residential: water efficient techniques in commercial, industrial and other non-residential urban settings.

Irrigated open spaces: best practice irrigation management in outdoor irrigated open spaces.

- Optimal Rainwater tank size supply reliability,
- Optimal storage sizes to retain pre-development runoff
- Ministers Specification for on-site detention
- Incentives needed for commercial and industrial



Flood management



capacity of the existing drainage system is not exceeded.

no increase in the 5 year ARI peak flow compared to existing conditions.

no increase in flood risk for the 100 year ARI peak flow, compared to existing conditions.



Bowden Urban Village

Source: Water Sensitive SA



Kirkcaldy Avenue, Grange

Source: Baden Myers

Stormwater Runoff Quality



45%

retention of typical annual urban load of total nitrogen.

60%

retention of typical annual urban load of total phosphorus.

80%

retention of typical annual urban load of suspended solids.



Caltex, 734 Marion Rd, Marion

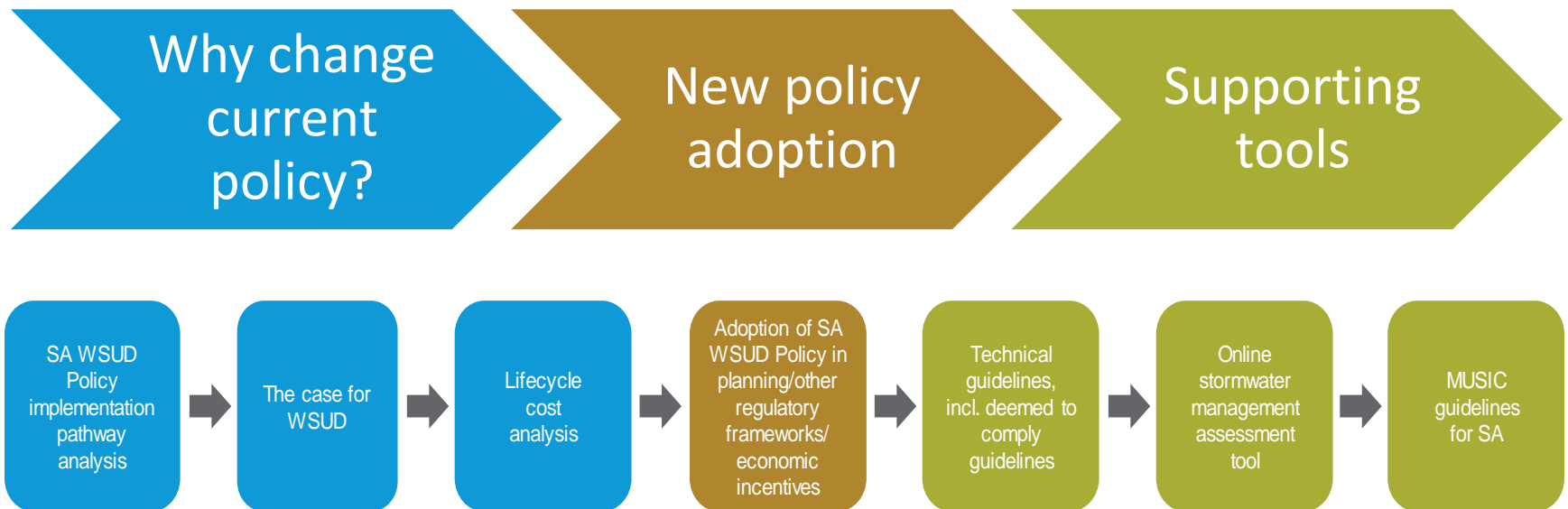
Source: Baden Myers



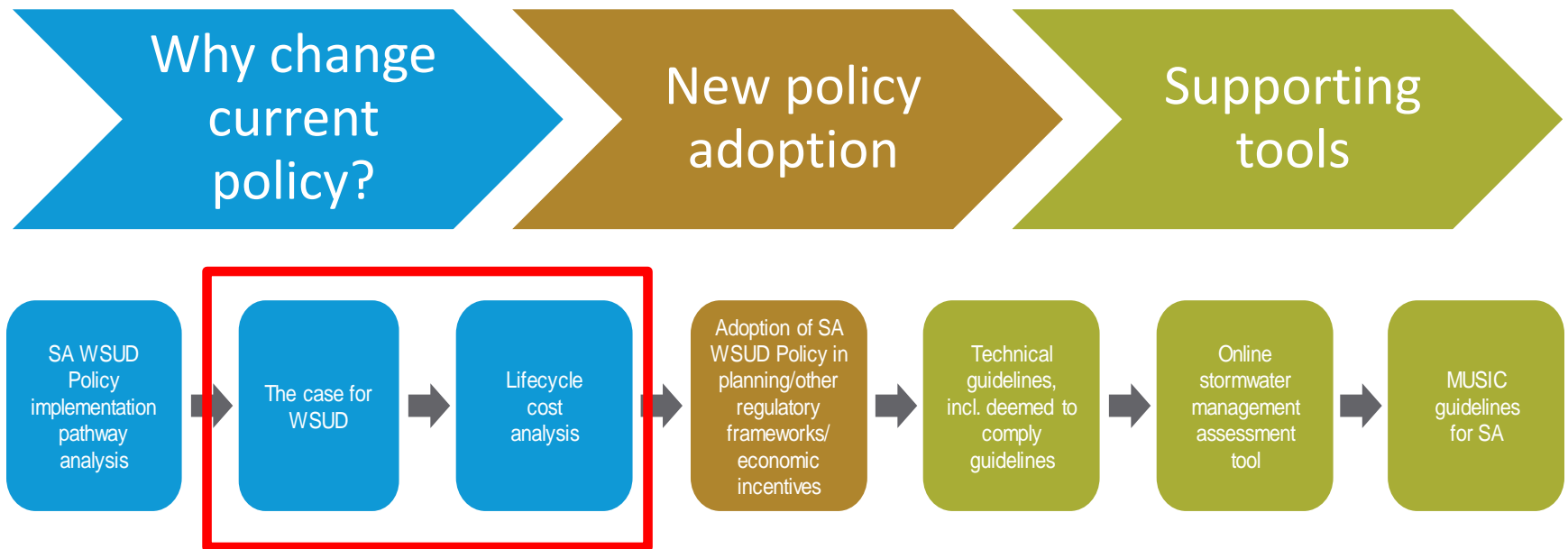
Cooke Reserve, Royal Park.

Source: City of Charles Sturt

Bringing about change...



Bringing about change...



Cost-benefit analysis tool

Urban design and water management solutions at a range of scales, with the lowest community cost

- ◆ Transparent framework – determining multiple benefits and costs of WSUD
- ◆ Lot scale to catchment scale projects
- ◆ New development, infrastructure capital works / asset renewals and retrofits
- ◆ Demonstrate:
 - who pays
 - who benefits
 - what changes to the urban water cycle are required
 - what are the community benefits



Christie Walk

Source: Baden Myers

Impact / Benefit - monetised



Western Sydney households
willingness to contribute to
recycled water schemes
\$0.45 - \$1.22/kL.

Marsden Jacobs Associates (2007)

Abatement cost Total
Suspended Solids removed
via Swales \$20 - \$120 (\$AUD
2010) / tonne of pollutant.

Hall (2012)

Abatement cost Total
Nitrogen removed via WSUD
bioretention \$100,000 to
\$1,000,000 (\$AUD2010) /
tonne of pollutant. Hall (2012)

Air quality

Amenity

Biodiversity and
Ecology

Building temperature

Carbon sequestration

Rain water harvesting

Enabling development

Flood risk

Groundwater recharge

Health

Pumping wastewater

Recreation

Treating wastewater

Water quality of
receiving water

Crime

Economic growth

Education

Flexible infrastructure

Tourism

Traffic calming

Brisbane household willingness
to pay for one % improvement in
public parks and gardens that are
green, \$1.20/household

Marsden Jacobs Associates (2010)

5kL rainwater tank cost
effectiveness - \$2.29 and
\$5.47/kL for 200m² and 50 m²
connected roof respectively

Marsden Jacobs Associates (2007)

Seagrass contribution to
secondary production of SA fish
Species \$1,500 per hectare per
year

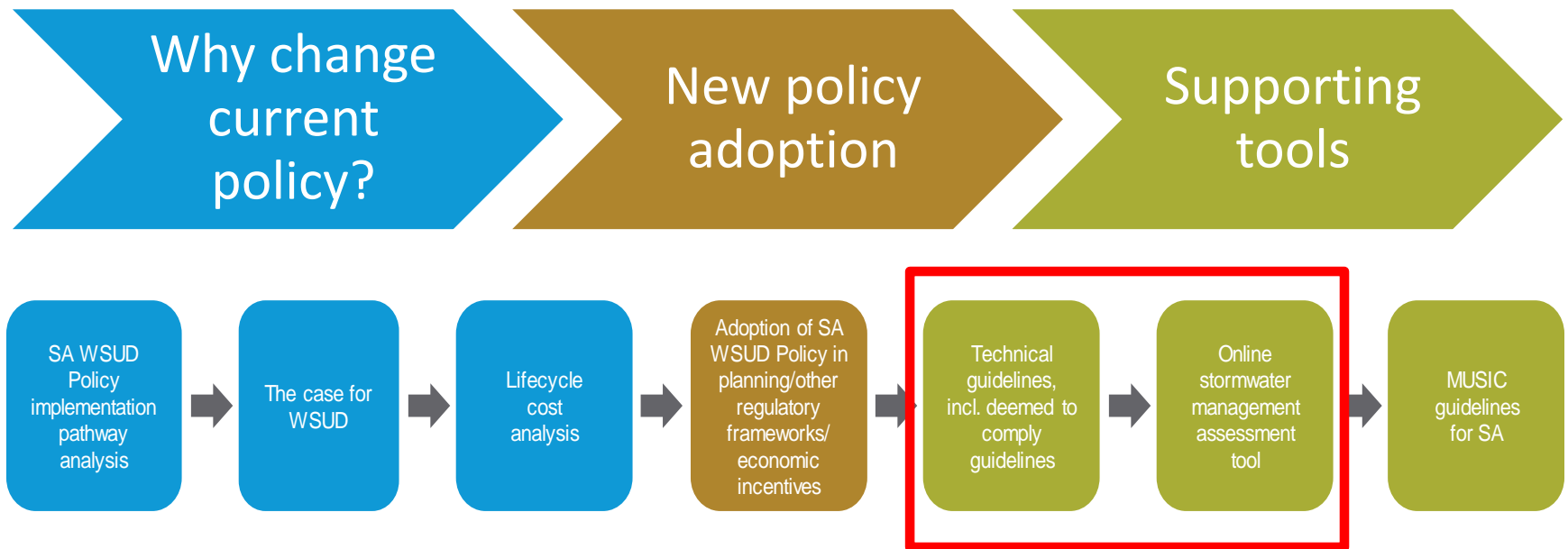
McArthur, 2003 and McArthur and Boland 2006

Value Category	Monetised sub-impact	Present value	Level of confidence of the quantity calculated	Level of confidence of the monetary value selected/used	Present value after confidence adjustment
Amenity	Street improvements	\$	0%	0%	\$
	Permanent body of works	\$	0%	0%	\$
	Property increase	\$	0%	0%	\$
Building temperature	Green roofs	\$	0%	0%	\$
Carbon reduction	Reduced energy heating and cooling	\$	0%	0%	\$
	Reduced energy pumping	\$	0%	0%	\$
Flooding	Damage to property	\$	0%	0%	\$
	Loss of time	\$	0%	0%	\$
Health	Walking	\$	0%	100%	\$
	Cycling	\$	0%	100%	\$
	View of green space	\$	0%	0%	\$
	Access to permanent water	\$	0%	0%	\$
	Access to green space	\$	0%	0%	\$

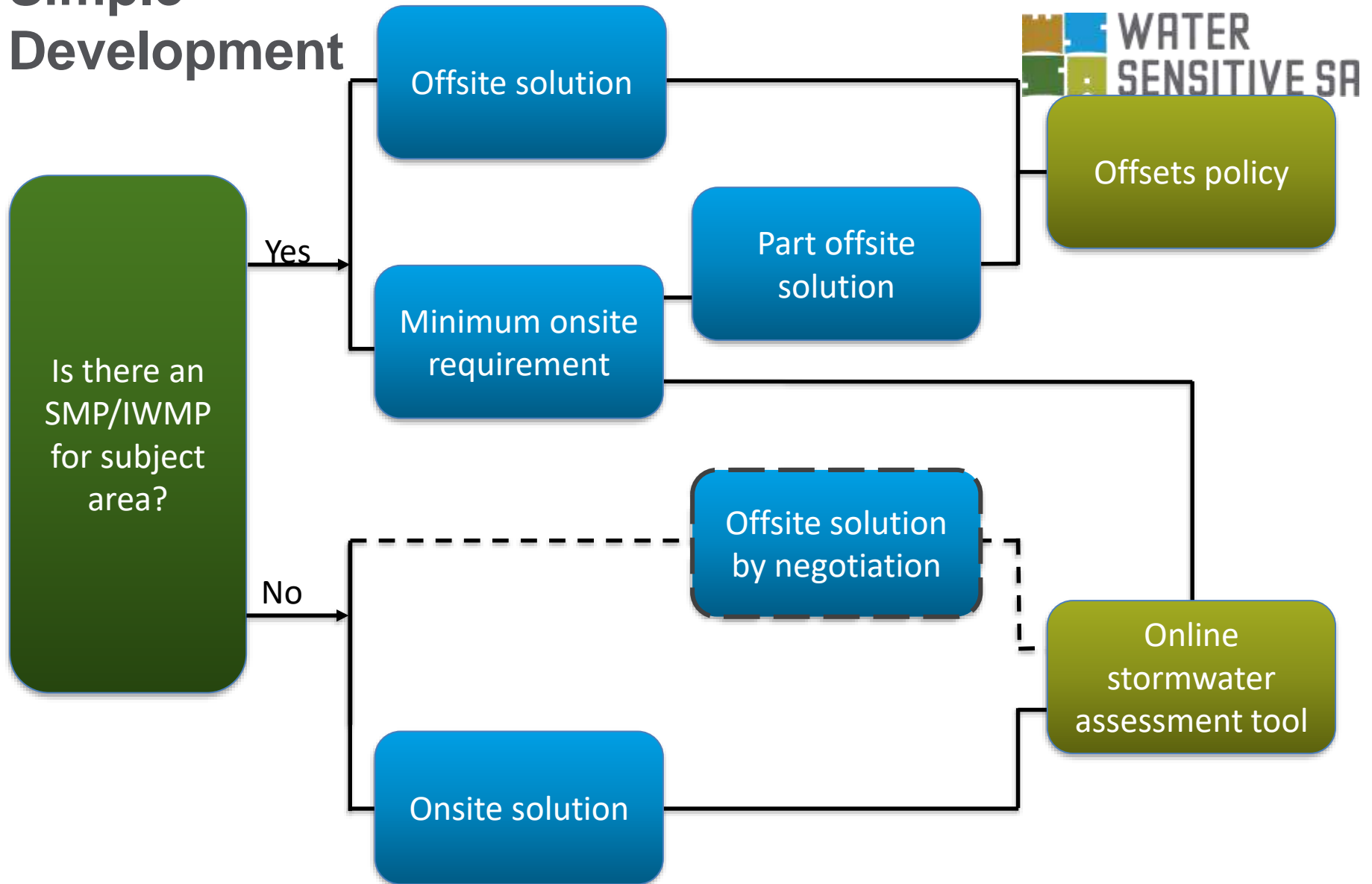
Cost Benefit Analysis Tool

Source: Adapted from
www.ciria.org

Bringing about change...



Simple Development



Online stormwater assessment tool

- for small scale / simple developments



Optimise solutions for site :

- Impervious area
- Rainwater storage (retention and re-use)
- Raingardens
- Permeable paving



Source: City of Mooney Valley

Infill - raingarden



Offsets



Stawell Street, Mentone (VIC) Source:M.Dobbie



Redfern, NSW Source: M.Dobbie

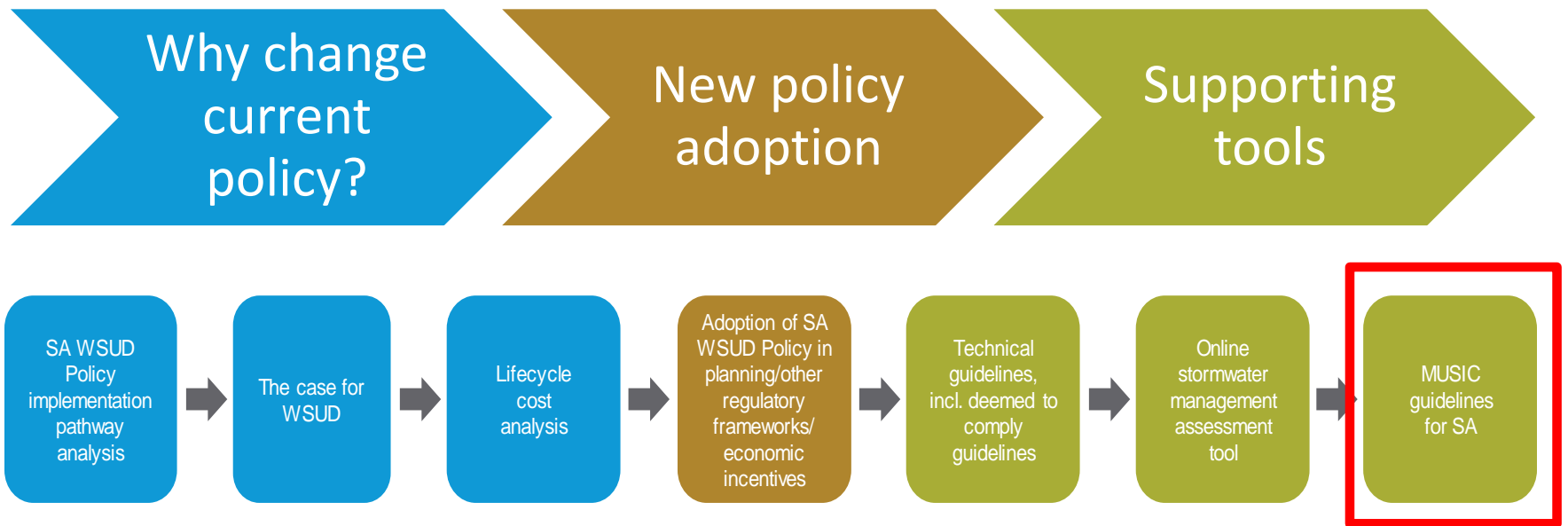


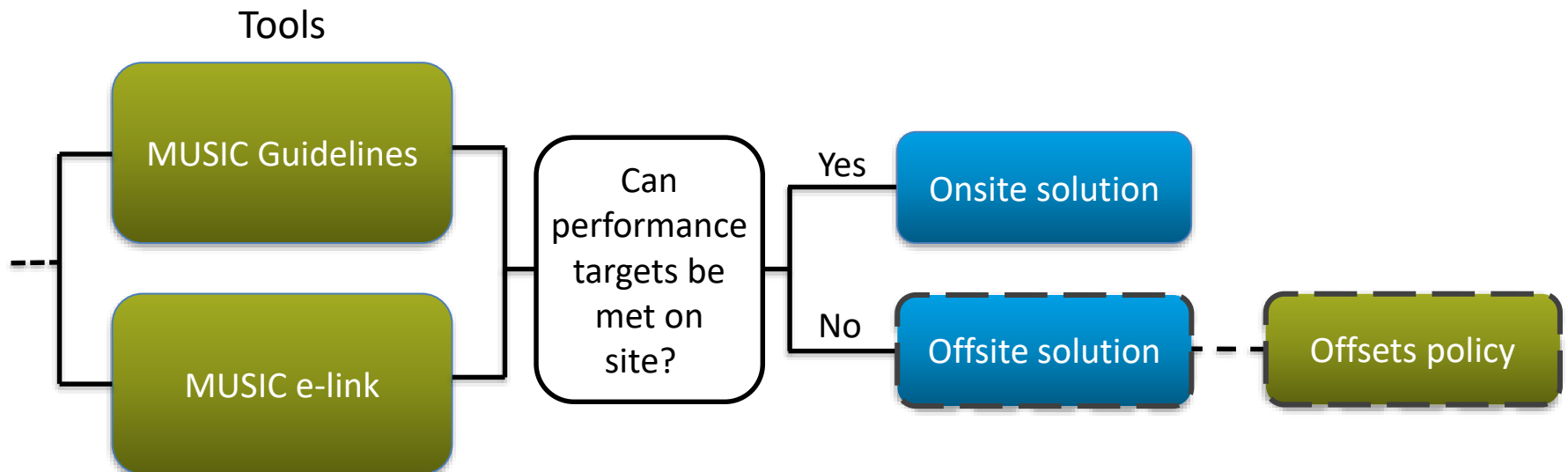
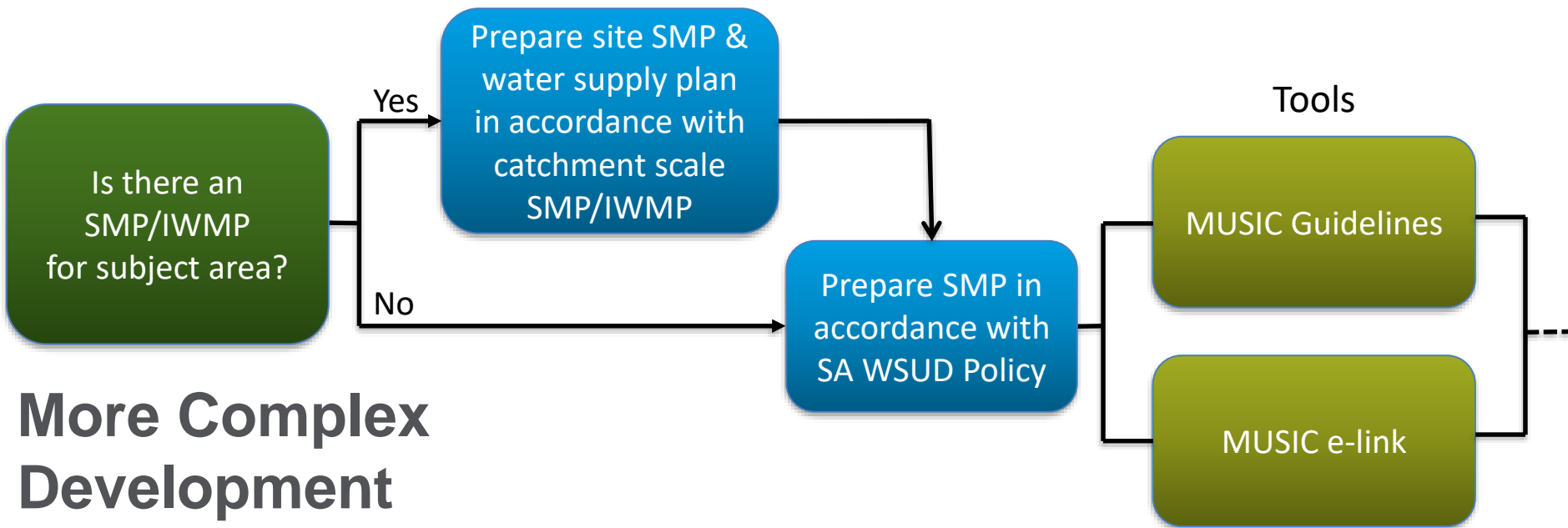
Lochiel Park



Springbank Waters, Burton Source: City of Salisbury

Bringing about change...





Upcoming training

16 **Leadership across boundaries to advance water sensitive urban design**
NOV 15 16 NOVEMBER - 8:30am to 17 NOVEMBER - 5:00pm

Upcoming events

16 **Plant species selection for amenity & resilience in stormwater biofilters & wetlands**
OCT 15 16 OCTOBER - 10:00am to 11:30am

29 **Pathways to water sensitive communities through planning**
OCT 15 29 OCTOBER - 10:00am to 4:00pm



North Terrace Source: City of Adelaide



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