

TREES IN A LIVEABLE CITY:

AN URBAN FOREST CONFERENCE

27 November 2020

Acknowledgement

The WA Local Government Association (WALGA) acknowledges the Traditional Owners of the land and pays respects to Elders past, present and emerging.

This document summarises the key messages from presentations delivered at the 2020 Urban Forest Conference, presented by WALGA in conjunction with the Local Government Urban Forest Working Group, on Friday 27 November 2020 at the University of Western Australia.

PLENARY SESSION 1 (9:00am-9:45am)- Murdoch Lecture Theatre, Arts Building	
<p>Professor Len Collard, Whadjuk Noongar Elder</p>	<p>Australianise the landscape – by using the Aboriginal language and returning local trees to land, re-treeing Perth. It is everybody’s knowledge and business to get engaged in restoring the Australian landscape. Moodja – personal tree – use the aboriginal names for local trees instead of the foreign language names. Moodja (Christmas tree) – secret tree for Noongar people.</p> <p>Flowering time of moodja has been a time for gatherings of Aboriginal people so the timing of the Urban Forest Conference is auspicious.</p>
<p>Minister’s Address Hon Dave Kelly, Minister for Water; Forestry; Innovation and ICT; Science; Youth</p>	<p>Addressing tree loss in urban areas cannot be delivered by a single entity, cooperation between all levels of government and other stakeholders is critical. Shared personal experience with revegetating a Water Corporation managed drainage basin adjoining a residential property. Impacts of climate change significant - SW WA one of the most impacted places by declining rainfall – major issue for water supply in the State. Thus returning trees to urban landscape is so important.</p> <p>The State Government released the Perth Waterwise Action Plan – whole Government program, including support for actions such as:</p> <ul style="list-style-type: none"> • Living streams – drainage for liveability (opportunity to increase vegetation and create Public Open Space) • Waterwise Councils Program – aim is for 80% of Local Governments in Perth MRS to achieve Gold Status (recognised some very good work LGAs were able to achieve) • Waterwise business and development program (with UDIA) • Actions 24 and 25 encourage engagement of Aboriginal people in identifying new water sensitive solutions. <p>Announcement of \$750,000 funding via Water Corporation to Local Governments to assist with planting more trees in the Perth regions.</p> <p>It is a shared problem that requires shared solutions.</p>
<p>Keynote Address</p>	<p><i>Presentation: Urban Forestry at the City of Melbourne - Current Opportunities and Challenges</i></p>

<p>David Callow, Director Parks & City Greening, City of Melbourne</p>	<ul style="list-style-type: none"> • High-performing urban forest should meet at least 5 key elements – strategically managed, diverse, life-sustaining, extensive and healthy • Canopy target set at 40% by 2040, adopted via Urban Forest Strategy in 2012 (current canopy 23.7% on public land and 11.5% across municipality) • There is no single approach to increasing urban canopy – first step is to identify the drivers for trees in a local area. • In Melbourne, inner city areas are 4 degrees hotter than outer suburbs therefore key driver for urban forest in Melbourne – liveability and cooling • Estimating the number of trees required to meet a tree canopy target: Baseline – Predicted losses + growth of existing + growth of replacements + growth of ‘new’ (in Melbourne it was estimated at 2400 trees a year plus replacements); to double tree canopy it is not enough to settle for ‘plant 2 trees for every tree removed’ it needs to be ‘plant <u>at least</u> 2 trees for every tree removed’ • Analysis of a relationship between age, (diameter at breast height) DBH and canopy size of each species was undertaken – correlation between age and DBH found for up to 20 years, so canopy size estimates calculated at 15 years for each species (an example of calculation of tree requirements to replace trees to be removed – slide 26). • Using urban forest to support ecological connectivity: by ranking road segments on importance to providing connectivity for all animal types, this is reflected in the 10-year tree planting plan. In high priority road reserves, understorey vegetation added, in some area concrete was replaced with vegetation verges. • Initiatives to manage tree canopy on private property: <ul style="list-style-type: none"> • Exceptional Tree register (since 2011 and lists 279 Trees- using the National Trust Criteria) – limitation, does not protect 99% of trees on private property • Urban Forest Fund – from Tree removal and other external contributions, provides financial support to enable new greening projects (endorsed in 2017, in 3 years of operation 14 projects funded with \$1.25M investment for \$4.9M value) • Sustainable Building Design Amendments and green Factor, City adopted the Green Our City Strategic Action Plan 2017-2021 which seeks to facilitate an increase in the quantity and quality of vertical and rooftop greening – via regulation (Planning scheme amendment to incorporate Sustainable Building Design Amendment C376) and investigating the applicability of greening assessment methodologies like ‘Green Factor’ to Melbourne.
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	<ul style="list-style-type: none"> Revised the tree valuation formula for the City due to advances in research and technologies: Tree value = Removal cost (removal, replacement, 2 year maintenance) + Amenity value (basic value x species x aesthetics x locality x condition) + Ecosystem services value (using i-Tree) _ Reinstatement greening costs. – Limitation is that we can only value some aspects of the tree benefits. But provide disincentive to clearing and funds to the City for tree replacement. New factors in the tree valuation formula include: climate suitability, habitat value, locality multiplier to increase value of trees in highly utilised areas and those acting as ecological linkages; canopy form, shift from market value to social cost of carbon, air pollution calculated as cost to health (previously cost of removal); compensation for pruning required to accommodate development.
<p>Gold Sponsor Address Naomi Lawrance, Development Manager, DevelopmentWA</p>	<p><i>Presentation: Taking the heat out of urban living - OneOneFive Hamilton Hill-A Case Study in Water Sensitive, Climate Responsive Design</i></p> <p>Overview of the master planning principles for the redevelopment of a closed high school site:</p> <ul style="list-style-type: none"> Objective: Medium density in-fill with housing diversity, affordability, liveability, waste avoidance & resource recovery, net zero energy housing – develop a demonstration site. Design principles: respond to the site’s topography, retain bushland, connect to surrounding community, climate responsive, diverse and accessible housing, with community consultation. Target for tree canopy set at 30% - influenced the design. Mechanisms used: <ul style="list-style-type: none"> Design guidelines and delivered via planning process, conditions for each lot (different conditions for different lot sizes) Utilising existing solutions such as the use of permeable paving to manage storm water, use of roadside bio-filtration drains, development of an underground stormwater retention system utilising the aggregate from the buildings on the site, provision of community bore – increase number of water days for garden but reduced the energy cost of mains water with 65% less GHG emissions; site analysis undertaken for the needs of underground infrastructure without damaging the retained trees. <p>Key outcomes:</p> <ul style="list-style-type: none"> Developed a ‘development pathway’ for a site development with waterwise development pathway (see presentation).

	<ul style="list-style-type: none"> • Unanticipated outcome - engagement with adjoining residents to develop a waterwise streetscapes within existing residential areas – choice of verge landscaping designs developed – applicable to other parts of Perth.
<p>Major Speaker Jess Miller, Project Manager, Greener Spaces, Better Places</p>	<p>Presentation: <i>Where Could All The Trees Be?</i> Project Launch</p> <p>Report published by <i>Greener Spaces, Better Places</i> in 2020 is the third instalment of reports on urban canopy status across Australian cities and suburbs, following the benchmarking study published in 2013. The study found the 69% of the 131 examined places still have less cover than in 2013; with 62% of these places improving green cover since 2016.</p> <p>Key points to consider when reading the report:</p> <ul style="list-style-type: none"> • Urban forest in any area depends on numerous factors and thus the figures cannot be used to ‘rank’ localities, but represent a spectrum of green covers influenced by climate, population density and growth as well as events such as bushfires. • Identify places with similar population size and land mass, in other words sites of similar urban density to your area to inform your strategies on overcoming urban greening challenges. • “<i>Challenge Rating</i>” had been assigned to each of the examined places providing an overview of factors affecting the capacity to increase green cover. 67% of the 131 places will face moderate to very high challenges to maintain and grow green cover over the next decade. • Considering rainfall, level of urbanisation and population density were used to classify the examined places into six place types: <ol style="list-style-type: none"> 1. Suburban, spacious low rainfall (Swan, Wanneroo) 2. Suburban, spacious & average-high rainfall (Armadale, Kalamunda, Mundaring) 3. Urban, spacious & low rainfall (Cambridge, Cockburn, Fremantle, Joondalup, Nedlands, Peppermint Grove) 4. Urban, spacious & average –high rainfall (Bassendean, Belmont, Canning, Gosnells, Kwinana, Melville, Rockingham) 5. Urban, compact & low rainfall (Claremont, Cottesloe, East Fremantle, Mosman Park) 6. Urban, compact & average-high rainfall (Bayswater, Perth, South Perth, Stirling, Subiaco, Vincent, Victoria Park) • Within each place type, places with growing or decreasing green cover can be identified: e.g. in type 4, data for the City of Kwinana showed greatest increase in population growth and green cover. Thus providing a good case study to investigate for places within the same place type.

	<p>Report available at: https://www.greenerspacesbetterplaces.com.au/guides/where-will-all-the-trees-be/</p> <p>And tools to increase green cover available at https://www.greenerspacesbetterplaces.com.au/guides/</p>
CONCURRENT SESSIONS 1 (1:00pm-2:00pm)	
<p>The Benefits of Trees in a Changing Climate</p> <p>Facilitator: Garry Middle</p> <p>Panellists:</p> <ul style="list-style-type: none"> • Cr Dan Bull, Mayor, City of Bayswater • Dr Josh Byrnes, Director, Josh Byrnes & Associates • Greg Simpson, Murdoch University • Associate Professor Sally Thompson, University of Western Australia 	<p>Cr Dan Bull, Mayor, City of Bayswater: The way in which a Local Government can lead the way in increasing tree canopy, and the headwinds it faces in doing so.</p> <p>Dr Josh Byrnes: Creating Canopy-Adopting to a changing climate and landscape.</p> <p>A/Professor Sally Thompson: Tree water requirements and the water costs associated with trees for urban cooling; strategic thinking about how and where we best deploy trees in a drying and warming climate</p> <p>Greg Simpson: Trees for Humans and Nature in a Changing Climate</p>
<p>Behaviour Change and Community Perceptions</p> <p>Facilitator: Mel Davies</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Ruth Cripps, Senior Program Officer, Greening WA and Dr May Carter, Research Associate, Behaviour Change Collaborative • Pierre Quesnel, Senior Place Leader, Town of Victoria Park 	<p>Ruth Cripps and May Carter: <i>Our Park Our Place</i> Preliminary outcomes of a 2-year project to bridge the gap between strategic targets captured within Urban Forest Strategies and community attitudes to trees and parks.</p> <ul style="list-style-type: none"> • Four LGAs participating in the project • Community engagement demonstrated different community priorities for local parks <p>Pierre Quesnel: <i>The Deep End: Deepening Engagement to Build Support of Urban Forest Actions</i> The Town of Victoria Park's Urban Forest Strategy is lead and developed by community. Urban Forest actions should be examined through science, place and psychology perspectives, using:</p> <ol style="list-style-type: none"> 1. Tell: <ul style="list-style-type: none"> • When talking about benefits of tree – focusing on benefits to people (canopy) and relate them to local places (where can you see different types of trees in the community) • Using story narratives to communicate the science • Using emotive imagery and language to communicate • Celebrate shared achievements 2. Teach: <ul style="list-style-type: none"> • Cultural activities 3. Involve: <ul style="list-style-type: none"> • Community participation in replanting • Urban Forest at home – plants grown by Friends Group

	<ul style="list-style-type: none"> • Urban Forest grants • Partner and empower community groups <p>4. Own:</p> <ul style="list-style-type: none"> • Community legacy created via projects facilitated by the implementation of the Urban Forest Strategy
<p>Redeveloping Around Trees</p> <p>Facilitator: Ashley Robb</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Janine Egan, Director, Design WA, Department of Planning, Lands and Heritage • Joanne Burgess, City of Stirling • Peter Wittkuhn, McLeods Barristers & Solicitors 	<p>Janine Egan: <i>Design WA-Medium Density Housing Code</i> Cost of every new business-as-usual dwelling to the broader community is \$29K over 20-year lifecycle or \$1,460/dwelling/year) (based on SGS Economics and Planning Report, May 2020 report) DPLH’s Urban forest mapping 2009-2018 documents loss of tree canopy greatest on private land, greatest loss in the Metro Central Region – <i>Data is publicly available on PlanWA interactive Urban Forest Dashboard</i> Current Medium Density site design: 40% living, 40% car park, 20% other – often hard cover Policy response – new requirements for Medium density residential areas released for consultation:</p> <ul style="list-style-type: none"> • Space for trees and associated deep soil area (20% of site) • Increased landscaping requirements • Specific tree requirements defined for dwelling types • Encourage diversity of housing types within medium density sites. <p>Testing indicates that the new policy facilitates increase in dwelling yield compared with business-as-usual approach.</p> <p>Joanne Burgess: <i>Learnings to Date from the Implementation of Statutory Provisions for Tree Retention and Planting During Development</i> In 2017, the City adopted a new policy for tree retention (LPP 6.11), review of its effectiveness showed:</p> <ul style="list-style-type: none"> • Street trees are being protected • Does not protect future tree planting places within development sites • As street trees are not considered in subdivision approvals by WAPC, they cannot be protected • Most people are choosing to clear and replant rather than retain existing trees (only 3% of 849 applications assessed) • All parties must be on-board with tree retention – designed & built (lack of experience among builders on how to develop around trees) • Lack of compliance due to limited enforcement • Access to canopy cover is an equity issue, yet that is not reflected in the current provisions of the policy. <p>Recommendations:</p> <ul style="list-style-type: none"> • Test a new policy for potential loopholes

	<ul style="list-style-type: none"> • Check that it will contribute to the achievement of a tree canopy target • Do not give away development rights without conditions • Policies are hard but free trees to residents are easy and do not cost a lot – therefore free street trees to residents remains a useful strategy in increasing tree canopy cover • Get agreements from utilities that when they remove trees within the LGA area to upgrade their infrastructure, they replace the removed trees. <p>Peter Wittkuhn: <i>Not so squeezey - The SAT's First Tree Canopy/Deep Soil Decision (Kemstone Investments Pty Ltd and City of Joondalup)</i></p> <p>Explored the appeal against a refusal of a development approval for 6 dwellings on a 728sqm site; SAT upheld the City's refusal of the development.</p> <p>The base for the SAT decision was on the interpretation of the 'Acceptable Outcome' within the relevant R-Code guidelines regarding the requirement for a deep soil area within the site. While the proponent argued that the site will include 56sqm or 7.7% of the site as 'deep soil area', SAT concluded that the proposed design and distribution of the 'deep soil area' will not guarantee that it will be possible to grow a tree on the site, even if the selected species was able to withstand the harsh conditions.</p> <p>It is important that development plans show genuine effort to ensure adequate 'deep soil area' to support mature tree is provided within proposed development areas.</p>
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CONCURRENT SESSION 2 (2:10pm-3:10pm)

<p>Data and Urban Forests</p> <p>Facilitator: Garry Middle</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Karen Sweeney, Urban Forest Manager, City of Sydney • David Ford, Environmental Coordinator, City of Canning • Renata Zelinova, Business Development Officer-LGmap, WALGA 	<p>Karen Sweeney: <i>Beyond Boundaries</i></p> <p>Smallest area defined by ABS – mesh blocks, data boundaries compatible with other ABS data to facilitate PlanitGeo – canopy cover per lot – not uniform size and difficult to visualise</p> <p>In Sydney – developed the 'urban tapestry method', assessing to achieve 30% canopy cover within 1.6km buffer from each sample point</p> <p>Using 'seed' data provided by the State Government to access data outside LGA area</p> <p>Good way of tracking the effectiveness of greening activities across the City – better than use of the mesh-block data especially when used 100m buffer instead of 1.6km buffer. Can be applied to historical data of canopy cover. The same methodology can be used to measure the diversity of canopy – used 800m buffer</p> <p>Analysis done in-house</p> <p>David Ford: <i>City of Canning Urban Forest Strategy</i></p>
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	<p>Important to interrogate what is driving the canopy cover in a suburb/area.</p> <p>City developed a methodology for residential canopy projections, using the R codes; identified fully developed lots, undeveloped lots, calculated % on the fully developed lots – combined the two to estimate the expected canopy – identified that about 28ha of current canopy loss within lands zoned residential, calculated the number of trees needed in POS (35,556 trees) then identified area of verges without trees – opportunity for planting where the 20% increase will be achieved.</p> <p>Demonstrated that loss of canopy on freehold land can be offset within POS and streetscapes.</p> <p>Renata Zelinova, WALGA: Exploring urban forest mapping via LGmap</p> <p>Data relevant to UF planning and management available via LGmap:</p> <ul style="list-style-type: none"> • DPLH 2009-2018 Urban Forest mapping (Canopy % for Local Government, suburb and ABS mesh blocks) for Perth and Peel • Vegetation height layer based on 2018 Urban Monitor data for Perth and Peel, allowing vegetation classification and canopy cover calculation for any area and canopy scenario modelling • Urban Heat Island index mapping for Perth • Ecological linkages mapping • Data to inform location specific native tree species selection. <p>LGmap tools allow recording of trees (including photo records), estimation of tree canopy size and tree canopy scenario modelling for varied development footprints.</p>
<p>Greenfield Development</p> <p>Facilitator: Ashley Robb</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Dan Pearce, Hatch/RobertsDay • Peter Ciemitis, Principal, Hatch/RobertsDay • Rachel Pleasant, Manager Strategic Planning, City of Cockburn 	<p>Dan Pearce: <i>Bushmead Shaped by Nature</i></p> <p>What worked:</p> <ul style="list-style-type: none"> • Setting the project objective from the start - to achieve a sustainable development which protects and enhances the existing natural values and character of the site, minimises environmental impacts and provides for engaged, healthy, connected and inclusive community. • 1/3 of the site to be developed, 2/3 to be protected as bushland – this was determined prior rezoning. • Greatest gain can be achieved within public realm – in respect of tree and vegetation retention – thus road reserves were identified as the biggest opportunity for additional tree retention (as parks were given) • Working with the topography allowed tree retention and maintain the site’s character. • Principle applied – maximise broader community benefits by locating public places, build around existing environmental assets – e.g. trees. • Prior subdivision planning – map tree locations. <p>Tips for increasing space for trees within a subdivision:</p> <ul style="list-style-type: none"> • Utilise pedestrian mews

- Clipped lots to accommodate additional landscaping treatments
- Corner lot truncation generally not required - remove
- Varying road reserve widths and meandering roads
- Tight kerb radii
- On-street parking

Outcome – new residential are with established landscape.

Peter Ciemitis: *More Harm than Good, Unintended Tree Loss Through Contemporary Planning Practice + Possible Directions for Change*

It is easier to bend a plan around a tree than bend the rule around a development

Most developments aim to achieve good sustainability and environmental outcomes. Good example of a sustainable project Frasers Landing in Mandurah, but not all environmental objectives can be achieved at all sites.

Focus of the presentation on the impact of WSUD on the overall environmental outcomes for new developments.

Approach in the 80's was less costly than current approach with complete re-contouring of a site and associated need for retaining walls.

Many drivers leading to natural canopy loss in the current setting, some are driven by the building industry: smaller lots, requirements for flat lots/retaining, rigid street grids/orientation; drainage design, bulk earthworks, bushfire risk, subdivision and residential codes, risk & liability.

Deep swales used in the past to accommodate drainage – now the same water value have to be accommodated in shallow swales for safety – as a consequence, extensive earthworks to accommodate grading of the landscape. This has implications on the design of the structure plan – very limited opportunity to retain vegetation and trees.

Sumps can be revegetated – thus deep swales should be considered as a tool for dealing with water drainage.

Rachel Pleasant: *Planning for Trees*

Two case studies from the City of Cockburn:

1 Beelias – development of the former quarry with a ridgeline of tuarts.

Revised structure plan included most of the Tuarts -

Contributors to success:

- Mapping of all trees, assessing their health and understanding the impact of the cut and fill activities on the trees

	<ul style="list-style-type: none"> • Cross functional team involved – planning, environmental, parks (arborist) and engineers. <p>‘Trees sell lots’ – the benefits of tree retention acknowledged by the developer.</p> <p>2 Hammond Park – delivered a green link</p> <p>Challenges:</p> <ul style="list-style-type: none"> • Limitations of the 10% POS allocations • Yield expectations by developers for urban zoned lots • Earthworks (benching) requirements to meet standards <p>Due to collaboration between planners, environmental and parks teams and the developer, the subdivision design includes a green link between major conservation areas.</p> <p>This project highlighted a need to strengthen the City’s local planning framework to facilitate the community expectations for green suburbs. Explain what ‘context’ and ‘local character’ mean in the City of Cockburn. These are now defined in the City’s Draft Local Planning Strategy (released on-line in October 2020).</p> <p>Key learnings:</p> <ul style="list-style-type: none"> • Tree retention in a growth setting is challenging • Community expectations are growing and drive outcomes • A whole of planning framework approach is required to achieve better environmental outcomes – a single Local Planning Policy or a tree study will not be effective • The local planning framework should focus on clear guidance for decision makers on how discretion will be applied to meet local objectives for land use.
<p>Planting for Biodiversity</p> <p>Facilitator: Ashley Robb</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Dr Jane Chambers, Murdoch University/NatureLink • Rob Bodenstaff, managing Director, Arbor Centre • Professor Kingsley Dixon, Curtin University 	<p>Jane Chambers, Murdoch University/NatureLink: <i>How to Achieve Bonus Biodiversity Benefits from Your Urban Forestry Strategy</i></p> <p>NatureLink Perth is a community in practice with an objective to integrate nature into our city to conserve and enhance internationally recognised biodiversity.</p> <p>The presentation focused on the outcomes of the a report prepared by Christina O’Donnell & Jane Chambers, Murdoch University; Improving Biodiversity Outcomes for Urban Forest Strategies through incorporating native Trees Species (available to download here).</p> <p>Key findings of a review of Urban Forest Strategies adopted by LGAs in Perth included:</p> <ul style="list-style-type: none"> • Lack of biodiversity consideration in Urban Forest Strategies – acknowledged as a factor but no specific objectives/KPIs defined • Barriers to greater use of locally indigenous species in increasing urban forest canopy: fire restrictions, policy

	<p>and planning, community perceptions, disease, climate change, invasive species, lack of knowledge of suitable species for urban settings.</p> <p>The report includes tables that help to identify suitable native tree species to plant in Perth.</p> <p>Key recommendations on how to increase biodiversity benefits of Urban Forest:</p> <ol style="list-style-type: none"> 1. Make it local – reflect local soil types 2. Provide habitat – Report identifies tree species that support insects (bees), birds (Carnaby’s black cockatoos) and mammals 3. Make it beautiful – information on flowering times and colours 4. Make it legal – minimal distances from buildings and infrastructure provided 5. Help it survive – fire resistance, drought, frost, salt tolerance noted for the listed tree species. <p>Urban Forest should not be only about trees but also consider understorey, this provides a greater opportunity to use local indigenous species (Useful Grow Local Plants guide)</p> <p>Avoid planting tree species with the potential to become environmental weeds</p> <p>Include targets or KPIs focusing on increasing biodiversity via implementation of Urban Forest Strategies.</p> <p>Rob Bodenstaff, Arbor Centre: The Contract Growing of Trees for Local Government – A Pathway to Successful Outcomes</p> <p>Need for innovation and collaboration identified to achieve successful urban forests.</p> <p>Current practice results in overspending on tree survival in WA – 100% to 400% more than is necessary for a tree to achieve maturity with high failure rates and significant handover issues.</p> <p>Challenges:</p> <ul style="list-style-type: none"> • Poor quality of available tree stocks in Perth, results in high failure rates • Significant handover issues (from developer to land manager) • Current process is too fragmented – too many participants from design to on-going maintenance delivered via separate contracts, compounded with misinformation and being delivered over long time frames; lost accountability in the long process – this results in high cost of Urban Forests • Cost are ‘micro-driven’ not life-cycle driven (25-30 years)
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This results in a high percentage of failed tree planting during the first 2-3 years.

Alternative to the current tree planting approaches is to use a single provider to supply, prepare the site, install and care for the planted trees for 3-7 years, to ensure proper establishment prior handover and long-term survival.

Kingsley Dixon, Curtin University: *Where Has All The Canopy Gone?*

New concepts for thinking differently about providing appropriate canopy in urban landscapes:

Better use of non-indigenous species to support native animals

For example replacing plane trees with pecan trees – known to support the threatened Carnaby’s black cockatoos as an alternative food source to banksias in urban areas

Why urban forest matters – in greater Perth, significant loss of biodiversity recorded, typical trees such as Banksias and Tuarts are now classified as threatened at the national scale;

A mature jarrah in Kings Park supports 83 spp, 65 genera and 38 families of native animals

Kings Park management history provides an insight into the impacts of long term human interventions on plant community structure – leading to their alteration and to tipping points for species loss

Utilise all available resources to secure adequate plant material

Many missed opportunities to preserve biodiversity in Perth with lack of pre-planning – e.g. seed collection pre development should be a standard to ensure canopy is maintained in the landscape.

Use rigorous scientific research to inform three health issues:

Tree management requires scientific approach rather than ad hoc management responses was demonstrated on the example of jarrah management in parks when excessive pruning without investigations of causes of tree changes lead to loss of mature trees. This can be prevented with, systematic research into the causes of tree health changes and identification of possible treatments. E.g. research into ‘mundella yellows’ showed iron or manganese deficiency caused by changes to the conditions around trees in parks (under grass or in areas where paths were built). The yellowing of tree foliage was managed via nutrient supplementation.

Another example – decline of Norfolk Island Pines in varied settings recorded over the last couple of years. However, no

	<p>funding has been allocated for research by appropriate disease specialist to inform appropriate response to the Norfolk Island Pine decline, yet the past examples demonstrate that is required to inform appropriate response.</p>
<p>CONCURRENT SESSION 3 (3:20pm-4:20pm)</p>	
<p>Latest Research</p> <p>Facilitator: Garry Middle</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Associate Professor Steven Livesley, University of Melbourne <p>Presentations from Venue Partner Clean Air and Urban Landscape Hub (CAUL), University of Western Australia:</p> <ul style="list-style-type: none"> • Associate Professor Bryan Boruff, University of WA • Dr Cristina Ramalho and Dawn Dickinson, CAUL, University of WA 	<p>Steven Livesley: Trees to shade and cool paths and cycleways in Australian cities</p> <p>Example of the Brisbane 2 Million Trees Program demonstrates the changing focus of tree planting – shift from tube stock planting in parks to improve biodiversity to a human health focus.</p> <p>Human health focus should consider equally:</p> <ul style="list-style-type: none"> • Heat exposure (canopy size/coverage) • Vulnerability (socio economic and demographic factors) • Behavioural exposure (times of use – e.g. children walking from school during the hottest part of day) <p>Examples of two new approaches to prioritising tree shade for active transport routes:</p> <ul style="list-style-type: none"> • Google 360 Sky View factor – indicating heat risk (used in Bendigo) • “Right tree, right place, right time’ – an approach to determining species selection to meet specific locality use, e.g. to encourage active journey to-from school at 3:30pm. Developed computer modelling utilising gaming techniques (agent based modelling) to determine the type of trees (based on shading attributes) best suitable for street trees to ensure shading at 3.30 pm. The model helped to identify additional planting areas which resulted in increase in number of houses that can be reached safely from a school, from 320 houses with the baseline canopy cover to 794 houses with additional strategic planting. <p>Summary:</p> <ul style="list-style-type: none"> • Tree canopy mapping programs at the mesh block or neighbourhood scale are good for UHI programs and environmental inequity, but • Shadeways for active transport behaviour need to consider destinations and routes that expose vulnerable people to heat stress and UV. <p>Bryan Boruff: Leaf my neighbourhood alone! Predicting the influence of densification on residential tree canopy cover in Perth.</p> <p>Examined the drivers of urban vegetation cover across the Perth Metropolitan Region, considering socio-economic and physical urban form</p> <ul style="list-style-type: none"> • Developed ‘Random Forest’ model to predict tree canopy coverage – used to model the impacts of local planning scheme changes on tree canopy

	<ul style="list-style-type: none"> • Older neighbourhoods, lower dwelling density and building footprint coverage, and improved socio-economic status were associated with greater canopy coverage. • The model allows consideration of trade-offs and synergies between urban development and canopy retention. <p>Dawn Dickinson: Managing urban forest in a global biodiversity hotspot; Biodiversity and Human Wellbeing Considerations for Species Selection.</p> <p>Explored how to cater for biodiversity in urban forest management while considering human wellbeing and ecosystem service delivery.</p> <ul style="list-style-type: none"> • Collected information via semi-structured interviews of 29 practitioners across 10 Local Governments on Perth Metropolitan region <p>Preliminary findings:</p> <ul style="list-style-type: none"> • Biodiversity tends to be a secondary consideration or by-product of species selection and biodiversity functions are spatially segregated • Public health practitioners are not consulted in relation to urban forest, if yes then at strategic planning stage not at day-to-day operations • Species lists can get political • Community participation can either help or hindrance <p>Presented an updated model of factors influencing urban forest composition.</p>
<p>Technical Workshop: Which Tree Where?</p> <p>Facilitator: Mel Davies</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Professor Michelle Leishman, Chief Investigator of the Which Plant Where Project 	<p>Professor Michelle Leishman: <i>Species Selection for Future Climates</i></p> <p>Increasing temperatures in urban areas are impacting all plant species, including very hardy tree species.</p> <p>Species damage from extreme heat event in Sydney – especially common horticultural species significantly affected</p> <p>Key strategies for building resilience of the urban forest:</p> <ul style="list-style-type: none"> • Build species diversity • Increase species representation with high tolerance to conditions expected due to climate change <p>‘Which Plant Tree Where’ (based on 5 years of research) focus areas:</p> <ul style="list-style-type: none"> • Species attributes & bioclimatic suitability – built a database of over 4,300 entities • Success & failures – the predictions are tested in labs; ‘how-to’ guide for climate smart street tree trials. • On-line plant selection tool – being developed

	<p>Presenter invited suggestions on what should be included in the best-practice-guidelines and results of tree species trials to inform the on-line plant selection tool.</p> <p>Workshop: Participants were invited to list tree selection criteria for 5 different site locations:</p> <ul style="list-style-type: none"> • Residential verges • Streetscapes • Parks and Reserves • Car parks • Private land <p>Information to be used to inform a business case for centralised tree selection tool for Local Government, e.g. street tree matrix by Town of Vincent.</p>
<p>Mixing Trees and Infrastructure</p> <p>Facilitator: Mel Davies</p> <p>Presenters:</p> <ul style="list-style-type: none"> • Vic Bijl, Arborist, City of Belmont • Brendan Oversby, Director, Oversby Consulting • Adele Gismondi and Perry Beor, Water Corporation – Platinum Sponsor 	<p>Vic Bijl: <i>Permeable Paving in Local Car Parks</i> Benefits and sequence of works to install permeable pavements that enables full canopy potential without pavement damage. It is a system – base course/stone base reservoir & bedding layer & paves Additional benefit – no car park flooding</p> <p>Brendan Oversby: <i>Gaining Canopy and Liveability Through Better Stormwater Management</i> Examples of water sensitive urban water design in Bunbury – UHI mapping demonstrates the cooling benefits of bio-gardens with trees</p> <ul style="list-style-type: none"> • Traditional treatments – accumulation of leaf litter, often the installation of pits does not adequately manage water • Should use species that are active in winter - when most rain falls in SW WA, use sedges/rushes below trees to increase water quality and long term information. • Example of transformation of a grassy, winter water logged underutilised park into a high quality landscaped park with linked basins designed to improved storm water quality entering the local estuary. <p>Perry Beor & Adele Gismondi: <i>Greening Perth and Protecting Infrastructure</i> Waterwise Action Plan for Perth – focus on 3 actions: Action 11 – 17 drainage areas transformed into constructed wetlands, Action 12 - Waterwise Greening Scheme - \$10,000 co-funding per Local Government to support a range of waterwise activities Action 15 - Urban Forest increase in high UHI risk High cost of root damage to drain infrastructure, risk to property damage and environmental impacts from damage to sewage lines. Select the right tree for a location, to minimise damage to infrastructure.</p>

