CRC for
Water Sensitive Cities

The Influence of Statutory Land Use Planning on Water Sensitive Urban Design Practices

Don Williams

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

INTRODUCTION TO THE RESEARCH

- **Objective: to use case studies to examine how statutory land use planning (SLUP) influences the adoption of water sensitive urban design (WSUD) practices**
- **The findings of the research will help to build SLUP systems that better support WSUD implementation**

INTRODUCTION TO THE RESEARCH

- **WSUD: 'an approach to urban planning and design that integrates the management of the total water cycle into the land use and development process' (SA DEWNR 2013)**
- **'statutory land use planning': statutory regulation of land use and development, to meet public policy objectives. Includes:**
  - **primary land use planning legislation**
  - **regulations and statutory policies**
  - **development approvals process**
  - **approvals for individual developments**

METHOD

- **Method = case studies: useful when knowledge/theory are sparse**
- **Cases examined development <u>at residential subdivision scale:</u>**
  - **Important SLUP tools applied at residential subdivision stage**
  - **Subdivision is when key decisions about 'components' of WSUD practice are made**
  - **Expansive vision of WSUD relies on changes to e.g. housing layout, road layout, and streetscape layout and design, which are finalised at subdivision stage.**
- **Investigating two Vic cases and two WA cases allowed intra and inter jurisdictional comparisons**

METHOD

- **2 Victorian case studies (Melb):**
  - **Coburg Hill: 500 dwelling residential redevelopment of a former industrial site**
  - **Davis Road East: 75 hectare greenfield residential development, 974 lots**
- **2 Western Australian cases (Perth):**
  - **Lane Gardens: 211 lot stage of Bletchley Park residential development**
  - **Wungong Precinct E, Stages 3, 4 and 5: 138 lot component of Wungong development**
- **Information from interviews and documents**

METHOD

- **Cases examined how SLUP influenced specific 'components' of WSUD practice**
- **Components = outcomes/results characterise implementation of WSUD:**
  - **Urban stormwater component**

  - **Urban water cycle component**

  - **Urban water infrastructure component: centralised & decentralised infrastructure**

  - **Urban design component**

RESULTS: COBURG HILL (VIC)

Influence of SLUP on Components of WSUD Practice			
Urban Stormwater Management	**Urban Water Cycle**	**Urban Water Infrastructure**	**Urban Design**
Stormwater is treated to comply with stormwater pollutant removal targets.	Roof runoff is collected in tanks and reused, reducing the volume of stormwater requiring treatment.	A combination of stormwater treatment devices, of varying scales, is used to minimise the area of land set aside for stormwater treatment.	At the local scale, urban water infrastructure is integrated with the development. At a wider scale, urban form was dictated by influences other than the urban water cycle.

Some positive outcomes related to urban water cycle, urban water infrastructure & urban design components, but these were incidental results driven by need to meet stormwater treatment targets

RESULTS: DAVIS ROAD EAST (VIC)

Influence of SLUP on Components of WSUD Practice			
Urban Stormwater Management	**Urban Water Cycle**	**Urban Water Infrastructure**	**Urban Design**
Stormwater is treated to comply with stormwater pollutant removal targets	Buildings in the development have the capacity to use recycled water.	Stormwater is treated via four sub-catchment scale systems.	Stormwater treatment systems are located in a waterway corridor. Little evidence that urban form was influenced by the urban water cycle.

Stormwater management strongly influenced by treatment targets

SLUP required localised, street-scale WSUD measures to be 'considered', but such measures were not adopted, so positive urban water infrastructure and urban design outcomes associated with decentralised WSUD systems <u>not</u> achieved

RESULTS: LANE GARDENS (WA)

Influence of SLUP on Components of WSUD Practice			
Urban Stormwater Management	**Urban Water Cycle**	**Urban Water Infrastructure**	**Urban Design**
Stormwater from the 1-year 1-hour ARI storm is treated and infiltrated close to source. Stormwater from the 1-year 1-hour ARI storm, and larger storms, is managed to maintain pre-development flows.	Stormwater infiltration helps to maintain the pre-development water cycle. Some measures reduce potable water demand. Groundwater infiltration to sub-surface drains is treated.	A combination of infrastructure, at differing scales (household, street-level, public open space), is used to manage stormwater runoff.	The development's urban form is influenced by roadside raingardens, biofilters in public open space and the inclusion of a living stream.

All components of WSUD practice materially encouraged by SLUP.

SLUP ensured urban water planning was considered at key stages in the land use planning process

RESULTS: WUNGONG E, STAGES 3,4 &5

Influence of SLUP on Components of WSUD Practice			
Urban Stormwater Management	**Urban Water Cycle**	**Urban Water Infrastructure**	**Urban Design**
Stormwater from the 1-year 1-hour ARI storm is treated and infiltrated close to source. Stormwater from the 1-year 1-hour ARI storm is managed to maintain pre-development flows.	Infiltration of stormwater helps to maintain the pre-development water cycle. Groundwater discharges are treated to remove pollutants	A combination of infrastructure, at varying scales (household, street-level, public open space), is used to manage stormwater runoff.	The development is integrated with multiple-use public open space corridors. Vegetated stormwater and groundwater treatment areas installed in adjoining public open space corridor. Urban design at the street-scale was not influenced by the urban water cycle.

Urban stormwater management, urban water cycle & urban water infrastructure components encouraged by SLUP.

Residential area integrate with public open space corridors, but urban design at street-scale not influenced by water cycle.

SLUP ensured urban water planning was considered at key stages in the land use planning process

CONCLUSIONS

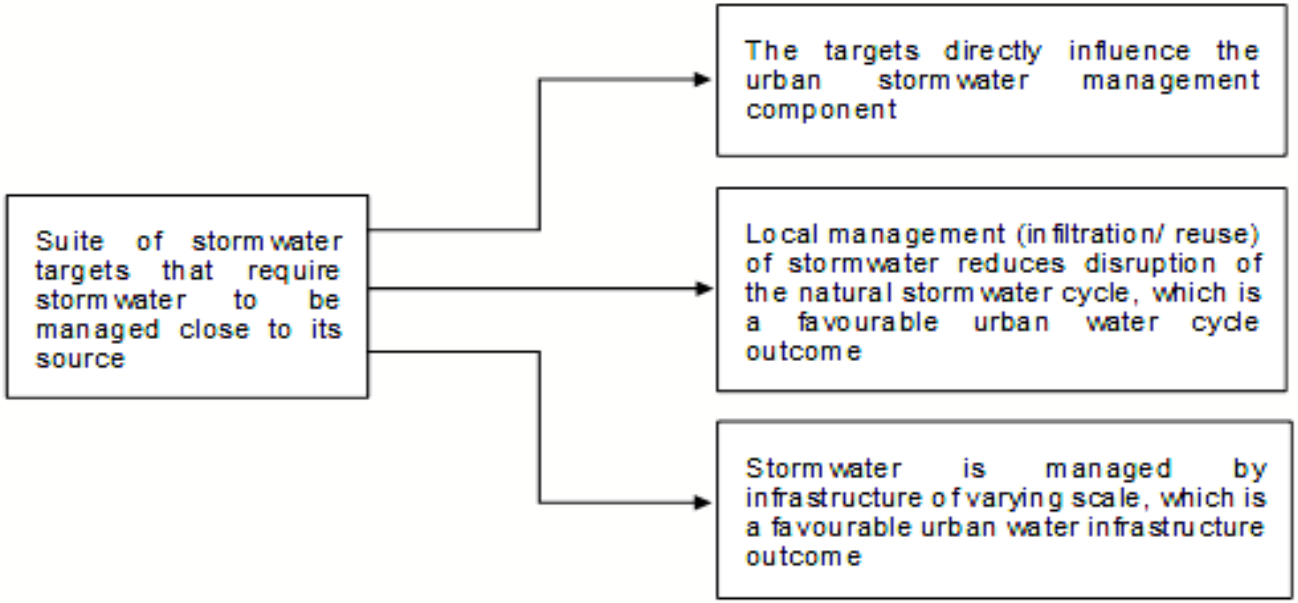
Findings confirm that SLUP does materially encourage the adoption of WSUD practices. The adoption of WSUD measures in the case studies was directly linked with requirements in SLUP tools.

SLUP provisions that include specific, quantitative targets were found to be more effective at encouraging WSUD practices, compared with provisions that lack such targets

CONCLUSIONS

Comparing WA and Vic cases suggests ability of stormwater targets to encourage the adoption of decentralised WSUD practices is increased by including a physical scale, which requires stormwater to be managed close to its source

This encourages the transition from previous reliance on large-scale urban water systems, to a combination of centralised and decentralised systems



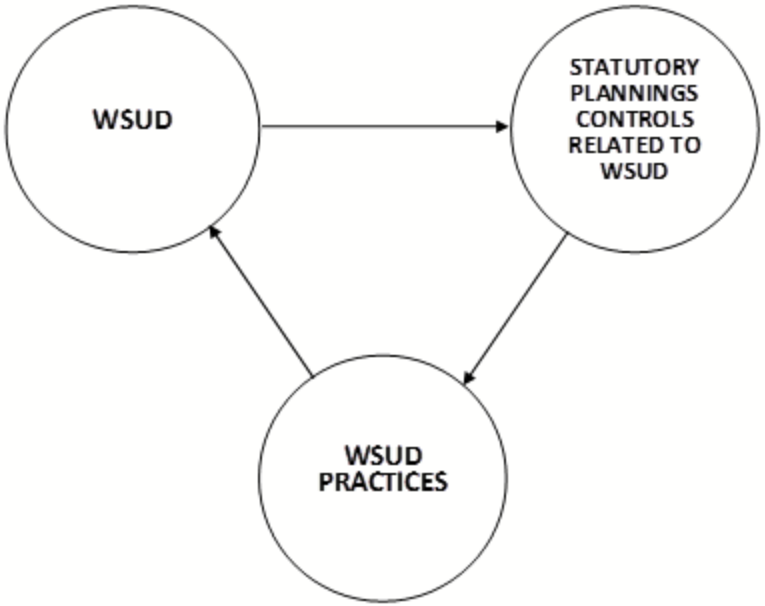
CONCLUSIONS

In case studies, focus of Vic system is meeting stormwater treatment targets, whereas WA system requires 1-year 1-hour ARI storm to be managed as close to source as possible, and a maintenance of range of pre-development stormwater flows & volumes.

WA system also emphasises aligning urban water management planning and urban design, particularly via 'Local Water Management Strategy' and 'Urban Water Management Plan' tools.

WA and Vic SLUP systems effectively provide different interpretations of 'WSUD practice': SLUP acts as a prism, through which WSUD is interpreted. Designing SLUP systems to encourage particular WSUD practices is itself an act of interpreting 'WSUD'

CONCLUSIONS



SLUP can drive the adoption of a specific set of WSUD practices, which can limit wider understandings of WSUD concept.

Overcoming this potential restriction will require practitioners and scholars from a range of disciplines to work together, to build imaginative and creative SLUP systems that maximise the contribution that WSUD makes to urban sustainability

CONCLUSIONS

https://figshare.com/articles/The_Influence_of_Statutory_Land_Use_Planning_on_Water_Sensitive_Urban_Design_Practices/5972140