



CRC for
Water Sensitive Cities

FY13/14 – Year in Review

Professor Tony Wong
Chief Executive



An Australian Government Initiative



Partnerships

Research | Governments | Agencies | Private Enterprises



- 30 Local Governments
- 14 State Government Departments/Agencies (*3 Essential Participants*)
- 12 Research Organisations (*3 Essential Participants*)
- 8 Water Utilities (*3 Essential Participants*)
- 4 Land Development Organisations
- 4 Private Companies
- 1 Federal Government Agency
- 1 Community Group
- 1 Training/Capacity Building Organisations

Technical University of Denmark
Danish Hydraulic Institute

UNESCO-IHE

University of Innsbruck

City of Rotterdam

City of Greater Geraldton

National University of Singapore
Public Utilities Board of Singapore

University of Western Australia, Department of Water, Department of Housing, Water Corporation, Metropolitan Redevelopment Authority, LandCorp, Swan River Trust, Chemistry Centre, City of Armadale, City of Joondalup, City of Gosnells, City of Mandurah, City of Melville, City of Canning, City of Wanneroo, City of Vincent, Edith Cowan University, Department of Regional Development, SERCUL, Eastern Metropolitan, Regional Council, City of Subiaco

University of Adelaide, Department of Environment, Water and Natural Resources, SA Water, Urban Renewal Authority, Adelaide & Mt Lofty NRM Board, South Australian Murray-Darling Basin NRM Board

Monash University, Department of Sustainability & Environment, Melbourne Water, South East Water, City West Water, Yarra Valley Water, City of Melbourne, City of Port Phillip, Manningham City Council, City of Boroondara, City of Greater Dandenong, City of Kingston, Department of Health, Mooney Valley City Council, Knox City Council, Maddocks, Places Victoria

Central West CMA

University of Queensland, Griffith University, Brisbane City Council, GHD, Kellogg Brown and Root, Veolia Water, International Water Centre
Queensland Urban Utilities

Marrickville Council, Hawkesbury Nepean CMA, City of Sydney, City of Newcastle, Hornsby Shire Council, Warringah Council, Ku-ring-gai Municipal Council, Blacktown City Council, Fairfield City Council, Department of Planning & Infrastructure, Metropolitan Water Directorate

City of Greater Bendigo

National Water Commission,
eWater Ltd

75 Partners



CRC for
Water Sensitive Cities

There are 14 research
organisations cooperating
in our research activities



MONASH
University

7 of the 10 Faculties



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

5 of the 6 Faculties



THE UNIVERSITY OF
WESTERN AUSTRALIA

7 of the 9 Faculties



CRC for
Water Sensitive Cities

There are 62
government
and industry
partner
organisations



Envisioning a water sensitive city



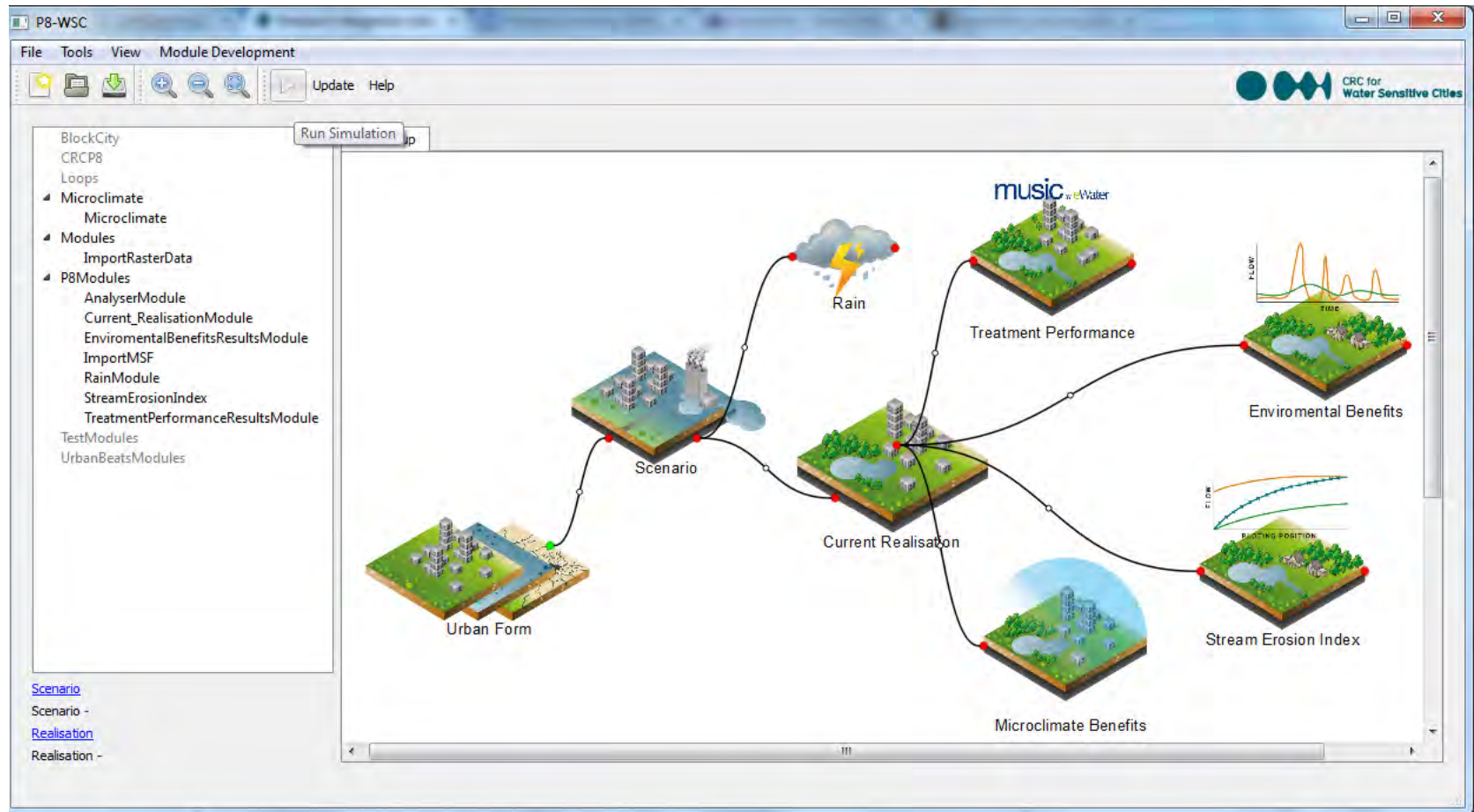
An aerial photograph of a city, likely Melbourne, Australia, showing a dense urban area with a river (Yarra River) and a large stadium (MCG) in the foreground. The text is overlaid on the right side of the image.

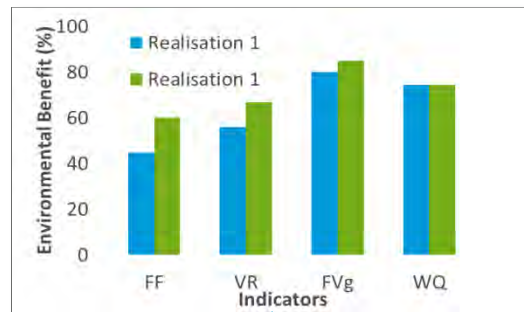
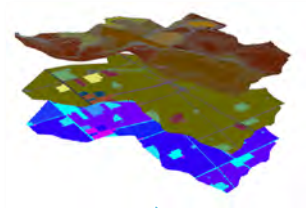
The output of our CRC will guide capital investments of more than \$100 Billion by the Australian water sector and more than \$550 Billion of private sector investment in urban development over the next 15 years.

The value proposition

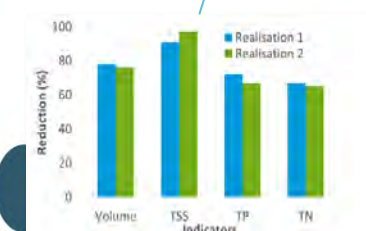
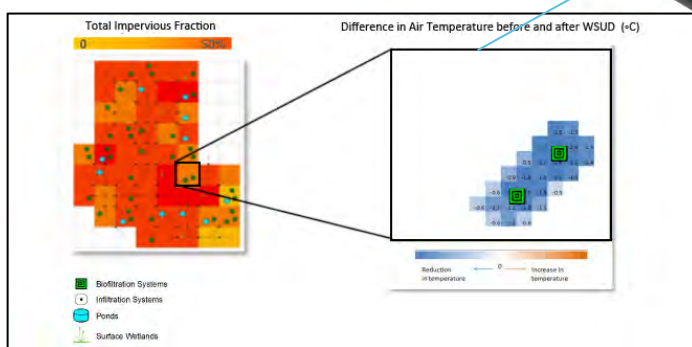
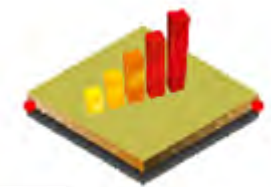
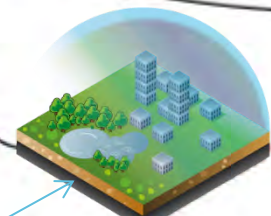
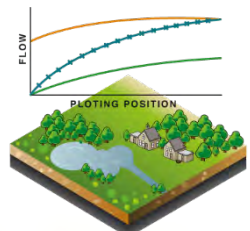
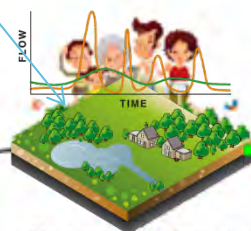
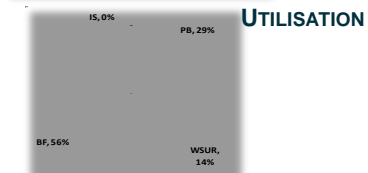
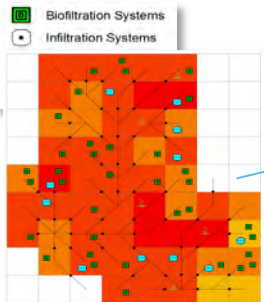
5th July 2013

Launch of new Water Sensitive City Modelling Tool





SEI



Positive Cities

16th July

blueprint2013 Stormwater Management in a Water Sensitive City

blueprint2013 Download

Stormwater Management in a Water Sensitive City

The purpose of **blueprint2013** is to foster discussion and innovation in harnessing the potential of stormwater to overcome water shortages, reduce urban temperatures, and improve waterway health and the landscape of Australian cities in their transformation into Water Sensitive Cities.

This report is the third version of an evolving document that articulates how, through a holistic approach to the management of urban stormwater, we can transition Australian cities to Water Sensitive Cities. Our reference to cities includes all urban environments and the approaches and philosophical context of water sensitive cities are equally applicable to regional towns and cities throughout Australia and overseas.



CRC for
Water Sensitive Cities

Stormwater Management in a Water Sensitive City

Pillar 2: Cities Providing Ecosystem Services

The built environment supplements and supports the functions of the natural environment and society

Stormwater management to improve urban stream health and micro climate



es 2012

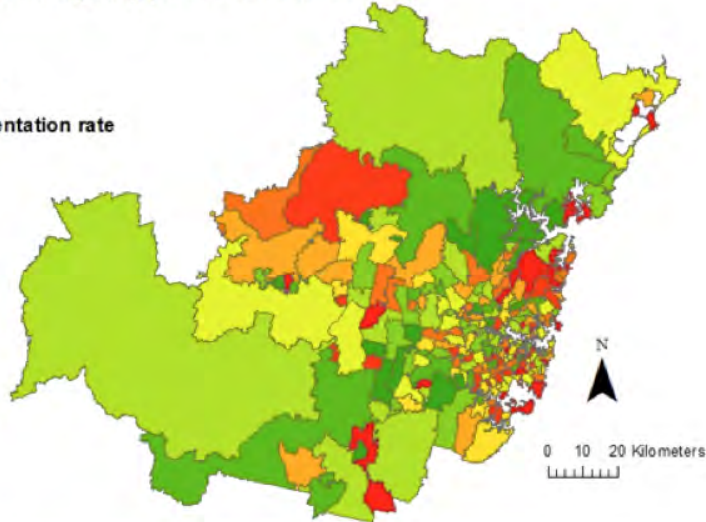
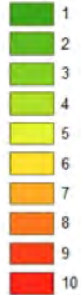


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Sydney emergency presentations hot days

Legend

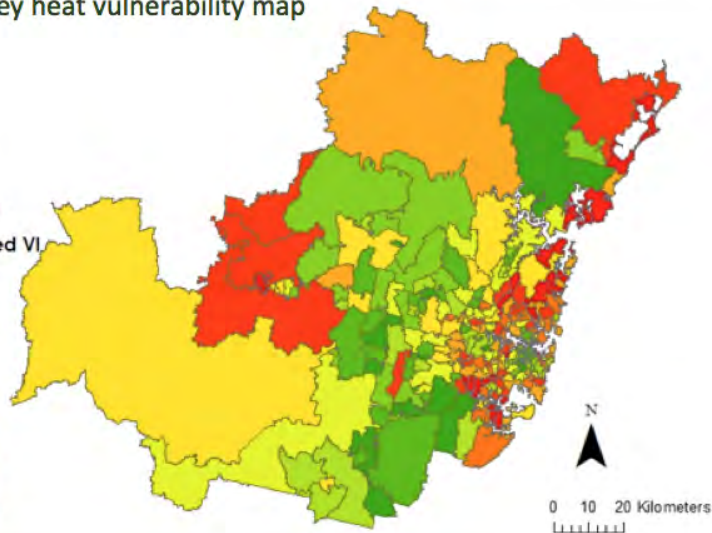
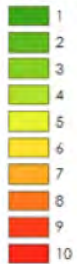
ED presentation rate



Sydney heat vulnerability map

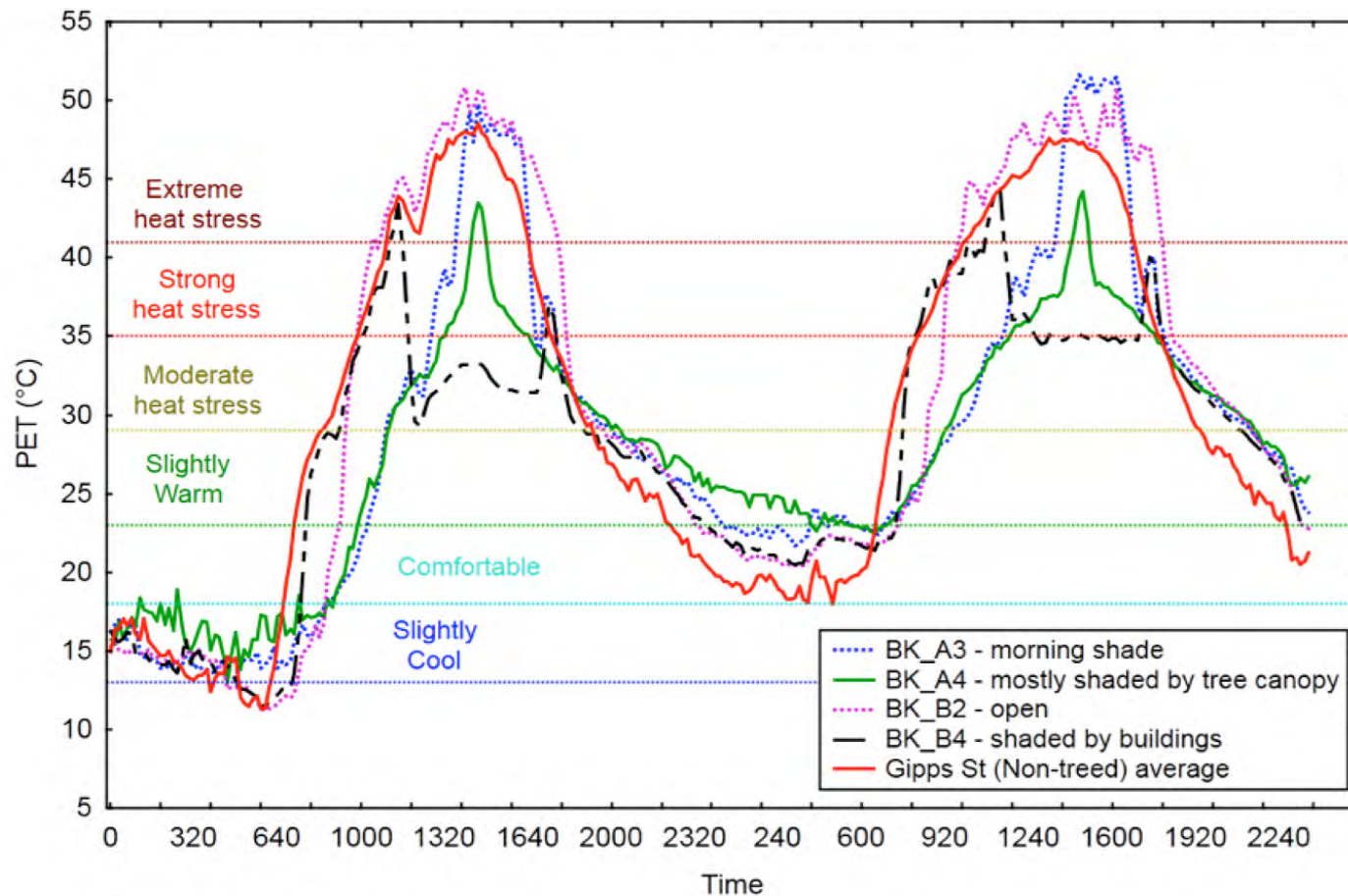
Legend

Weighted VI



Heat extremes and the number of days exceeding critical heat-health thresholds are projected to increase in all Australian capital cities in the coming decades.

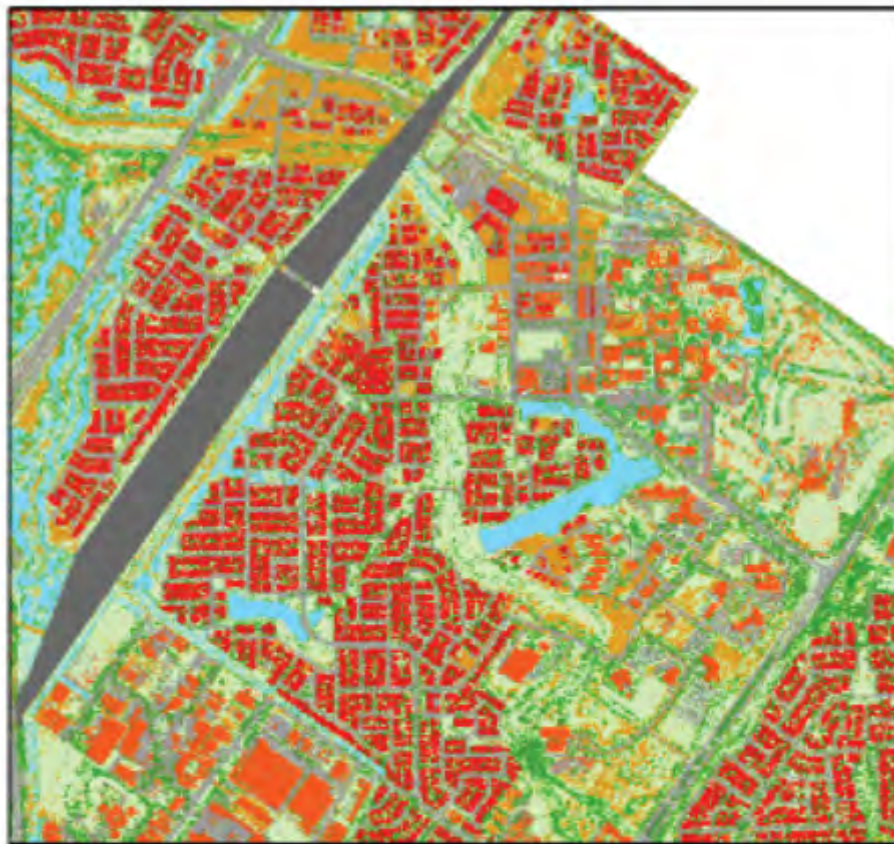




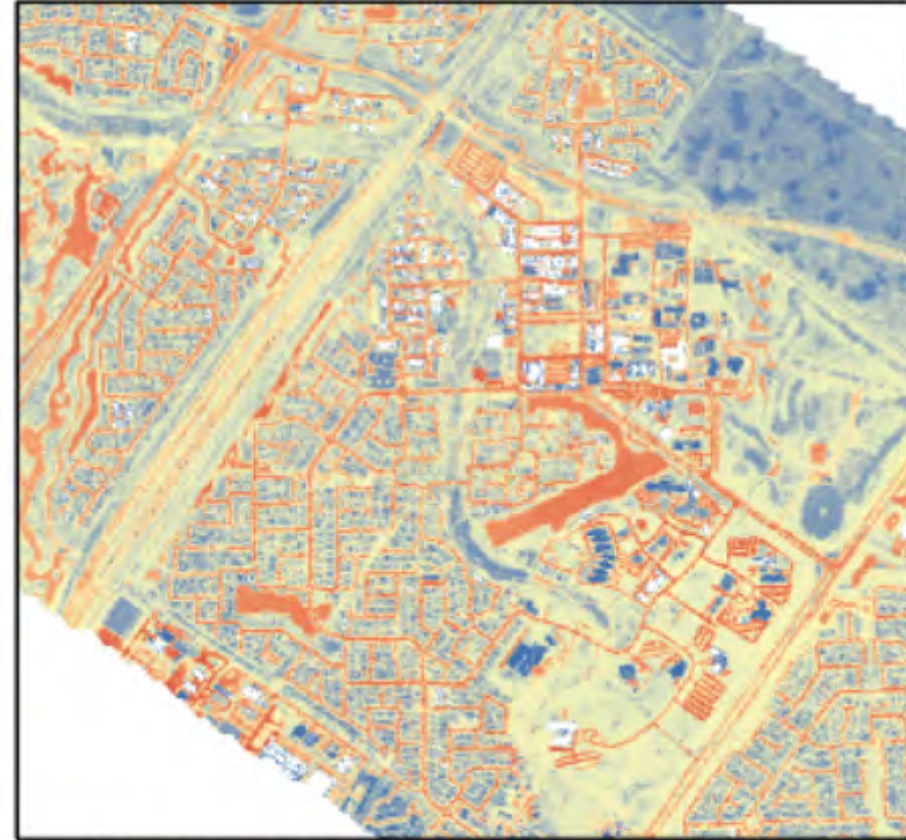
Influence of shade from trees and buildings on Physiological Equivalent Temperature (PET) in Bourke (BK) and Gipps Street, Melbourne, 24-25 February 2012. (Coutts et al., 2013)



Understanding the Influence of Stormwater Harvesting and Green Infrastructure on Urban Climate



Land Cover

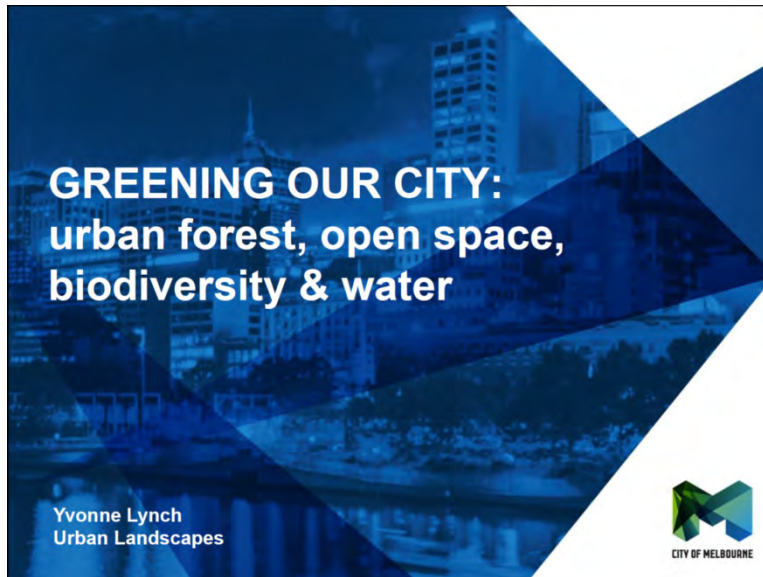
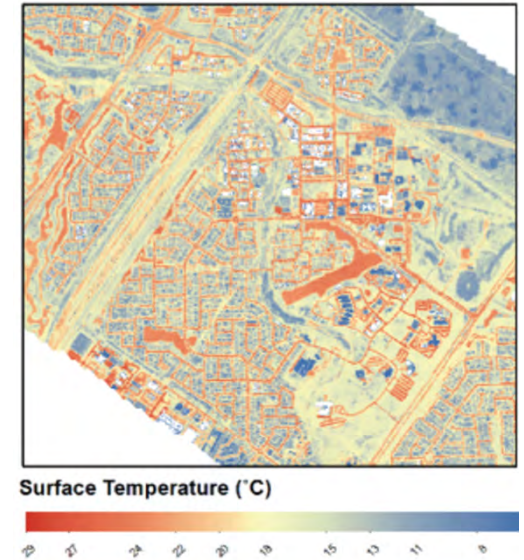


Surface Temperature ($^{\circ}\text{C}$)



Mawson Lakes remote sensing data showing land cover (left) and night land surface temperature (right)

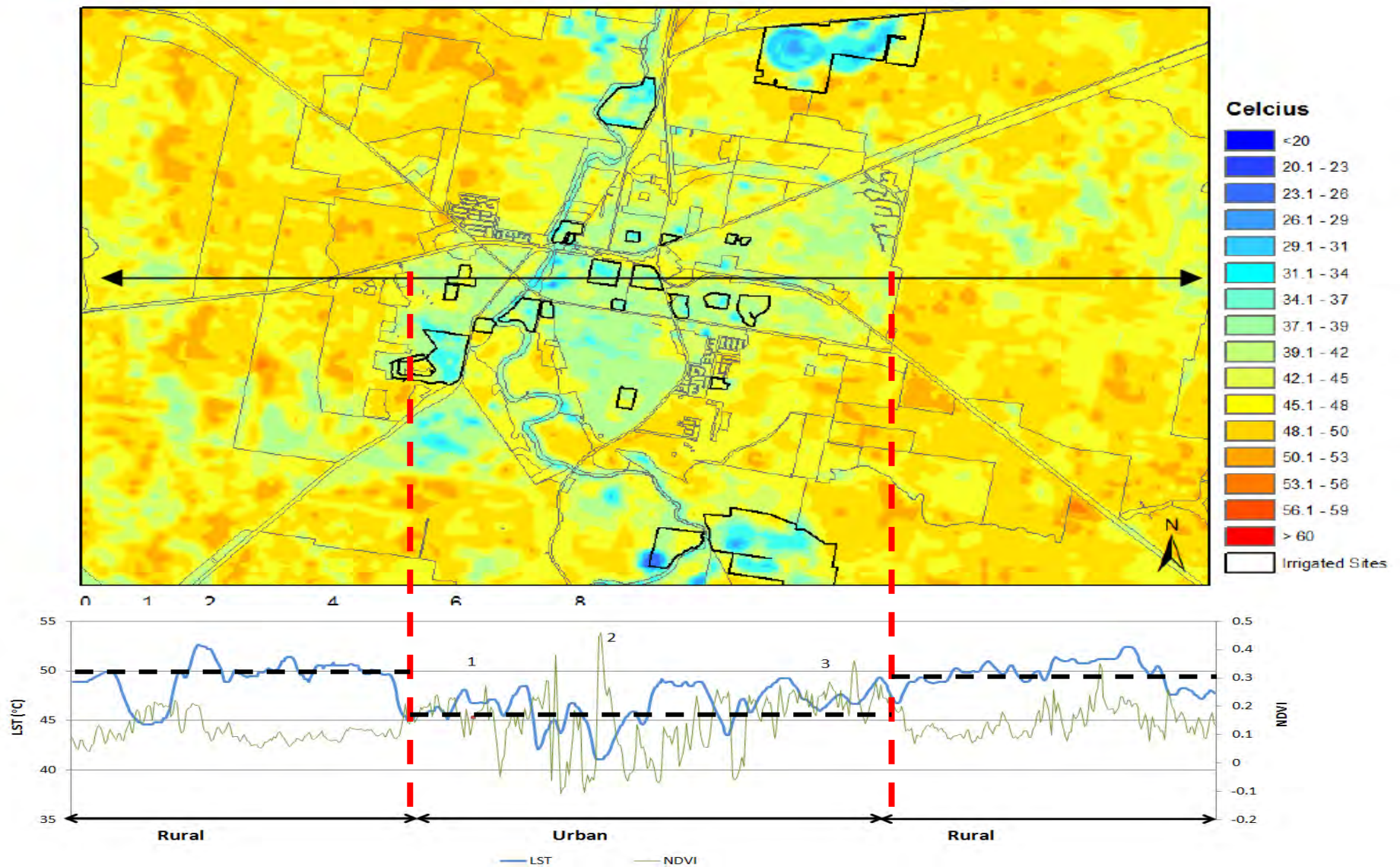
Trees and water bodies (lakes and wetlands) have a significant cooling effect during the day. This cooling is apparent, independent of other influential factors.



Within the typical range of urban site coverage a 10% increase in tree cover can result in a reduction in land surface temperature of between 0.5°C and 1°C.

www.watersensitivecities.org.au

Wong *et. al.*, (2013), blueprint2013 - Stormwater Management in a Water Sensitive City, Wong, T.H.F (ed), Cooperative Research Centre for Water Sensitive Cities, ISBN 978--1--921912--02--3 76pp.



The Dubbo Case Study

CRC Western Region participants start the year with a successful workshop on urban micro-climate in Western Australia

6th February 2014

Published on: 17 February 2014

The CRC for Water Sensitive Cities (CRCWSC) kicked off the year with the Urban Heat and Micro-climate Workshop on Thursday 6 February. Researchers and industry leaders gave a series of presentations, before the floor was opened to all attendees to participate in the facilitated discussion session.

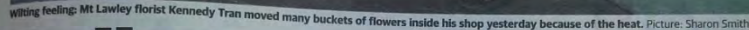
Mr Max Hipkins, Mayor of the City of Nedlands, began with a presentation on the effects of climate change on local government. Mr Hipkins discussed the increased frequency of extreme weather events and shared how the City of Nedlands is responding. Ms Erin Harrison, Environmental Advisor at the Eastern Metropolitan Regional Council, continued the presentations with a look into the establishment and priorities of the council and the various future-proofing programs in place for the region.



CRC for
Water Sensitive Cities

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■ Yolanda Zaw

Nigel Tapper, from Monash's Co-operative Centre for Water Sensitive Cities, said heat vulnerability of specific suburbs was assessed on environmental risk factors includ-

"There is a clear association between suburbs with extreme heat vulnerability and the number of hospital emergency visits or ambulance call-outs on extremely hot days," he said. "In areas covered by buildings, urban warming occurs that can increase local

metropolitan maximum temperature in Perth hovered around 37C, it was 40C on Beaufort Street in Mt Lawley and 35C in Mt Hawthorn on The Boulevard. Professor Tapper said a few degrees atmospherically could make a big difference to body temperature.

Energy solutions

Camp

Mk140 Watts to power one fridge, lights, TV etc \$380

Mk210 Watts to power two fridges, lights, TV etc \$480

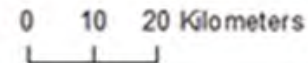
Camping Fold-up Kits complete with regulator, 10 mtrs of 6sq mm cable, carry bag.

AGM Sealed Cyclic Batteries

4Ah 7Ah 10Ah 15Ah 20Ah 30Ah 40Ah 50Ah 60Ah 75Ah 100Ah 120Ah 150Ah 200Ah 250Ah 300Ah 350Ah 400Ah 450Ah 500Ah 600Ah 700Ah 800Ah 900Ah 1000Ah 1200Ah 1500Ah 2000Ah 2500Ah 3000Ah 3500Ah 4000Ah 4500Ah 5000Ah 6000Ah 7000Ah 8000Ah 9000Ah 10000Ah 12000Ah 15000Ah 20000Ah 25000Ah 30000Ah 35000Ah 40000Ah 45000Ah 50000Ah 60000Ah 70000Ah 80000Ah 90000Ah 100000Ah 120000Ah 150000Ah 200000Ah 250000Ah 300000Ah 350000Ah 400000Ah 450000Ah 500000Ah 600000Ah 700000Ah 800000Ah 900000Ah 1000000Ah 1200000Ah 1500000Ah 2000000Ah 2500000Ah 3000000Ah 3500000Ah 4000000Ah 4500000Ah 5000000Ah 6000000Ah 7000000Ah 8000000Ah 9000000Ah 10000000Ah 12000000Ah 15000000Ah 20000000Ah 25000000Ah 30000000Ah 35000000Ah 40000000Ah 45000000Ah 50000000Ah 60000000Ah 70000000Ah 80000000Ah 90000000Ah 100000000Ah 120000000Ah 150000000Ah 200000000Ah 250000000Ah 300000000Ah 350000000Ah 400000000Ah 450000000Ah 500000000Ah 600000000Ah 700000000Ah 800000000Ah 900000000Ah 1000000000Ah 1200000000Ah 1500000000Ah 2000000000Ah 2500000000Ah 3000000000Ah 3500000000Ah 4000000000Ah 4500000000Ah 5000000000Ah 6000000000Ah 7000000000Ah 8000000000Ah 9000000000Ah 10000000000Ah 12000000000Ah 15000000000Ah 20000000000Ah 25000000000Ah 30000000000Ah 35000000000Ah 40000000000Ah 45000000000Ah 50000000000Ah 60000000000Ah 70000000000Ah 80000000000Ah 90000000000Ah 100000000000Ah 120000000000Ah 150000000000Ah 200000000000Ah 250000000000Ah 300000000000Ah 350000000000Ah 400000000000Ah 450000000000Ah 500000000000Ah 600000000000Ah 700000000000Ah 800000000000Ah 900000000000Ah 1000000000000Ah 1200000000000Ah 1500000000000Ah 2000000000000Ah 2500000000000Ah 3000000000000Ah 3500000000000Ah 4000000000000Ah 4500000000000Ah 5000000000000Ah 6000000000000Ah 7000000000000Ah 8000000000000Ah 9000000000000Ah 10000000000000Ah 12000000000000Ah 15000000000000Ah 20000000000000Ah 25000000000000Ah 30000000000000Ah 35000000000000Ah 40000000000000Ah 45000000000000Ah 50000000000000Ah 60000000000000Ah 70000000000000Ah 80000000000000Ah 90000000000000Ah 100000000000000Ah 120000000000000Ah 150000000000000Ah 200000000000000Ah 250000000000000Ah 300000000000000Ah 350000000000000Ah 400000000000000Ah 450000000000000Ah 500000000000000Ah 600000000000000Ah 700000000000000Ah 800000000000000Ah 900000000000000Ah 1000000000000000Ah 1200000000000000Ah 1500000000000000Ah 2000000000000000Ah 2500000000000000Ah 3000000000000000Ah 3500000000000000Ah 4000000000000000Ah 4500000000000000Ah 5000000000000000Ah 6000000000000000Ah 7000000000000000Ah 8000000000000000Ah 9000000000000000Ah 10000000000000000Ah 12000000000000000Ah 15000000000000000Ah 20000000000000000Ah 25000000000000000Ah 30000000000000000Ah 35000000000000000Ah 40000000000000000Ah 45000000000000000Ah 50000000000000000Ah 60000000000000000Ah 70000000000000000Ah 80000000000000000Ah 90000000000000000Ah 100000000000000000Ah 120000000000000000Ah 150000000000000000Ah 200000000000000000Ah 250000000000000000Ah 300000000000000000Ah 350000000000000000Ah 400000000000000000Ah 450000000000000000Ah 500000000000000000Ah 600000000000000000Ah 700000000000000000Ah 800000000000000000Ah 900000000000000000Ah 1000000000000000000Ah 1200000000000000000Ah 1500000000000000000Ah 2000000000000000000Ah 2500000000000000000Ah 3000000000000000000Ah 3500000000000000000Ah 4000000000000000000Ah 4500000000000000000Ah 5000000000000000000Ah 6000000000000000000Ah 7000000000000000000Ah 8000000000000000000Ah 9000000000000000000Ah 10000000000000000000Ah 12000000000000000000Ah 15000000000000000000Ah 20000000000000000000Ah 25000000000000000000Ah 30000000000000000000Ah 35000000000000000000Ah 40000000000000000000Ah 45000000000000000000Ah 50000000000000000000Ah 60000000000000000000Ah 70000000000000000000Ah 80000000000000000000Ah 90000000000000000000Ah 100000000000000000000Ah 120000000000000000000Ah 150000000000000000000Ah 200000000000000000000Ah 250000000000000000000Ah 300000000000000000000Ah 350000000000000000000Ah 400000000000000000000Ah 450000000000000000000Ah 500000000000000000000Ah 600000000000000000000Ah 700000000000000000000Ah 800000000000000000000Ah 900000000000000000000Ah 1000000000000000000000Ah 1200000000000000000000Ah 1500000000000000000000Ah 2000000000000000000000Ah 2500000000000000000000Ah 3000000000000000000000Ah 3500000000000000000000Ah 4000000000000000000000Ah 4500000000000000000000Ah 5000

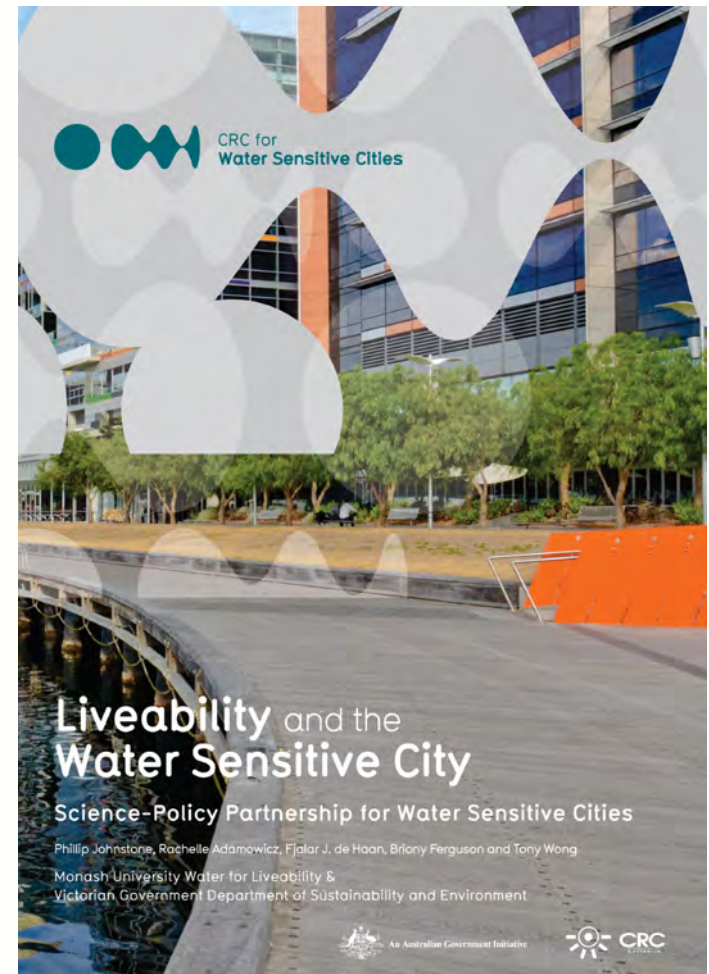
Reduce your Lighting Bills with t

FINAL CLEARANCE AUCTION, ALL REMAINING STOCK TO BE SOLD INCLUDING:
LOUNGE SUITES: Quality 100% Leather Suites, Fabric Suites, Recliners, Chaise, Wing Chairs, Sofas, Mock



6th September 2013

Notions of ‘liveability’ are emerging as common narratives for Water Sensitive Cities. While these seem appropriate at the conceptual level, **they need to be characterised and defined to some extent to be useful for framing and shaping investment in and design of urban water systems.**





15th & 16th August

WATER



is everything summit 2013

Celebrating co-operation for Geraldton's water future



CRC for
Water Sensitive Cities

15th & 16th August

CRCWSC and the City of Greater Geraldton collaborates to facilitate a community forum on innovative water management- ***Water is Everything Summit***

A view from the Summit

Published on: 2 February 2014

The CRC for Water Sensitive Cities (CRCWSC) and the City of Greater Geraldton recently collaborated to facilitate a community forum on innovative water management. The two-day *Water is Everything Summit*, held in August 2013, attracted around two hundred participants from the region.

Stretching from Geraldton on the coast to the Gibson Desert deep in the state's interior, Western Australia's vast Mid West region faces serious challenges from scarcity of water. Greater Geraldton has committed to a community charter that aims to balance the five pillars of sustainability (environment, social, cultural, economic, governance) by 2029. Geraldton is in a fortunate position. It has formed strong collaborative partnerships with the Water Corporation and the Department of Water for an integrated approach to water planning and management



CRC for
Water Sensitive Cities

Postgraduate students seek opportunities to apply the latest thinking on Water Sensitive Cities

Published on: 6 September 2013

The CRC is committed to sharing knowledge, translating research outcomes and building capacity amongst current water professionals and future sector leaders. As part of this, the CRC has developed an education module on Water Sensitive Cities, which is currently being implemented in collaboration with the International WaterCentre (IWC) through its Masters in Integrated Water Management (MIWM).

This education module aims to equip participants with an interdisciplinary understanding of the interplay between society, technology and urban design to ensure water security, water resource efficiency, waterway health, flood mitigation, public health and amenity. Participants critically engage with the underlying principles of a Water Sensitive City and examine socio-technical pathways for facilitating its delivery.

6th September 2013



CRC for
Water Sensitive Cities

Outstanding achievements by Project D4.1 researchers

Published on: 21 May 2014

CRC for Water Sensitive Cities (CRCWSC) researchers Dr Annette Bos and Dr Briony Ferguson have been recognised for their outstanding achievement in updating the *Urban Futures: Delivering Water Sensitive Cities* module that is run as part of the International WaterCentre's Masters of Integrated Water Management program (www.watercentre.org/education). Annette and Briony redeveloped the module with the aim of translating CRCWSC insights into education. This work was undertaken as part of Project D4.1 Strengthening educational programs to foster future water sensitive cities leaders, and is part of the CRCWSC's overall education and training strategy.



CRC for
Water Sensitive Cities

"A walk on the wet side" – 2013 Researchers and Industry Partners Workshops

28th -31st October 2013

Published on: 18 November 2013

The CRC for Water Sensitive Cities (CRCWSC) held the second Researchers and Industry Partners Workshops of 2013 in Adelaide between 28 and 31 October. Feedback from both workshops was very positive with each event garnering the CRCWSC's highest ever participant attendance.

The Researchers Workshop was held on 28 and 29 October, and was attended by 105 of the CRC's partner researchers from around the world. Researchers received updates on each of the CRC's programs, and were encouraged to identify new linkages and opportunities for collaboration between their projects.



Tonsley – manufacturing a greener future

Published on: 5 May 2014

The closure of the Mitsubishi plant in Adelaide's Tonsley Park in 2008 marked the end of an era in a suburb that had long been synonymous with industry. At the same time, it created a unique opportunity to reimagine a 61 ha inner-city urban renewal site in a contemporary sustainable context. It became possible not only to master plan an exciting new development with a greener future in mind, but also to take a broader view: to consider impacts on the surrounding landscape, and to aim for ecological, hydrological, and cultural benefits.



25 ways to think about creating a water sensitive Tonsley



The principles adopted by the groups at the Industry Partners Workshop to guide their development of Ideas for Tonsley were collated and consolidated and are summarised in the following 25 points.

Envisioning

- 1 **Envisioning** processes are valuable for the visions they produce, as well as the process of bringing people together to develop shared understandings, recognise interdependencies, challenge perspectives and stimulate collective learning.
- 2 Develop a vision for **orientating short-term actions that lay the foundation towards achieving long-term goals** but to do so they need to be translated to have meaning for different stakeholder groups (e.g. engineers, economists, communities, politicians).
- 3 Nothing happens in isolation. It always happens in a region or catchment. When **downscaling visions** to focus on a specific project, consideration should be given to potential synergies that could be realised because of the regional context, and the effect that any trade-offs might have on the surrounding region or catchment.
- 4 Acknowledge and recognise the **traditional owners**.

Business Case

- 5 **Understand** the implications of current economic regulation, social equity and the need (of key stakeholders) to maintain a low risk profile.
- 6 **A strong business case** is required to capture both tangible and non-tangible benefits of an innovative approach. It should quantify the environmental and social benefits in a monetary form so that they are properly weighted in the decision-making process.



Tonsley forms part of a larger catchment on the boundary of suburbia and the Adelaide Hills.

↑↑

Use the prevailing wind direction with a green buffer to reduce heat island effects.

→

Clear road access and circulation support a unique identity.

→→

East-west residential streets shade public open space and provides for optimal building orientation.

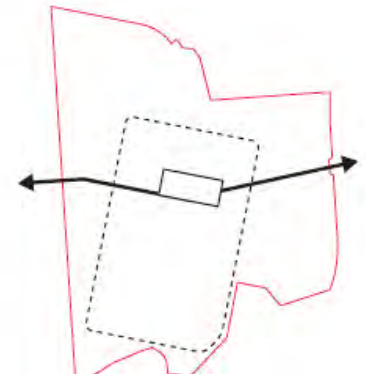
→→→

Promote multiple integrated water systems.

Public Realm

- 7 Orientate residential development to the north **capitalising on east/west multifunctional streetscapes**.
- 8 **WSUD and green infrastructure** should be strategically designed into the landscape to capitalise on reducing summer temperatures.
- 9 **Take advantage of the natural wind regime** and the availability of water and land along the western and northern perimeter to reduce the impacts of summer heat.
- 10 Trees should be promoted wherever possible **for reduced urban heat, greater thermal comfort** and reduced energy consumption.
- 11 Green space at ground level should be maximised and **irrigated wherever possible**.
- 12 **Waterways in urban catchments have undergone major degradation processes** over many years. It has been argued that most urban waterway restoration projects in highly modified catchments have adopted poor modification templates.

- 13 Past modifications to waterways often mean pre-development rehabilitation or restoration targets and templates that are no longer relevant. **A remediation approach is proposed to improve the value and function of urban waterways.**
- 14 **Re-establish natural watercourses** and rebuild environmental corridors to create an ecological link to the northern parkland, slow water flow, and reduce downstream flooding while maintaining overflow access to the existing culvert for flood conveyance during large events.
- 15 **Active transport routes, including walking and cycling to key destinations,** should be provided and landscaped to provide a good experience and for safety.



Built Form

- 16 Within the constraints of the existing design, **minimise the height to width (H:W)** ratios in built canyons and provide some open space heat refuge.
- 17 If **green roofs or green/living walls** are used then they must comprise actively transpiring plants supported by stormwater harvesting.
- 18 **Store excess winter rainwater** for use in evaporative cooling and spray misting techniques in summer heatwaves.
- 19 Utilise water storage tanks within the large shed to **provide thermal mass** to store and radiate winter warmth and summer coolth.
- 20 All residents and workers should have **easy access to spaces** that provide opportunities for physical health, mental health and social connection.

Water

- 21 **Two types of alternative water** sources are available at Tonsley - stormwater (from the site and from the underground pipeline that transects the site) and wastewater (from localised water recycling and sewer mining). Technologies to harvest water from these sources can complement each other, and moving away from sole reliance on traditional water sources could make the development more resilient to climate shocks.
- 22 Alternative water supplies should be secured and available for **irrigating public spaces** and for effective transpiration during periods of dry hot weather.
- 23 **Fit-for-purpose uses** for water from alternative sources include the maintenance of strategically placed, multi-use green open spaces to mitigate the urban heat island effect.
- 24 Direct stormwater management along major pedestrian and cycle routes to passively **irrigate avenues of shade trees**.
- 25 **Early engagement** between the developer and the water utility is required to enable strategic planning of the development and exploration of alternative solutions.



WA Participants gather to follow up on the Industry Partners Workshop and celebrate 2013

Published on: 3 December 2013

Approximately 60 people gathered at the Australian Urban Design Research Centre in Perth for a half day research workshop and networking event. The purpose of the event was to continue the energy created during the Industry Partners Workshop held in October in Adelaide and to highlight some of the exciting research being led by the University of Western Australia.

Greg Claydon, Executive Director, Science and Planning at the Department of Water (Western Australia) and CRCWSC Board Member opened proceedings with a challenge for Western Australia to be at the forefront of the water sensitive cities movement and be the place others will look to for ideas and leadership.

Presentations were given by a number of researchers during the event. Professor David Panell spoke about valuing intangible benefits from integrated urban water management. Dr Carlos Ocampo introduced locally significant research on hydrology and nutrient transport processes in groundwater/surface water. Dr Leah Beesley provided a valuable conceptual understanding of the variations in the upper, mid and lower reaches of our waterways which is likely to lead to a more sophisticated understanding of restoration solutions best suited to each reach.

20th November 2013



CRC for
Water Sensitive Cities

19th November 2013

URBAN WATER MANAGEMENT

1. COMMUNITY POWER

2. URBAN WATER CYCLE MANAGEMENT

3. WEALTHY CITIES

4. VISION + GOALS

5. RESOURCES

6. CAPACITY BUILDING

7. POLICY + INFORMATION

8. LEARNING ORGANISATIONS

9. ROLES + NETWORKS

10. WHAT CAN WE DO?

11. RESILIENCE

12. INVESTMENT OPTION

13. WATER GOVERNANCE

14. WATER GOVERNANCE

15. WATER GOVERNANCE

16. WATER GOVERNANCE

17. WATER GOVERNANCE

18. WATER GOVERNANCE

19. WATER GOVERNANCE

20. WATER GOVERNANCE

CRCWSC shines at 8th International WSUD Conference on the Gold Coast

Published on: 11 December 2013

The CRCWSC had a very strong showing at the 2013 WSUD Conference. Congratulations must firstly go to the winners of the young research presenter awards. Not only did the judges decide to award five winners instead of just one, four of the five winners are directly associated with the CRCWSC. The fifth winner, Ryan Brotchie from GHD, is the industry partner contact from GHD for Victoria. A big round of applause goes to:

25th – 29th November 2013

CRC FOR WATER SENSITIVE CITIES



6th March 2014

The Economics of Water Sensitive Cities Workshop

Ever wondered how economic research can be applied to achieve water sensitive urbanism outcomes?

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) Western Region gathered with more than 50 local participants to explore some of the key economic research relevant to water sensitive cities and towns. The workshop began with an introduction from Professor David Pannell, CRCWSC Research Project Leader from the Centre of Environmental Economics and Policy (CEEP) at the University of Western Australia. David and the researchers from CEEP have been studying research economics as part of the Society Program on Economic Modelling and Analysis (Project A1).



CRC for
Water Sensitive Cities

The CRC for Water Sensitive Cities sponsors the CEDA Urban Water Security Event

21st March 2014

Published on: 29 April 2014

On Friday 21 March, the Committee for Economic Development of Australia (CEDA) presented the WA Water Challenges Series Part 3: Urban Water Security. The CRC for Water Sensitive Cities was a key sponsor for the event held at the Perth Convention and Exhibition Centre. The CRC hosted a table of its Western Region participants from the Department of Water, Landcorp, Water Corporation, Department of Housing, Department of Regional Development, The Eastern Metropolitan Regional Council, City of Nedlands and the University of Western Australia.





Building a business case for the water sensitive city – a collaborative journey

2nd – 3rd April 2014

Published on: 8 April 2014

From 2-3 April, the CRC for Water Sensitive Cities (CRCWSC) brought together some 135 researchers and industry participant representatives to begin the collaborative process of building a business case for a water sensitive city. Participants gathered first in Sydney on the afternoon of Tuesday 1 April, and were treated to their choice of two site visits – a tour of the raingardens of Redfern hosted by the City of Sydney, or a tour of the Central Park development hosted by Flow Systems. We thank the hosts of these excellent site visits for affording this opportunity to see first hand local efforts in building a water sensitive Sydney.



http://www.youtube.com/watch?feature=player_embedded&v=7T64w1sAr9c



**CRC for
Water Sensitive Cities**

9th April 2014

Introducing our new membership category – SME Associate

Published on: 8 April 2014

The CRC for Water Sensitive Cities (CRCWSC) is now inviting small and medium-sized enterprises (SMEs) to join the CRC through a new membership category – SME Associate.

The CRCWSC is focused on ensuring industry adoption of its research outputs. We will position our SME Associates at the forefront of knowledge and thought-leadership in water sensitive urban design and the creation of water sensitive cities. We will support their commercial endeavours through access to, and training in, our research outputs.



CRC for
Water Sensitive Cities

Resource recovery from wastewater

Published on: 2 February 2014

A problem as an opportunity

For most of us, wastewater is something we don't like to think about too much. It's down the sewer: out of smelling range, out of mind. But believe it or not, "there's gold in them thar sewers" – or at least some other valuable resources. And the push is on at the CRC for Water Sensitive Cities (CRCWSC) to recover them, with promising results for both the water and agricultural industries.

That wastewater contains useful nutrients is nothing new. But it's only recently that researchers like the University of Queensland's Associate Professor Damien Batstone, leader of CRCWSC's Sub-project C2.1 (Resource recovery from wastewater), have been developing the technology to recover them. It's a classic case of seeing a problem as an opportunity. The problem with wastewater is that nutrients in it (nitrogen, phosphorus, and potassium) promote the growth of microbes in waterways, often causing toxic blooms. So traditional sludge treatment has focused on removing nutrients or rendering them biologically unavailable.

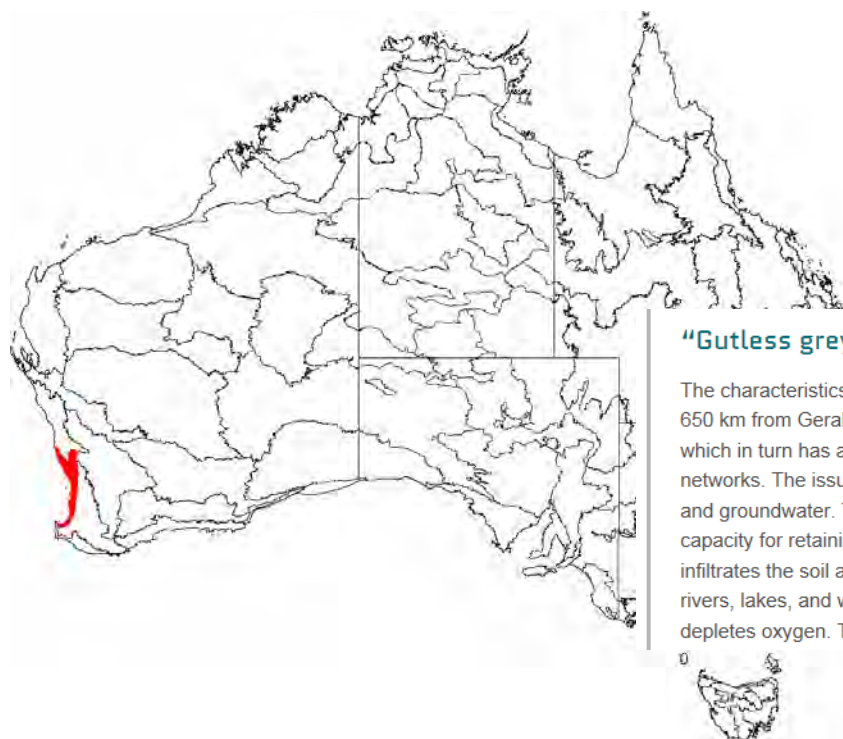


CRC for
Water Sensitive Cities

Understanding the hydrology of the Swan Coastal Plain

Published on: 4 May 2014

Perth is Australia's fastest growing capital city. Increasingly, urban development is occurring on the drained wetlands of the Swan Coastal Plain; but seasonal inundation is a real issue, and in parts groundwater lies within two metres of the surface. In fact, because of reduced rainfall and hotter, drier summers resulting from climate change, groundwater remains a key water source. Protecting availability and quality of water is therefore crucial. However, existing attempts to manage these issues – through water sensitive urban design (WSUD), for example – have highlighted fundamental differences between this region and the cities of Australia's east coast where many WSUD tools have been locally designed and implemented.



"Gutless grey sand" and high groundwater

The characteristics of the Swan Coastal Plain – the narrow coastal strip between the ocean and the Darling Range, stretching 650 km from Geraldton to Busselton in the south of Western Australia – pose a particular challenge for urban development, which in turn has altered the hydrology by introducing impervious surfaces, withdrawing water, and changing drainage networks. The issue of excess nutrients contaminating waterways is compounded by the interaction between surface water and groundwater. The dominant soil type – described by farmers as "gutless grey sand" – is highly permeable, with little capacity for retaining nutrients. Unlike in many eastern-state cities, surface runoff is minimal; instead stormwater rapidly infiltrates the soil and percolates through (taking nutrients with it) to recharge the superficial aquifers, which in turn flow into rivers, lakes, and wetlands. Too much phosphorus and nitrogen, in particular, can lead to excessive algal growth, which depletes oxygen. This is expensive to fix, and causes problems such as bad odours and fish kills.



CRC for
Water Sensitive Cities

21st May 2014

IDEAS FOR AQUAREVO

May 2014



Short streets and
cul-de-sacs for
water management,
play, cars + services

Heat pumps for
energy/cooling
system.

Central water
to maximize flow
and minimize depth.

urban forest edge
to rail corridor

street orientation
maximizes solar app.

water
convergence +
management
in streets.

usual and
physical connections
to amenity



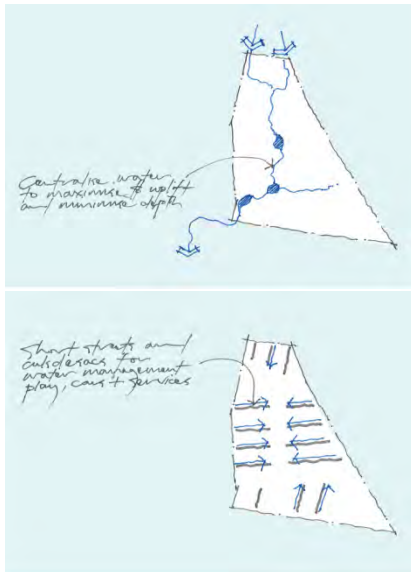
CRC for
Water Sensitive Cities

11 ideas for a water sensitive Aquarevo

The ideas generated and explored through the workshop are presented here under three broad themes: urban planning and design, green infrastructure, and intelligent (water+ energy) systems.

a. Urban planning and design

Managing stormwater on a flat site to support cost-effective drainage infrastructure deployment and earthworks, while designing to connect to key regional natural assets and creating a more liveable community.



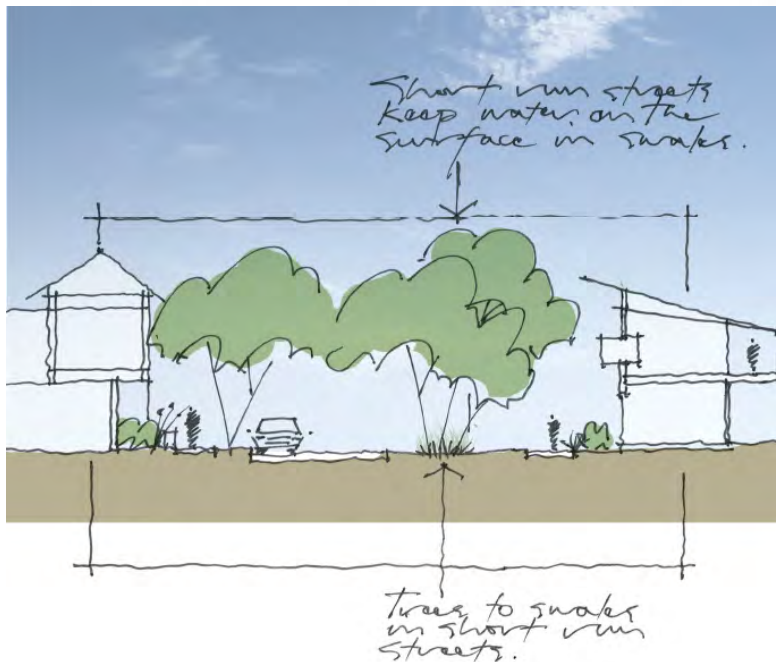
- 1 Create a central green infrastructure spine facilitating short street lengths. This urban structure enables at-surface stormwater conveyance (bioswales) on residential access streets in place of piped stormwater infrastructure to reduce the high volume of imported fill typically required for traditional (piped) stormwater infrastructure on flat sites.
- 2 Rethink street design options for residential access (and other) streets: urban forest elements, active and passive open space, 30 km/h speed limits, single lane with integrated parking.
- 3 Rethink street typology options: re-envisioned cul-de-sac streets (with pedestrian/bike permeability), pedestrian friendly streets.
- 4 Provide connections to adjacent communities and destinations.



b. Green infrastructure

Using water and vegetation to achieve multiple community benefits, including stormwater quality improvement, safe conveyance of floodwaters, improved urban microclimate and mitigation of urban heat.

- 5 Adopt a distributed (branched) waterway design that incorporates green infrastructure for stormwater treatment and heat mitigation and high pedestrian mobility while also increasing the number of premium properties (properties with water or open space views).
- 6 Incorporate green streets for heat mitigation: maximise (summertime) tree canopies, maintain water in the landscape.



c. Intelligent (water + energy) systems

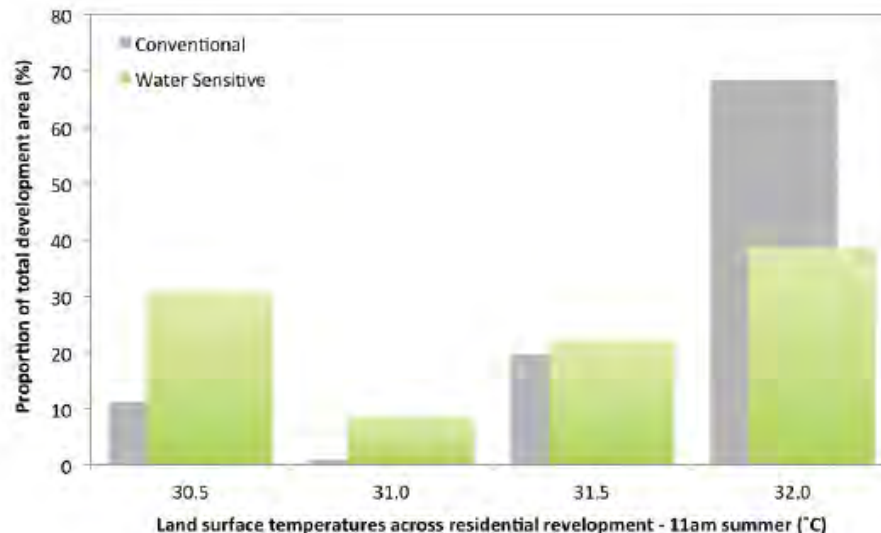
Identifying distributed, precinct-scale opportunities for cost-effective water services.

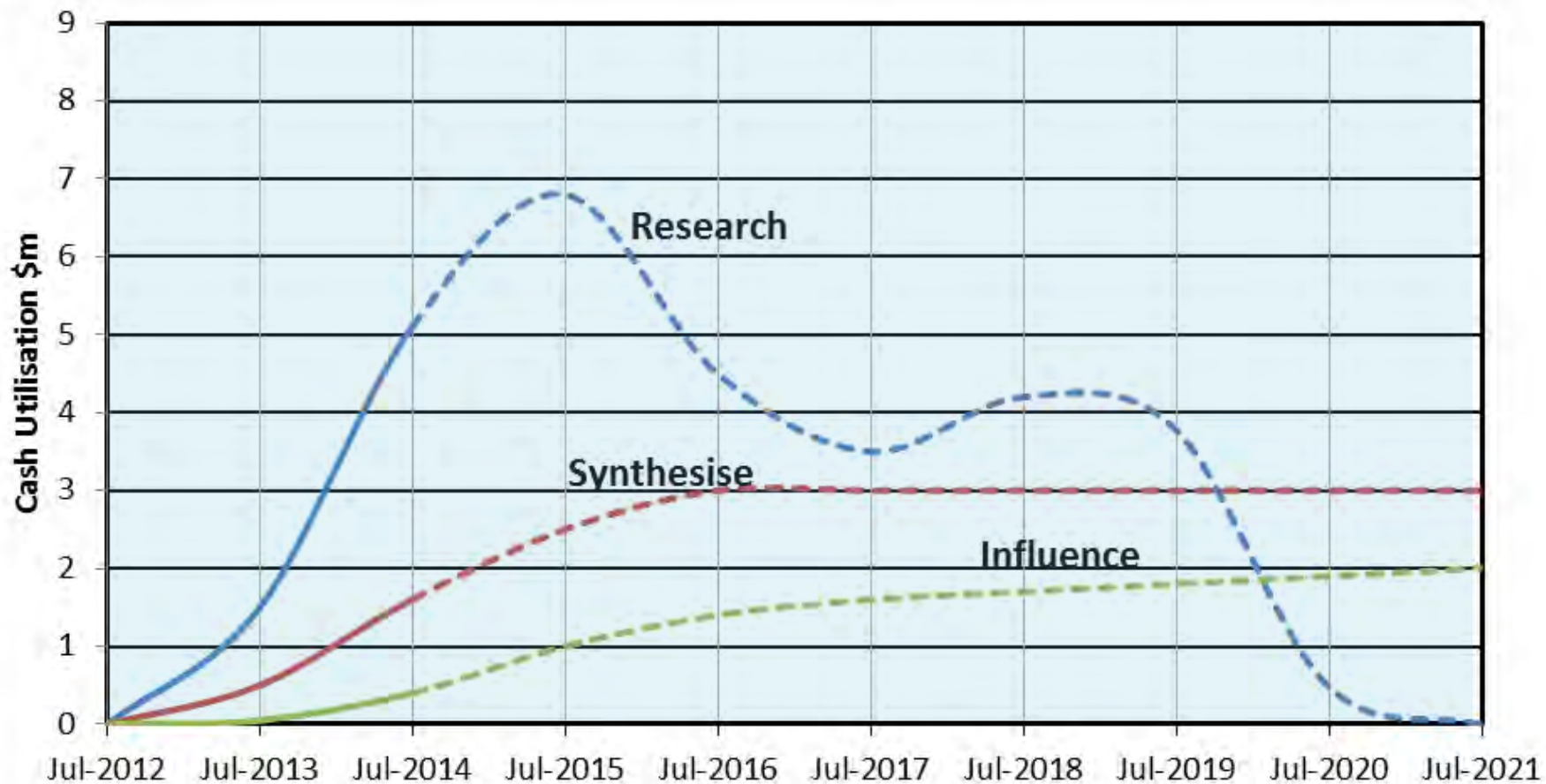
- 7** Apply a portfolio approach to water supply servicing: utilise fit-for purpose sources matched to demand requirements. This may include potable (mains) water, local sewer mining (or regional recycled water), rainwater or stormwater.
- 8** Implement system-scale management of water services for catchment-scale benefits (e.g. OneBox powering talking tanks).
- 9** Implement pressure sewers to reduce the high volume of imported fill typically required for traditional (gravity) sewer infrastructure on flat sites and remove sewer infrastructure as an urban planning and design constraint.
- 10** Explore sewer mining from the main sewer (located adjacent to the railway line) to reduce potable water demand. This has the potential to provide district (reticulated) heating and cooling in addition to recycled water for the site to address the high energy demand associated with residential hot water generation.
- 11** Explore opportunities for body corporate style governance structures to manage community assets and infrastructure.



Assessing water sensitive ideas

The CRCWSC is developing a Water Sensitive City Modeling Toolkit (the Toolkit) to support the strategic planning and conceptual design of stormwater management and green infrastructure initiatives at a range of scales. The Toolkit is comprised of a number of interlinked modules covering stormwater infrastructure planning (including stormwater harvesting), stream health, pluvial flood risk and urban microclimate. The stream health module assesses annual runoff volumes, number of runoff days, filtered flow volumes and pollutant load reductions for a range of scenarios, and compares results against identified objectives and targets.





Research | Synthesise | Influence

