CITY of PERTH

Lord Mayor and Councillors,

NOTICE IS HEREBY GIVEN that the next meeting of the **Works and Urban Development Committee** will be held in Committee Room 1, Ninth Floor, Council House, 27 St Georges Terrace, Perth on **Tuesday, 6 September 2016 at 5.30pm.**

Yours faithfully

MARTIN MILEHAM
CHIEF EXECUTIVE OFFICER

1 September 2016

Committee Members:

Members:	**1st Deputy:**	**2nd Deputy:**
Cr Limnios (Presiding Member)		
The Lord Mayor	Cr Harley	Cr Chen
Cr McEvoy		

Please convey apologies to Governance on 9461 3250
or email governance@cityofperth.wa.gov.au

WORKS AND URBAN DEVELOPMENT COMMITTEE

Established: 17 May 2005 (Members appointed 22 October 2015)

Members:	**1st Deputy:**	**2nd Deputy:**
Cr Limnios (Presiding Member)		
The Lord Mayor	Cr Harley	Cr Chen
Cr McEvoy		

Quorum: Two

Expiry: October 2017

TERMS OF REFERENCE: OCM 24/11/15

To oversee and make recommendations to the Council on matters related to:

1. works required to construct, upgrade and maintain streets, footpaths, thoroughfares and other public places, including streetscape upgrades, landscaping initiatives and directional signage and graffiti;

2. design, construction and upgrading of parks, reserves, recreational and civic amenities and facilities and Council owned buildings, excluding Council House, the Perth Town Hall, City of Perth Public Lending Library and the Perth Concert Hall;

3. oversight of the implementation of the Lighting Strategy;

4. waste management.

This meeting is not open to members of the public

WORKS AND URBAN DEVELOPMENT COMMITTEE
6 SEPTEMBER 2016

ORDER OF BUSINESS

1. **Declaration of Opening**

2. **Apologies and Members on Leave of Absence**

3. **Confirmation of Minutes – 16 August 2016**

4. **Correspondence**

5. **Disclosure of Members' Interests**

6. **Reports**

7. **Motions of which Previous Notice has been Given**

8. **General Business**

   8.1. Responses to General Business from a Previous Meeting

   Nil

   8.2. New General Business

   1. **Installation of an Operational Beehive in the City of Perth Local Government Area (Elected Member Information Request)**

      The Director Construction and Maintenance will provide information on this matter to the Committee.

9. **Items for Consideration at a Future Meeting**

Outstanding Reports:

- **"PTA Proposed construction of Fitzgerald Street Bus Lanes (City of Perth Section)" (Deferred 12/04/16, Updated 24/05/16, Updated 26/07/16).**

10. **Closure**

INDEX OF REPORTS

ITEM NO: 1

CITY LANEWAYS ENHANCEMENT PROJECT – MCLEAN LANE

RECOMMENDATION: ***(APPROVAL)***

That Council:

1. ***receives the results of the public consultation on the McLean Lane Enhancement - Draft Concept Plan as detailed in Schedule 1;***

2. ***approves the final concept plan for implementation as detailed in this report and Schedule 2, noting that construction is scheduled to be completed by Friday, 30 June 2017; and***

3. ***notes that stakeholder consultation on a proposed partial daytime closure of McLean Lane (Murray Street end) to facilitate alfresco dining will be postponed until an alfresco application is received from the new tenants of 100 Murray Street.***

BACKGROUND:

FILE REFERENCE:	P1032430
REPORTING UNIT:	Co-ordination & Design
RESPONSIBLE DIRECTORATE:	Planning and Development
DATE:	25 August 2016
MAP / SCHEDULE:	Schedule 1 – Consultation Results Report Schedule 2 – Final Concept Plan

The McLean Lane Enhancement - Draft Concept Plan was presented to the Council at its meeting held on **5 April 2016**. The Council subsequently endorsed the following resolutions:

"That Council:

1. *approves the draft concept plan for the upgrade of McLean Lane as detailed in this report and Schedules 9 and 10;*

2. *approves the release of the draft concept plan for consultation with stakeholders;*

3. *approves stakeholder consultation on a proposed partial daytime closure of the laneway at the Murray Street end to facilitate alfresco dining; and*

4. *notes that the results of the public consultation, together with the final plans and cost estimate for progressing the physical works will be presented to the Works and Urban Development Committee for further consideration."*

This report presents the results of the public consultation and provides details on the Final Concept Plan, including estimated costs and a proposed construction program.

LEGISLATION / STRATEGIC PLAN / POLICY:

Integrated Planning and Reporting Framework Implications	**Strategic Community Plan** Council Four Year Priorities: Perth as a Capital City S5	Increased place activation and use of under-utilised space

DETAILS:

Draft Concept Plan - Public Consultation

The Draft Concept Plan was published on the City of Perth's community engagement website 'Engage Perth' in April 2016. In addition, a letter was sent to all property owners and tenants on the block defined by Murray Street, Wellington Street, Pier Street and Barrack Street, inviting comments on the proposal.

Of the eight formal responses received:

- Four were fully supportive of the proposal; and
- Four provided conditional support.

The comments were supportive of generating more activity in the laneway, introducing public art and highlighting the character of the space.

Schedule 1 provides a full account of the consultation responses.

Partial Laneway Closure to Facilitate Alfresco

The owners of 100 Murray Street are introducing a café to the ground level of their building and reorienting towards the laneway. Maximising the alfresco area for this café to bring activity to the lane is a key objective of the enhancement. Restricting vehicle access to this part of the laneway during the day would greatly increase the amount of available space and improve the alfresco experience.

The City of Perth will continue to work with the owner's architect to co-ordinate the laneway enhancement works with the building refurbishment and alfresco design

before proceeding with stakeholder consultation on a partial daytime closure of the laneway.

Final Concept Design

The Final Concept Design in Schedule 2 is inspired by Robert (Bob) McLean's second-hand furniture shop, which was located in McLean Lane in the 1920's.

The key components of the enhancement are:

Surface treatment	• New black asphalt paving; and • A central drainage channel formed with granite cobble stones salvaged from the lane and excess cobble stones recovered from earlier laneway upgrades.
Lighting	• Catenary lighting with colourful domestic-style lampshades reinterpreted using robust and long lasting anodised aluminium; • Wall-mounted gooseneck LED lamps for general lighting; • Feature lighting of character architectural elements; and • A neon feature at a high level on the northern elevation of the Pier Street Car Park to draw attention to the lane from surrounding city areas.
Events	• Water taps, sewer connections and 1-phase and 3-phase power for events.
Drainage	• New stormwater drainage pipes and grates
Activation, Crime Prevention & Safety	• The below-ground stairwell at the rear of the Pier Street Car Park are to be demolished and removed to eliminate opportunities for concealment, improve passive surveillance and maximise alfresco and event space; • The owners of 100 Murray Street have agreed in principle to install a gate to the top of their driveway to restrict public access; • Two new CCTV cameras to improve formal surveillance of the lane; and • New Wi-Fi access points to extend the City of Perth's

	free network.
Public Artwork	• A colourful artwork on the western elevation of the Pier Street Car Park inspired by Bob McLean's second-hand furniture shop; and • A mural on the northern elevation of the Padlock Building.
Signage	• A large 'McLean Lane' sign at the Murray Street entrance to assist way-finding.

FINANCIAL IMPLICATIONS:

ACCOUNT NO:	CW1966
BUDGET ITEM:	McLean Laneway - Gasworks
BUDGET PAGE NUMBER:	38
BUDGETED AMOUNT:	$1,276,500
AMOUNT SPENT:	$ 119,162
PROPOSED CONSTRUCTION COST:	$1,008,622
PROPOSED DESIGN & PROJECT MANAGEMENT COST (FY16/17):	$ 148,716
PROPOSED TOTAL COST:	$1,276,500
BALANCE:	$0
ANNUAL MAINTENANCE:	TBC
ESTIMATED WHOLE OF LIFE COST:	TBC

An independent quantity surveyor has estimated the above construction costs based on the 50% design documentation drawings. This includes a 12% contingency for unforeseen costs and latent site conditions.

In addition to the Capital Works budget for the enhancement, the City of Perth has been awarded a Federal grant of $13,475 for the supply and installation of the two new CCTV cameras in the lane.

There is also scope to increase the budget for the public art component of this project through the City's Public Art Reserve.

All figures quoted in this report are exclusive of GST.

COMMENTS:

Construction is scheduled to commence in early 2017 and is expected to take approximately 10 weeks to complete. The works will be staged to minimise disruption to adjacent businesses and the general public.

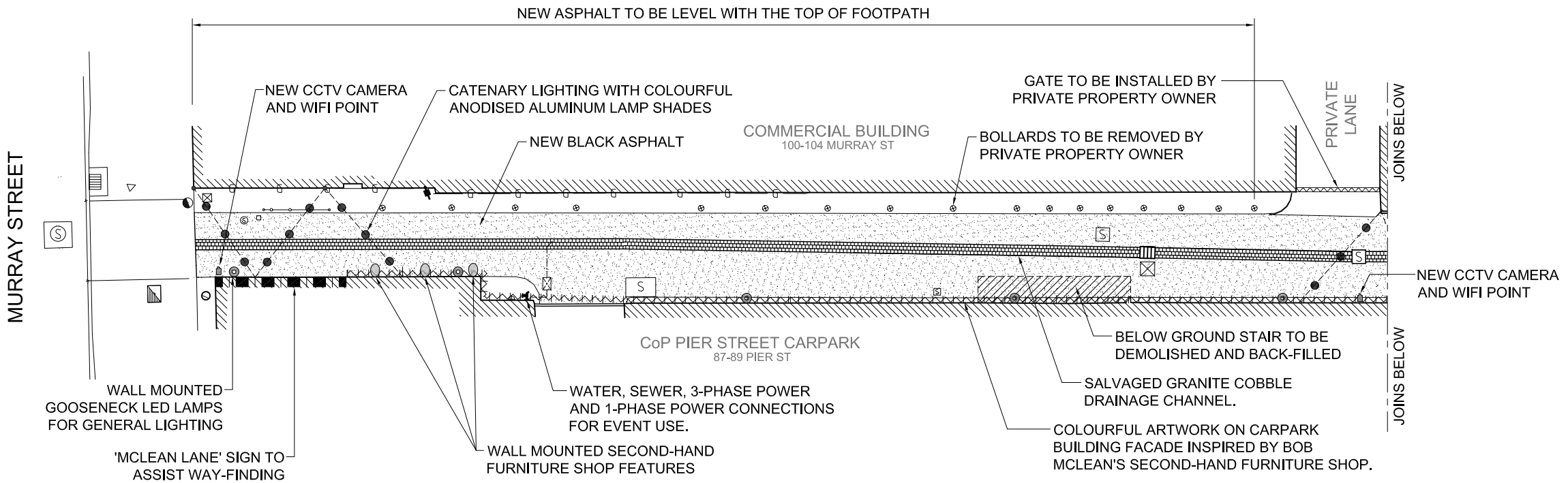
A communications plan will be developed to ensure all stakeholders are adequately notified of the works and to deal with any specific needs concerning access requirements during construction.

McLean Draft Concept Design - Community Consultation

	TRIM REF	DATE RECEIVED	RESIDENT / BUSINESS	COMMENTS	RESPONSE
			FULLY SUPPORTIVE		
1	63142/16	15/04/2016	Ratepayer (type not specified)	• Supports laneway enhancements • Vast improvements have been made to other city laneways • The enhancement will discourage littering and antisocial behaviour.	Noted.
2	63146/16	13/04/2016	Not specified	• Fabulous, loves activated laneways with an urban vibe	Noted.
3	67856/16	23/04/2016	Not specified	• Fantastic idea • Will give the city character	Noted.
4	67901/16	22/04/2016	Resident	• Excellent idea • Will improve safety: lives very close to MacLean Lane and knows that laneways are problem areas • Supports highlighting industrial heritage of the Gasworks and the Padlock Building • Supports the idea of a cafe • Supports local public art • The proposal will add value to the East Perth precinct	Noted.
			QUALIFIED SUPPORT		
5	63149/16	13/04/2016	Not specified	• Supports the proposal • Requests greater development and diversity of businesses adjacent the lane • Suggests incorporating a bike storage/repair facility in one of the buildings adjacent the lane • Supports high quality paving • Supports light installation • Supports public art proposal • Requests vegetation • Supports signage/wayfinding	• The City anticipates that the laneway enhancement will encourage future development of adjacent private propoerties as did the upgrade of Grand Lane, Howard Lane and Wolf Lane. • There is insufficient space, sunlight and irrigation to successfully incorporate vegetation in the laneway
6	67485/16	26/04/2016	Business	• Supports the proposal • Requests that alfresco dining and events are subject to the same toilet facility requirements as restaurants in the City	Noted.
7	67896/16	20/04/2016	City worker	• Supports the upgrade • The original cobblestones once uncovered should be retained insitu	• The extent of the existing cobblestones beneath the asphalt is unknown. Preliminary investigations have indicated that they do not cover the full extent of the laneway. • The existing cobblestone will be lifted and relayed in a central drainage channel.
8	N/A	2/05/2016	Not specified	• Public art should not glorify violence (Comment received via telephone)	Noted.
			NOT SUPPORTIVE		
			OTHER		

Fully Supportive	4
Qualified Support	4
Not Supportive	0
Other	0
Total	**8**

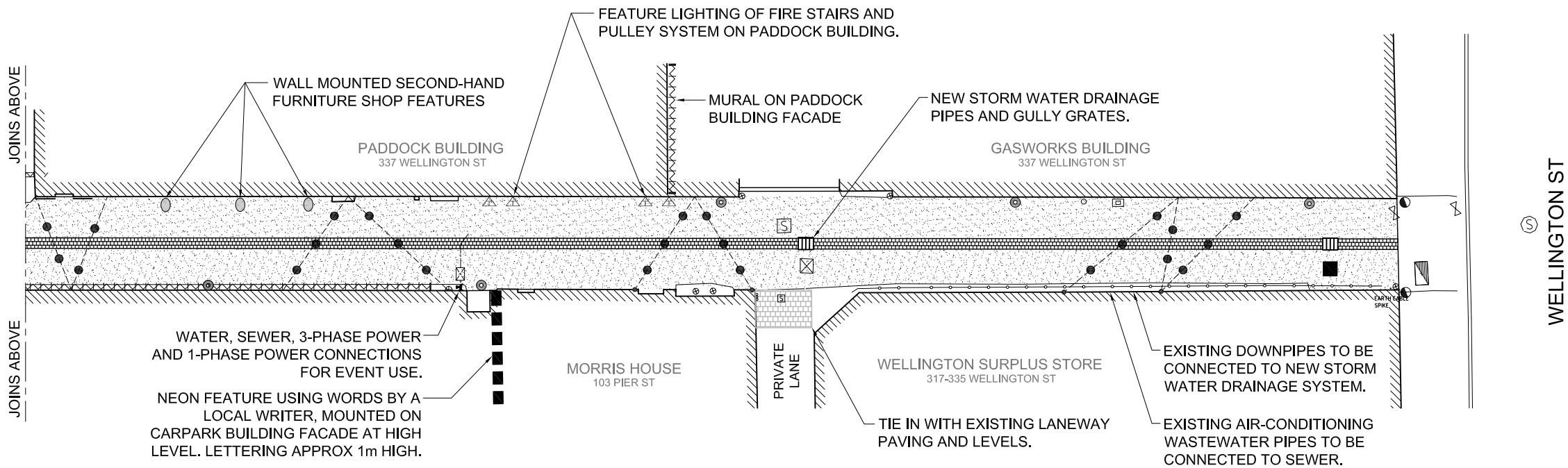
SCHEDULE 1



McLEAN LANE PLAN - SOUTH

LEGEND

- PAVEMENT TYPE A: ASPHALT PAVEMENT
- PAVEMENT TYPE B: SALVAGED GRANITE COBBLE CHANNEL
- CATENARY LIGHTING WITH COLOURFUL ANODISED ALUMINUM LAMP SHADES
- WALL MOUNTED GOOSENECK LED LAMPS FOR GENERAL LIGHTING
- WALL MOUNTED SECOND-HAND FURNITURE SHOP FEATURES
- FEATURE LIGHTING OF FIRE STAIRS AND PULLEY SYSTEM ON PADDOCK BUILDING.
- 'MCLEAN LANE' SIGN
- NEON FEATURE
- COLOURFUL ARTWORK ON BUILDING FACADE
- EXISTING BUILDING LINE
- EXISTING GUARD RAIL
- EXISTING BOLLARD TO BE REMOVED BY PRIVATE PROPERTY OWNER
- PROPOSED DRAINAGE STRUCTURES
- EXISTING DRAINAGE STRUCTURES



McLEAN LANE PLAN - NORTH

0 2 4 6 8 10m

SCALE 1:250 AT ORIGINAL SIZE. U.N.O.

NORTH

REV	DATE	REVISION DETAILS	DWN
01	02/08/2016	ISSUED FOR WORKS AND URBAN DEVELOPMENT COMMITTEE APPROVAL	S.W.

CITY of PERTH
COUNCIL HOUSE,
27-29 ST. GEORGE'S TERRACE, PERTH.

VAUGHAN JAMES - PRINCIPAL DESIGN ENG, COORDINATION & DESIGN

AMANDA MANNOLINI - A/MANAGER, COORDINATION & DESIGN

DRAWN: S. Wilson
TRAFFIC ENG.:
DESIGNED: C. Bell
DATE: 22/07/2016
CIVIL ENG.: S. Chutoorgoon
SCALE: 1:250
PROJECT MGR.: J. Chng
CO-ORD SYS.: MGA 50 / AHD

McLEAN LANE ENHANCEMENT

MURRAY ST - WELLINGTON ST

SURFACE TREATMENT AND ARTWORK PLAN

DRAWING STATUS: ISSUED FOR APPROVAL

DWG SET No.	DISPLN	DWG TYPE	SHEET No.	REV.
16018	C	SK	18	01

RKS FILE No. P1032430 CAD REF: 16018-C-SK-18.dwg FOLDER: H:\CAD\1_DR\1_PUB\MCLEAN\ A3

02/08/2016 09:28:01 AM

ITEM NO: 2

ADOPTION – CITY OF PERTH URBAN FOREST PLAN

RECOMMENDATION: ***(APPROVAL)***

That Council:

1. ***adopts the City of Perth Urban Forest Plan as detailed in this report and Schedule 4;***

2. ***notes the high level of support from stakeholders; and***

3. ***notes that the first stage of implementation will be the planting of approximately 450 trees in priority areas before Friday, 30 June 2017.***

BACKGROUND:

FILE REFERENCE:	P1030783
REPORTING OFFICER:	Barbara Meldrum
REPORTING UNIT:	Co-ordination & Design
RESPONSIBLE DIRECTORATE:	Planning and Development
DATE:	25 August 2016
MAP / SCHEDULE:	Schedule 3 - Community feedback and responses Schedule 4 – City of Perth Urban Forest Plan (Final) Schedule 5 - Concept Map: Infill Street Tree Planting Program

At its meeting held on **28 October 2014** the following Council resolution was adopted:

"The Council recognises the need for a plan to ensure the City's trees and landscapes are resilient and responsive to a changing environment, and requests that:

1. an Urban Forest Plan be developed for the purposes of:

- *guiding the future development of the City's green infrastructure;*
- *setting targets to increase canopy cover in the public realm;*
- *replacing ageing tree populations; and*
- *protecting the City's existing trees and landscapes.*

At its meeting held on **15 March 2016** the Council adopted the Environment Strategy. The Environment Strategy articulates the City of Perth's aim to lead, inspire and work with the community to ensure that Perth is one of the world's most environmentally sustainable cities.

At its meeting held on **7 June 2016** the following Council resolution was adopted:

"That Council:

1. *receives the draft Urban Forest Plan as detailed in this report and Schedule 13;*

2. *releases the draft Urban Forest Plan for consultation and feedback, noting that a further report will be presented to the Council – detailing comments received and any recommended changes to finalise the document'*

LEGISLATION / STRATEGIC PLAN / POLICY:

Integrated Planning and Reporting Framework Implications	**Community Business Plan** Council Four Year Priorities: Healthy and active in Perth S16 Increase accessibility to green networks in the city. 16.1 Finalise and implement Urban Forest Plan

DETAILS:

An urban forest is broadly defined as the collection of green spaces, trees and other vegetation that grows within an urban area, on both public and private land. The City of Perth's Urban Forest Plan covers street and parkland trees planted on land located within the City of Perth boundaries.

The guiding principles of the City of Perth Urban Forest Plan are to:

- Mitigate the urban heat island effect by cooling our public spaces;
- Create healthy, robust and attractive public spaces that are comfortable for outdoor activity all year round;
- Design for liveability and health and wellbeing; and
- Ensure that the city is climate responsive.

Refinement of the Plan through Consultation

With the purpose of refining the draft document and ensuring that there would be broad community support for the Urban Forest Plan, the following stakeholders were invited to provide feedback:

- Relevant State Government agencies;
- Adjoining Local Government authorities;
- Relevant academics from WA Universities;

- Relevant industry groups and professional institutes;
- Specific community interest groups; and
- Relevant infrastructure and service providers.

As well as inviting key stakeholders to comment, the City of Perth also used the Engage Perth website as an online forum for the community.

At the close of the consultation period on Friday, 15 July 2016, the following submissions were received:

- 14 from key stakeholders; and
- 64 from members of the public.

The Urban Forest Plan vision received 100% support through the Engage Perth forum. The benefits of an urban forest that were identified as being the most important to the community were:

- Cooling the city;
- Improve air and water quality;
- Reduce impact of global warming; and
- Access to green space.

The consultation process also informed the following key changes to the final Plan:

Item	**Comments**	**Proposed change to final Plan**
Urban Forest Vision	A number of respondents requested that biodiversity be added to the vision statement.	Biodiversity has been included in the vision statement.
Resilience standards and tree diversity	Some respondents felt that the standards applied were too simple in relation to species mix.	Standards have been qualified. The Plan also reinforces the importance of diversity in urban forest management, in particular, in relation to disease outbreak.
Water management	A number of respondents requested that references to water saving solutions be included in the Plan.	More information has been included regarding the City's proposed Water Sensitive Transition Study and Water Sensitive Urban Design initiatives.
Importance of tree canopy cover	A number of respondents did not understand the importance of tree canopy size.	Illustrations have been added to the Plan to explain the importance of having large tree canopies to shade public spaces. Information has also been

Item	Comments	Proposed change to final Plan
		included on the importance of species, health and tree spacing.
Canopy – targets and timeframe	Some respondents felt that the targets set by the Plan were too low and a requested a specific target and timeframe for delivery.	The targets have been reviewed and clarified. A target of 30% canopy cover over the public realm over 30 years has been set.
Staged approach	Some respondents were confused by the different stages proposed in the Plan and requested that Green Infrastructure and trees in private realm also be included.	Illustrations have been included to clearly show the stages and reasons why a staged approach is essential for the success of the overall Plan.

FINANCIAL IMPLICATIONS:

ACCOUNT NO:	CW1982
BUDGET ITEM:	Urban Forest – Various
BUDGET PAGE NUMBER:	38
BUDGETED AMOUNT:	$500,000
AMOUNT SPENT TO DATE:	$ 12,620
PROPOSED COST:	$487,380
BALANCE:	$0

All figures quoted in this report are exclusive of GST.

One of the key deliverables of the Urban Forest Plan is to increase the canopy cover in the City of Perth. The implementation of a new four year program of infill tree planting in selected City of Perth streets, prioritising hot spots identified in the thermal imaging maps, has commenced. Adjacent property owners are being consulted as the planting works are incrementally implemented.

COMMENTS:

The Urban Forest Plan covers street and parkland trees planted on land located within the City of Perth boundaries. It currently excludes those parts of the City of Subiaco that have recently been amalgamated with the City of Perth, under the provisions of the *City of Perth Act 2016.* The data for this area will be included as a separate supporting document to be issued in late 2016.

The Urban Forest Implementation Plan will drive the delivery of the vision and goals. The Implementation Plan will set out the detailed actions required to achieve each of the objectives.

The City of Perth Urban Forest Plan is an important strategic action plan for the protection, management and expansion of the urban forest. It recognises the urban forest as a critical element of infrastructure for its ongoing contribution to city liveability, community health and well-being and climate resilience.

DRAFT URBAN FOREST PLAN – COMMUNITY CONSULTATION

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
1	129751/16 & 118871/16	1/7/2016 & 23/06/16	Resident of East Perth	✓			• Request replacement of existing trees in Old Belvidere Promenade and planting of new trees with potential to grow to be large trees with good levels of canopy cover.	• The issue of tree planting in Old Belvidere Promenade has been referred to Parks Unit as this is a current operational issue.
2	122609/16	12/07/16	Main Roads	✓			• Consideration of and planning for the urban forest is appreciated and welcome and will have many benefits that Main Roads approves and supports. • Published noise studies show that trees are not effective in noise reduction and this benefit should be removed from the plan with other benefits added such as soil stabilization. • Include references to sustainable water management in water supply and management section along with potential Water Sensitive Urban Design (WSUD) solutions to meet water demand and stormwater management. • Wider selection of photographs needed to show different landscapes trees can provide. • Improve clarity of Figure 17 to include reference to hot spots and clearly indicate new tree planting numbers. • Ensure new tree planting maintains clear sight distances and public safety.	• Reference to noise reduction benefit has been removed from the UFP. • The UFP promotes a water sensitive approach to water management issues. It has been amended to provide further information on the issues and challenges faced with regard to future water supply and management. Goal 3 has also been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP. • Figure 17 has been removed. • A wider range of photographs have been included in the Plan.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
3	122611/16	14/07/16	Green Space Alliance (GSA) – *an alliance of a broad range of WA amenity horticulture industry bodies and aligned organisations incl. Parks and Leisure WA, Nursery and Garden Industry Association, Tree Guild WA & Turf Growers Assoc. WA*	✓			• GSA submitted copy of their Position Statement and Discussion Paper in support of the UFP. • GSA seeks to promote and protect green space in all its forms, including Urban Forests. • Their Paper makes the following recommendations for local councils - researching quantity of green space and funding improvements, promoting awareness of value of WSUD and implementing transparent consultation processes.	• Content of the Position Statement and Discussion Paper has been noted. • Goal 3 has also been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP.
4	118473/16	7/07/16	Department of Parks and Wildlife	✓			• Supportive of the Plan and benefits it can provide. • Habitat value of trees is well documented and should not be understated in Plan implementation.	• The issues of biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
5	122307/16	14/07/16	Member of Public	✓			• Supportive of Plan. • Believes the City's targets for future tree planting are too low. More than 450 trees will need to be planted for next four years to improve canopy cover. This number will only replace trees lost by natural attrition. • City should measure mortality rate for new plantings and make this information public.	• Goal 4 of the UFP has been amended to provide a clearer canopy target and time frame. • The proposed 450 trees refers to new tree planting in new planting sites only. Additional trees will be planted, above these 450, to replace trees that are at the end of their ULE (see Objective 2.1 of the UFP). • Mortality rates will be recorded as part of the UFP implementation plan and monitoring framework, currently in development. Broader information on the urban forest will also be included on the City of Perth website as the implementation of the UFP progresses.
6	119656/16	14/07/16	Claise Brook Catchment Group	✓			• Congratulates the City on undertaking the Plan. • Standards to address imbalance in tree diversity are too simple and fail to take account of large number of tree species present in some families. • Use of surface temperatures obtained by thermal imaging may be misleading as people interpret temperature as air temperature as this most directly affects personal comfort. • More emphasis should be placed on planting native vegetation to 'Give Perth a Perth look', improve water quality, promote biodiversity and create linkages.	• The UFP has been amended to provide more information, justification and clarity around the tree diversity standards selected. • The development of the UFP has been based on good practice and is evidence based. • The street and parkland tree population is already heavily reliant on native species. Over 60% of trees are native. • The issues of biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
							• More information should be included on trees to be planted in the future and the full range of current tree species. • Consider understorey planting as well as trees.	• The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.
7	122229/16	15/07/16	Department of Water	✓			• Commends City of Perth for the development of the UFP and supports the initiative. • Notes that non-native trees do not provide significant stormwater run-off reductions, affect water quality due to excessive nutrient release associated with annual leaf drop, clog stormwater systems, require more water and change local habitat values. • Changing climate should be considered in species selection.	• UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits. • The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
							• Right tree for right place should consider water sensitive outcomes and other liveability, resilience, productivity and sustainability outcomes. • Goal 1 should include car park trees. • Goal 3 should have a new objective to replace impervious surfaces with pervious surfaces to retain water in the landscape. • Goal 4 should set an overall canopy target by a specific date. • Goal 5 should include tree planting in car parks, plazas and public spaces to reduce hot spots. • Goal 6 does not explain the standards to address imbalance in tree diversity which fail to take account of large number of tree species present in some families. • Plan should state that no more London Planes should be planted so this species achieves the 10% target for species representation. • Objective 6.3 should be expanded to include more information on the scope of proposed Biodiversity Study.	• Objective 7.7 of the UFP aims to improve the health of car park trees, which will help protect them. • Goal 3 has been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP. The UFP contains an objective regarding the use of pervious surfaces. • Goal 4 of the UFP has been amended to provide a clearer canopy target and time frame. Additional information is provided on the range of new planting opportunities that will be pursued in the implementation of the UFP. • More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
8	122245/16	15/07/16	Office of the Government Architect (OGA)	✓			• OGA recognises the importance of the Urban Forest and commends the depth of research and clarity and graphic presentation of the report. • Supports recommendation to improve tree valuation methodology. • Support strategic and proactive approach to urban forest management. • Canopy cover target should be made clearer and deadline set -current target is too low. Plan should consider the following; • other types of urban forest planting – green roofs and other green infrastructure. • Facilitate development of Green Infrastructure (GI) through planning approvals process. • how urban ecology can be improved. • how the Plan links to other activities in pursuit of City's sustainability and liveability objectives. • Plan could inform a city wide landscape design strategy. • Interact and promote links with other relevant research organisations and key findings. • Establish ongoing and regular monitoring. • Explain exclusion of Kings Park from the UFP.	• Goal 4 of the UFP has been amended to provide a clearer canopy target and time frame. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017. • The issues of urban ecology will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP. • Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017. • Goal 8 has been amended to include an objective on collaboration with other research organisations and agencies. • The UFP implementation and monitoring framework will be used to track and report on progress in achieving the UFP goals and objectives on an annual basis. • The UFP has been amended to include an explanation on the exclusion of Kings Park under 'Plan Area'.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
9	120556/16	15/07/16	Planning Institute Australia – WA	✓			• Express overall support for the draft UFP as a positive step towards addressing contemporary issues facing urban environments. • Supports objective for balanced approach to providing both native and non-native trees. • Tree valuations (i-Tree Eco or similar) should inform tree selection process. • Include section on elements of green infrastructure and reference new technologies such as structural planting cells. • Goals and implementation plan should come first in the Plan's structure. • Maintenance costs should be balanced with long term benefits and indicative budgets included. • Alternative water collection methods should be referenced in the Plan. • Information on how GI will be addressed in the future should be included in the Plan's Goals and Objectives section.	• The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP. • Comments on tree valuations are noted. • Comments on the UFP report structure are noted. • Project costs and budgets will be included in the UFP implementation plan. • The UFP promotes a water sensitive approach to water management issues. It has been amended to provide further information on the issues and challenges faced with regard to future water supply and management. Goal 3 has also been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
10	122241/16	15/07/16	Kings Park and Botanic Gardens (BGPA)	✓			• Strongly supports the concept of an urban forest and congratulates this City on this initiative. • Implementation should address suitable species selection, stock quality and planting site preparation. • Encourage planting of WA native trees in parklands and wide medians more so than high density built environment. • Recommends new trees are contract grown. • Supports the use of modular cells. • Tree trials should have scientific rigor. • Consider engagement of a qualified Arborist as part of City's Parks team. • Review planting priorities to achieve balance between hot spot and non hot spot areas to improve success of new tree planting. • Opportunity for City to work with BGPA and share in tree selection and growing expertise.	• Measures to ensure stock quality, appropriate site preparation will be addressed in the implementation of Objective 7.5. Broader tree management issues will also be included in the review of the City's Street Tree Framework. • The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP. • Comments on contract growing are noted. • Support for the use of modular cells is noted and addressed in Objective 7.6 of the UFP. • 'Hot-spots' have been selected as priority areas for planting to reflect the important role the UFP has to play in helping to cool the City. Comments on reviewing planting priorities are noted. • Suggestion regarding engagement of a qualified Arborist is noted. • The City welcomes the opportunity to work with BGPA and share in their expertise on the issues raised. Goal 8 has been amended to include an objective on collaboration with other research organisations and agencies.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
11	118868/16	24/06/16	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
12	118867/16	28/06/16	Public comment through Engage Perth	✓			• Supports vision. • Plant trees everywhere possible.	• The UFP aims to increase the level of canopy cover within the City by pursuing a wide range of possible opportunities for new tree planting.
13	118861/16	30/06/16	Public comment through Engage Perth	✓			• Supports vision. • Create green bus stops. • Make it compulsory for new development in the CBD to have a set percentage of green space at street level. • Encourage green spaces on tops of buildings. • Plant trees in St Georges/Adelaide Tce median if possible.	• Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017. • Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017.
14	118863/16	30/06/16	Public comment through Engage Perth	✓			• Supports vision.	• Noted.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
15	118859/16	1/07/16	Public comment through Engage Perth	✓			• Vision should include reference to biodiversity. • Canopy cover targets should be set higher.	• Biodiversity has been added to the vision. • Goal 4 of the UFP has been amended to provide a clearer canopy target and time frame.
16	118855/16	4/07/16	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
17	118857/16	4/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Plant more trees on Wellington Street east of Barrack to provide shade and reduce noise. • Plant trees on Mounts Bay Road to create linear park and exercise space. • Ensure trees and lighting are managed together to promote adequate levels of light and sense of safety.	• Suggestions for additional tree planting will be considered in the development of new tree planting plans to be developed as part of Objective 4.1 of the Urban Forest Plan. • The management of trees and lighting infrastructure will be addressed in the development of the City's Lighting Masterplan and Good Practice Guide and the review of the Street Tree Framework.
18	118872/16	6/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
19	118853/16	6/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
20	118851/16	6/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
21	118850/16	7/07/2016	Public comment through Engage Perth	✓			• Supports vision but should include reference to biodiversity and importance of a diverse urban forest. • City of Perth should collaborate with other major Australian cities. An urban forest network should be established to share knowledge and expertise. • Canopy cover targets should be more ambitious and promote canopy growth in the short term. • More transparency and stronger public engagement should be incorporated in plan finalisation and implementation.	• Biodiversity has been added to the vision. • The development of the UFP has drawn on the knowledge and experience of other capital cities, including the outcomes of the Urban Forest Masterclass hosted by the City of Melbourne and the “How to Grow an Urban Forest” guidance document. • Goal 8 has been amended to include an objective on collaboration with other research organisations and agencies. • Goal 4 of the UFP has been amended to provide a clearer canopy target and time frame. • The development of the UFP has and will continue to include processes of public consultation and engagement.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
22	118848/16	8/07/2016	Public comment through Engage Perth	✓			• Vision should include reference to encouraging native birdlife. • Tree planting should support endangered bird species particularly Carnaby Cockatoos – City should liaise with conservation groups. • Urban forest should mainly consist of native species to encourage native wildlife and reflect the City's Australian character.	• Biodiversity has been added to the vision. • The issues of biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP. • Non-native trees can also provide habitat for native fauna (eg Liquidambar, Cape Lilacs, Pinaster Pine and Stone Pine provide for Carnaby's Black Cockatoo as referenced in the UFP). • UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits.
23	118843/16	9/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Create a little forest in the centre of town.	• The UFP aims to increase the level of canopy cover within the City. • Comments on "a little forest within the centre of town" are noted. Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.

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				Y	N	Neutral		
24	118846/16	8/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
25	118842/16	9/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
26	118839/16	9/07/2016	Public comment through Engage Perth	✓			• Vision focuses on canopy coverage only, should consider habitat corridors and water capture and reuse, microclimate creation and food production. • Plan can educate and empower community and change mindsets. • Urban orchard is an example and can be expanded as part of the overall urban forest project.	• Biodiversity has been added to the vision. • Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest. • Comments on success of urban orchard are noted. Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.

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				Y	N	Neutral		
27	118837/16	10/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Work with environmental experts to plant bird attracting trees. • Involve the community in planting and caring of trees. • Promote tree festivals like Jacaranda festival in Applecross. • Plant trees on roof tops. • Enforce requirement that all new development plants trees. • Elizabeth Quay, Forest Place and areas with large expanses of concrete all require more tree planting.	• The issues of biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP. • Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest. • Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017.
28	118835/16	10/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Plant local trees as default and introduces species only if predetermined criteria are met. • Local trees provide habitat & shade protection year round.	• UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits.
29	118834/16	10/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Include flowering trees and edible plants. • Garden at Art Gallery is great idea. • Incorporate flower planting in public spaces.	• Comments on additional planting elements are noted. Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.

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				Y	N	Neutral		
30	118833/16	11/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Engage surrounding local governments to support the Plan vision. • Introduce different trees to streets and laneways. • Encourage young people and children to become involved in planting and tree maintenance.	• Comments on new tree planting are noted. • Town councils surrounding the City have been invited to comment on the UFP. • The UFP aims to increase the level of canopy cover within the City by pursuing a wide range of possible opportunities for new tree planting. • Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest.
31	118832/16	11/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
32	118831/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Revitalise bushland (trees and understorey) and its inhabitants – insects, mammals and reptiles. • Retain old trees to provide habitat.	• The City has limited areas of bushland. Issues relating to biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP. • Objective 1.5 proposes the development and implementation of a strategy to retain and value 'veteran' trees.
33	118830/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Plan implementation should bring nature into the city; lessen radiant heat from concrete and buildings, clean water before recharging ground water.	• Issues relating to biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP. • Cooling the city and improving water quality are addressed in the UFP.

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				Y	N	Neutral		
34	118829/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Supports Plan as evidence of commitment to City's green future. • Greater representation of native trees needed. • Private enterprise should be encouraged to increase canopy cover. • Phase out extensive areas of lawn which are resource heavy. • Tree planting should consider safety and security in parks and maintain levels of visibility.	• UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits. • Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017. • Comments on tree planting and safety and security are noted.
35	118827/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Vision should focus on provision of WA Indigenous food sources for all. • Develop program to engage local Indigenous people, prioritise strong roles for elder participation, educate future generations and prioritise cross cultural community education programs.	• The Department of Aboriginal Affairs has been consulted and provided comment on the UFP.
36	118826/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Develop educational presentations and fact sheets.	• Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest.

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				Y	N	Neutral		
37	118823/16	1/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Continue to add to number and extent of trees in City.	• Increasing canopy cover within the city is a key objective of the UFP.
38	118370/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Set up areas for children's play, nature playgrounds and whimsical areas that inspire people – don't just plant trees for shade. • Prohibit use of pesticides and Glyphosate. • Incorporate fruit trees and community garden to promote healthy, sustainable food choices for community.	• Suggestions for additional planted elements are noted. Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017. • The issue of pesticide use will be addressed as part of the implementation of Objective 7.5.
39	118821/16	12/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Promote physical activity and encourage people to get outside.	• Promoting physical activity and health is included as a key driver for the development of the UFP.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
40	119620/16	13/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Provide incentives for residents to adopt a tree. • Provide incentives for home owners to provide green space. • Provide incentive for developers to provide % of green space. • Ban artificial turf, encourage other options. • Donate trees to private owners for roof top venues. • Provide movable planter boxes and roving installation. • Plant trees in hubs on Langley Park, maintaining event space.	• Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017. • Suggestions for additional plantings are noted. Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.
41	119622/16	13/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Protect dying or poisoned trees.	• Issue around tree care will be addressed as part of the implementation of Objective 7.5 of the UFP.
42	119623/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Include reference to Aboriginal knowledge in landscaping and design of forest. • Design urban forest to improve social interaction by including gathering spaces and create picturesque views. • Use native plant in shrubs and ground cover, introducing colour.	• The Department of Aboriginal Affairs has been consulted and provided comment on the UFP. • The promotion of attractive and inviting public spaces is a key driver in the development of the UFP.
43	119624/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
44	120523/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Place greater emphasis on green roofs.	• Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.
45	120525/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
46	120527/16	14/07/16	Public comment through Engage Perth	✓			• Supports vision. • Cross reference with Green Space Alliance WA Discussion Paper. • Consider inclusion of turf and range of benefits it offers including promotion of urban cooling and energy reduction.	• Reference to GSA Discussion Paper noted. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.
47	120530/16	14/07/16	Public comment through Engage Perth	✓			• Supports vision. • Mandate replacement of every tree removed with a 250 litre tree size as minimum. • Hope City of Perth has courage to demand implementation and mandate action.	• The UFP has been amended to provide additional information on tree size.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
48	120533/16	14/07/16	Public comment through Engage Perth	✓			• Supports vision – add strong focus on WA natives and endemic plants. • Tree selection should take account of maintenance costs. • Shade trees need to be carefully selected to produce canopy but protect water use and understorey growth.	• UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits. • The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP.
49	120534/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
50	120536/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Offer support of Green Space Alliance in Plan development. • Include roof gardens, vertical gardens, and recreational green spaces. • Encourage more greenery in the city by setting up requirements/incentives for buildings to provide 100% of land space in living green cover.	• Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.
51	120537/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision and plan as a major step forward. • Include London Planes in median of Wellington Street (between William and Elder Streets) to create arching canopy, boulevard and unique precinct.	• Wellington Street upgrade will be completed in late 2017 and includes tree planting in the median.

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				Y	N	Neutral		
52	120543/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Plant more trees on Wellington, William and Roe Streets. • Space trees well. • Select tree species that will provide ample shade.	• Suggestions for additional tree planting are noted. • The UFP has been amended to provide additional information on tree spacing. • The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP.
53	120545/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
54	120552/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision but reference biodiversity and habitat.	• Biodiversity has been added to vision.
55	120553/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Integrate green and blue space and reuse water. • Include sports facilities. • Integrate community involvement • Adopt low tech easy to use and maintain green space.	• The UFP promotes a water sensitive approach to water management issues. It has been amended to provide further information on the issues and challenges faced with regard to future water supply and management. Goal 3 has also been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP. • Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest.

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				Y	N	Neutral		
56	122301/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
57	122297/16	14/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Change planning laws to prohibit removal of mature and healthy trees by developers – create a tree register. • Perth and its suburbs are ugly, barren and hot. Building setbacks and residential should allow for large trees, green space between buildings and common gardens. • Develop public nurseries and free trees. • Promote growth of tree canopies over streets and reduce tree lopping. • Focus on education / training to reduce fear of trees and promote benefits. • Encourage public participation in public planting days.	• Goal 1 of the UFP focuses on the protection of existing trees. • Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017. • The creation of connected canopy is a key concern of the UFP. The Plan has been amended to include additional information on the importance of canopy cover levels and quality. • Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest.
58	122295/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision but have more a focus on climate change. • Place interpretative signage on key species. • Create a green urban forest education centre in the city.	• Managing the impacts of climate change is a key driver of the UFP and the plan has been amended to include additional information on this issue. • Goal 9 of the UFP aims to raise community awareness and appreciation of the Urban Forest.
59	122289/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision with focus on more trees. • Create avenues – tree lined streets with symmetry.	• The vision currently emphasises the need to optimise canopy cover. • Comments on avenue planting are noted.

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				Y	N	Neutral		
60	122280/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
61	122277/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
62	122273/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
63	122270/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision.	• Noted.
64	122263/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Set a canopy density target and action plan. • Increase tree planting density. • Identify grey areas suitable for planting.	• Goal 4 of the UFP has been amended to provide a clearer canopy target and time frame. • The Plan has been amended to include additional information on the importance of canopy cover levels and quality and the issue of tree spacing.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
65	122259/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Plant more trees and shrubs and add into existing subdivisions. • Parks and gardens should have more trees less lawn. • Use grey water for watering street and park trees to promote faster growth.	• Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017. • The UFP promotes a water sensitive approach to water management issues. It has been amended to provide further information on the issues and challenges faced with regard to future water supply and management. Goal 3 has also been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP.
66	122256/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Fully or partially convert area where the railway has been sunk into parklands.	• Suggestions for additional tree planting are noted and will be considered in the development of new tree planting plans to be developed as part of Objective 4.1 of the UFP.
67	122255/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision but focus on canopy cover limits the strategy's ability to address small and medium sized vegetation. • Allow residents to sponsor a tree, with a plaque.	• Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017. • Stage Two of the UFP will address trees on private property. Stage Two is scheduled for completion in 2017.

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68	122250/16	15/07/2016	Public comment through Engage Perth	✓			• Supports vision. • Include summary at front of UFP. • Vary photographs. • Look at opportunities to plant more trees not more barriers as often put forward by planners and engineers. • Reallocate water use from lawns to trees. • Replace lawn with mix of water wise ground covers.	• An Executive Summary has been included at the front of the UFP. • Comments on opportunities for new planting are noted and will be considered in the development of new tree planting plans. • The UFP promotes a water sensitive approach to water management issues. It has been amended to provide further information on the issues and challenges faced with regard to future water supply and management. Goal 3 has also been amended to include information on the range of WSUD initiatives that will be pursued in the implementation of the UFP.
69	122234/16	15/07/2016	Public comment through Engage Perth	✓			• Supports Vision - incorporate a range of methods other than canopy cover such as vertical gardens or living facades to provide insulation, lower energy use, absorb sound, and create a healthy environment. • Cover large expanses of concrete in the city with vertical gardens (freeway supports and entrances, building facades) to promote these benefits.	• Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
70	121401/16	18/07/16	Member of Public	✓			• Generally supports the goal to increase canopy cover, improve amenity and mitigate heat island effect. • Selection of trees should be prioritised around functional considerations such as creation of safe spaces, human amenity and interest – great care should be exercised with any shift towards more native trees at the expense of shade trees. • Plan makes no reference to Bushfire Prone Areas. Issue of Kings Park and QE2 Hospital should be considered in particular.	• The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP. • UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits. • Consultation with DFES will continue as the UFP is implemented to ensure the issue of Bush Fire risk is addressed and managed appropriately.
71	120795/16		Urban Bushland Council WA			✓	• Commends City on Plan but key issues to be recognised and substantially modified. • The City of Perth should recognise that Perth is a biodiversity hot spot and chose tree species that are local to the Perth region of the Swan Coastal Plain. • Native trees should be also be planted because they promote biodiversity and habitat creation, give Perth a Perth look, provide a tourist attraction, require less fertiliser and summer water and provide shade.	• The issues of biodiversity, green corridors and the habitat value of trees will be further addressed in the City of Perth's proposed Biodiversity Study. More detail on the proposed scope of the Biodiversity Study has been included in Objective 6.3 of the UFP. • UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
72							• Exotic trees should not be planted as they do not belong here, affect water quality, require more summer water, fail to provide habitat for native fauna. • Tree species selection should be revised completely to promote local species and exclude exotic plants. Impact of allergies should also be considered. • London Planes should be removed and gradually replaced due to allergy and catchment management issues. • Promote removal of hard hot surfaces to promote urban cooling.	• Non-native trees can also provide habitat for native fauna (eg Liquidambar, Cape Lilacs and Pinaster Pine and Stone Pine provide for Carnaby's Black Cockatoo as referenced in the UFP). • The selection of tree species for planting will be guided by the 'right tree for the right place' philosophy. The City's Street Tree Framework will be updated to ensure tree species selected for planting align with the goals and objectives of the UFP. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
73	120044/16	15/07/16	City of Perth Ratepayer			✓	• Congratulate City on this Plan but concerned about current prioritisation of goals. Suggest goals should be reordered as follows: 1. Protect existing trees. 2. Maintain tree health. 3. Increase canopy cover. 4. Prioritise tree planting to help cool public spaces and City 'hot-spots'. 5. Promote sustainable water management. 6. Promote balance and resilience in species composition. 7. Promote community engagement. 8. Implement a 'whole-of-forest' management approach. 9. Replace aging trees. • Replace aging trees should be placed last as tree removal is based on arbitrary decisions and preferences for particular trees rather than scientific evidence of decline or end of Useful Life Expectancy (ULE). • State wide model tree policy and law for protection of mature trees are of paramount importance and should be incorporated into UFP. • UFP ignores adverse effects of pesticides on tree health especially Glyphosate. UFP should prohibit this highly polluting practice. • Natural water retaining ground covers should be promoted and plastic turf on verges should be prohibited.	• Comment on reordering priority of goals is noted. • The UFP has nominated trees for replacement based on a professional assessment of their ULE. • Comment on the need for a state-wide model tree policy and law is noted. • The issue of pesticide use will be addressed as part of the implementation of Objective 7.5 of the UFP. • Stage Three of the UFP will address elements of other vegetation that make up the urban forest (ie elements of green infrastructure including understorey planting, green roofs, green walls, living walls and raingardens) within both the public and private realm. Stage Three is scheduled for completion in 2017. • UFP continues to support the planting of both native and non-native species on the basis of the particular and differing qualities they both bring to the promotion of a resilient and healthy forest, improved canopy cover and shade, and the delivery of a range of community benefits.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
							• Planting native trees will help create a sense of place and identity, promote biodiversity.	
74	119/659/16	14/07/16	Department of Transport			✓	• Advised that Department of Transport has no comment to provide.	• Noted.
75	124396/16	19/07/16	State Heritage Office			✓	• UFP goals have the potential to impact on registered places containing mature trees. • Strategy for the replacement of trees that have cultural significance should be included in the UFP.	• UFP contains a number of objectives that will address the issue managing, maintaining and replacing trees of cultural significance including the development of : o management and maintenance plans for parks and public open spaces (Objective 8.5). o management options and replacement strategies for those significant tree stands within the City that have a deteriorating structural condition. This will include the stands of London Planes currently included on the City of Perth City Planning Scheme No. 2 Register 1 (Objective 7.9); and o a strategy to retain and value veteran trees (Objective 1.5).
76	123011/16	15/07/16	Department of Fire and Emergency Services (DFES)			✓	• Recognises significance of project and notes the information provided. • UFP provides DFES Operations portfolio with information to establish and implement Fire Emergency Strategy and Management Plans.	• Noted. • Consultation with DFES will continue as the UFP is implemented.

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
							• Understands the staged approach to the plan and remains confident that the strategies adopted for operational effectiveness during the Plan's implementation are thorough and in line with community expectations.	
77	122607/16	8/07/16	Department of Aboriginal Affairs (DAA)			✓	• Notes that the Urban Forest Plan involves presentation of green zones in the City – this is more consistent with the protection of Aboriginal heritage sites. • Provided a list of Listed Sites under the Aboriginal Heritage Act 1972 that may be affected by new tree planting. • Approval may be required under the Act. • Details should be sent to the South West Aboriginal Land and Sea Council for comment.	• Noted.
78	122604/2016	1/07/2016	Western Power			✓	• The submission lists Western Power's requirements for planning new planting or other works around Western Power Infrastructure.	• Noted.

SCHEDULE 3

	TRIM REF	DATE	STAKE HOLDER	SUPPORT			MAIN COMMENTS	CITY OF PERTH RESPONSE
				Y	N	Neutral		
79	122266/16 & 120642/16	14/07/14 and 15/07/16	Member of Public		✓		• UFP has been developed in isolation and ignorance of the threat that its implementation will pose to public safety with regard to bushfires. • Bushfires in cities are not uncommon in the 21st Century. • It is a primary function and obligation of local governments to ensure that effective Local Emergency Management Arrangements (LEMA) are prepared under s.36 of the Emergency Management (EM) Act. • WESTPLAN FIRE requires Local Governments to implement a Bushfire Risk Management Plan. This should be endorsed by the City of Perth and form part of LEMA. • There has been little or no public engagement in bushfire strategy, no BRMP, little planning for fire prevention and fuel reduction in the City of Perth. • The Draft Urban Forest Plan should be abandoned and deficits in the LEMA attended to immediately.	• A map of Bushfire Prone Areas has been developed for the City of Perth. Applications for development in these areas are required to demonstrate that they have met the standards required to address the issue of Bushfire Risk appropriately. • As part of the public consultation process on the Draft UFP, a copy was forwarded to DFES for comment. DFES have provided feedback on the draft UFP and have raised no major concerns. DFES noted that the draft UFP will provide the DFES Operations Portfolio with significant relevant information to establish and implement Fire Emergency Strategy and Management Plans. • Consultation with DFES will continue as UFP is implemented, to ensure the issue of bush fire risk is considered appropriately and mapping is updated as required. • The City of Perth is currently in the process of updating its LEMA and Bushfire Risk Management Plan. Relevant information from the UFP will be included and addressed in this review process, to ensure that any issues of public safety that may arise as a result of its implementation are addressed appropriately.

CITY of PERTH

URBAN FOREST

PLAN

2016-2036

SCHEDULE 4

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SCHEDULE 4

Lord Mayor's Message

Across the world, more people are choosing to live in cities. This creates the need to pay closer attention to our urban environment.

With a focus on environmental sustainability and health, climate response, energy resilience, water sensitivity and consciousness our Urban Forest Plan aligns with the City's overarching Environment Strategy. The Strategy sets out our aspirations for Perth's environmentally sustainable future.

The City's green spaces, trees, plants and vegetation cool and soften our streets and public spaces. Our green networks, including cycle ways and pedestrian paths, create opportunities for active and passive recreation, helping to improve community health and well-being.

The Urban Forest Plan provides direction for how our organisation will build upon these features and ensure Perth's natural environment is able to flourish and provide a high quality of life for all flora, fauna and people.

As a community, we have the opportunity to make major environmental changes that will benefit other generations in the years to come. Increasing levels of urbanisation and climate change require dedicated resources and management, and it is imperative that we make strategic decisions today to play a proactive role in planning for a more sustainable future.

Looking towards 2036, the City will embark on a series of ambitious tree planting plans that will help keep the City cool by increasing canopy cover. We will also foster innovation in sustainable water management and develop a wider network of green infrastructure.

This Plan will maximise our urban forest's long term health and resilience and ensure our organisation's policies and procedures meet best practice standards.

By sharing knowledge and providing information on the changing condition and level of benefits provided by our urban forest, the City will look to you, our community, to help make a difference to its future.

By working together we have the potential to create a valuable and enduring legacy by handing over a greener, more beautiful, healthy and resilient City for all who live, work and play within it.

Lisa M Scaffidi

Lord Mayor

SCHEDULE 4

SCHEDULE 4

Victoria Gardens - East Perth

Vision

The urban forest will be recognised and valued as an important asset and a key element of infrastructure, one that continues to deliver a range of benefits for our community's physical and mental well-being and the overall liveability, landscape character, biodiversity and climate resilience of our City.

The urban forest will be planned and managed in an integrated manner that above all optimises canopy cover and protects and promotes its sustainable growth, health and resilience in the face of continued urbanisation and climate change challenges.

Florence Hummerston Reserve - Perth

SCHEDULE 4

Executive Summary

The urban forest is a valuable asset and key element of city infrastructure which delivers a wide range of community benefits. Its collection of green spaces, trees and other vegetation help to improve city liveability and promote community health and well-being. The urban forest also contributes to the creation of a climate resilient city and helps improve overall environmental quality.

The City of Perth Urban Forest Plan is a strategic action plan that aims to promote the urban forest's long term health and resilience, despite the challenges it faces, and maximise the level of benefits delivered.

Using an evidence based approach the Plan sets out a clear vision for the urban forest. The vision will be achieved through the delivery of nine goals which focus on protecting the existing urban forest, promoting its sustainable expansion, adopting a strategic management approach and raising community awareness of the benefits it provides.

Improving canopy cover is a key focus of the Plan. Through a targeted program of new tree planting the City is aiming to increase the level of canopy cover within the public realm from 19 percent to 30 percent over a 30-year period. Canopy cover will also be improved by protecting existing trees, replacing those that are aging and maintaining high levels of tree health.

Rising city temperatures resulting from climate change pose a significant risk to city liveability and community health. Harnessing the potential of the urban forest to help cool city 'hot-spots' is another important focus.

Ensuring a sustainable water supply for irrigation has emerged as a critical issue if the health and cooling benefits of the urban forest are to be maximised. The Plan recognises the importance of transitioning to a water sensitive city and promotes the use of water sensitive urban design in urban forest management.

The Urban Forest Plan will be supported by an implementation plan and monitoring framework which set priorities and measure progress in achieving the vision and goals.

The City of Perth Urban Forest Plan is being developed in three stages. This report represents Stage One and addresses street and parkland trees. Subsequent stages will address trees on private property and other elements of green infrastructure. These are scheduled for completion in 2017.

The City of Perth Urban Forest Plan currently includes all land located within the City of Perth boundaries, with the following exclusions:

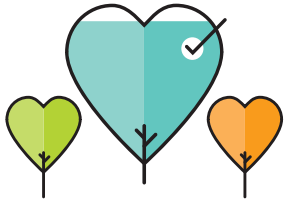
- Kings Park given its primary function as a botanic garden rather than an element of the urban forest. Including it would result in an inaccurate representation of the urban forest.
- Metropolitan Redevelopment Authority projects currently under development
- Parts of the City of Subiaco recently amalgamated with the City of Perth, under the provisions of the City of Perth Act 2016.

A separate supporting document will be issued later in 2016 to include the latter two areas within Stage One.

SCHEDULE 4

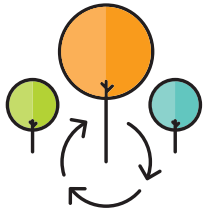
Goal 1:

Protect existing trees



Goal 2:

Replace aging trees

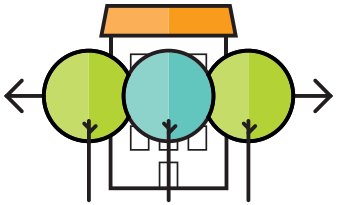


Goal 3:

Promote sustainable water management

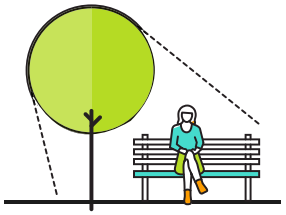
Goal 4:

Increase canopy cover



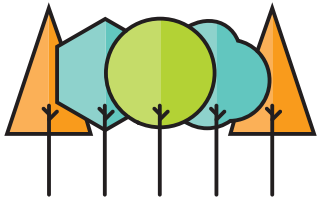
Goal 5:

Prioritise tree planting to help cool public spaces and City 'hot-spots'



Goal 6:

Promote balance and resilience in species composition

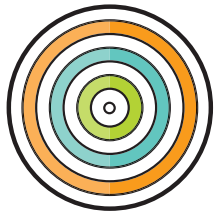


Goal 7:

Maintain tree health

Goal 8:

Implement a 'whole-of-forest' management approach



Goal 9:

Promote community engagement

1.0 Introduction

Traditionally urban trees have been valued for their beauty and aesthetic quality. They soften and add human scale to city streets. Avenues of trees and distinctive parklands help create an attractive city with a unique sense of place.

More recently, urban forests are also being valued for the social, economic and environmental benefits they provide. They help to cool our cities, improve air and water quality, reduce greenhouse gases, provide food and shelter for wildlife and improve levels of community health and well-being.

With more people choosing to live in cities, many are struggling to maintain a healthy environment and a high quality of life for their citizens.

Australia is an increasingly urbanised country with approximately 70 percent of its population living in cities (Australian Bureau of Statistics, 2013). The residential population of the City of Perth increased by nearly 50 percent between 2006 – 2011. This trend is expected to continue, with a population of 28,500 predicted by 2030 (City of Perth, 2013).

As cities become more built up and lifestyles are more sedentary, access to green space is all the more important in promoting community health and well-being.

Climate change brings another set of challenges. Our cities are heating up. Since 1950 the average number of heat wave days per year has been increasing across Australia (see Figure 1). The number of heatwave events and their duration and intensity is also increasing. Within this time frame Perth has experienced an increase from 6 to 9 heatwave days per annum (Steffan, et al., 2014).

Over the past 100 years heatwaves have been the cause of more deaths than any other natural hazard in Australia (Steffan, et al., 2014). Increases in temperatures and heat waves pose a potential risk to city liveability and the health of urban populations in future decades (Brown, et al., 2013).

Climate change projections predict that Perth will continue to experience an increase in the number of hot days over 35 degrees Celsius from 28 to 67 days by 2070, along with declining levels of rainfall. More frequent and intense storm events also threaten to damage city infrastructure and buildings (see Figure 2).

The range of benefits provided by healthy and resilient urban forests means that they are uniquely placed to help cities meet these contemporary urban challenges.

Consequently, urban forests are increasingly recognised as an important part of a city's infrastructure, emerging as indispensable assets in the creation of liveable and climate responsive cities. Many of the world's major cities are currently developing, funding and implementing plans to protect and grow their urban forests.

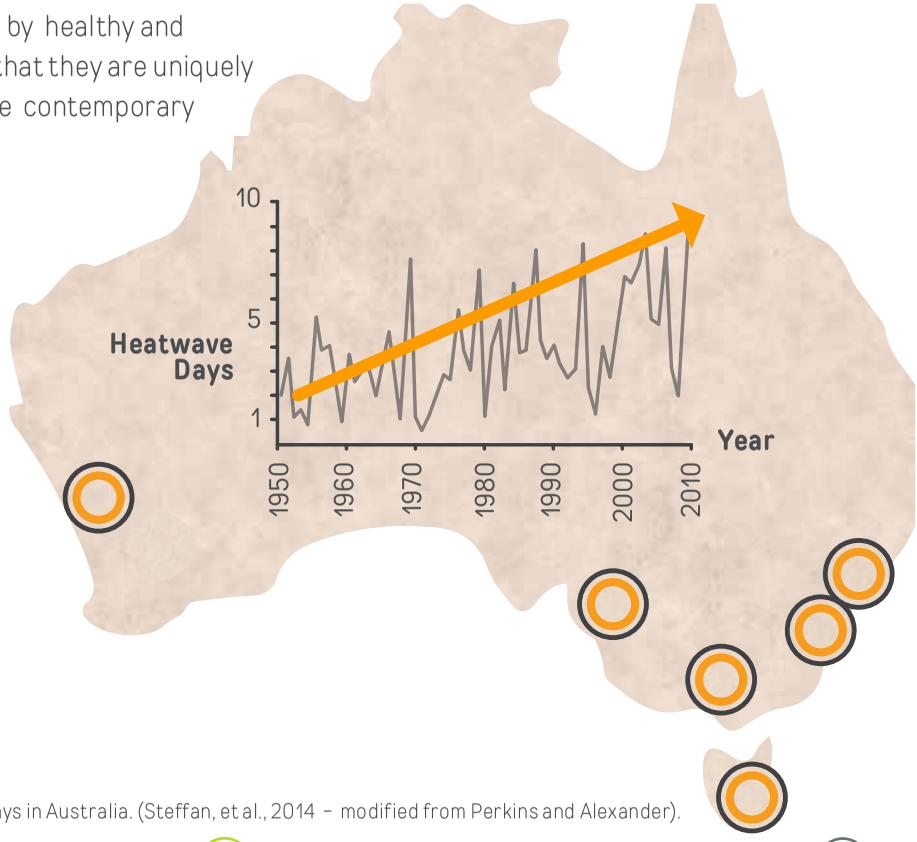
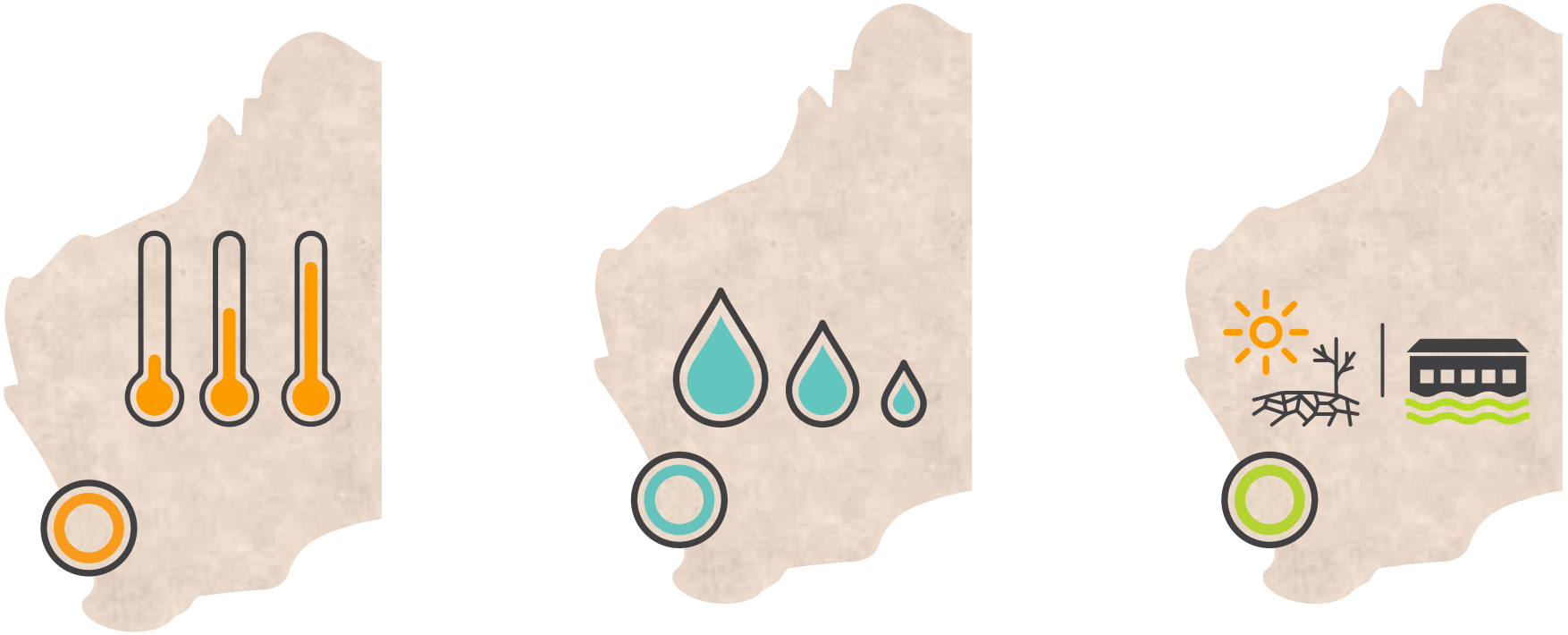


Figure 1. Rising number of heat wave days in Australia. (Steffan, et al., 2014 – modified from Perkins and Alexander).

SCHEDULE 4

Climate Change Challenges Facing Perth



Rising Temperatures

- Average temperatures will continue to increase in all seasons.
- The number of days with temperatures over 35oC are predicted to increase from 28 days to 67 days by 2070.

Declining Rainfall

- Decrease in mean annual rainfall and water runoff.
- The trend of decreasing winter rainfall is predicted to continue.
- Spring rainfall is also predicted to decrease.

Extreme Events

- The intensity of extreme rainfall events is predicted to increase .
- Increased disruption from climate related events such as heatwaves and floodin.

Figure 2. Climate change challenges facing Perth

SCHEDULE 4

Mardalup Park - East Perth

2.0 Background

2.1 Historical development

Pre European settlement

Before European settlement, the land now covered by the City consisted of an ancient wetland, based on a series of lakes located between an area north of the existing railway line and the Swan River. Historically, these wetlands provided seasonal camping sites for the Aboriginal people and the lakes were essential for gathering food, including freshwater crayfish, turtles and frogs. The wetlands and the ancient campsites have significant cultural and spiritual value for the Wadjuk Noongar people, the traditional owners of this area (Godfrey, 1988).

Pre European settlement, Perth's landscape was characterised by a mixture of open forest, fringing woodlands and closed scrub, mainly comprised of Eucalypts, Banksia and Melaleuca. The canopy cover provided would have been relatively open and sporadic in character, as indicated in Figure 3.

Figure 3. Pre European Settlement from Re-imagining Perth's Lost Wetlands 2014. Collaboration project with ECU, Landgate, City of Perth and City of Vincent

Figure 4. Present day Perth from Re-imagining Perth's Lost Wetlands 2014. Collaboration project with ECU, Landgate, City of Perth and City of Vincent

Early European settlement

While the wetlands are the reason for Perth's long, narrow shape, this landscape has been significantly modified since the early nineteenth century due to the arrival of European settlers and their aspirations to develop the area.

The original settlement of Perth was established on a ridge near Mt Eliza overlooking the Swan River. The wetlands provided early settlers with water and fertile soils. However, they also saw the wetland system as an impediment to development, which resulted in the majority of it being drained to provide alternative uses, including market gardening, municipal gardens and a town rubbish dump (Singleton, 1988).

In the late nineteenth century, as urban development grew, the need for designated parklands became a public debate. The "city beautiful" idea became popular with planners during this time and street trees along with small parks were promoted (Bold, 1911). During the early twentieth century, the "garden city" movement pioneered by Ebenezer Howard influenced the Perth town clerk, William Bold. Bold envisioned the development of a linked system of parklands, with the wetlands forming an integral part (Blackwell & Associates Pty Ltd, 1995).

The Post-War period

During mid to late twentieth century, Western Australia experienced a mining boom resulting from the discovery of iron ore and natural gas throughout the State. This led to a surge in economic and property development in Western Australia. This had a significant effect on the state of the City's urban forest as canopy coverage was reduced due to the influx of new buildings.

During this period, prominent Australian landscape architect , John Oldham had a vision based on the idea of a unified landscape structured around Perth's wetland system. This vision was only partially realised and can be seen today in the Narrows Interchange parkland area (Blackwell & Associates Pty Ltd, 1995).

Recent times

In the last few decades, the City of Perth has continued to plant trees, with significant achievements made in increasing the level of street tree planting, particularly along east-west streets.

A major new tree planting program was carried out in the mid to late 2000's, with over 700 new trees planted in various locations throughout the City.

In the last decade, new tree planting has been mainly carried out as part of various streetscape upgrades and other capital works projects.

The most recent Public Spaces Public Life Study by Gehl Architects (2009) acknowledges the valuable contribution this has made in improving the quality of public space and public life. The increased number of street trees has created a greener and more beautiful city, provided shade and made a city that is better to be in.

SCHEDULE 4

Hay Street Mall – Perth

2.2 Strategic context

The City of Perth has set a clear direction for development in its Integrated Planning and Reporting Framework (IPRF). This Framework, and the interaction between key City plans and the influence of informing strategies, is outlined in Figure 5. The intent of the IPRF is to ensure the priorities and services provided by the City of Perth are aligned with community needs and aspirations.

The City of Perth Urban Forest Plan is an Informing Strategy within the IPRF and works in conjunction with its suite of strategic and operational documents (see Figure 5). It integrates the relevant challenges, aspirations and strategic directions outlined in key documents including:

- Strategic Community Plan
- Corporate Business Plan
- Environment Strategy
- Transport Strategy
- Urban Design Framework
- Public Spaces Public Life Study – Perth 2009

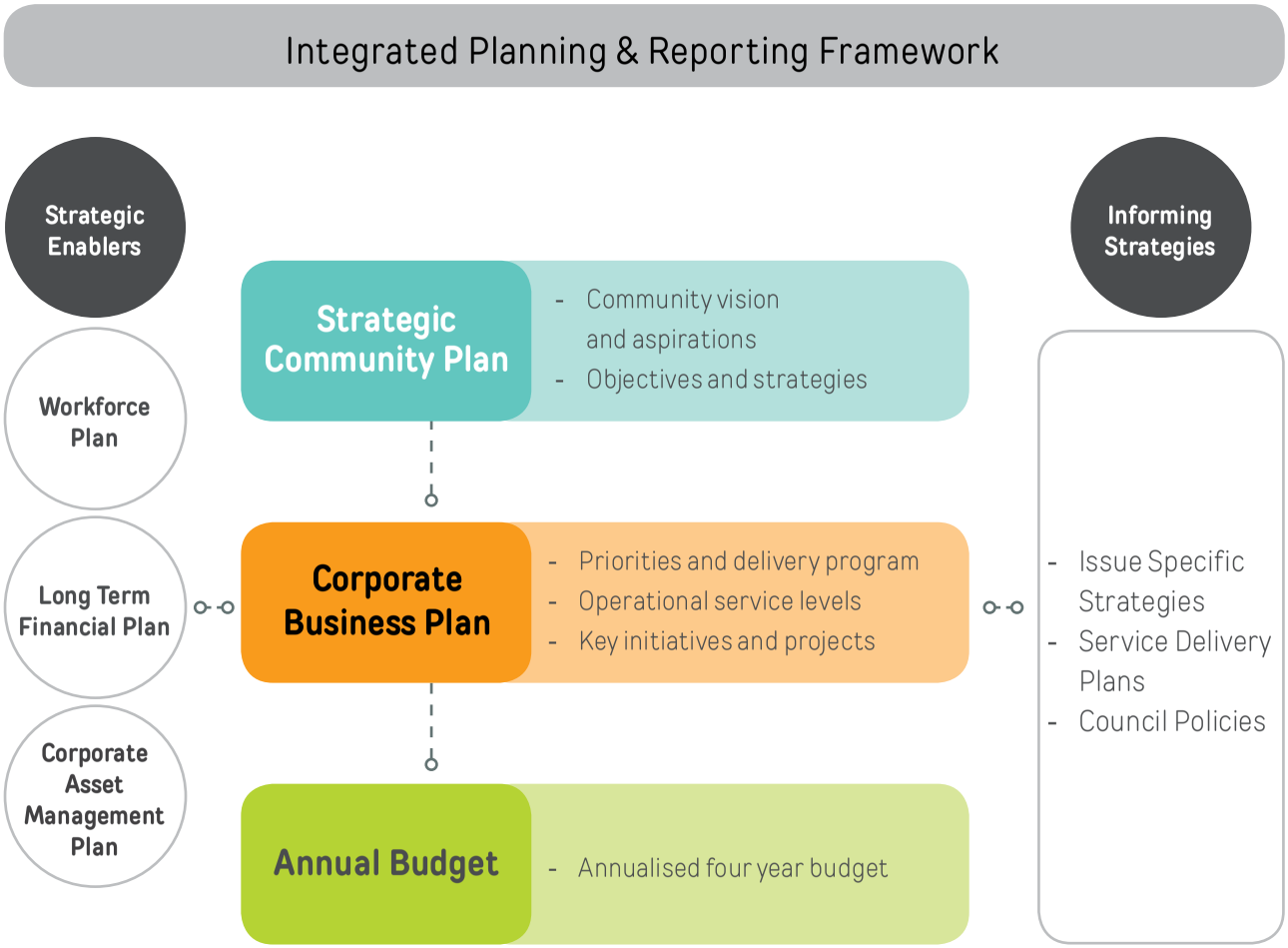


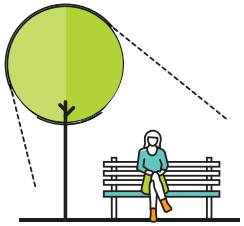
Figure 5. City of Perth Integrated Planning and Reporting Framework

SCHEDULE 4

2.3 Plan drivers

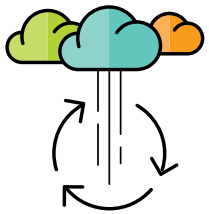
The benefits provided by the urban forest will assist in the delivery of the strategic direction for the City. Three organisational strategic drivers have been identified and these underpin the development of the City of Perth Urban Forest Plan (See Figure 6).

Designing for liveability
expanding the urban forest will help create a greener, more beautiful, cooler and inviting city.



Promoting community health and activity
the urban forest will create an accessible green network that facilitates a healthy and active urban lifestyle.

Managing climate change
a healthy, resilient and sustainable urban forest will help achieve a climate responsive city.



Strategic Community Plan
Perth is renowned as an accessible city. It is alive with urban green networks that are safe and vibrant. As a global city, there is a diverse culture that attracts visitors. It provides city living at its best. Local and global businesses thrive here. Perth honours its past, while creating a sustainable future.

Corporate Business Plan
Four year plan driven by the Strategic Community Plan and the delivery of services, key projects and capital investments. Activates the City's informing Strategies and Action Plans.

Urban Forest Plan
City of Perth Action Plan to protect, manage and expand the urban forest.

Key Informing Strategies and Action Plans

- Environment Strategy
  - Environmental Sustainability and Health
  - Climate Response
  - Waterwise city
- Transport Strategy
- Lighting Strategy
- Urban Design Framework
- Public Spaces Public Life Study – Perth 2009
- Street Tree Framework
- Public Health and Wellbeing Plan 2014 - 2016

Supporting policy and guidance documents

- City of Perth Policy Manual
  - Protection and Enhancement of Open Place (15.2)
  - Street Trees – Planting, Pruning and Removal (20.8)
  - Recognising the Amenity Values of the City's Trees (20.9)
- Design and Construction Notes
- Parks Management Unit – Tree Specifications
- City Design Guidelines

Figure 6. Organisational Strategic Context

SCHEDULE 4

3.0 The Urban Forest

3.1 What is an urban forest?

An urban forest is broadly defined as the collection of green spaces, trees and other vegetation that grows within an urban area, on both public and private land (see Figure 7). Together, these green elements provide a range of benefits that enrich the quality of life and promote human well-being in the urban environment.

A primary distinguishing element of an urban forest, as compared to a 'natural' forest, is that it exists within a man-made environment, characterised by hard surfaces, a range of building types and concentrated human activity. This poses many challenges for its planning and management compared to more naturally vegetated areas.

The emerging discipline of Urban Forestry is concerned with the art and science of managing trees in urban environments to maximise the range of community benefits. Its focus is on the health and resilience of the urban forest as a whole.

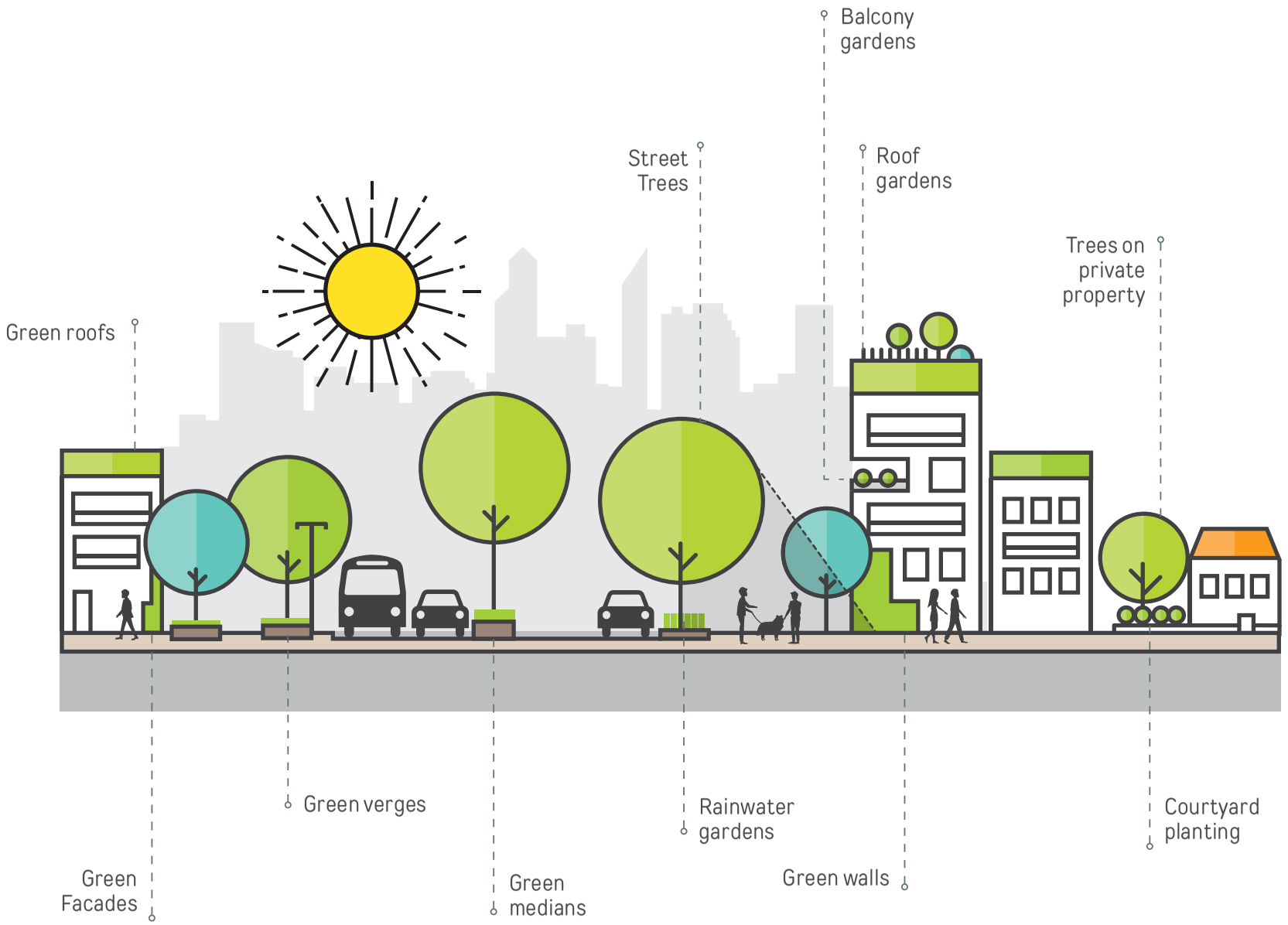


Figure 7. The urban forest

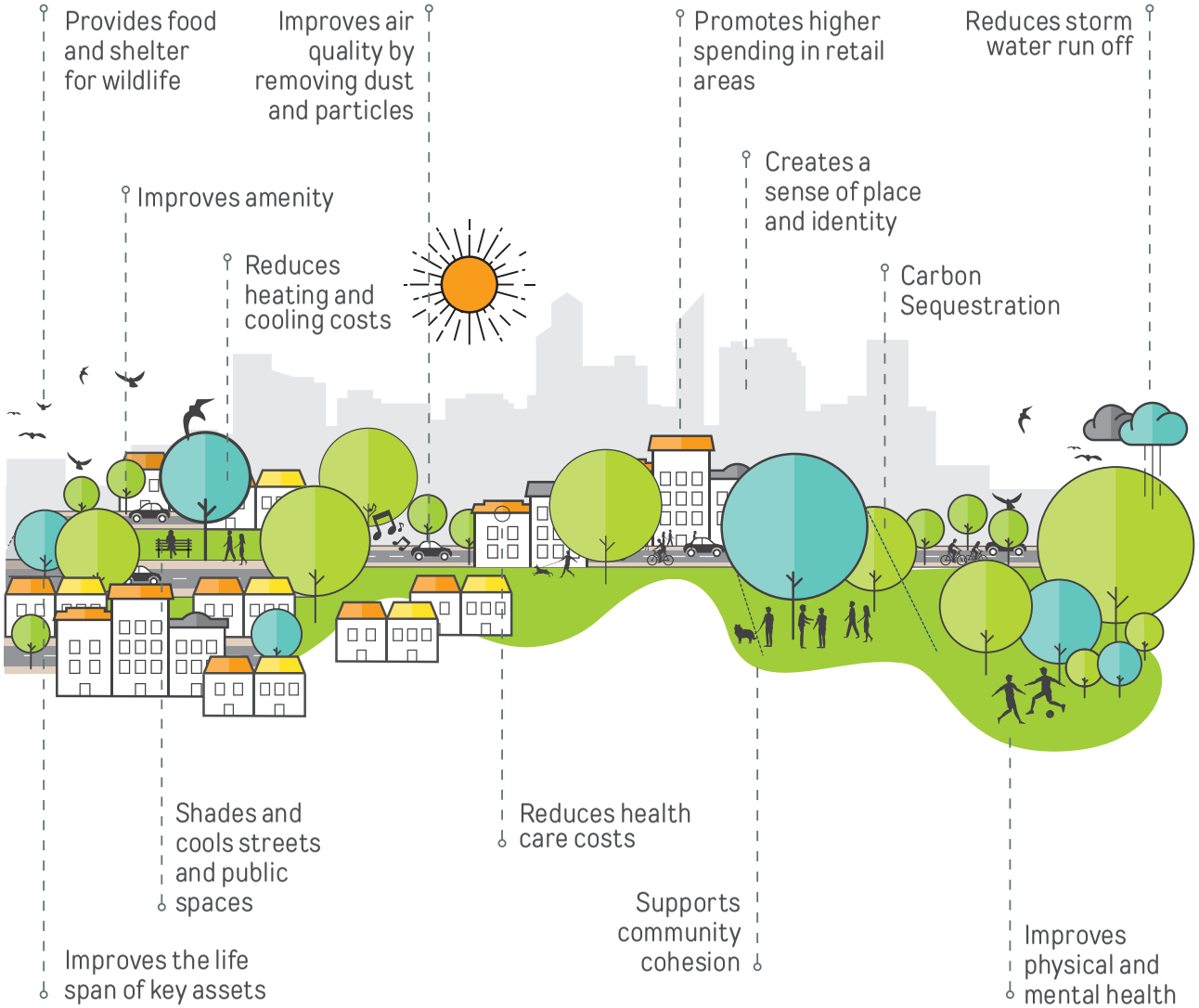


Figure 8. Benefits provided by the urban forest

3.2 What benefits can urban forests provide?

Urban forests can deliver a wide range of social, economic and environmental benefits to urban communities (see Figure 8).

Social benefits

Creates a sense of place and identity

Attractive street trees and well-designed green spaces enhance the quality of the urban environment, create a strong city image and foster a sense of connection to place.

Improves physical and mental health

Giving people the ability to access and interact with green space within cities has a range of positive health effects that improve individual and social well-being.

Supports community cohesion

Urban trees and greenery contribute to the creation of inviting public spaces that facilitate gathering and interaction, helping to promote community cohesion.

SCHEDULE 4

Reduces sun and heat related illnesses

Trees provide shade and protection from the potentially harmful effects of prolonged exposure to the sun and high temperatures. Research indicates that increasing the levels of vegetation in cities can reduce excess mortality rates.

Social Behaviour

Access to nature can have a positive effect on the social behaviour of communities, including a reduction in the level of some crimes.

Economic benefits

Improves amenity

Trees in streets enhance aesthetics and help increase property values.

Promotes higher spending in retail areas

City streets with large, well-tended trees help create attractive shopping environments where people are prepared to spend up to 9-12 percent more for goods and services.

Reduces heating and cooling costs

Trees planted to provide shade from the sun can cool buildings by up to 8 degrees Celsius, helping to reduce air conditioning costs.

Improves the life span of key assets

The shade provided by trees can increase the life span of road surfaces, reducing maintenance and replacement costs.

Reduces health care costs

People living in greener neighbourhoods are likely to exercise more. Increased levels of physical activity and improved mental health can all help to reduce community health care costs.

Environmental benefits and ecosystem services

Carbon sequestration

Trees capture and store carbon, removing it from the atmosphere and helping to mitigate the impact of global warming.

Shades and cools streets and public spaces

Trees provide shade and cool the surrounding air through the process of evapotranspiration, helping to reduce urban temperatures and improve levels of pedestrian thermal comfort.

Improves air quality by removing dust and particles

Trees trap and absorb pollutants from the air, helping to improve air quality and levels of community health.

Reduces stormwater runoff

Evergreen trees capture and filter stormwater through their canopies and root systems, helping to slow flow rates, reduce levels of stormwater run-off and improve water quality.

Provides food and shelter for wildlife

Tree canopies and other vegetation provide shelter for birds, bees and other wildlife and their fruit and flowers can be an important food source.

The Importance of Canopy Cover

Canopy cover describes the percentage of urban land covered by tree canopy when viewed from above. Improving the level and quality of canopy cover over cities is a key objective of many urban forest plans. It is a commonly used indicator of the success of the urban forest.

Research shows that there is a direct co-relation between the amount of canopy cover and healthy leaf area provided by an urban forest and the level of community benefits delivered (Nowak, et al., 2010 & Rogers et al.,2015)

However, improving the level and quality of canopy cover within a city is a more complex process than simply planting more trees. A range of additional factors need to be taken into account including tree size, species, health and spacing.

Size Matters

Large trees provide significantly greater benefits compared to smaller trees, largely because they tend to have greater leaf areas and provide higher levels of canopy cover. Larger trees remove more air pollution, provide greater reduction in stormwater flows, have greater cooling effect and provide greater economic benefits compared to smaller trees (Beecham & Lucke, 2015).

When planting new trees emphasis will be placed on selecting those that are vigorous and actively growing. These will be as large as possible, taking cost and space constraints into account.

SCHEDULE 4

Tree Size

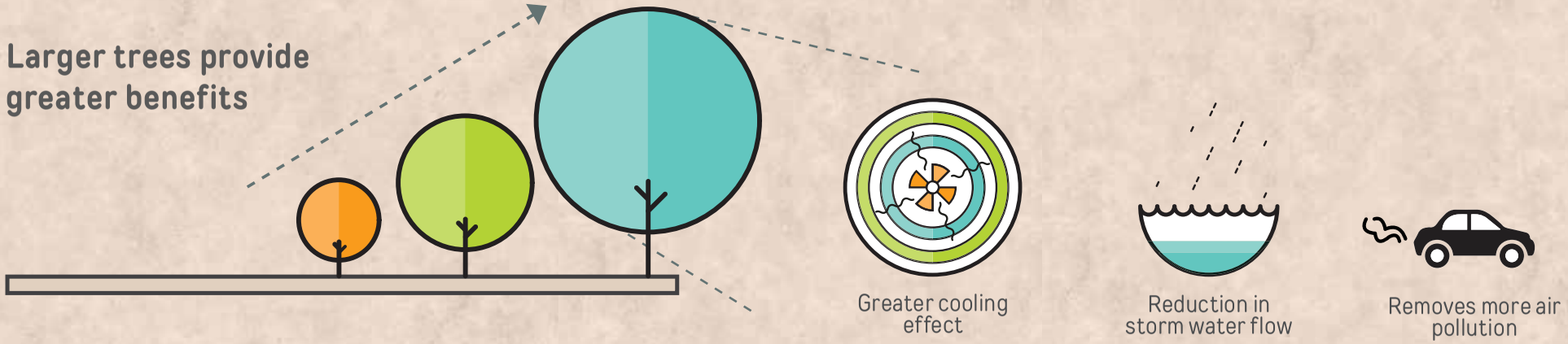


Figure 9. Benefits of larger trees

Species Matters

Different tree species have different canopy architecture, partly due to the various spatial patterns they adopt for intercepting light. These canopies provide different levels of density and depth in canopy layers, creating different types and quality of canopy cover.

Consideration will therefore be given to selecting a tree species with a canopy architecture that is appropriate to the context of its particular planting site.

Health Matters

Healthy trees have healthy canopies. Species selection will therefore consider a tree's ability to become established, thrive and develop appropriate levels of healthy canopy growth within the given environmental conditions and context of its particular planting site.

Tree Spacing

Where appropriate, trees will be spaced to encourage the development of an appropriate level of continuous and connected canopy cover over city streets and public spaces at maturity (see Figure 10). Consideration will also be given to ensuring that each tree has adequate space to develop a vigorous and healthy canopy, along with issues such as maintaining solar access and adequate levels of space and access for all city users.

SCHEDULE 4

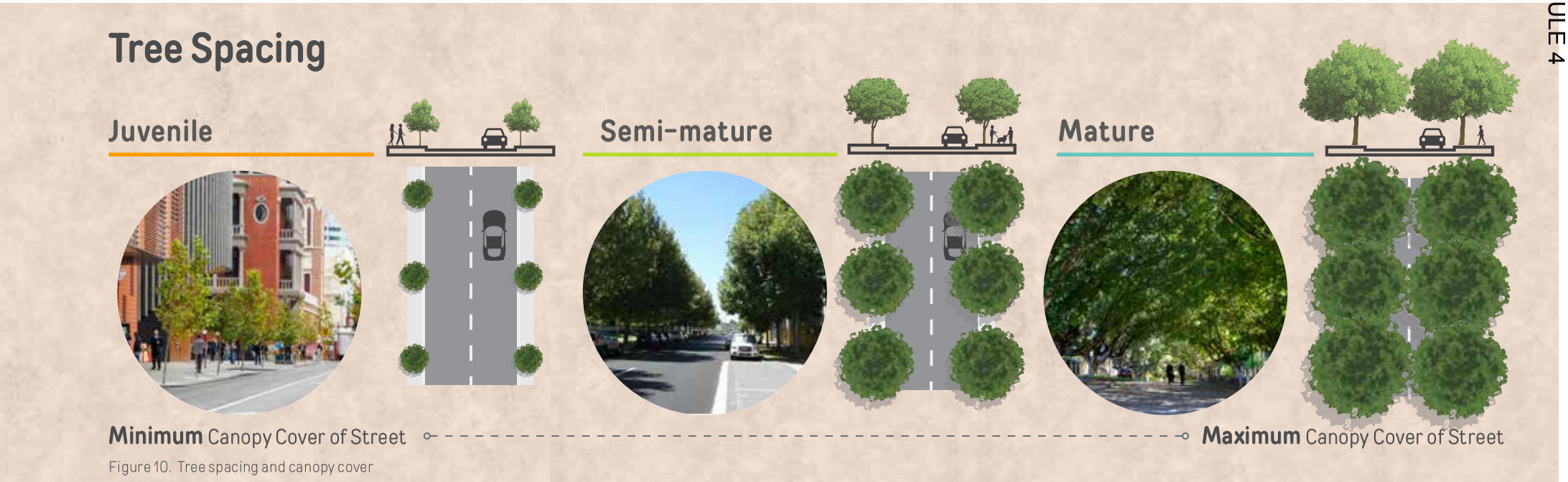


Figure 10. Tree spacing and canopy cover

3.3 Urban forests and the urban heat island effect

One of the most significant benefits that urban forests offer is their ability to cool their immediate environment. This is particularly important in cities as they are generally hotter than surrounding, less built up areas, sometimes by as much as 1-3 degrees Celsius or more (U.S Environmental Protection Agency (EPA), 2008). Urban surfaces can be highly effective at absorbing and storing heat during the day, creating higher day-time temperatures in cities. This heat is released at night leading to higher temperatures after dark. This phenomenon is known as the Urban Heat Island (UHI) effect.

As a result of the UHI effect city dwellers are exposed to higher temperatures for longer periods each day. Elevated night-time temperatures mean that people are not given the chance to recover from heat stress experienced during the day. During heat waves prolonged exposure to high temperatures can lead to increased levels of heat related illnesses and morbidity. Vulnerable groups such as children, the elderly and those whose health is already compromised can be particularly affected (Block, et al., 2012).

With temperatures predicted to rise with climate change, the UHI effect is likely to intensify. Unless this is addressed, it poses significant risks to the overall liveability of cities and levels of community health and well-being.

While many factors contribute to the UHI effect, the reduced level of vegetation in cities is a key issue. This is partly because vegetated land surfaces, with good moisture levels, remain cooler during the day compared to the hard impervious surfaces that characterise urban areas. Research indicates that a 10 percent increase in urban green cover could reduce the day-time surface temperatures in cities by around one degree Celsius (Harris & Coutts, 2013).

The City of Perth is already pursuing a range of strategies to help cool the City, including facilitating climate responsive built form and increasing green infrastructure as a whole. It is evident that the urban forest has a key role to play and this is a key driver for the development of the Urban Forest Plan.

SCHEDULE 4

"Globally, extreme heat events (EHE) have led to particularly high rates of mortality and morbidity in cities as urban populations are pushed beyond their adaptive capacities...many cities expect catastrophic EHEs more often, as the frequency, intensity and duration of EHE's are projected to increase with climate change." (Norton, et al., 2015)

SCHEDULE 4

Macey Street - East Perth

The cooling effect of urban trees

Urban trees have a key role to play in helping to mitigate the UHI effect.

Trees provide shade, which prevents urban surfaces from heating up during the day. This also helps lower night-time temperatures as less heat is trapped for release after dark.

Up to 95 percent of incoming solar radiation can be blocked by a tree's canopy (Brown, et al., 2013). The quality of shading provided depends on a range of factors such as leaf size, angle and structure. Canopy architecture, canopy clumping and continuity along with the depth and density of canopy layers, is also important (Sanusi & Livesley, 2014).

While shade can be created through the introduction of man-made elements, such as shade cloth and awnings, these fail to provide the added cooling benefit created by urban trees through evaporative cooling (Cooperative Research Centre Water Sensitive Cities, 2014). In this process, trees use the heat from the surrounding air to convert water to gas, producing a cooling effect similar to two air conditioners running for 20 hours (Brown, et al., 2013).

Shade and evaporative cooling provided by trees combine to help reduce city temperatures and the levels of heat stress experienced by urban populations.

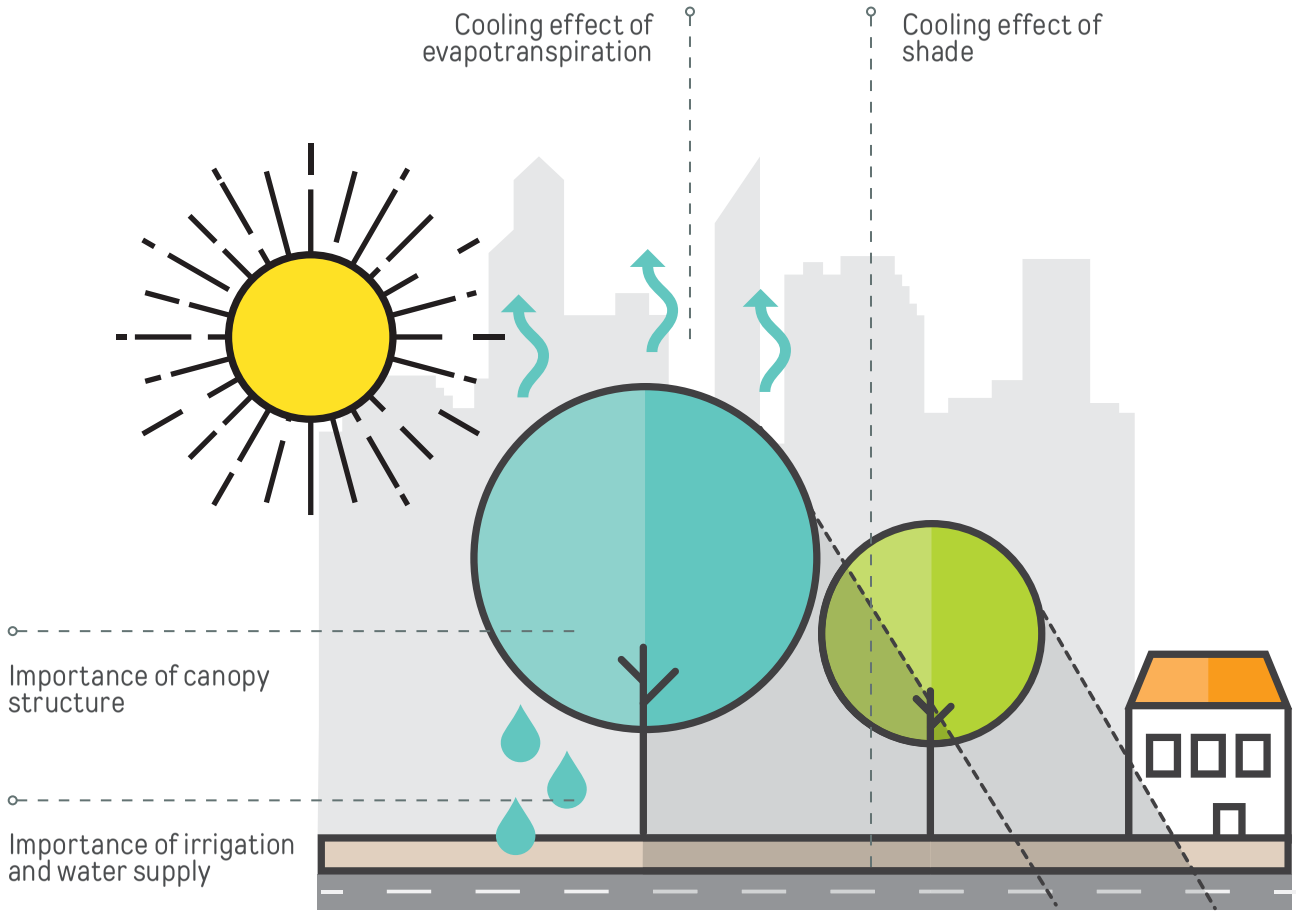
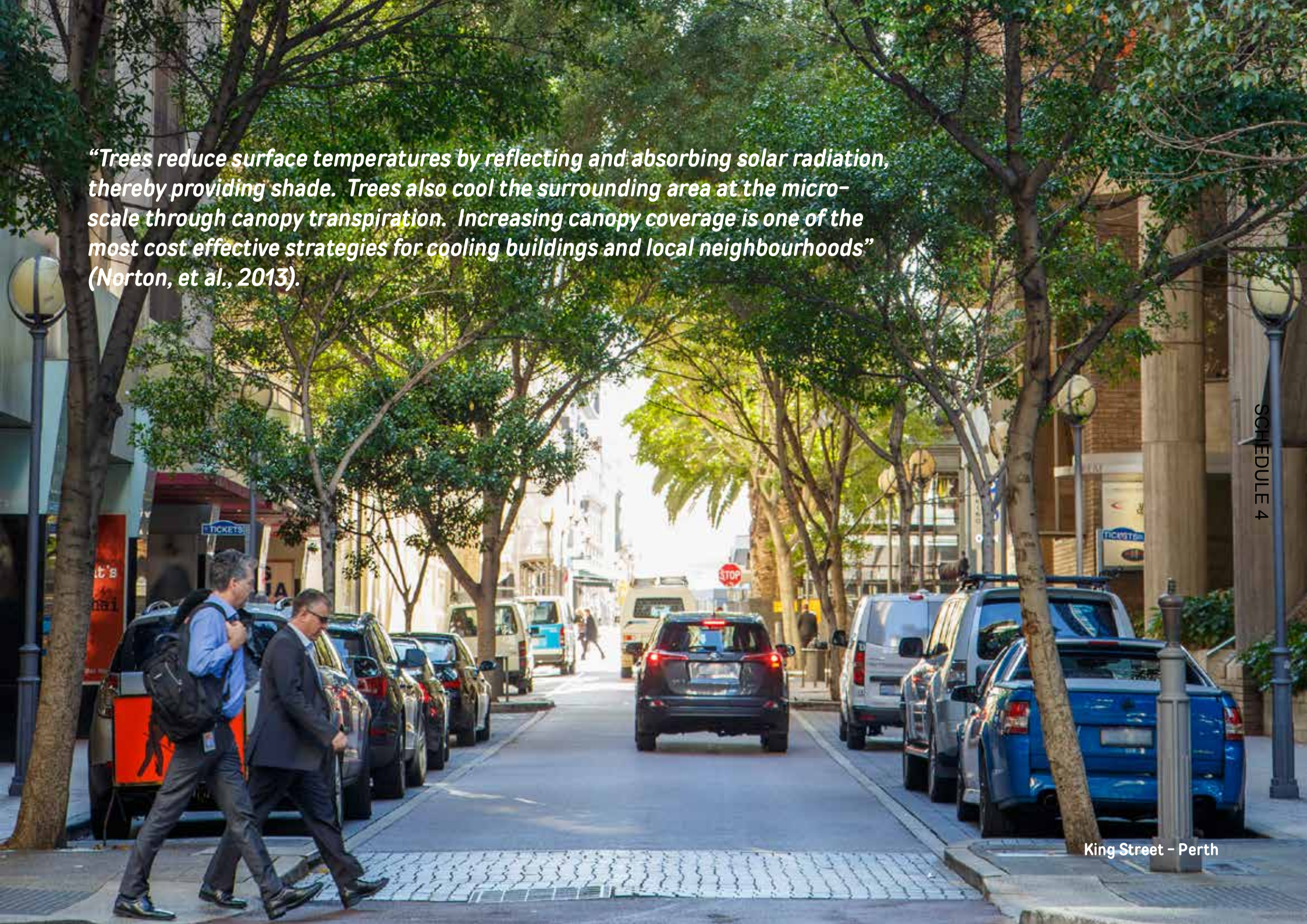


Figure 11. Cooling effect of urban trees

"Trees reduce surface temperatures by reflecting and absorbing solar radiation, thereby providing shade. Trees also cool the surrounding area at the micro-scale through canopy transpiration. Increasing canopy coverage is one of the most cost effective strategies for cooling buildings and local neighbourhoods" (Norton, et al., 2013).



King Street - Perth

3.4 Urban forests and climate change

While the benefits provided by urban forests can help achieve a climate responsive city, it is also important to consider the potential impacts climate change may have on the urban forest itself.

The exacerbation of the UHI effect in cities, for example, is likely to create more challenging growing environments for urban trees, placing them under increasing levels of heat stress. Along with reduced levels of rainfall, this may have a negative effect on the health and survival of urban trees.

The importance of irrigation

The ability of trees to contribute to urban cooling is also affected by rising temperatures and a lack of water. In periods of extreme heat, the evaporative cooling effect can be lost, just when it is needed most. Trees effectively shut down to prevent water loss and avoid water stress. High temperatures can also cause leaf scorch, and in some cases cause trees to drop their leaves altogether.

If trees are to continue to contribute to urban cooling by providing healthy canopies for shade and transpirational cooling, they will require supplementary watering through irrigation, particularly during hotter periods.

Species composition

Some tree species will respond and adapt successfully to changing environmental conditions, while others will struggle to survive and thrive. This may affect the overall composition and level of tree diversity within the urban forest, with implications for its future resilience.

Pests and diseases

Pests and diseases pose a significant threat to urban forests. Climate change can exacerbate this by creating conditions in which the lifespan and distribution of existing pests and diseases can be extended and new ones introduced.

Climate change is therefore likely to have a potentially negative effect on the overall health and resilience of the urban forest. Measures are needed to ensure that it is able to adapt and remain robust in the face of these challenges.

"Supplementary irrigation of UGI (Urban Green Infrastructure) in cities that experience hot, dry summers is a wise investment to ensure long term temperature mitigation, as well as other ecosystem services" (Norton, et al., 2015).

3.5 Why do we need an urban forest plan?

Growing and managing a thriving urban forest in the face of increasing challenges requires that a highly systematic and co-ordinated approach be taken (see Figure 12). It is essential that:

- there is a clear and shared understanding across all disciplines of the importance of the urban forest and the measures required to ensure its health and vigour
- these measures are based on the latest scientific research and are relevant to the Perth context
- the effectiveness of these measures is monitored and assessed systematically.

The City of Perth Urban Forest Plan sets out such an approach. It is intended for all those who have a stake, either directly or indirectly in the urban forest – its protection, management, expansion and promotion.

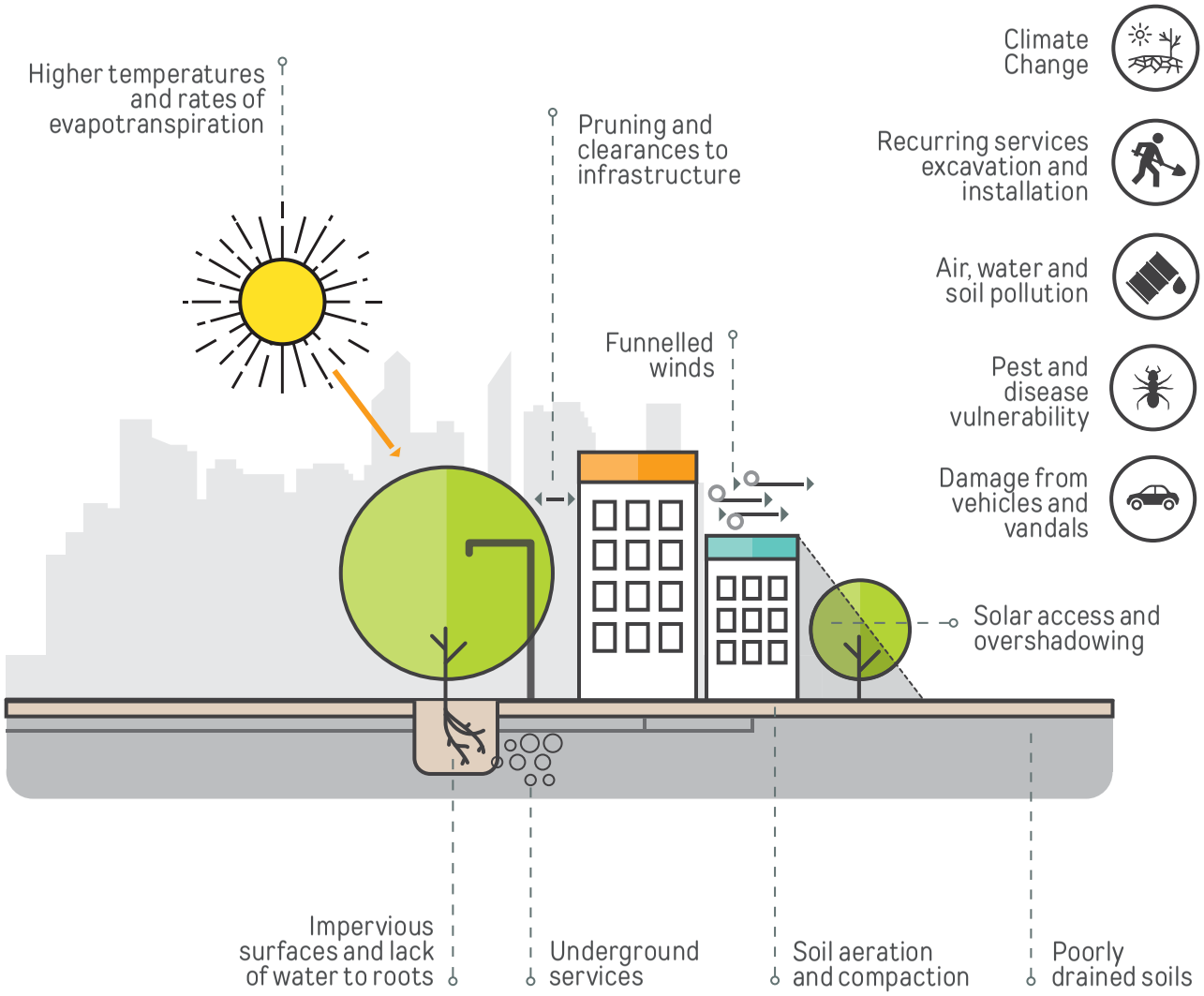


Figure 12. Street tree challenges

3.6 A staged approach

An urban forest is comprised of many elements including publically owned and managed street and parkland trees, trees on private property and other vegetation including wider elements of green infrastructure such as understorey planting, green roofs, green walls, living walls, green verges and medians and rainwater gardens.

The City of Perth Urban Forest Plan is being developed in 3 stages, reflecting the complexity of the urban forest itself (see Figure 13).

Stage One focuses on the City's street and parkland trees. The decision was made to address this element of the urban forest first as the City has direct control of these trees and the spaces in which they are planted. It can therefore undertake early and effective action in the planning, management and expansion of the urban forest, promoting improvement and change within a short timeframe.

Stage Two will address trees planted on private property.

Stage Three will address other vegetation that makes up the urban forest, including wider elements of green infrastructure.

Both of these additional stages are scheduled for completion in 2017.

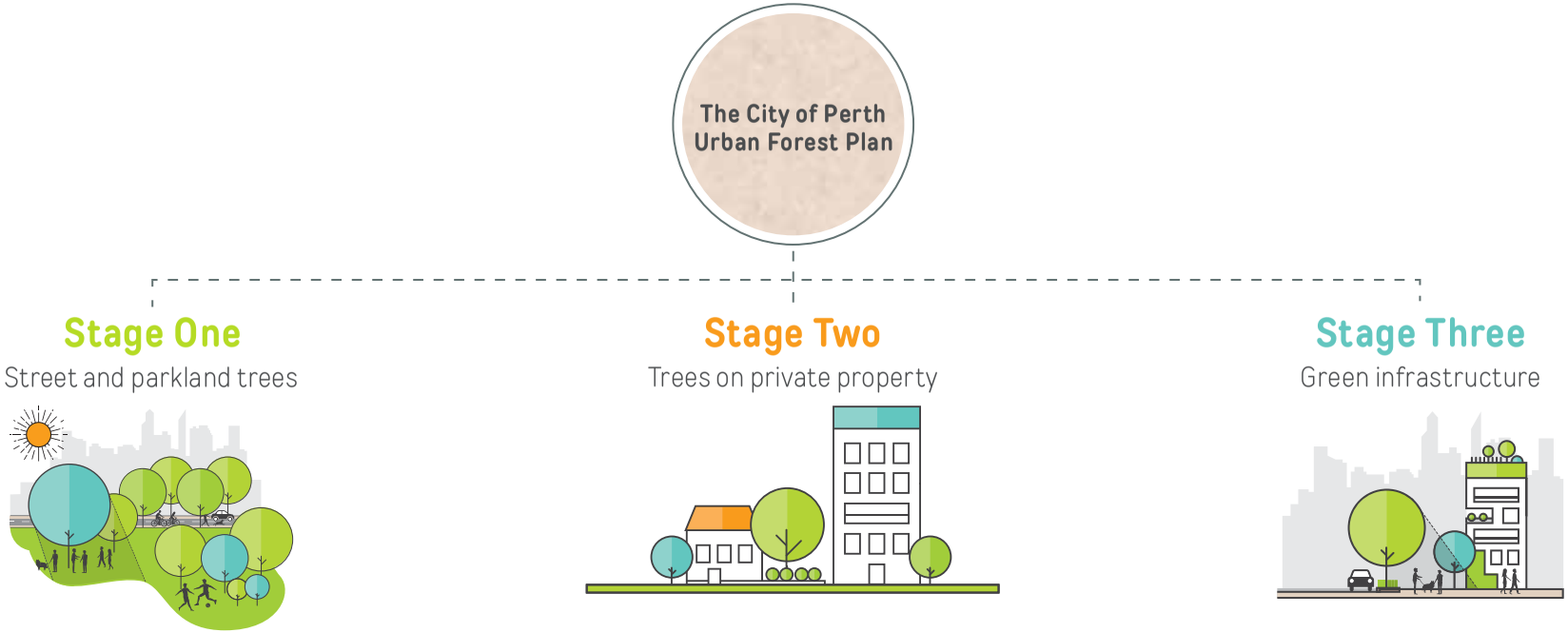


Figure 13. Staged approach

SCHEDULE 4

Mount Street – West Perth

4.0 Stage One – Street & Parkland Trees

There are currently over 14,000 trees planted in the City's streets and parklands. In this context parklands include formal parks such as Wellington Square, Supreme Court Gardens and Russell Square in addition to more informal elements of the City's wider open space network, including the Narrows Interchange.

SCHEDULE 4

4.1 Planning for street & parkland trees

The process used to plan for the City's street and parkland trees is based on a best practice approach structured around four key steps (see Figure 14).

Step 1: What we have

Research undertaken to collect the technical data required to develop a detailed and comprehensive understanding of the existing character and condition of street and parkland trees and identify key issues and challenges.

Step 2: Where we want to go

Research findings combined with input from a process of community consultation and engagement to establish goals and objectives for the planning, management and expansion of street and parkland trees.

Step 3: How we will get there

Implementation plan developed to identify the actions to be undertaken to deliver the goals and objectives of Stage One of the Urban Forest Plan. Indicative budgets, priority projects, timeframes and key roles and responsibilities clearly identified.

Step 4: Have we arrived

Monitoring framework developed to measure progress in implementing Stage One of the Urban Forest Plan.

[1] While there is no one, universally recognised 'best practice' approach to the preparation of an urban forest plan there are a number of key guidance documents that have informed the development of the City of Perth Urban Forest Plan. These include How to Grow an Urban Forest, 202020 Vision; the Urban Forest Management Plan Toolkit, California Urban Forest Council; Trees in the Townscape: A guide for decision makers, Trees Design Action Group; and Planning the Urban Forest, Schwab.

Figure 14. Plan process

Evidence based planning

Stage One of the City of Perth Urban Forest Plan is underpinned by the findings of two specifically commissioned baseline research studies:

- Canopy Cover and Thermal Imaging Baseline Study (2015)
- Street and Parkland Tree Audit (2015).

These studies provide the technical data needed to effectively plan for the City's street and parkland trees, by assessing them against a range of commonly accepted performance indicators for urban forest management including:

- existing levels of canopy cover (including information on canopy height and width)
- age diversity
- useful life expectancy
- tree diversity
- tree health (Kenney, et al., 2016).

The Thermal Imaging Baseline Study acquired satellite, airborne and terrestrial thermal data to provide a visual representation of temperatures in the City during the day and after dark and inform an assessment of Perth's existing Urban Heat Island effect.

The research findings from these studies have been used to :

- provide baseline data to help formulate goals and objectives
- establish benchmarks to measure and monitor change and progress in implementation.

4.2 What We Have: issues & challenges

Data collected by the Street and Parkland Tree Audit (2015) shows that the City has a total of 14,811 street and parkland trees. Further information on how this overall population is broken down by location, tree family and species is summarised in Figure 15.

The City's parklands, including Harold Boas, Supreme Court, Stirling and Queens Gardens contain particularly diverse and varied collections of trees. Some of the oldest trees (100–150 years old) are also found in the parkland areas including:

- Camphor Laurel in Harold Boas Gardens
- Moreton Bay Figs in Russell Square
- Port Jackson Figs and Flooded Gums in Wellington Square
- Norfolk Island Pine in Stirling Gardens
- London Planes in Queen's Garden and Victoria Avenue.

Collectively the City's street and parkland trees have an estimated amenity value of $98 million. This figure excludes the ecosystem services they provide.

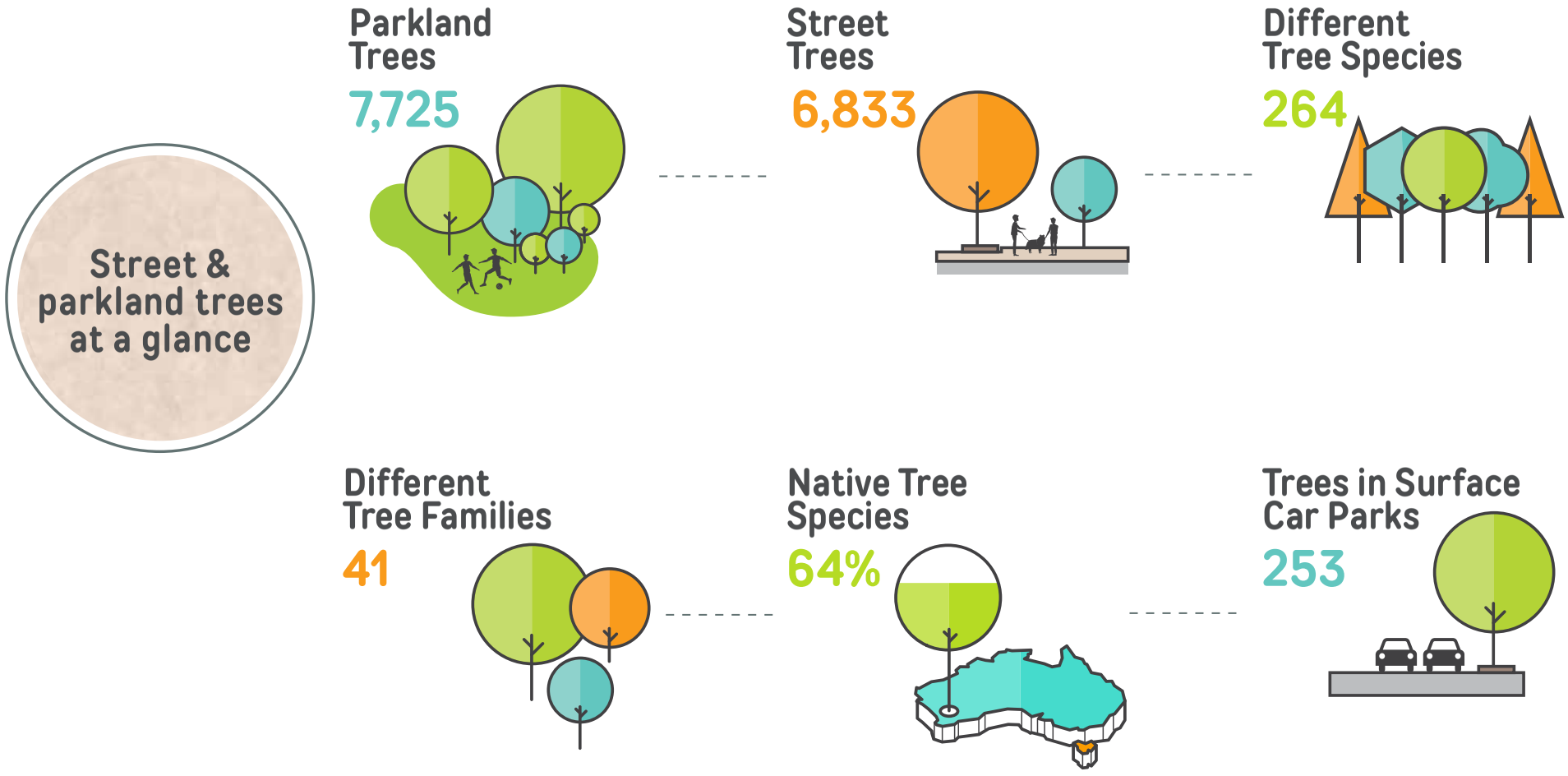


Figure 15. Street and parkland trees

The City of Perth Street Tree Framework

The selection of tree species for planting within the urban forest is currently guided by the City of Perth Street Tree Framework. This document sets out a list of existing and proposed tree species, including native and non-native trees. At present over 50 percent of the recommended tree species for planting are from the Myrtaceae family (native trees).

The Framework's approach to tree selection is based upon choosing a species that is most appropriate to its context and environmental factors. It is broadly reflective of the 'right tree for the right place' philosophy (Schwab, 2009).

Contemporary urban forestry increasingly promotes this philosophy as the primary guiding factor in tree selection processes. Once the necessary measures have been taken to maximise planting conditions at each site (e.g. soil depth, quality and volumes, availability of water) trees are primarily chosen for their ability to grow and thrive given the specific environmental qualities and challenges. This maximises the tree's potential to grow into a large, mature tree with a healthy canopy.

A range of other factors are also considered in the application of the 'right tree for the right place' philosophy including, but not limited to, issues such as local culture and heritage.

The 'right tree for the right place' helps to promote a more balanced, sustainable and evidence based approach to the tree selection process. It is a valuable tool in urban forest management.

The Street Tree Framework will be reviewed to reinforce and up date this philosophy and ensure that it aligns with and supports the goals and objectives of the Urban Forest Plan. The Framework document will also be augmented to provide guidance on key tree management issues within the City.

"We need much more specific knowledge to adequately select trees for urban areas to deliver a wide range of economic, social and environmental benefits. This will contribute to improving the welfare of urban residents in what is essentially a human habitat not a natural one" (Johnston, et al., 2012).

Issues and challenges

Research findings indicate that the City's street and parkland trees are generally performing well against key performance indicators. However, they do face some important issues and associated challenges.

Existing levels of canopy cover

Perth currently has a relatively low level of canopy cover.

The Canopy Cover Baseline Study (2015) acquired high resolution airborne multispectral imaging to measure the baseline canopy cover for all land, both publicly and privately owned within the City of Perth boundaries (see Figure 18). This data was collected on 23 February 2015. The findings were stratified into canopy cover provided by vegetation within the following height categories:

- 0–3m
- 3–10m
- 10–15m
- 15m+

Findings show that approximately 10 percent of all the land within the City's boundaries is covered by tree canopy, vegetation greater than 3.0 metres in height (see Figure 16).

Information on canopy spread, collected as part of the Street and Parkland Tree Audit (2015), indicates that the City's streets and parklands areas (the public realm) have a canopy cover of approximately 19 percent (see Figure 17).

Setting a canopy cover target is considered important as it provides a benchmark for measuring progress in increasing canopy cover.

A number of cities have adopted the standard of between 30–40 percent canopy cover set by American Forests for cities in the United States. Other approaches suggest that canopy targets should be based on an assessment of the quality and quantity of available planting spaces and local environmental and climatic conditions, rather than the application of generic standards (Kenny, et al., 2011)

Challenge: Setting an achievable target and increasing the level of canopy cover provided by street and parkland trees .

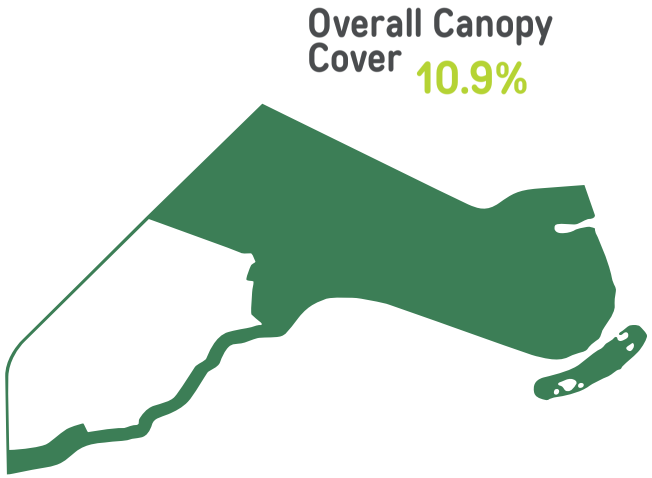


Figure 16. Overall canopy cover

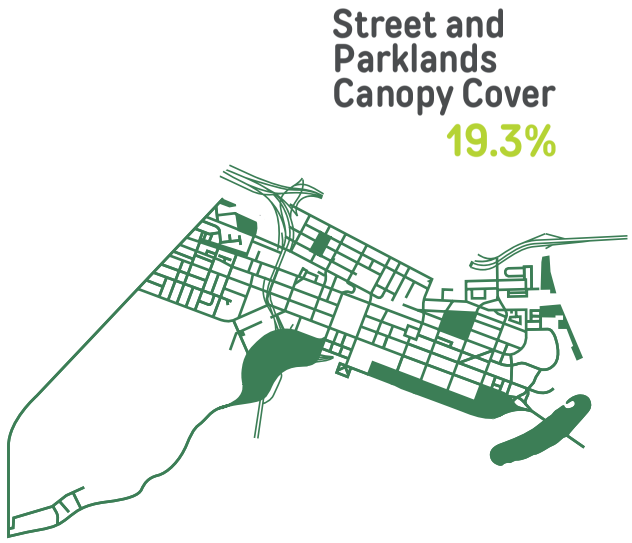


Figure 17. Public realm canopy cover

Figure 18. Baseline canopy cover stratified by height

Overall canopy cover in City precincts

At the precinct level, Crawley is performing the best with a level of overall canopy cover of 21.2 percent across both its public and private realms. Perth and Northbridge have the lowest levels – 8.1 percent and 7.2 percent respectively.

This is perhaps unsurprising given the built up and dense urban character of these areas. The outer precincts of East and West Perth have levels of 10.3 percent and 13 percent respectively, these higher levels perhaps reflecting their less dense and mixed commercial/residential character.

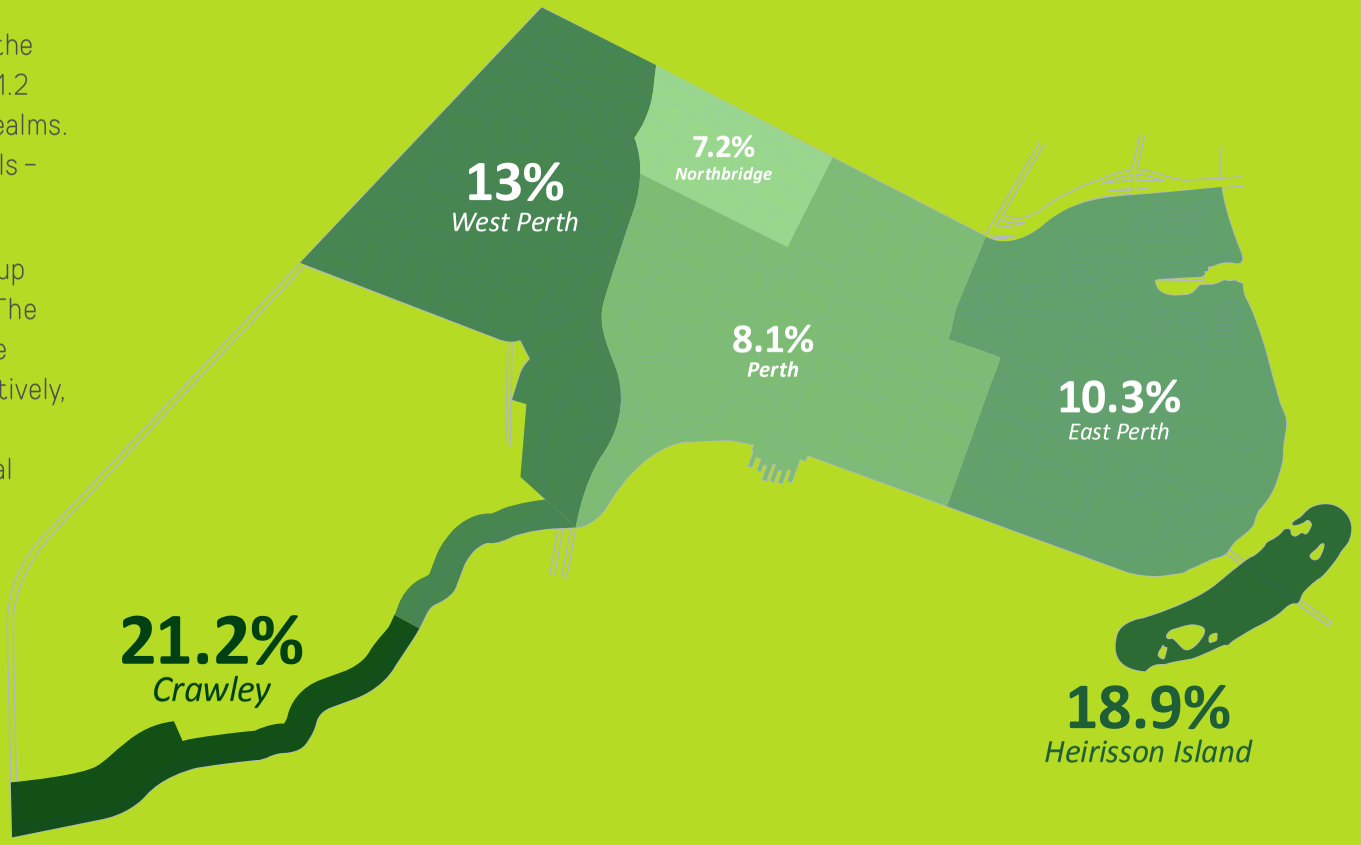


Figure 19. Levels of overall canopy cover by precincts

Ameliorating Perth's UHI effect

The Thermal Imaging Baseline Study (2015) collected data on the City's UHI effect.

Satellite data was collected mid-morning on 10 January 2014, when the daytime temperature was 34.2 °C followed by 43.3°C the next day. This data provided information on day-time land surface temperatures within the City and identified a number of 'hot-spots', or areas with high day-time land surface temperatures (see Figure 21).

'Hot-spot' areas tend to be located where there is a high concentration of hard surfaces such as the freeway, railway lands, and large areas of unirrigated natural surfaces like the East Perth Cemetery. Some are located in residential areas and around major gathering places. They also appear to correlate to those parts of the City with lower levels of canopy cover.

Airborne thermal imaging was captured after 10.30pm on 3 March 2015, following a day-time maximum temperature of 30.6 °C .

The previous 16 days were all in excess of 26 °C. This data indicates the degree to which residual heat is trapped in streets and roads after dark (see Figure 20). These areas are hotter than the more natural surfaces of parklands and public open spaces.

Perth's UHI effect is contributing to higher City temperatures, with potentially negative impacts on City liveability and community health and well-being. With City temperatures predicted to rise there is potential for this situation to worsen over time. Planting more trees and increasing the level and quality of canopy cover in City 'hot-spots' and along streets and roads will help cool the City.

Challenge: Harnessing the potential of street and parkland trees to promote urban cooling, especially in 'hot-spot' areas.

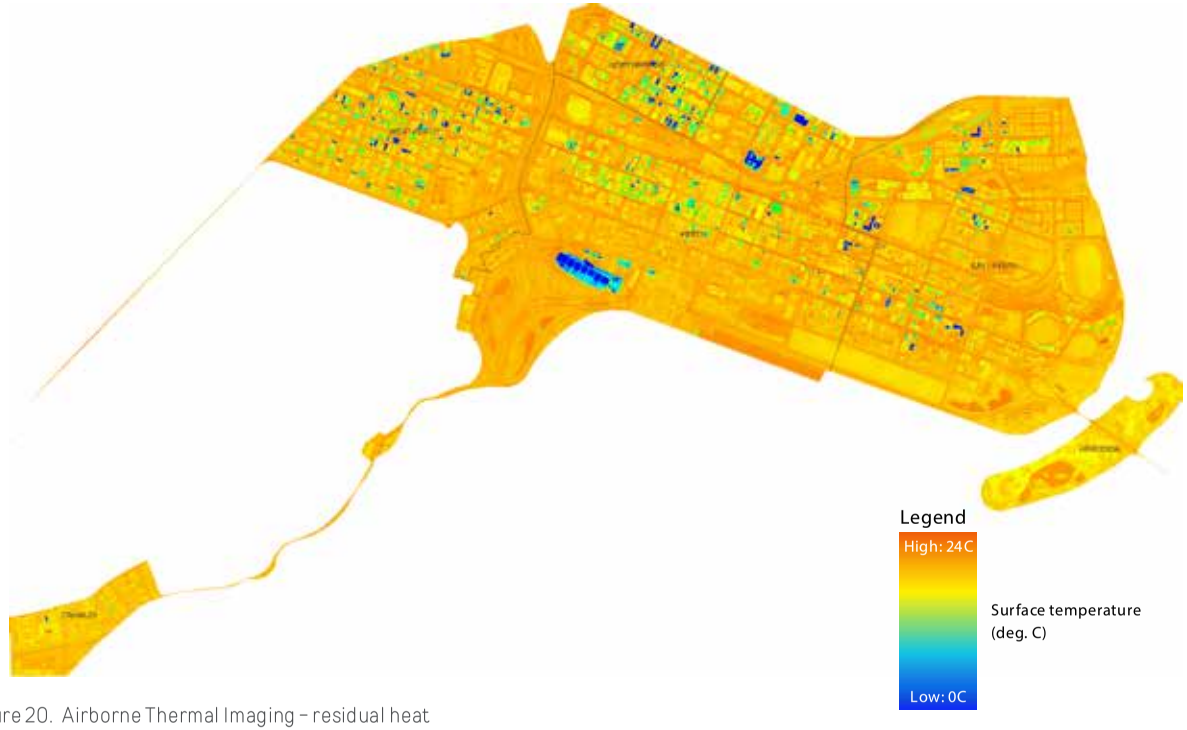


Figure 20. Airborne Thermal Imaging - residual heat

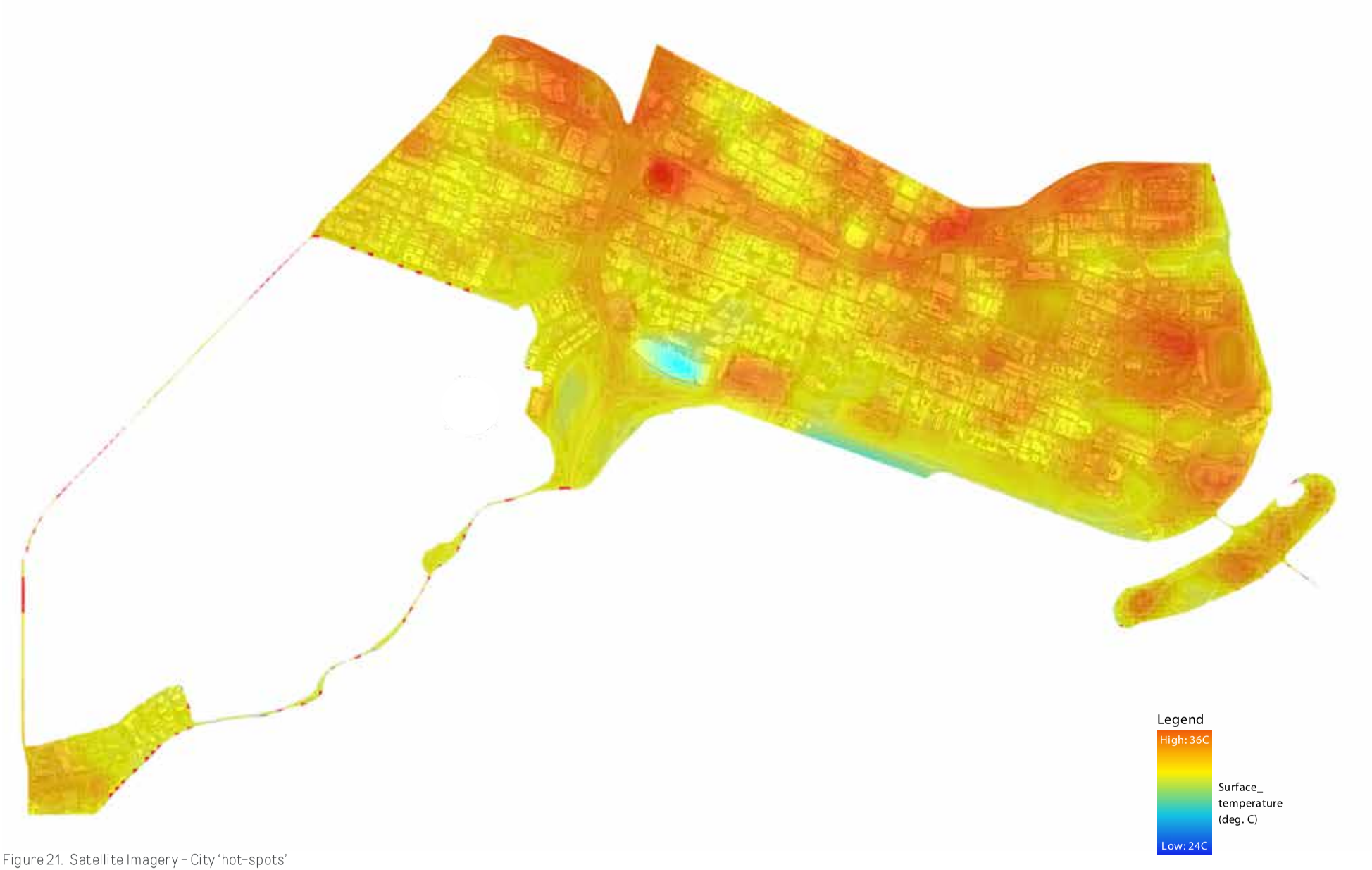


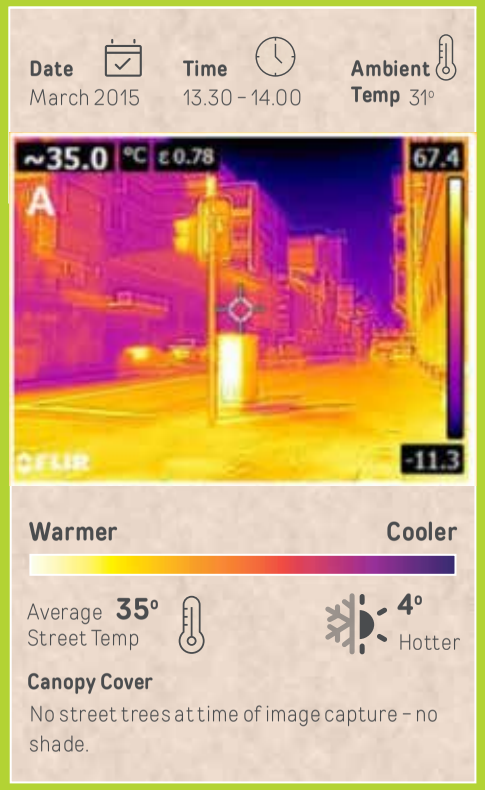
Figure 21. Satellite Imagery – City 'hot-spots'

Cooling the City – the potential of street trees

Terrestrial thermal imaging was captured as part of the Thermal Imaging Baseline Study to provide an indication of the average day-time temperatures in three City streets with different types and levels of canopy cover. This data was collected between the hours of 13.30 and 14.00 during 2 afternoons in March 2015, when the ambient day-time temperature was 31°C . It provides an indication of how trees contribute to urban cooling.

Victoria Avenue, with its high and wide tree canopy was 10 °C cooler than Hay Street which had no street trees. Francis Street was 3 °C cooler than the ambient day-time temperature but nearly 4°C hotter than Victoria Avenue.

Hay Street
(between Barrack & Pier St)



Francis Street
(between Lake & William Street)

Victoria Avenue
(between St Georges Terrace and Terrace Road)

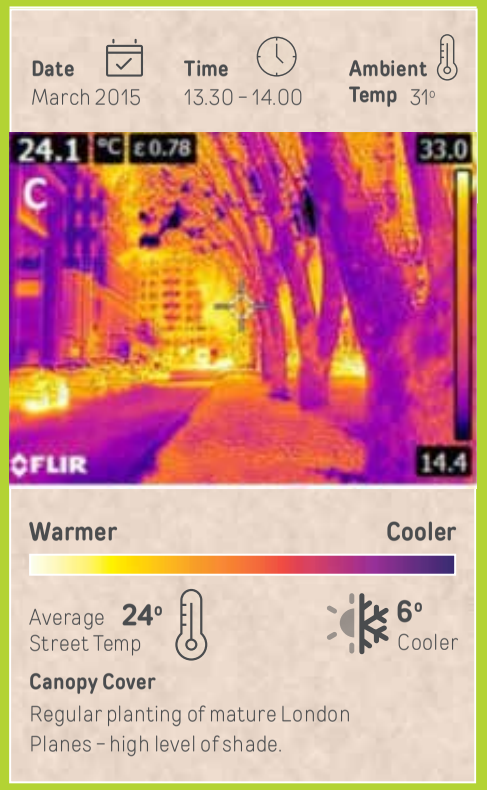


Figure 22. Terrestrial thermal imaging of 3 city streets

Water supply and management

Perth faces a particular set of challenges when it comes to ensuring water supply for the irrigation of the City's street and parkland trees.

The south-western part of Western Australia, including Perth, has experienced an on-going drying trend. Annual average rainfall has declined since the late 1960's (see Figure 23). The May to July drying trend has intensified over the last ten years and is predicted to continue to intensify through to the end of the century (IOCI, 2012).

Since the late 1960's the south western area has experienced a **20% decline** in autumn and winter rainfall.

Figure 23. Declining autumn and winter rainfall

Additionally, summer rainfall is low and sporadic. The monthly average summer rainfall for Perth for the last four years has been 13.2mm for December, 9.6mm for January and 12.5mm for February (Water Corporation, 2016). The City is also committed to reducing its level of water use and water restrictions imposed by the Water Corporation currently apply in summer.

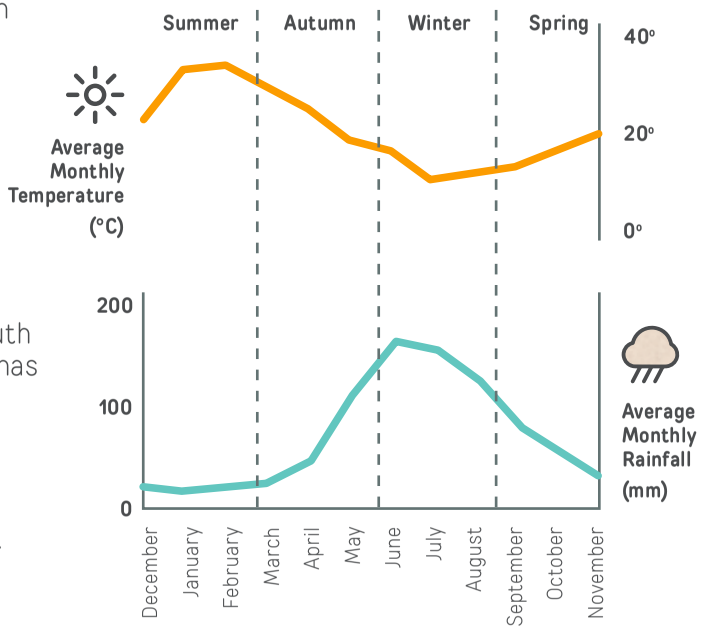


Figure 24. Seasonal rainfall and temperature patterns

Consequently, water is often least available when it is needed most to support tree health and maximise the cooling effect (see Figure 24).

At present the City's street and parkland trees are irrigated for the first 2 years after planting. Trees up to 4 years old are also irrigated during periods of extreme heat. Water for irrigation is currently sourced from a mix of scheme water, ground water and water captured in surface water bodies including the Claisebrook Inlet and Lake Vasto in Ozone Reserve.

In order to ensure the development of a robust, healthy urban forest capable of contributing effectively to urban cooling, it is imperative that steps are taken to ensure an adequate supply of water for supplementary irrigation. This is especially important during periods of extreme heat and during the establishment period for juvenile trees.

The issue of water supply and management will increase in significance as more trees are planted as part of the implementation of the Urban Forest Plan. More trees require more water.

Challenge: Securing a sustainable water supply for the irrigation needed to support tree health and maximise urban cooling.

"Water restrictions reduce the ecosystem service function of green space and vegetation, diminishing the cooling benefits locally and city wide, reducing human thermal comfort levels and increasing urban energy demands for building space cooling. The need to maintain water supply to urban trees and green spaces is evident...it is not a "waste" – it has quantifiable benefit that must be included in any policy about water use in urban areas" (Block, et al., 2012).

SCHEDULE 4

Point Fraser - East Perth

Imbalance in age diversity

While the street and parkland tree population is generally performing well in terms of age class distribution the majority of trees are in the mature category, reflecting a lack of significant levels of new tree planting programmes in recent times (see Figure 25).

Measures are also needed to protect 'veteran' trees (over 100 years old) and improve the aftercare and maintenance of juvenile trees to increase their levels of representation within the overall tree population.

In urban forestry it is good management practice to have an even spread of trees across a range of different age classes. This promotes resilience and long-term sustainability, helping to ensure consistency in the level of canopy cover provided and the delivery of community benefits.

Challenge: Developing and implementing measures to improve the balance of age classes over time within the street and parkland tree population.

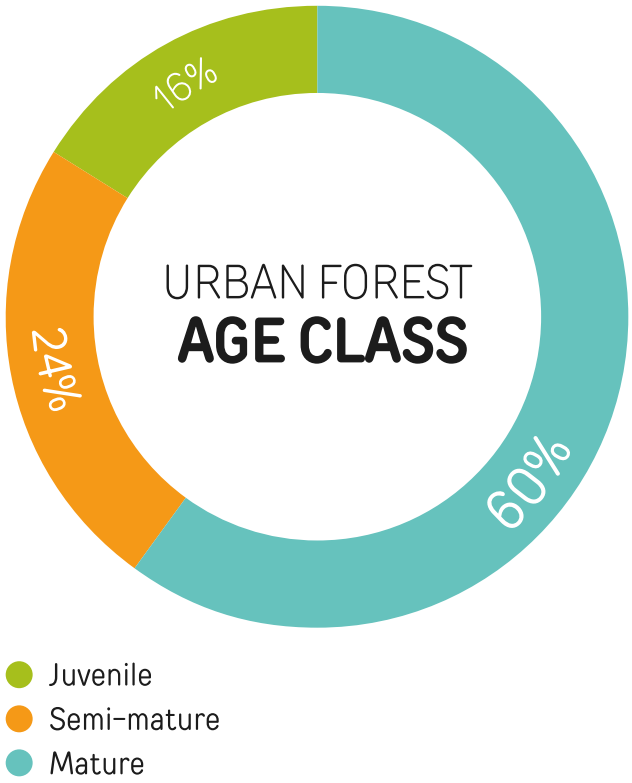


Figure 25. Age Class

Aging trees

Useful Life Expectancy (ULE) is a measure of the potential time span remaining for a given tree in its existing location. A range of factors are taken into account including a particular tree's typical life span, environment, climate change impacts, land uses, pest and disease and soil quality and volumes.

ULE is an important management tool for urban forestry (City of Melbourne, 2012). It facilitates long term planning for the staged replacement of trees that are reaching the end of their ULE at the same time. This prevents significant 'gaps' emerging in canopy cover, with a corresponding reduction in the level of benefits delivered.

Assessment of ULE at the species level is also useful as it can help to identify those that are performing poorly within an urban forest. Plans can be made to either improve the level of maintenance to increase the health of these trees, or replace affected species with one that is more suited to the urban environment.

The population of street and parkland trees is performing well in terms of their ULE. Nearly 70 percent of trees have a long term ULE and are expected to remain in place in the landscape for more than 40 years (see Figure 26 and 27).

Of the top ten tree species, only the Queensland Box has a significant issue in terms of ULE, with nearly half these trees requiring replacement within the next 15 years. This species currently makes up 1.7 percent (approx. 600 trees) of the City's street and parkland trees. The continued use of tree species with a high percentage of limited to short term ULE requires careful consideration.

Challenge: Replacing trees with a limited to short term ULE to avoid significant gaps in the canopy cover provided by street and parkland trees.

Around **2%** of trees (approx. 350 trees) will require replacement in the next **5 years**

a further **10%** (approx. 1,400 trees) in the next **5 -15 years.**

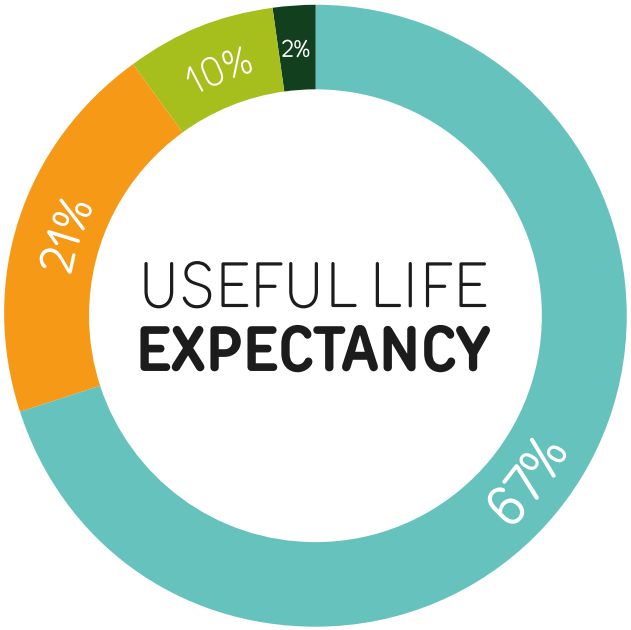


Figure 26. Useful Life Expectancy

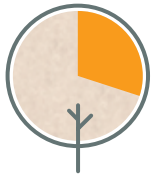
Figure 27. ULE of street and parkland trees

SCHEDULE 4

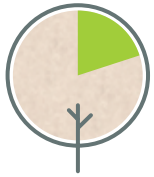
Imbalance in tree diversity

One of the most important considerations in urban forestry is the level of tree diversity present within the overall tree population. A highly diverse population is considered desirable as it reduces the risk of a catastrophic loss of trees should one particular family or species be affected by an outbreak of a specific pest or disease, or become particularly susceptible to climate change or other environmental impacts.

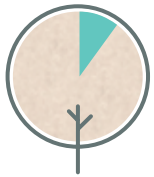
Addressing this risk is an important factor in promoting the long term resilience of the urban forest. The Street and Parkland Tree Audit (2015) analysed a range of tree diversity standards. The findings suggested that the following are the most appropriate to the Perth context (based on the work of Santamour).



No more than **30 percent** of an urban forest should be comprised of trees from the same tree family.



No more than **20 percent** of an urban forest should be comprised of trees from the same tree genus.



No more than **10 percent** of an urban forest should be comprised of trees from the same tree species.

The City's population of street and parkland trees is currently over reliant on one tree family. Trees from the Myrtaceae family make up more than 40 percent of the total population making it the largest family present. It exceeds recommended standards by more than 10 percent (see Figure 28).

The prevalence of Myrtaceae is partly due to it being native to Australia. It also includes more than 70 different species present in the street and parkland tree population, including:

- West Australian Peppermint
- Queensland Box
- Tuart
- Swamp Paperbark
- Spotted Gum
- Marri
- Jarrah
- Flooded Gum
- Bottlebrushes

Despite the large variety trees within the Myrtaceae family, it is estimated that many of them could be susceptible to varying degrees to the disease myrtle rust (a serious fungal disease which attacks actively growing leaves, shoot tips and young stems). Myrtle rust is currently present in the Eastern States. It is not yet present in Western Australia. However, its arrival could have a catastrophic impact on the City's street and parkland tree population.

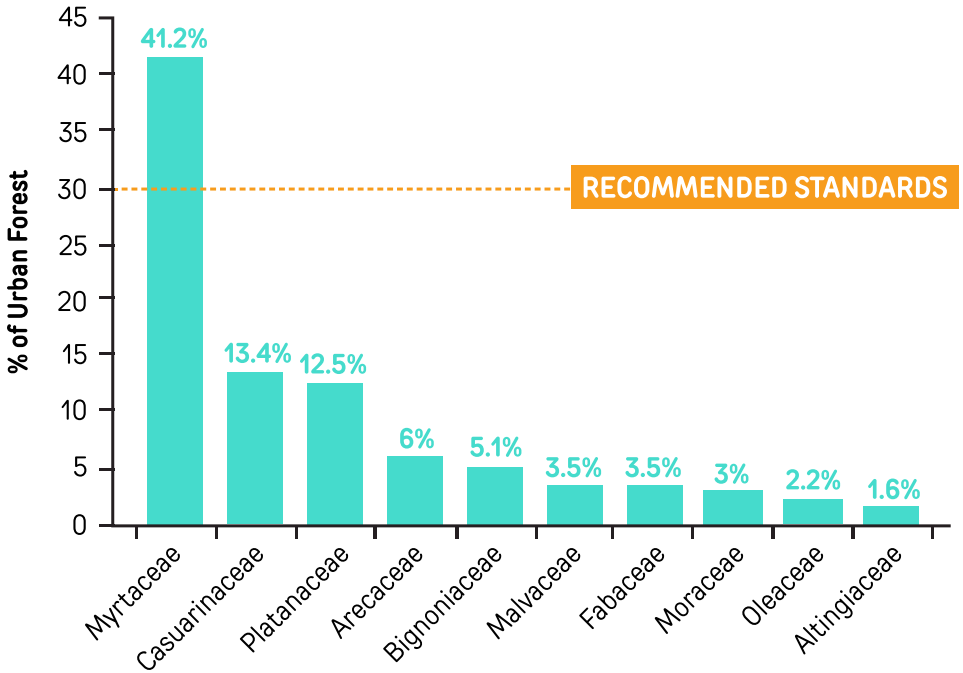


Figure 28. Tree diversity: representation of top ten tree families

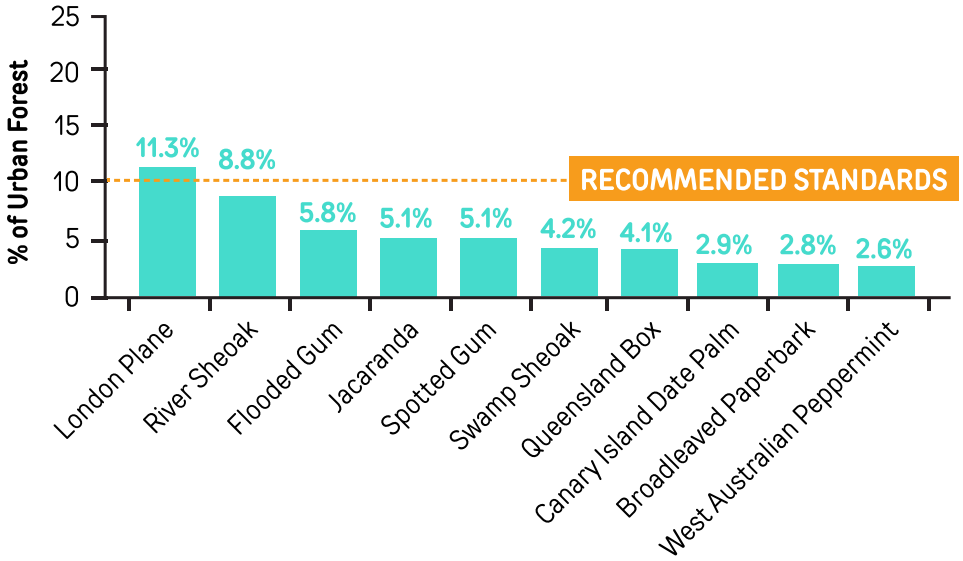


Figure 29. Tree diversity: representation of top ten tree species

At the tree species level, street and parkland trees are performing well, with potential to increase the representation of tree species other than the London Plane (see Figure 29).

Tree Family

Single or group of genera that closely or uniformly resemble each other in general appearance and technical character.

Tree Genus

A group of tree species that have fundamental traits in common but that differ in other, lesser characteristics.

Tree Species

A natural group of trees in the same genus made up of similar individuals

Challenge: Meeting or exceeding the recommended standards for tree diversity within the street and parkland tree population.

Native and non-native trees in the urban forest

Tree species vary in their ability to deliver benefits. Both native and non-native trees are capable of providing a range of economic, social and environmental benefits and the issue of whether to plant native or non-native species is a significant debate in urban forestry.

Native trees

A preference for planting native trees has been broadly evident in recent times, with over 60 percent of street and parkland trees being native species. These trees are often planted for reasons of nature conservation and the provision of habitat for native fauna. Native trees are often also selected for patriotic and wider landscape management reasons (Johnston, et al., 2012).

An automatic preference for planting native trees can influence the overall resilience of the urban forest and result in unmitigated risks. Increasing heterogeneity and complexity of species composition can allow for adaptive management in the face of climate change. Similarly, a wide diversity of native and non-native trees can mitigate disease spread and lessen the distribution of environmental pests.

Although they are currently over-represented, native trees within the Myrtaceae family will remain a significant component in the urban forest, with a valuable role to play. They will continue to be considered for planting as part of new tree planting programmes, guided by the 'right tree for the right place' philosophy and other provisions of the Street Tree Framework.

Native trees will continue to be planted where they are considered to be most effective, for instance, along streets that are identified as wildlife corridors/eco zones and in parkland settings. Gateway plantings will also use native species where possible as a way of promoting local flora. Native tree planting will also be guided by the findings of the Biodiversity Study proposed in the City's Environment Strategy.

Non-native trees

A number of non-native species occurring within the greater Perth metropolitan region can provide ecological functions to native fauna. One example is the relationship of Carnaby's Black Cockatoo and non-native tree species including Liquidambar, Cape Lilac, Pinaster Pine, and Stone Pine.

In some instances, non-native trees can provide greater benefits than native species in the urban environment.

Non-native trees are often better adapted to thrive in the increasingly challenging and harsh growing environments within city streets, whereas native tree are often better suited to more natural areas.

Including non-native trees within the urban forest also contributes to greater species diversity and improves its long-term resilience.

For these reasons, non-native trees will often be chosen for planting over native trees in particular parts of the City, especially in more built up areas, public spaces with high levels of pedestrian activity and residential areas.

The London Plane for example, is a popular and widely used urban tree species. It is frequently selected for planting within streets and public spaces in both Australian and other cities throughout the world. This is due to its ability to thrive in harsh urban conditions and provide a high level of ecosystem services.

Differing shade qualities of native and non-native trees

Research suggests that large-canopied, broadleaf trees, with thick or denser foliage can be more effective in urban cooling.

A recent study comparing the different cooling effects of three common street tree species in Australia (London Plane, European Elm and River Gum) indicates that the higher the canopy quality, the cooler the midday microclimatic conditions under that canopy in summer. Conditions were significantly hotter under the River Gum, due to its thin, open canopy architecture and more pendulous leaf structure, in comparison to the denser, rounder canopy architecture of the European Elm and London Plane trees (Sanusi & Livesley, 2014).

"Important ecological considerations for species selection are often narrowed down to a debate on whether or not native trees should be systematically preferred. Such framing diverts attention away from a balanced approach considering both ecological value and resilience" (Trees & Design Action Group , 2012).

The leaves of the native Eucalypt trees tend to have a pendulous structure, allowing them to limit their exposure to the sun. As a result more sunlight passes through their canopies, creating a lower level of shade over the ground surfaces below.

The leaves of non-native, broadleaved trees tend to have a horizontal orientation, allowing them to absorb more sunlight for photosynthesis. As a result these trees tend to provide a higher level of shade over the ground surfaces below their canopies.

Photo showing different shade qualities of Eucalypt trees and non-native Elm.

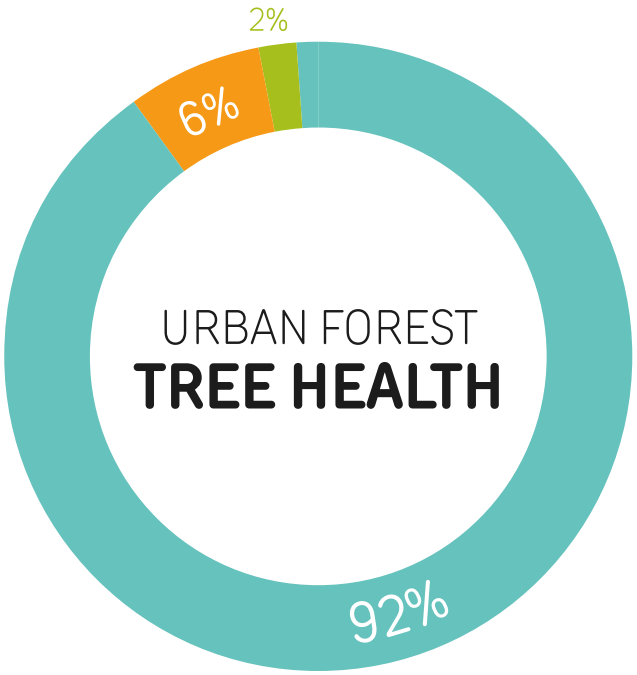


Figure 30. Tree health

Maximising tree health

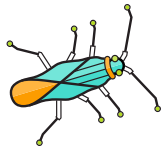
A high level of tree health within an urban forest is important for a range of reasons. Healthier trees promote higher levels of amenity. They are also more likely to reach their expected life span and attain maximum levels of growth. Larger trees, with dense healthy canopies provide significantly more benefits than smaller trees. Good levels of tree health also promote an appropriate age class mix and help reduce maintenance costs.

The City's population of street and parkland trees is performing very well in terms of overall health with over 90 percent of them in good or excellent health (see Figure 30). This is partly attributed to the fact that the most commonly used street trees, the London Plane, Jacaranda and the Spotted Gum are well adapted to the urban environment, and have proven to be very good urban tree species in the Perth context.

However, the findings of the Street and Parkland Tree Audit (2015)uncovered some specific health issues that must be addressed if these health levels are to be maintained and maximised in future.

Pest and disease

A number of pests and diseases are present including:



Olive Lace Bug in Olive trees

Fusarium Wilt in the Canary Island Date Palm

Borer in the West Australian Peppermint

Canker in some Marri and Red Flowering Gums

Leaf-blister Sawfly in some Eucalypts

Powdery Mildew in the London Plane

Sunscald is affecting some trees, particularly those from the Acer, Brachychiton, Erythrina, Ficus, Fraxinus, Sapium and Zelkova genus. The use of these trees as street trees is not considered appropriate in Perth's climate and urban environment, consequently they often struggle to thrive and have poor levels of health.

While these pests and diseases do not appear to be having a significantly detrimental effect on tree health at present, they have the potential to significantly affect the urban forest if they escalate.

Environmental issues

Reduced rainfall is suspected of having an impact on the health of a few species including a large number of mature Queensland Box and some fig trees including the Moreton Bay Fig and Small Leaved Fig. While other species seem to be adapting to the effects of climate change, this may change over time.

Car park trees

Only 79 percent of trees planted in the City's surface car parks are in good or excellent health, primarily because of their particularly harsh environment. Over 20 percent of these trees will reach the end of their ULE in 15 years.

Deteriorating structural condition

Some tree species are exhibiting a deteriorating structural condition including the Western Australian Peppermint and Flame Trees in West Perth and the mature London Plane trees on Victoria Avenue and Mounts Bay Road. With future management options being limited, these will require replacement over the next 20 years.

Tree risk

Tree risk is largely addressed through appropriate pruning practices, however, there are a small number of tree species that have a higher potential for branch failure. These species are primarily native trees and include the Northern River, Sugar, Rose and Lemon Scented Gums, the Tuart and Bangalay. Together these trees form less than 3 percent of the total street and parkland tree population.

Management and maintenance

In some cases, the City's current policies and practices relating to the procurement, planting and after care of juvenile and transplanted trees are contributing to lower levels of health and tree establishment. Mowing practices and the ineffective use of tree grates, for example, is causing damage to tree stems and bark, affecting tree health.

Challenge: Developing and implementing appropriate management practices, policies and procedures to maintain and maximise levels of tree health.

Urban forest management

Contemporary urban forestry advocates a long-term, pro-active and strategic approach to the management of the urban forest. This approach focuses on the urban forest as a whole, and considers its overall health, resilience and on-going sustainability as a single entity over the longer term (van Wassenaer, et al., 2012).

At present, there is no overall plan or strategy for the urban forest. Street and parkland trees are managed and maintained on a short term, day-to-day basis that primarily addresses the needs of individual trees. This makes it difficult to assess how the urban forest is performing as a whole and how capable it is of delivering community benefits over the longer term.

Challenge: Developing and implementing a strategic and pro-active approach to managing the urban forest as a whole.

Community awareness of the urban forest

Community support plays a vital role in successful urban forestry (Schwab, 2009). However, there is often a lack of community awareness of the benefits provided. As a result, community concerns about urban trees can often outweigh an appreciation of their importance in ensuring on-going liveability and climate resilience.

People interact with urban trees on a range of different levels, and opinions on the role and value of urban trees can vary widely. Some are concerned about leaf and fruit litter, allergies and the potential of trees to block views and cause damage from invasive roots and limb drop. This, coupled with a lack of awareness of the range of benefits trees provide, can mean that the larger community often undervalues them.

Stage One of the Urban Forest Plan will result in changes to where, when and how trees are planted within the City. This will affect the design of streets, squares and parklands and impact on how the community interacts with urban trees in the future.

The development of the Plan should therefore foster community support for the urban forest by raising awareness on the range of benefits it provides. It should also understand and respond to community values regarding urban trees.

As part of the consultation on the draft Urban Forest Plan the community provided input on their perceptions of the relative importance of urban forest benefits. The findings are summarised in Figure 31 below.

Challenge: Developing community support for the protection, management and expansion of the urban forest.

Figure 31. Community perceptions of urban forest benefits

SCHEDULE 4

Murray Street Mall - Perth

4.3 Where we want to go – goals & objectives

The vision for the urban forest will be realised through the delivery of nine goals.

Goal 1: Protect existing trees

Street and parkland trees can take many years to establish and develop mature canopies. One of the most effective strategies to address the challenge of low canopy cover is to protect existing trees , through the following objectives.

Priority objectives

1.1 Review all City practices and procedures, planning policies and design and construction notes to align with the objectives of the City of Perth Urban Forest Plan.

1.2 Develop and implement new policy to protect existing street and parkland trees from damage caused by construction and other works in the City.

1.3 Review and update City of Perth Policy 20.9 "Recognising the Amenity Value of the City's Trees" to include the ecosystem services provided by urban trees.

Other objectives

1.4 Include information on new tree valuations on the City of Perth website to help raise community awareness and appreciation of the level of benefits delivered by the urban forest.

1.5 Develop and implement a strategy to retain and value 'veteran' trees within the population of street and parkland trees.

Goal 2: Replace aging trees

The City will plan for the gradual and timely replacement of street and parkland trees that are reaching the end of their Useful Life Expectancy in the next 15 years. Trees may be replaced by a more suitable species ,guided by the Street Tree Framework.

Priority objectives

2.1 Implement the following replacement planting plan:

Timeframe	Number of trees to be replaced
2016	73 existing dead trees
2017-2020	71 trees replaced annually (limited ULE)
2021-2035	95 trees replaced per annually (short ULE)

Other objectives

2.2 Prioritise replacement planting in City precincts where significant gaps in canopy cover may emerge due to a significant proportion of street and parkland trees reaching the end of their ULE concurrently.

Goal 3: Promote sustainable water management

In order to maximise the cooling benefits and ensure the on-going health and resilience of the street and parkland tree population, the City will plan pro-actively for an adequate and sustainable water supply for irrigation. This issue will be addressed as follows:

City of Perth Water Sensitive City Transition Study

This study is currently being undertaken by the City of Perth as part of the delivery of its Environment Strategy. It aims to develop an integrated water management approach, and is underpinned by the premise that all water resources are supply sources and that water infrastructure and the urban landscape should have an integrated design for function and aesthetics.

Water Sensitive Urban Design (WSUD) Initiatives

The City will also continue to pursue and deliver on best practice WSUD initiatives in its management of the urban forest. These measures will help retain water within the landscape and improve stormwater management and water quality.

Priority Objectives

3.1 Design and implement a pilot project for stormwater capture and storage. If successful and feasible, use project findings to promote the development of similar projects throughout the City.

3.2 Prioritise the use of WSUD initiatives, where feasible, in new street and parkland tree planting in the City.

Other Objectives

3.3 Complete the Water Sensitive CityTransition Study. Amend the Urban Forest Plan to reflect its findings and support its implementation.

3.4 Replace existing impervious surfaces with pervious surfaces where possible.

3.5 Investigate the potential to introduce more efficient and targeted irrigation of street and parkland trees where feasible.

3.6 Monitor soil moisture levels.

Goal 4: Increase canopy cover

Stage One of the Urban Forest Plan aims to increase the level of canopy cover within the public realm from 19% to 30% within a 30 year timeframe.

This target has been established through an assessment of local conditions and an estimate of the number of new tree planting sites potentially available across the City's public realm.

It assumes the selection and planting of tree species with the capacity to provide a large to medium–large canopy at maturity, taking existing and future environmental conditions into account.

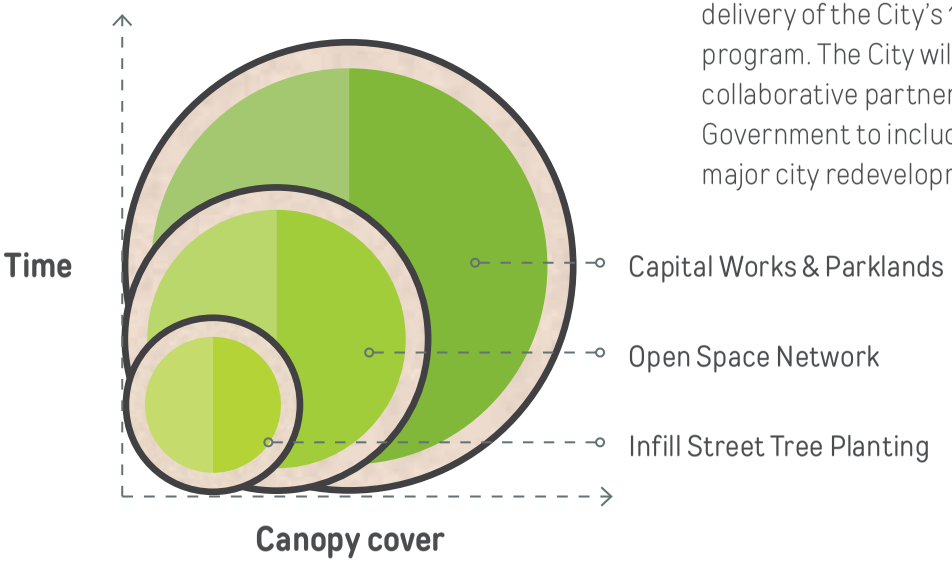


Figure 32. Indicative new tree planting opportunities

New tree planting opportunities will include (see Figure 32):

- Infill street tree planting –a targeted program to plant new trees where there are gaps in existing street tree planting, within each of the City' precincts
- Open space network – targeted new tree planting programs for key parts of the City's wider open space network
- City parklands - increasing the level of canopy cover provided by parkland trees on an on-going basis, as part of the development of tree management and maintenance plans
- Capital works projects - continue to undertake new tree planting as part of the on-going delivery of the City's 10 Year capital works program. The City will also seek to develop collaborative partnerships with State Government to include new tree planting in major city redevelopment projects.

These programs will be delivered on an incremental basis, through the four yearly implementation plans, over the lifetime of the City of Perth Urban Forest Plan.

Priority Objectives

4.1 Develop and implement infill street tree planting plans.

4.2 Prepare community based urban forest precinct plans.

4.3 Update tree procurement processes to ensure the timely availability of new trees.

Other Objectives:

4.4 Continue to ensure opportunities for increased tree planting are factored into City capital works projects from the earliest stages of project planning.

4.5 Progress the development of new tree planting plans for the City's wider open space network.

SCHEDULE 4

Goal 5: Prioritise tree planting to help cool public spaces and City 'hot-spots'

The City will maximise the potential of street and parkland trees to help reduce City temperatures and ameliorate existing 'hot-spots', as part of its goal of increasing the level of canopy cover.

Priority Objectives

5.1 Prioritise new tree planting in 'hot spot' areas and public spaces with high levels of pedestrian activity.

5.2 Select and plant tree species that have the ability to maximise the urban cooling effect in these areas.

5.3 Ensure an adequate level of irrigation is available to maintain the health and maximise the cooling potential of trees in these areas.

Goal 6: Promote balance and resilience in species composition

The City will seek to establish a street and parkland tree population that meets or exceeds recommended standards in terms of tree diversity. In the future, no more than 10 percent of the total population of street and parkland trees will be from the same tree species, 20 percent from the same tree genus and 30 percent from the same tree family.

Priority objectives

6.1 Review the City of Perth Street Tree Framework to update and reinforce the 'right tree for the right place' philosophy.

6.2 Identify and trial new tree species for future planting in the City's street and parkland spaces.

Other objectives

6.3 Complete the Biodiversity Study, as proposed in the City's Environment Strategy. This study will investigate the challenges and opportunities to manage flora, fauna and habitats within the City. It will include an evaluation of habitat type, location, linkages, city ecosystems, flora and fauna population and distribution. The study will inform key operational and capital plans.

6.4 Update the Street Tree Framework every four years to take account of the outcomes of tree trials and findings from contemporary research.

Goal 7: Maintain tree health

Appropriate management tools will be developed and implemented to deal with the potential effects of climate change and the specific health challenges currently identified for the City's street and parkland trees.

Priority objectives

7.1 Introduce measures for the early detection and treatment of, either an escalation in existing pests and diseases or, the emergence of new ones within the population of street and parkland trees.

7.2 Monitor, report and act on any other health impacts of climate change.

7.3 Select and plant tree species that are well adapted to existing and emerging environmental challenges, as part of the review of the Street Tree Framework.

7.4 Develop and implement practices and procedures for the strategic management of tree risk.

7.5 Bring existing management and maintenance practices and procedures for street and parkland trees in line with best practice, particularly with regard to the issues of:

- the procurement of good quality stock
- tree planting standards
- the aftercare and maintenance of juvenile and transplanted trees.

Other objectives

7.6 Prioritise the use of purpose built below ground structural cells where project goals and budgets allow, to help improve the growing environment for new street trees.

7.7 Develop and implement a strategy to improve the health of trees in the City's surface car parks.

7.8 Introduce measures to ensure that staff and contractors are appropriately resourced, trained and supervised in the implementation of updated management and maintenance practices and procedures.

7.9 Develop management options and replacement strategies for significant tree stands with deteriorating structural condition.

Goal 8: Implement a 'whole-of-forest' management approach

The City of Perth Urban Forest Plan represents a first and significant step in promoting a more proactive, strategic 'whole-of-forest' management approach. It sets out a high-level, 20-year vision and associated goals for the protection, management and expansion of the urban forest.

The 'whole-of-forest' management approach is supported by the development of a four-year implementation plan and monitoring framework for the City's Urban Forest.

Priority objectives

8.1 Finalise the implementation plan and monitoring framework 2016-2020.

8.2 Review and report on the implementation plan and monitoring framework annually.

Other objectives

8.3 Update the City's GIS database to record the findings of the Street and Parkland Tree Audit (2015).

8.4 Maintain the City's GIS database to record on going changes and support monitoring of the City's street and parkland tree population.

8.5 Develop tree management and maintenance plans for the City's parklands and public open spaces.

8.6 Implement an appropriate management structure to support the effective planning and management of the urban forest.

8.7 Build collaborative working relationships with other city agencies that have a stake in the protection, management and expansion of the City's Urban Forest.

8.8 Collaborate with appropriate professional and research agencies with expertise and knowledge in urban forest management.

8.9 Complete regular, four yearly audits of street and parkland trees.

8.10 Complete regular, four yearly canopy cover and thermal imaging surveys.

Goal 9: Raise community awareness

The following measures will be undertaken to help raise community awareness on the benefits of the urban forest and promote support for the City of Perth Urban Forest Plan:

Priority objectives

9.1 Develop and implement a program of community engagement to raise awareness of the Urban Forest Plan and facilitate input into its development.

9.2 Update the City of Perth website regularly to enable community access to information on the urban forest and community engagement initiatives.

9.3 Promote meaningful community involvement in the development of the urban forest precinct plans.

Other objectives

9.4 Develop policies and procedures to help address community concerns and provide guidance on the management and maintenance of urban trees.

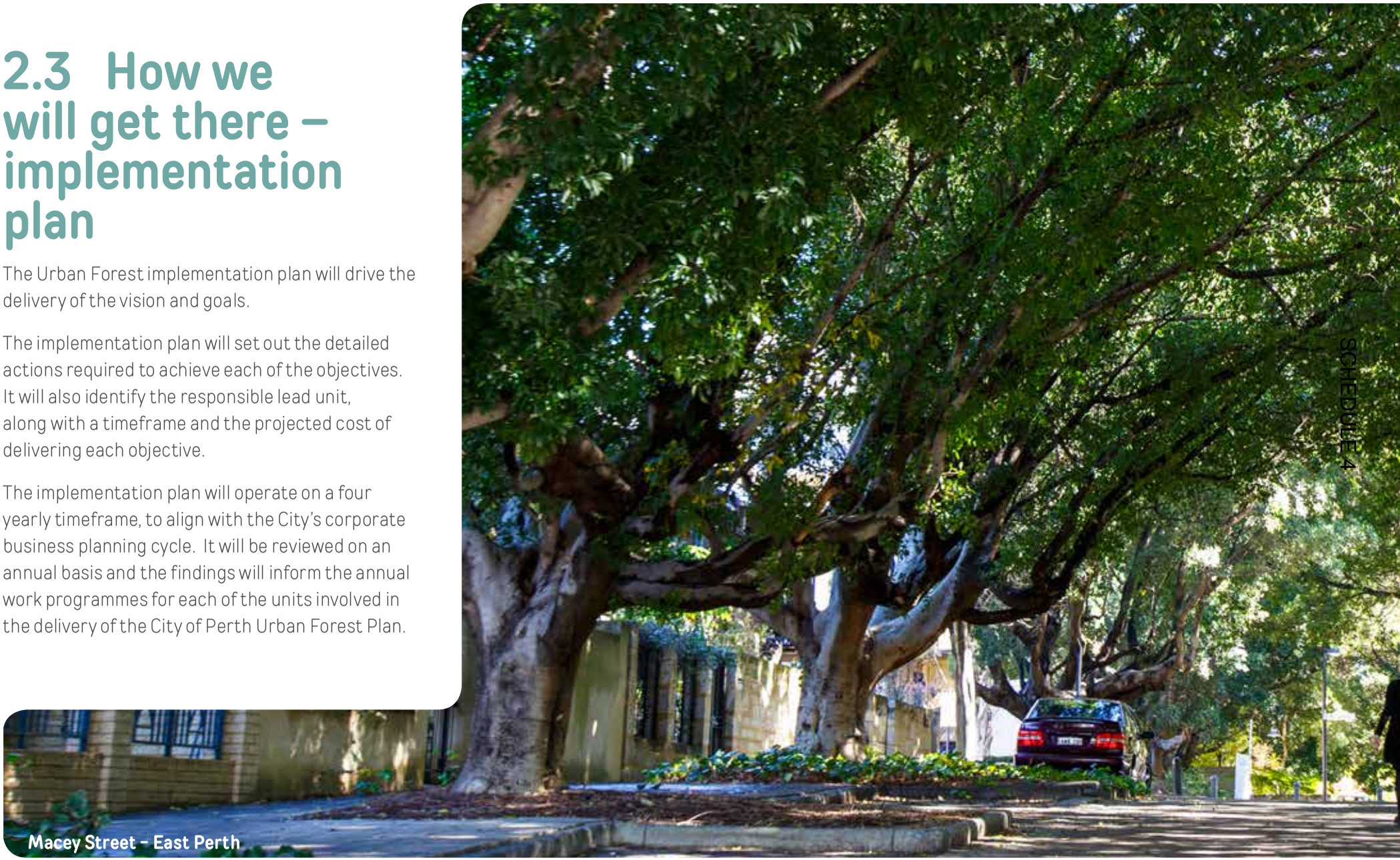
9.5 Continue to work with the community to increase awareness of environmentally sustainable living and deliver positive environmental outcomes through the delivery of an external engagement programme.

2.3 How we will get there – implementation plan

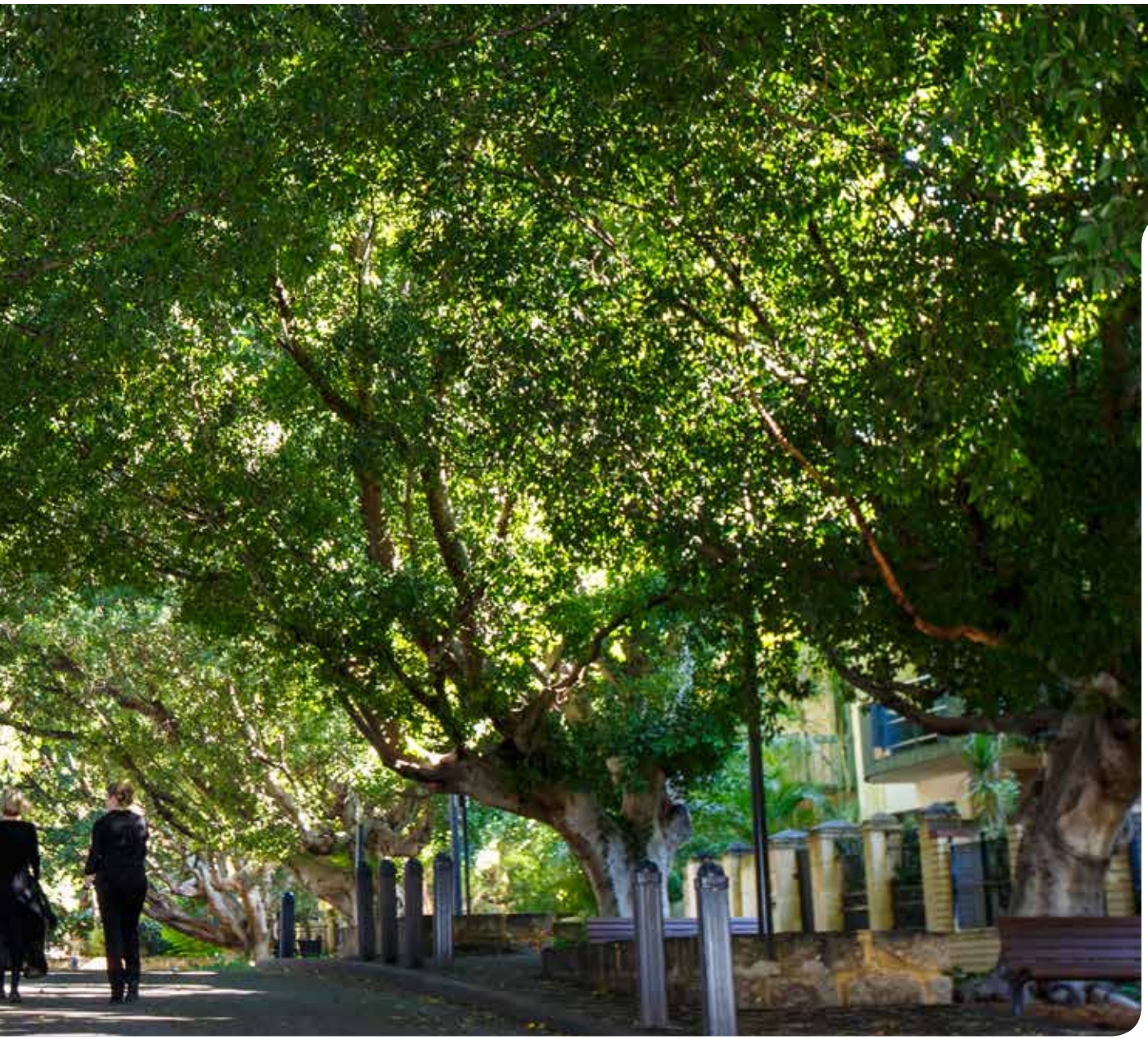
The Urban Forest implementation plan will drive the delivery of the vision and goals.

The implementation plan will set out the detailed actions required to achieve each of the objectives. It will also identify the responsible lead unit, along with a timeframe and the projected cost of delivering each objective.

The implementation plan will operate on a four yearly timeframe, to align with the City's corporate business planning cycle. It will be reviewed on an annual basis and the findings will inform the annual work programmes for each of the units involved in the delivery of the City of Perth Urban Forest Plan.



Macey Street – East Perth



2.4 Have we arrived – monitoring framework

The Urban Forest implementation ilan will include a monitoring framework to help track the progress of implementing each of the objectives for the urban forest. The Framework will identify a success measure for each objective and record the degree to which that measure has been achieved within a set timeframe.

The monitoring framework will be reviewed every year, as part of the annual review of the implementation plan. This will allow any difficulties or issues emerging with regard to attaining each of the goals to be identified and addressed early, allowing for adaptive management as implementation of the Urban Forest Plan progresses.

Glossary of Terms

Adaptive management

A systematic process for continually improving management by learning from the outcomes of previously employed policies and practices.

Canopy cover

The percentage of urban land covered by tree canopy when viewed from above.

Carbon sequestration

The process by which trees absorb and assimilate carbon dioxide from the atmosphere.

Ecosystem services

Benefits provided to humans by goods and services delivered by ecosystems. (Source: Millennium Ecosystem Assessment 2005)

Green Infrastructure

The term Green Infrastructure (GI) is used to describe the network of green spaces which intersperse, connect and provide vital life support for humans and other species within urban environments. It includes elements such as green networks and links, allotments, cemeteries, community gardens, domestic gardens, roof gardens, green walls, living walls and verges.

Rare trees

A tree species that is considered to be a rare species for the Perth metropolitan area. Consideration is given to the frequency of finding the trees' given species in other areas of metropolitan Perth as well as within the City itself.

Tree amenity

A quality, feature, or attribute of the tree that makes it pleasant, attractive, and agreeable which is conducive to the comfort, convenience, and enjoyment of people. It is a physical feature which increases attractiveness and value of a site through contributions to the physical, psychological, or material comfort of people and which facilitates happiness, pleasure, enjoyment and contentment.

Urban forest

An urban forest is broadly defined as the collection of green spaces, trees and other vegetation that grows within an urban area, on both public and private land.

Urban Heat Island (UHI)

Many urban areas experience elevated temperatures compared to their outlying surroundings, this difference in temperature is what constitutes an urban heat island. (US EPA, 2008)

Useful Life Expectancy (ULE)

An estimation of the useful life remaining for a given tree taking account of its current health condition and known typical lifespan expected for the species in its given location and situation.

Veteran trees:

Trees which are considered to be in excess of 100 years old.

Water sensitive urban design

Integrating water cycle management into urban design processes and outcomes.

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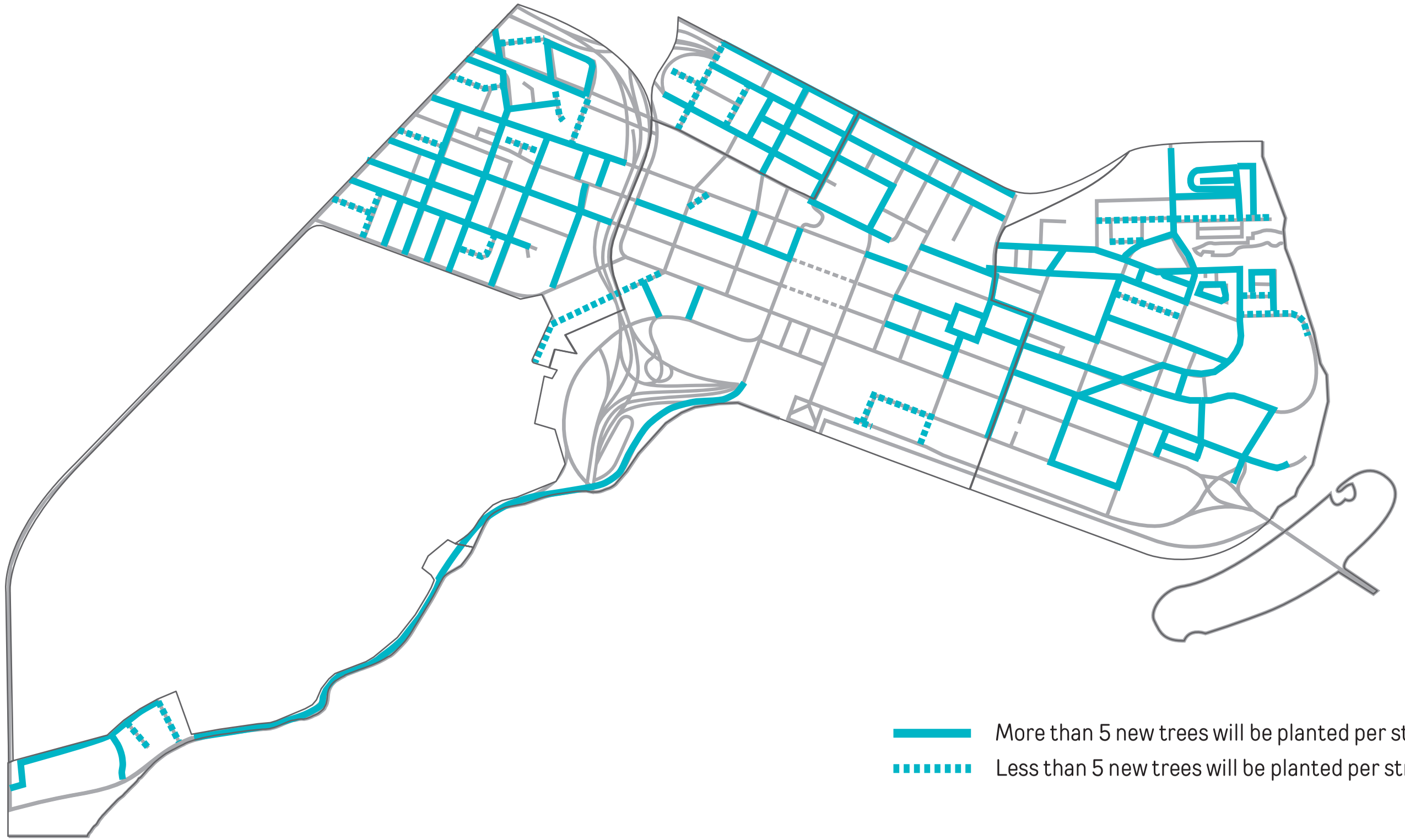
SCHEDULE 4

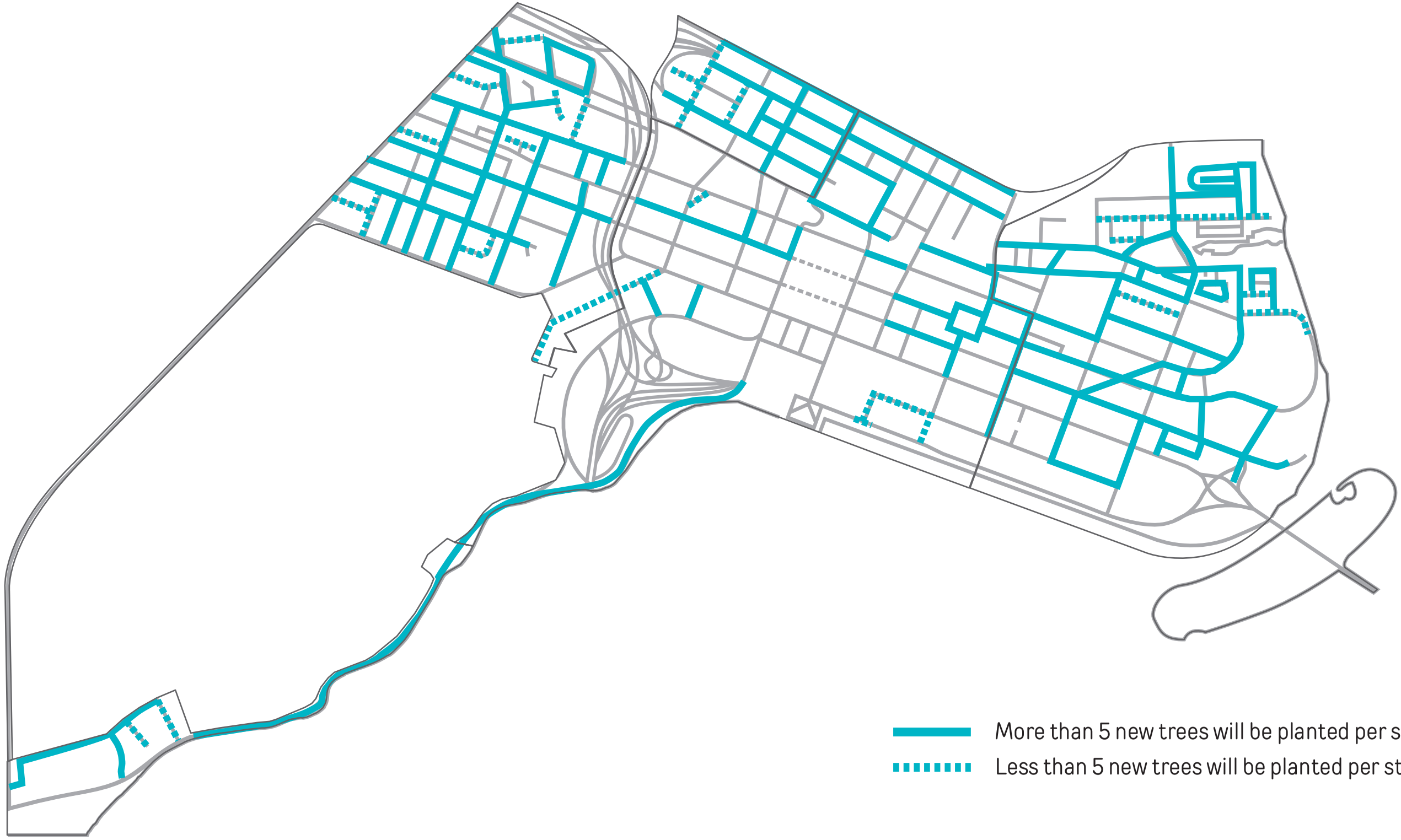
Concept Map: Infill street tree planting program



More than 5 new trees will be planted per street

Less than 5 new trees will be planted per street

Concept Map: Infill street tree planting program



ITEM NO: 3

TENDER NO. 017-16/17 – INSTALLATION, MAINTENANCE & DISMANTLE OF CHRISTMAS DECORATIONS 2016 – 2018

RECOMMENDATION: ***(APPROVAL)***

That Council:

1. ***accepts the most suitable tender, being that submitted by Gilmore Global Pty T/A Happy Excavations, for the installation, maintenance and dismantling of Christmas Decorations (Tender No. 017-16/17) for the total estimated lump sum for three years of $1,104,218 and rates detailed in Confidential Schedule 7 at the following locations:***

   1.1 Location 1 – Perth Central, Murray Street Mall, Forrest Place ($722,800);

   1.2 Location 2 – Northbridge, East Perth, West Perth ($325,940);

   1.3 Location 3 – Pine Trees – Council House & Victoria Gardens ($55,478);

2. ***accepts the rates for reduction in Christmas decorations if not installed, as detailed in Confidential Schedule 7;***

3. ***accepts the hourly rates for repair and refurbishment of decorations as required, as detailed in Schedule 8;***

BACKGROUND:

FILE REFERENCE:	P1033025
REPORTING UNIT:	Street Presentation & Maintenance
RESPONSIBLE DIRECTORATE:	Construction & Maintenance
DATE:	22 August 2016
MAP / SCHEDULE:	Confidential Schedule 6 – Qualitative Selection Criteria Evaluation Matrix Confidential Schedule 7 – Rates Comparison Matrix Schedule 8 – Hourly rates for Labour & Equipment

The City of Perth has installed Christmas decorations throughout the city for more than 40 years. Over time, a suite of decorations has been developed for the City of Perth varying from large intersection and catenary decorations suspended over roadways to smaller decorations on buildings and structures, light poles and lights in trees.

The proposed works in Tender No. 017-16/17 includes the supply of all materials, labour, plant, tools, services and the execution of all activities necessary to collect, transport, install, electrically connect, test, dismantle and return of decorations to the City of Perth's storage facility over a period of three years.

Tenders were advertised on Wednesday, 16 July 2016 and closed on Tuesday, 2 August 2016.

The basis of the tender is to enter into a three year Installation, Maintenance & Dismantle of the City's annual Christmas Decorations program according to the lump sum rates and hourly rates for maintenance and testing works as tendered:

LEGISLATION / STRATEGIC PLAN / POLICY:

Legislation	Section 3.57 of the *Local Government Act 1995* Part 4 of the *Local Government (Functions and General) Regulations 1996*
Integrated Planning and Reporting Framework Implications	**Strategic Community Plan** Council Four Year Priorities: Perth as a Capital City S5 Increased place activation and use of under-utilised space
Policy	
Policy No and Name:	9.7 - Purchasing

DETAILS:

At the close of tenders on Tuesday, 2 August 2016 five submissions were received as follows:

1. Watway Pty Ltd and Advanced West Electrical Pty Ltd ATF The Trustee for Advance West Electrical Trust.
2. Suncourt Pty Ltd ATF B&M Unit Trust T/A High Speed Electrics.
3. Hender Lee Electrical Contractors Pty Ltd.
4. Gilmore Global Pty Ltd T/A Happy Excavations.
5. Duratec Australia Pty Ltd.

The prices tendered relate to all existing decorations (excluding the old Barrack Street decorations) and 15 new Barrack Street Light pole mounted decorations. Any additional decorations developed during the contract period are subject to quotations being obtained from the successful tenderer and other contractors. Similarly any decorations that are no longer required to be installed are deleted and the contract

sum reduced. Should one or more of a suite of decorations not be installed, the contract is also reduced as per Confidential Schedule 7.

The tender specification also requests for work to be carried out on the repair and refurbishment of decorations each year which is charged at hourly rates. The hourly rates for labour and plant hire are detailed in the attached Schedule 8.

Compliance with the tender requirements

All five tenders were assessed for compliance with the tender requirements. Watway Pty Ltd were highlighted as not complying with the General Conditions of Contract. Hender Lee Electrical Contractors Pty Ltd complied with the General Conditions of Contract but have made reference to exclusions on the Letter of Offer which has been provided as part of the tender submission. All the other tender submissions have been assessed as compliant with the General Conditions of Contract.

Qualitative Assessment against the Selection Criteria

The tender submissions were assessed against the following selection criteria:

- Capacity to complete works within specified time;
- Experience with similar works;
- Safety management; and
- Pricing.

Capacity to Complete works within specified time

The tender submissions from Watway Pty Ltd, Suncourt Pty Ltd, Hender Lee Electrical Contractors Pty Ltd and Duratec Australia Pty Ltd all received scores which reflected deficiencies, not meeting criterion and a lack of detail.

Gilmore Global Pty Ltd T/A Happy Excavations demonstrated a concise and detailed capacity to complete works within the specified time which included all details requested within the tender. This included a works prioritisation matrix and response plan, organisational background, affiliations, technical and management procedures. Gilmore Global Pty Ltd's background also covers electrical as well as major rigging which is considered to be well suited to the City of Perth's Christmas Decorations Install, Maintenance and Works program.

Experience with similar works

The tender submissions from Watway Pty Ltd, Hender Lee Electrical Contractors Pty Ltd and Duratec Australia Pty Ltd all received scores which reflected deficiencies, not meeting criterion and lacking detail.

Gilmore Global Pty Ltd and Suncourt Pty Ltd both demonstrated the appropriate experience with similar works in their submissions with the qualified and experienced personal to undertake the works as requested within the tender. Also, both these companies have previously completed allocated location areas of the annual City of

Perth Christmas Decorations program over the last three years and therefore are considered to have demonstrated the appropriate experience.

Safety Management

The tender submissions from Watway Pty Ltd and Suncourt Pty Ltd both received scores which reflected deficiencies, not meeting criterion and lacking detail.

The Duratec Australia Pty Ltd tender submission is considered to have met this criteria.

Hender Lee Electrical Contractors Pty Ltd and Gilmore Global Pty Ltd provided detailed safety management procedures which included details requested within the tender. This included safety management practices, traffic management experience, quality management systems, staff qualifications / training and Lost Time Injury (LTI) records. Both companies demonstrated excellent previous track record for LTI. As this tender predominately involves night works to be performed at height and high risk, these two companies scored well and were considered suited for the tendered works.

Pricing

Tenderers were assessed against the pricing received for various decoration locations as requested in the tender form to assess value for money. The pricing is contained in attached Confidential Schedule 6. A formula was then applied to the overall company prices submitted which then produced a score.

The Qualitative Selection Criteria Evaluation Matrix then weighted these scores to rank the lowest to highest price. Overall Duratec Australia Pty Ltd scored the highest followed by Gilmore Global Pty Ltd. Hender Lee Electrical Contractors Pty Ltd had the highest pricing overall and therefore scored the lowest.

On completion of the qualitative assessment against the selection criteria, the five tenderers were ranked in the following order:

Order	Tenderer
1.	Gilmore Global Pty Ltd T/A Happy Excavations
2.	Suncourt Pty Ltd ATF B&M Unit Trust T/A High Speed Electrics
3.	Hender Lee Electrical Contractors Pty Ltd
4.	Watway Pty Ltd and Advanced West Electrical Pty Ltd ATF The Trustee for Advance West Electrical Trust
5.	Duratec Australia Pty Ltd

On completion of this assessment it was determined that the Gilmore Global Pty Ltd T/A Happy Excavations achieved the best overall value for money for the City of Perth.

Therefore Gilmore Global Pty Ltd is recommended as the preferred tenderer for the installation, maintenance and dismantling of Christmas Decorations in the following locations:

1. Location 1 – Perth Central, Murray Street Mall, Forrest Place;
2. Location 2 – Northbridge, East Perth, West Perth; and
3. Location 3 – Pine Trees (Council House & Victoria Gardens).

FINANCIAL IMPLICATIONS:

ACCOUNT NO:	CL 8115700
BUDGET ITEM:	Electrical Services/Christmas Decorations
BUDGET PAGE NUMBER:	Page 67
BUDGETED AMOUNT:	$1,206,357.84
AMOUNT SPENT TO DATE:	$ 44,151.53
PROPOSED COST:	$ 360,787.00 (For 2016 only) $ 60,000.00 (Estimated provisional amount to be paid as hourly rate)
BALANCE:	$ 741,419.31

All figures quoted in this report are exclusive of GST.

COMMENTS:

After analysis of all the tender submissions, the assessment panel concluded that awarding this tender to the one principal company would have the following benefits for the City of Perth:

- Cost reduction in installing and dismantling of decorations from previous years' budget;
- The tender price includes 15 new pole decorations for Barrack Street;
- The estimated saving over three years is approximately $250,000. However, this excludes the Bell Tower Star and substitutes the large Bethlehem Stars in Barrack Street with pole decorations;
- Efficiencies to be gained with only contract managing one contractor for these works who has demonstrated an increase in their resource availability to cope with all three locations;
- Improved communications with dealing with only one principal contractor;
- The selected tender also had previous experience with installation of City of Perth's decorations with no recorded safety incident; and
- The recommended tender was very competitively priced across all locations.

It is recommended to allocate one contractor to all three location areas for the City's three year Christmas Decorations installation, Maintenance and Dismantle program.

CONFIDENTIAL SCHEDULE 6
ITEM 3 – TENDER NO. 017-16/17 INSTALLATION, MAINTENANCE & DISMANTLE OF CHRISTMAS DECORATIONS (2016 – 2018)

FOR THE WORKS & UBRAN DEVELOPMENT COMMITTEE

6 SEPTEMBER 2016

DISTRIBUTED TO ELECTED MEMBERS UNDER SEPARATE COVER

CONFIDENTIAL SCHEDULE 7
ITEM 3 – TENDER NO. 017-16/17 INSTALLATION, MAINTENANCE & DISMANTLE OF CHRISTMAS DECORATIONS (2016 – 2018)

FOR THE WORKS & UBRAN DEVELOPMENT COMMITTEE

6 SEPTEMBER 2016

DISTRIBUTED TO ELECTED MEMBERS UNDER SEPARATE COVER

HOURLY RATES FOR LABOUR EQUIPMENT

TENDER NO. 017-16/17
INSTALLATION, MAINTENANCE & DISMANTLE OF CHRISTMAS DECORATIONS

Classification	6AM to 6PM					6PM to 6AM				
	Watway Pty Ltd	Suncourt Pty Ltd	Hender Lee Elec. Contractors Pty Ltd	Gilmore Gobal Pty Ltd	Duratec Australia Pty Ltd	Watway Pty Ltd	Suncourt Pty Ltd	Hender Lee Elec. Contractors Pty Ltd	Gilmore Gobal Pty Ltd	Duratec Australia Pty Ltd
Qualified Electrical Tradesperson:	$150.00	$85.00	$95.82	$86.00	$120.00	$150.00	$110.00	$122.52	$99.00	$144.00
Electrical Trades Assistant:	$55.00	$64.00	$72.53	$60.00	$88.00	$55.00	$85.00	$99.21	$72.00	$105.60
Rigger:	$140.00	$85.00	$106.25	$86.00	$98.00	$140.00	$110.00	$156.26	$99.00	$117.60
Apprentice:	$55.00	$64.00	$68.22	$60.00	$88.00	$55.00	$85.00	$94.90	$72.00	$105.60
Labourer:	$55.00	$64.00	$72.53	$60.00	$93.00	$55.00	$85.00	$99.26	$72.00	$111.60

Hourly rates (Excluding GST) for plant items for additional work if required under the contract:

Classification		Capacity/Model	Hourly Rate				
			Watway Pty Ltd	Suncourt Pty Ltd	Hender Lee Elec. Contractors Pty Ltd	Gilmore Gobal Pty Ltd	Duratec Australia Pty Ltd
Crane 20 tonne (22m reach)			$150.00	$237.00	$267.00	$265.00	$299.00
Cherry Picker	16m		$95.00	$75.00	$269.00	$124.00	$36.00
	19m		$110.00	$92.50	$269.00	$149.00	$54.00
	42m		NA	$439.00	$394.00	$371.00	$102.00
Hiab Truck	10m		$140.00	$92.50	$248.00	$115.00	$70.00
	18m		NA	$92.50	N/A	$156.00	$100.00
Low Loader – 12m extendable			$400.00	$182.00	$289.00	$184.00	N/A
Other - Scissor lift			$95.00				N/A
Other - 55m Cherry Picker				$439.00			N/A
Other -62m Cherry Picker						$638.00	N/A

SCHEDULE 8