



THE URBAN FOREST AND URBAN LIVEABILITY

The Melbourne Experience

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Manager, Urban Landscapes

5th Healthy Cities Conference,
Geelong 2012







Future Melbourne Community Plan

people

- A great place to live
- Inclusive community
- A healthy community
- Designed for people
- An affordable place to live
- Quality public space
- Community facilities and services meet growth.



Future Melbourne Community Plan

eco-city

- ♦ Zero net emissions city
- ♦ The city as a catchment
- ♦ Resource efficient
- ♦ Adapted for climate change
- ♦ Living and working in dense urban centres.

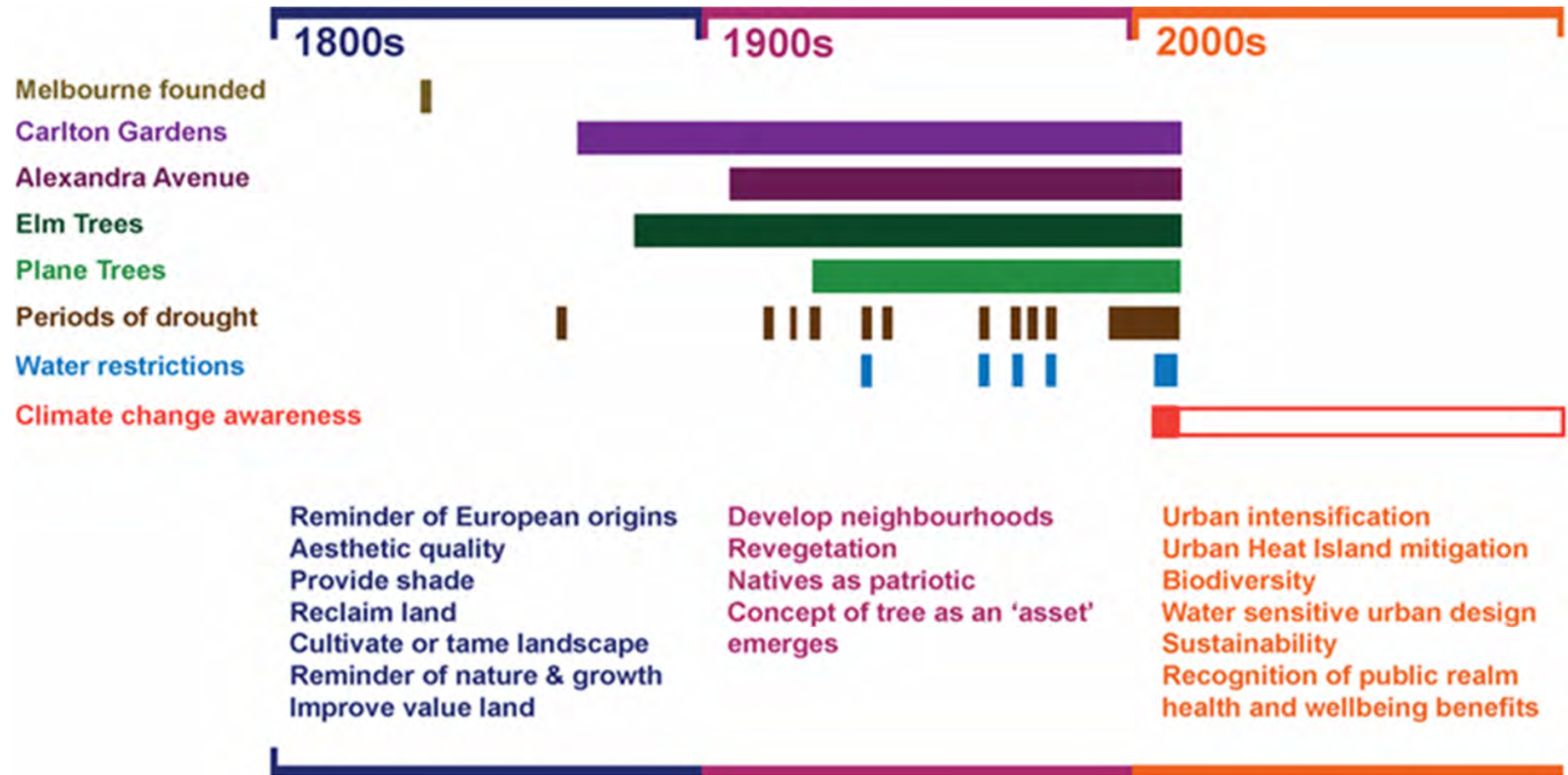




Our Goal

Strategically transforming our landscapes to respond to current challenges and to a dramatically different climate and population

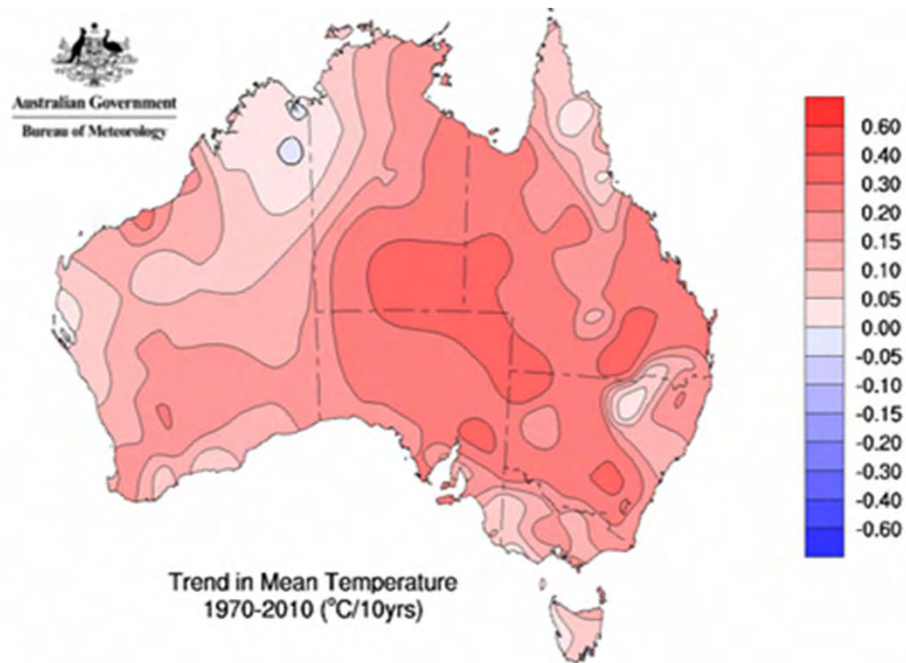
Context of the 'urban forest'



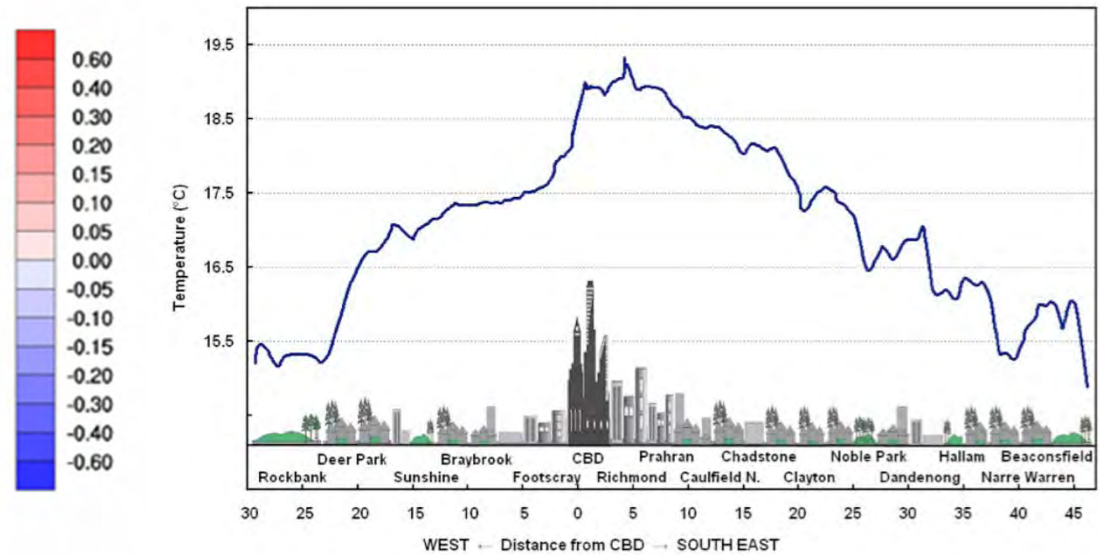
Three primary challenges

- **Population growth and intensification**
- **Urban heating**
- **Climate change**

Future challenges: climate change, urban heating & growth



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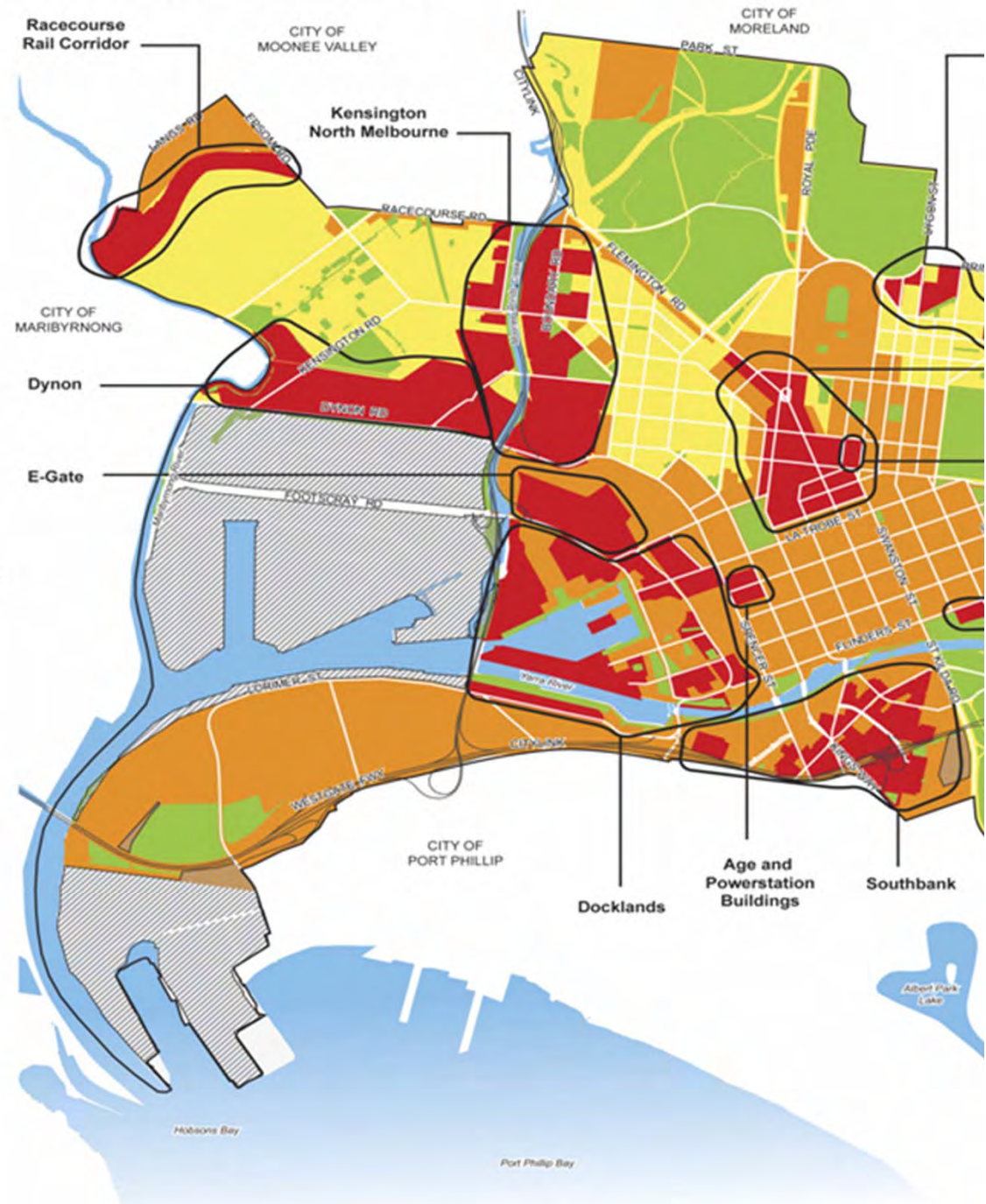
Issued: 16/02/2011

City of Melbourne Municipal Strategic Statement



*Almost doubling the residential
and working population over
30 years*

FIGURE 2: GROWTH FRAMEWORK PLAN

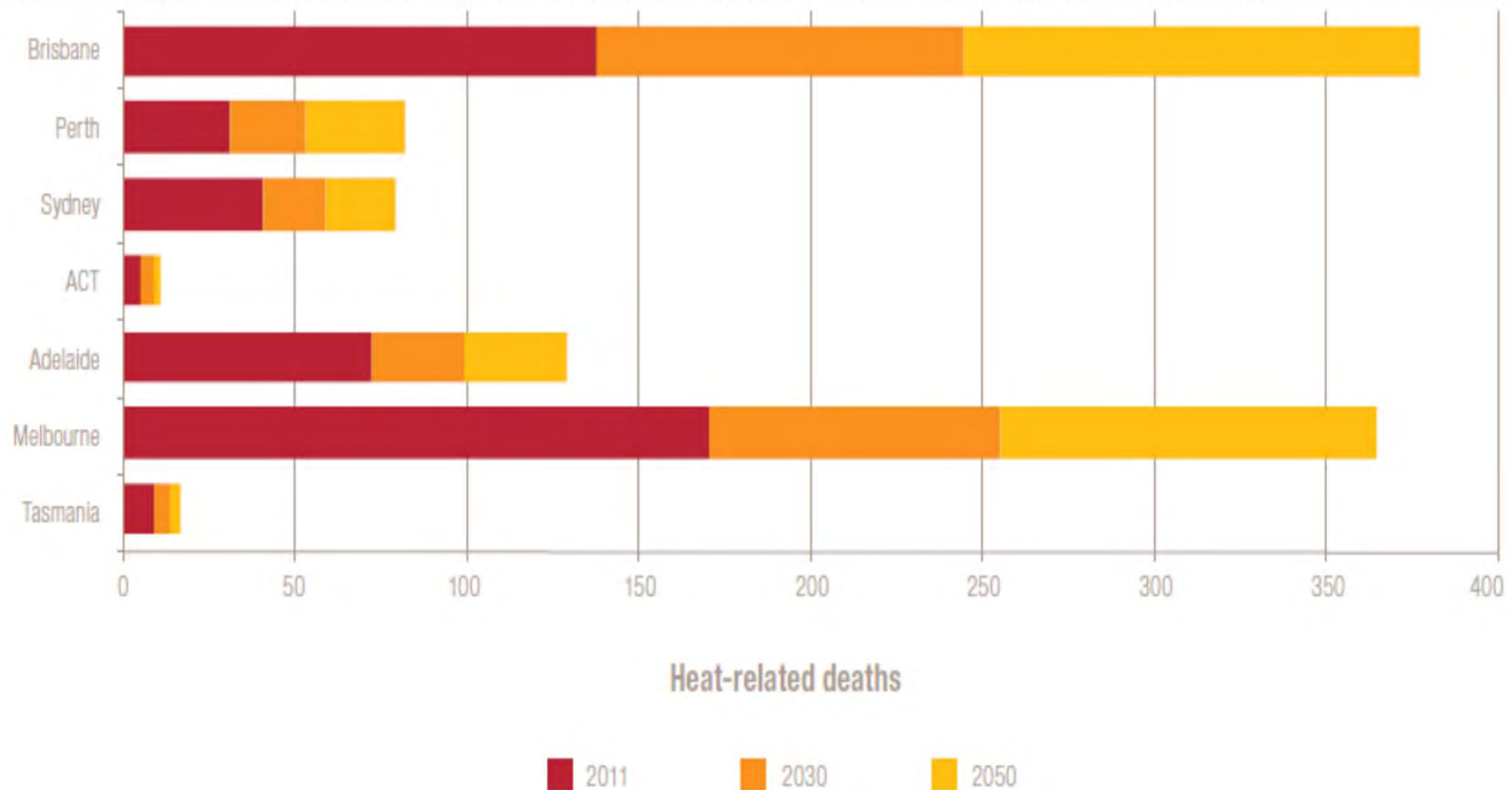


Impacts

- Social cost of heat-related illness and morbidity
- Damage to vital infrastructure from extreme weather events
- Vulnerability of urban vegetation
- Cumulative impact = creating less healthy landscapes and diminishing quality of city life

Heat-related mortality

Figure 7: Estimates of heat-related deaths, based on highest historic EHF load (1981-2009)



Declining trees – St Kilda Road



Modelling technology - existing



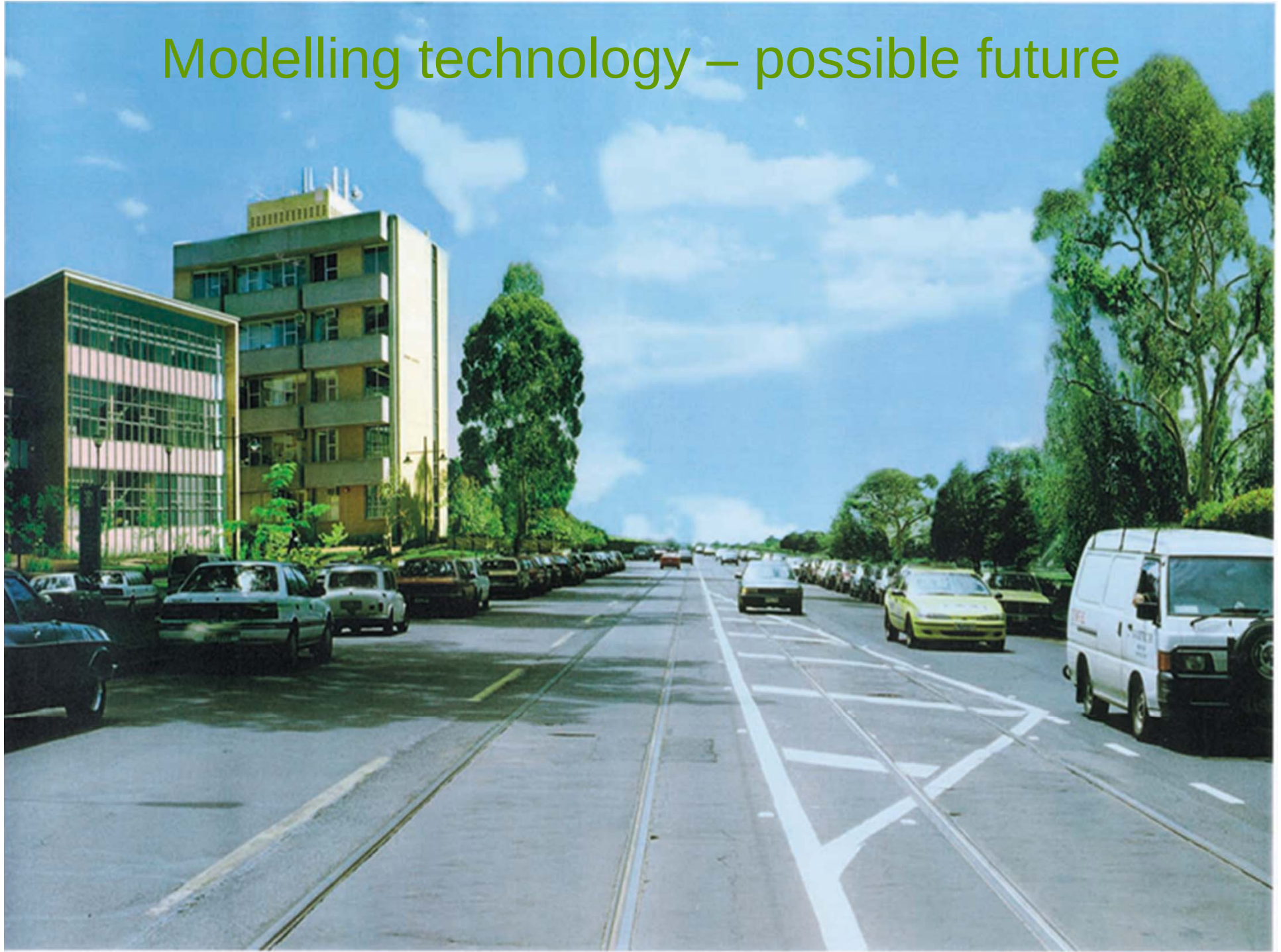
Modelling technology – possible future



Modelling technology - existing



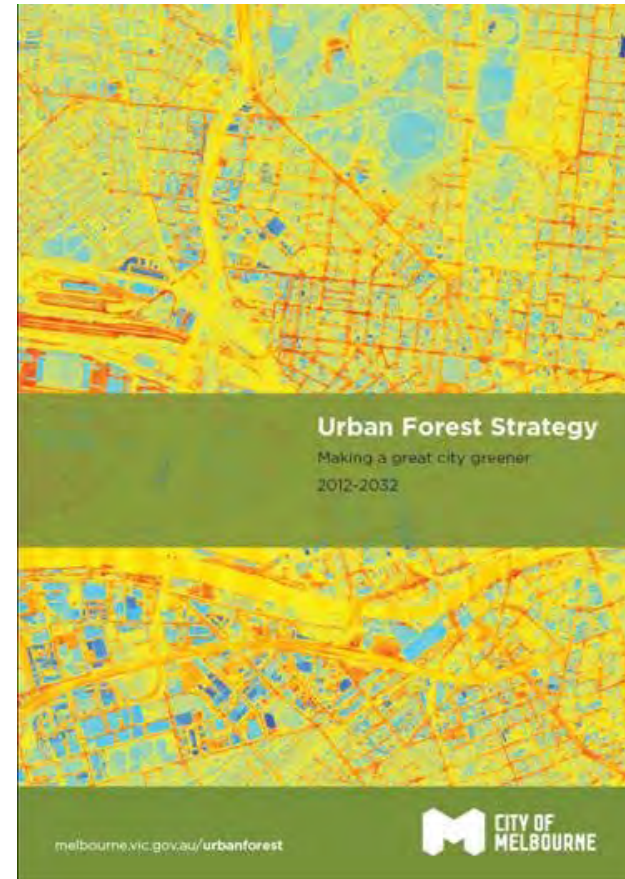
Modelling technology – possible future



How to address the increase in these impacts and lack of resilience?

Two primary initiatives

- **Urban Forest Strategy**
- **Open Space Strategy**



... To guide the improvement and expansion of Melbourne's Green Infrastructure network towards a strong state of health and resilience for the future ...

Why is open space important?

Melbourne is identified as the most liveable city in the world, and one of the major contributory elements to this liveability is the quality and amount of open space. In a recent household survey undertaken at the commencement of the research phase of this Strategy, many people indicated they live in the City of Melbourne because of the open space. Open space is also extensively used by the local community and visitors from across Australia and overseas. Open space is important for numerous reasons, some of which are described here.

Social connectedness



Social contact



Community events and festivals

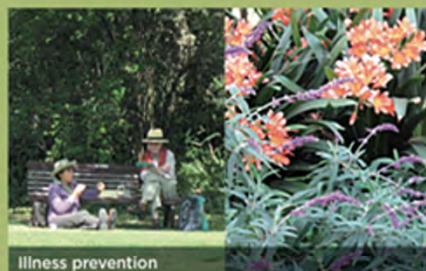


Meeting place, particularly associated with high density living

Mental health & wellbeing



Spaces to relax and unwind



Illness prevention



Social development in children

Physical health, fitness & wellbeing



Participating in organised sport



Exercising informally



Contact with nature



Being outside in the fresh air and sunlight

Urban heat island effect mitigation



Where the heat can radiate out at night and cool the city following hot weather



Space for large canopy trees to grow and provide shade



Creating cool spaces by irrigating them with sustainable water supply



Permeable surfaces that hold moisture and cool the environment

Why is open space important?

Biodiversity



Habitat for native fauna including birds



Protection of remnant areas of indigenous flora



Selective reintroduction of habitat diversity

Cultural heritage and character



Aboriginal and Torres Strait Islander cultural heritage values



World, National and State heritage significance of existing parks and gardens

Economics and tourism



Visitor destination points



Commemorative events

Events and Arts

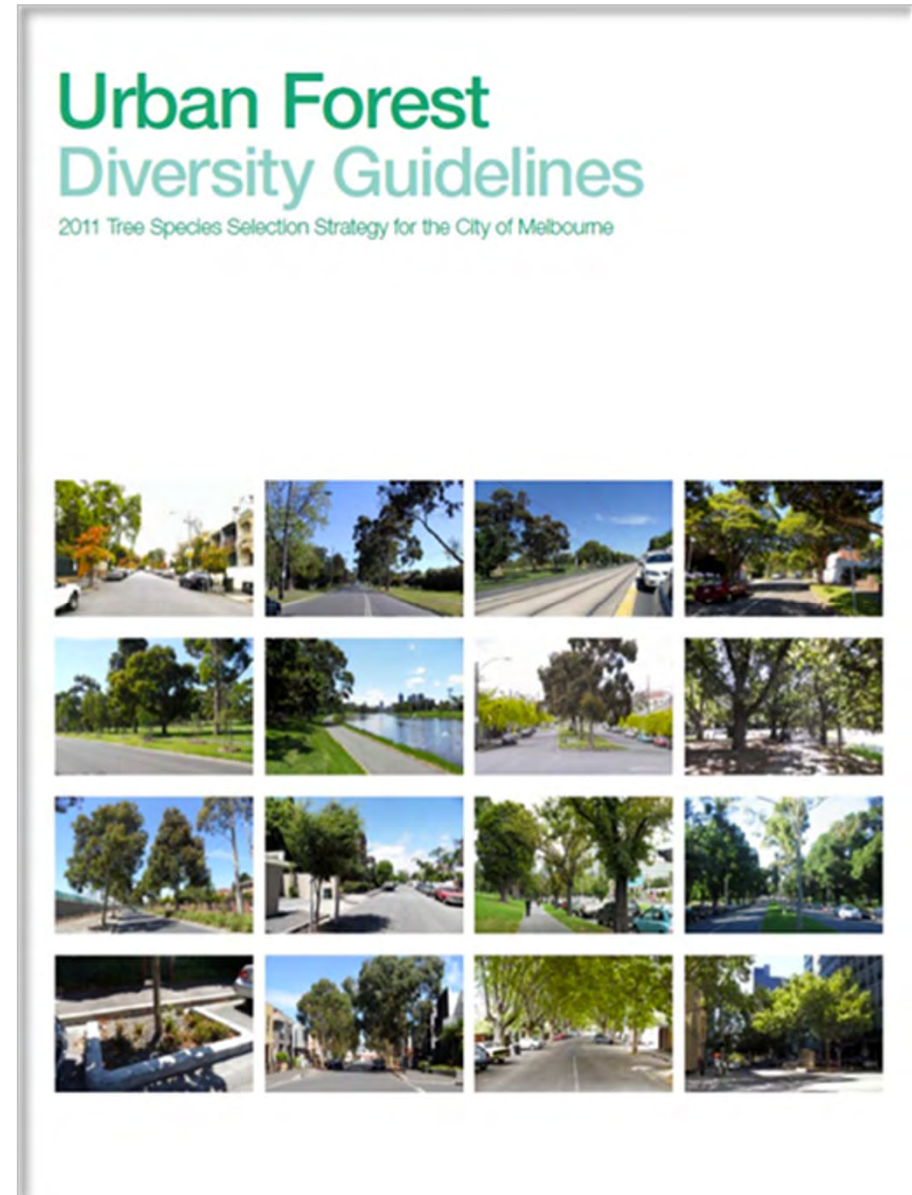
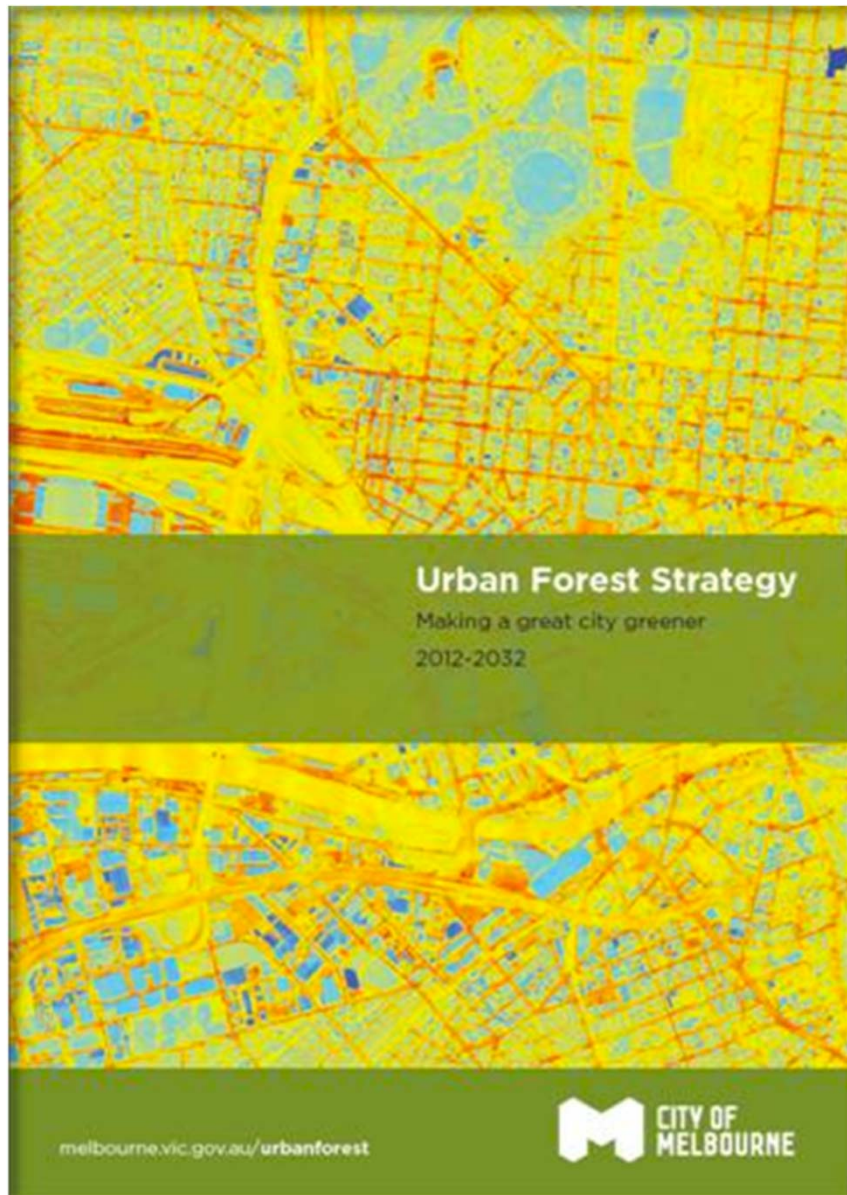


Permanent and temporary installations

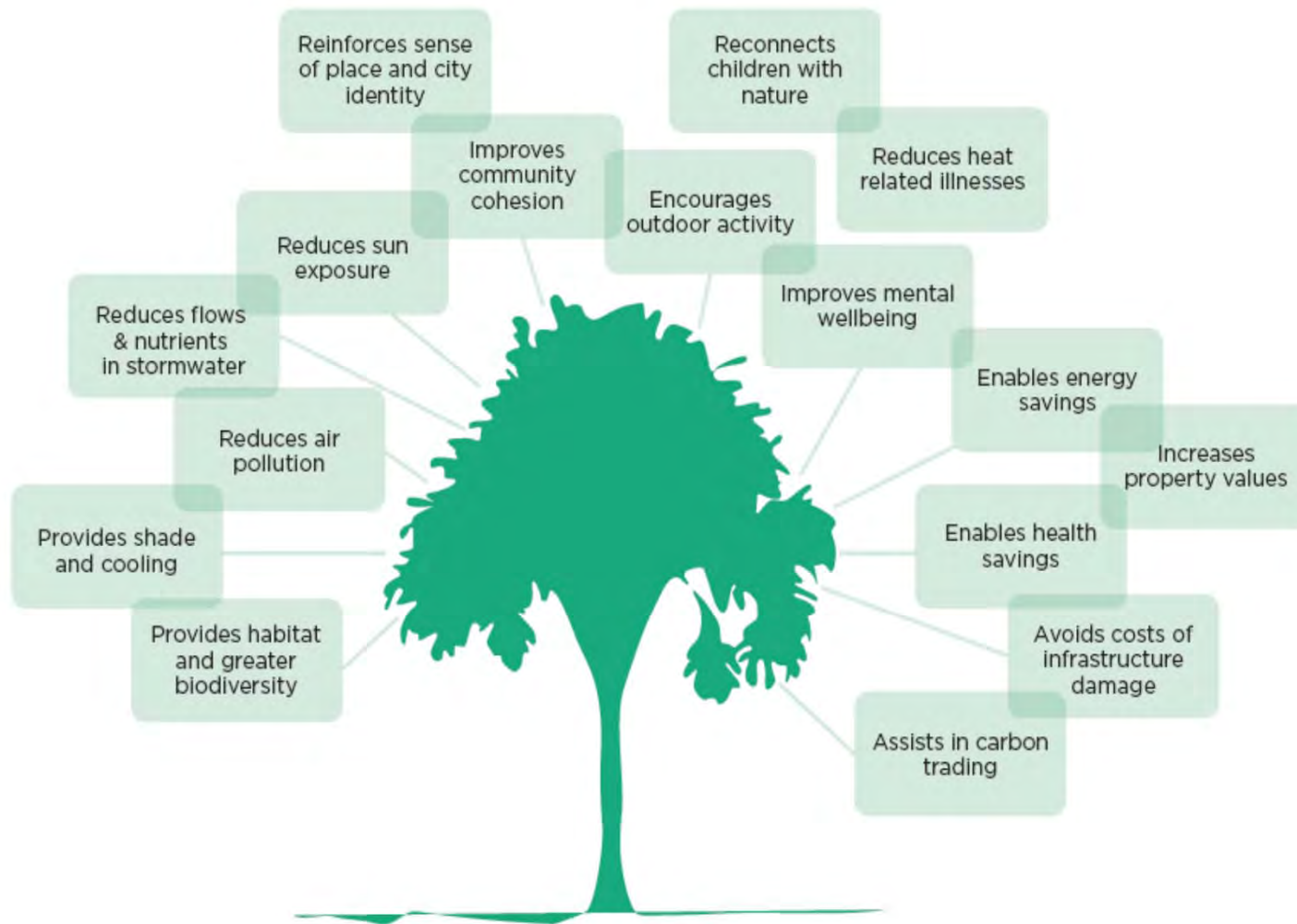


Performance

Urban Forest Strategy



Urban forest benefits



Urban forest principles

1. Mitigate and adapt to climate change
2. Reduce the urban heat island effect
3. Design for health and wellbeing
4. Create healthier ecosystems
5. Become a water sensitive city
6. Position Melbourne as a leader in urban forestry
7. Design for liveability and cultural identity

Major approaches

- Multi-disciplinary – using a broad range of learnings, research and data from industry experts, academics and decision makers (public and private)
- Setting visionary targets – based on understanding current conditions and future goals
- Technical analysis – employing technical data and suite of tools to quantify, assess and forecast the state of public realm assets and green infrastructure

Strategies & targets

Strategy 1: Increase canopy cover

Target: Increase public realm canopy cover from 22 per cent to 40 per cent by 2040.

Strategy 2: Increase urban forest diversity

Target: The urban forest will be composed of no more than 5 per cent of any tree species, no more than 10 per cent of any genus and no more than 20 per cent of any one family.

Strategy 3: Improve vegetation health

Target: 90 per cent of the City of Melbourne's tree population will be healthy by 2040
Design for health and wellbeing

Strategy 4: Improve soil moisture and water quality

Target: Soil moisture levels will be maintained at levels to provide healthy growth of vegetation
Become a water sensitive city

Strategy 5: Improve urban ecology

Target: Melbourne's green spaces will protect and enhance a level of biodiversity which contributes to the delivery of ecosystem services.

Strategy 6: Engage the community

Target: The community will have a broader understanding of the importance of our urban forest, increase their connection to it and engage with its process of evolution

Useful life expectancy



23% loss in 10 years

39% loss in 20 years

- 1 year to 10 years
- 11-20 years
- 21-30 years
- 31-60 years
- 61+ years
- To Be Determined

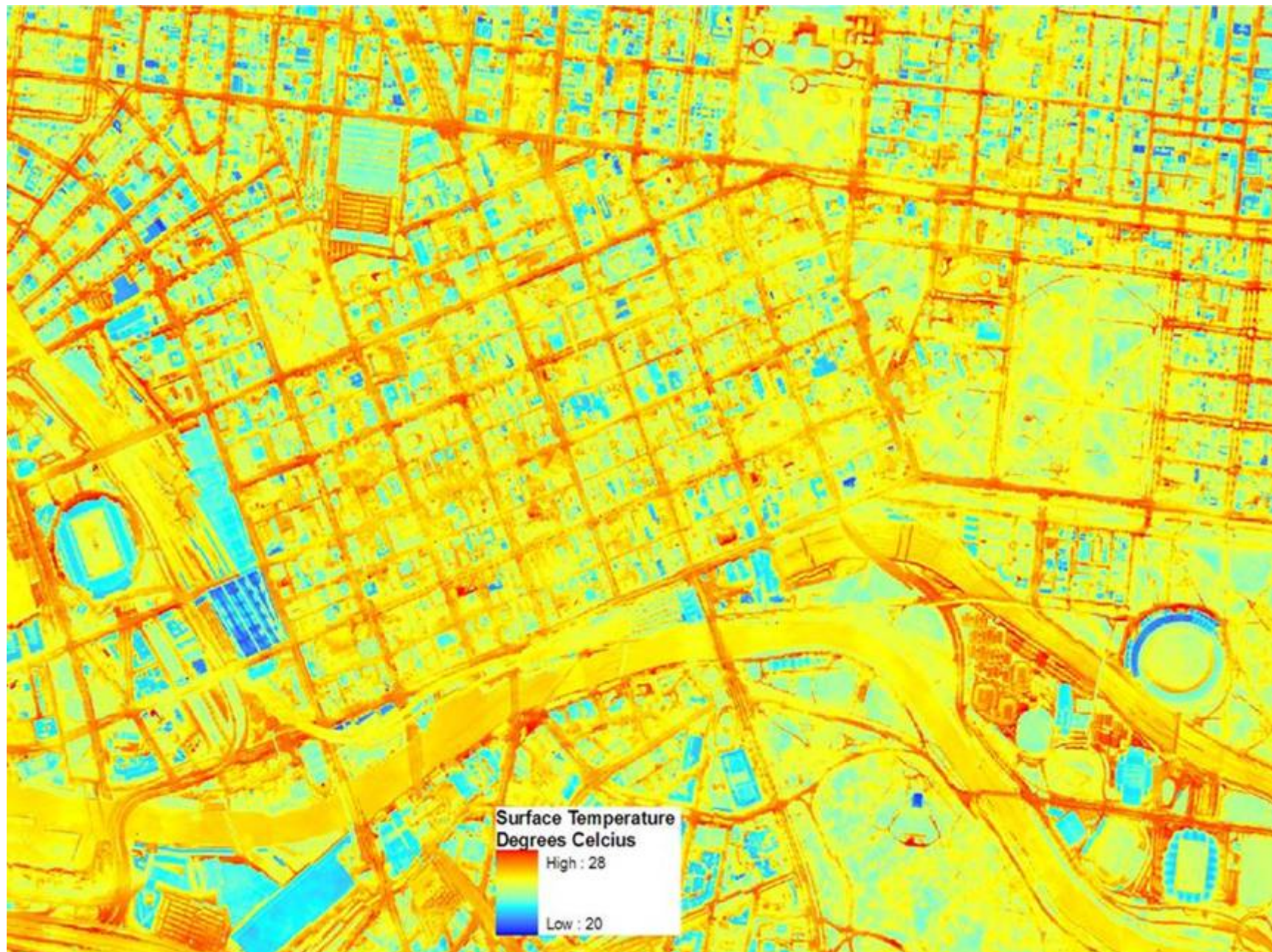
Tools and processes

- Suite of tools required to:
 - quantify and assess the character, significance and status of existing vegetation and open space resources
 - establish growth and health targets for trees and associated green infrastructure
 - manage water throughout the urban landscape
- Multi-faceted community engagement program

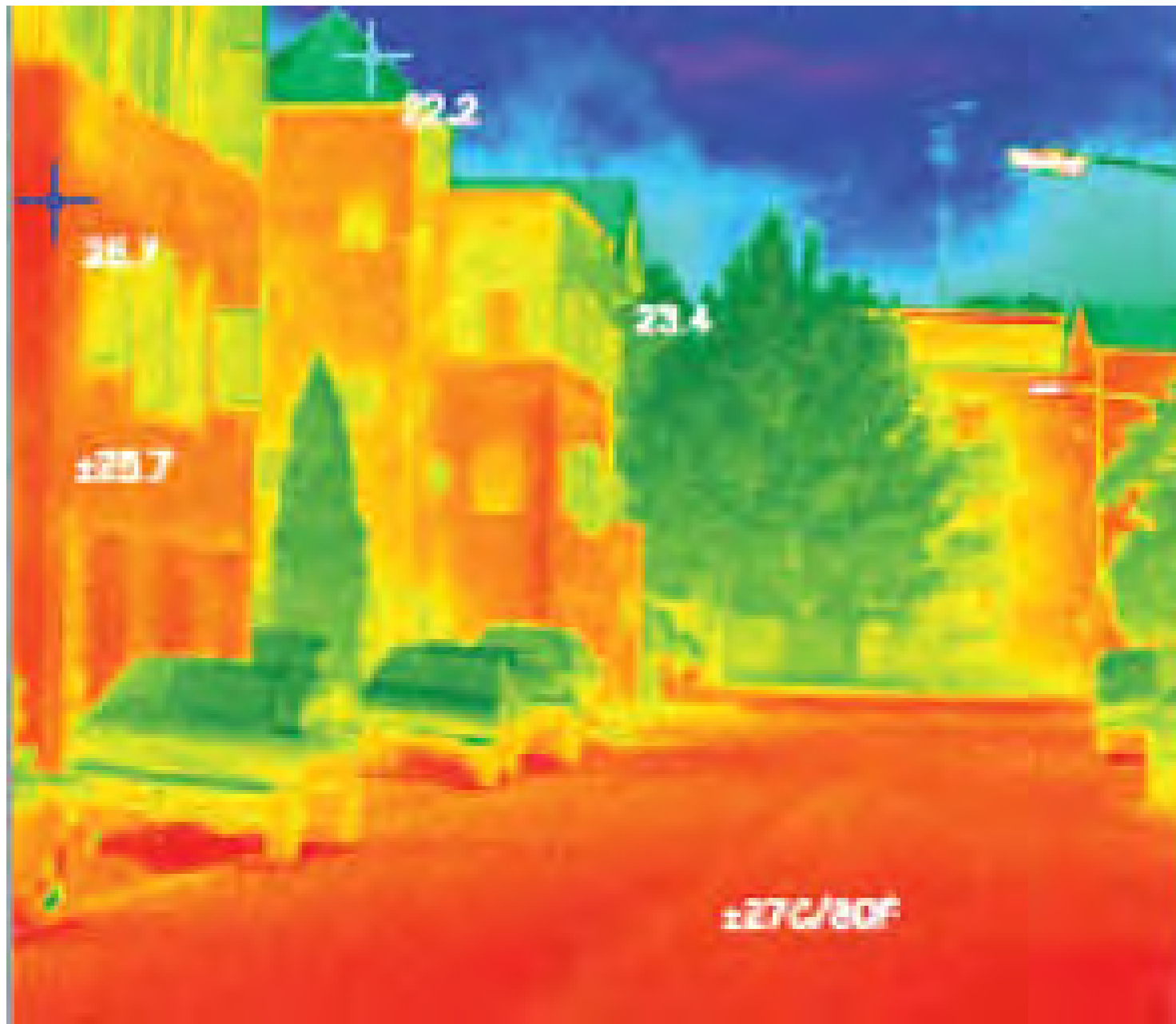
Specific tools and responses

- Spatial mapping to establish tree canopy cover and species diversity targets
- Aerial thermal imagery and microclimatic modelling to indicate where and how to create liveable streets and spaces
- Field surveys to provide information about needs of the community re: quality & quantity of open/green space
- Water sensitive urban design
- Species diversity guidelines
- Urban forest precinct plans

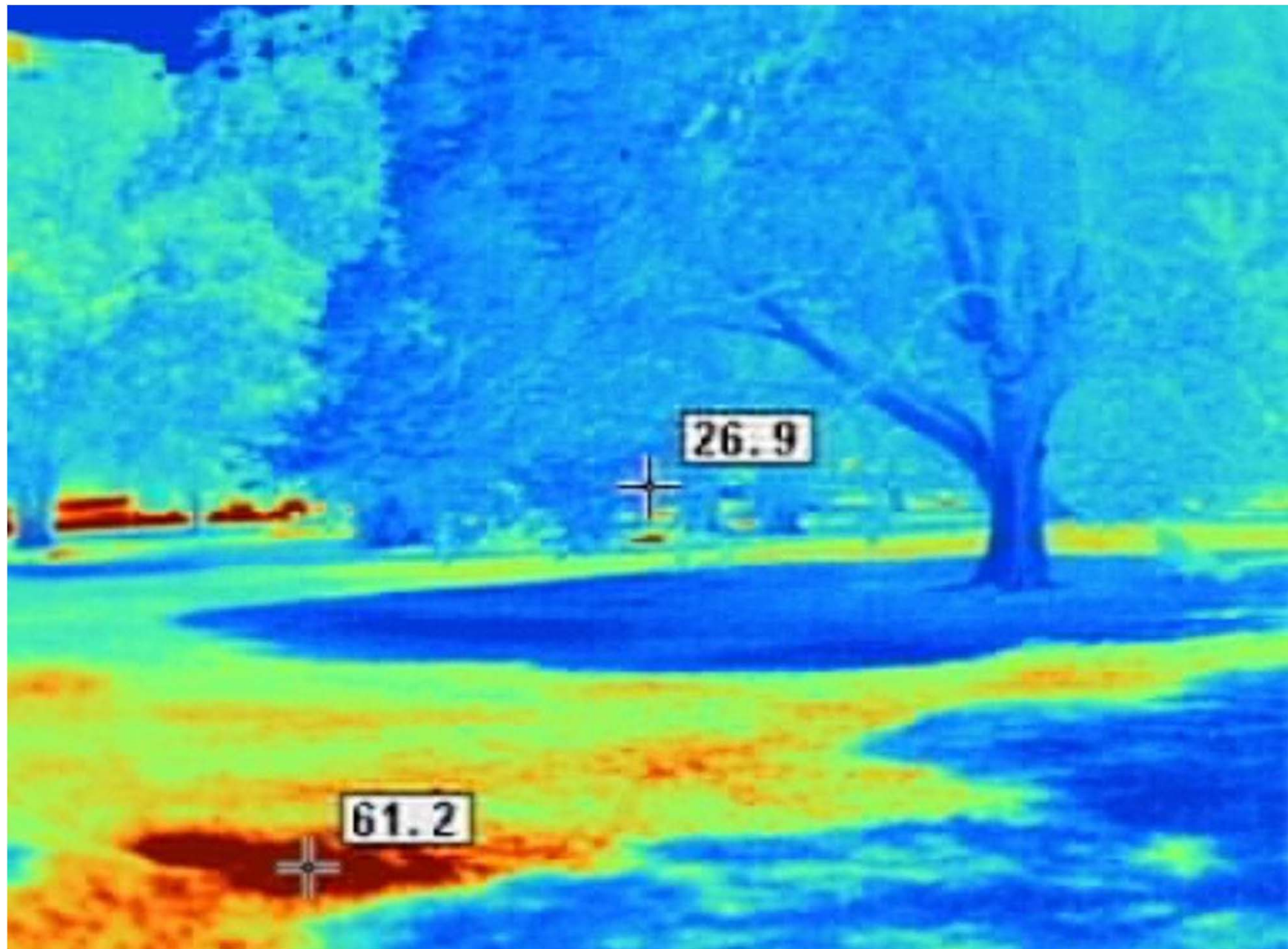
Thermal imaging – city centre



Thermal Imaging – streetscapes



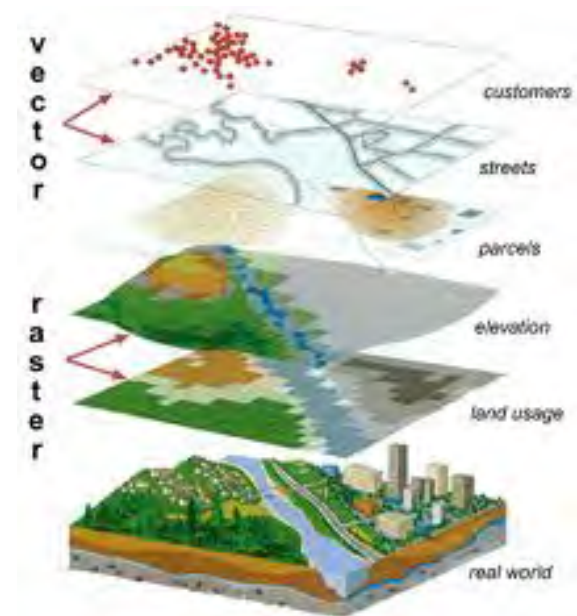
Thermal imaging – parkland



Geospatial tools

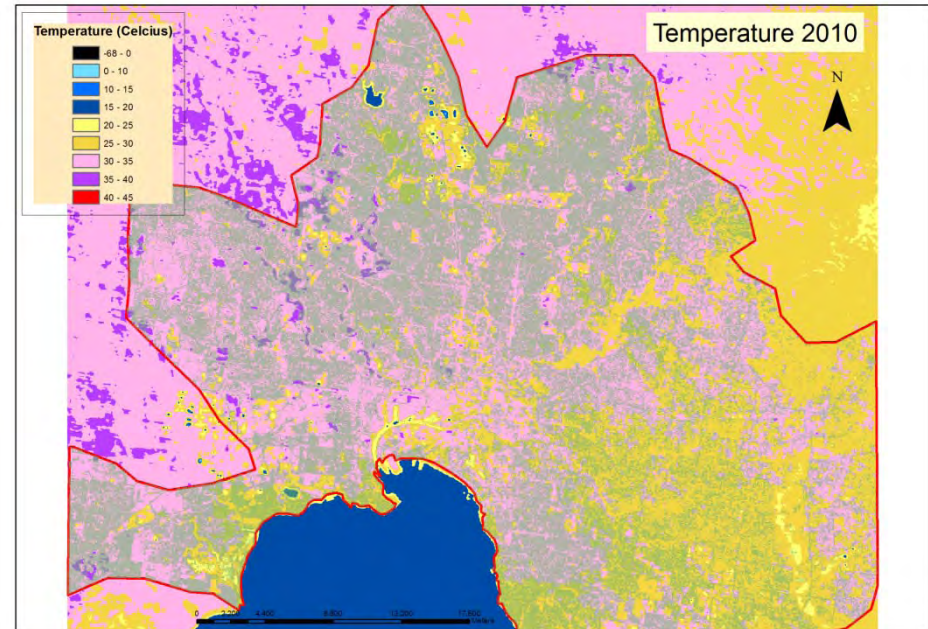
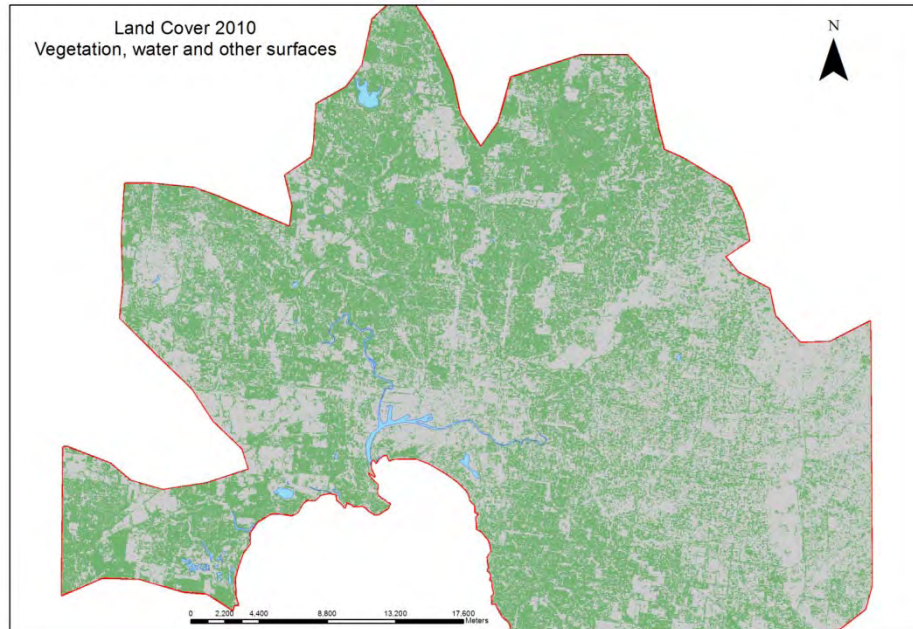
GPS, GIS and remote sensing

- Analyse spatial heterogeneity
- Visualize changes over time
- Analyse landscape
- Analyse the structure and composition of vegetation
- Vegetation health
- Urban heat island
- Carbon storage

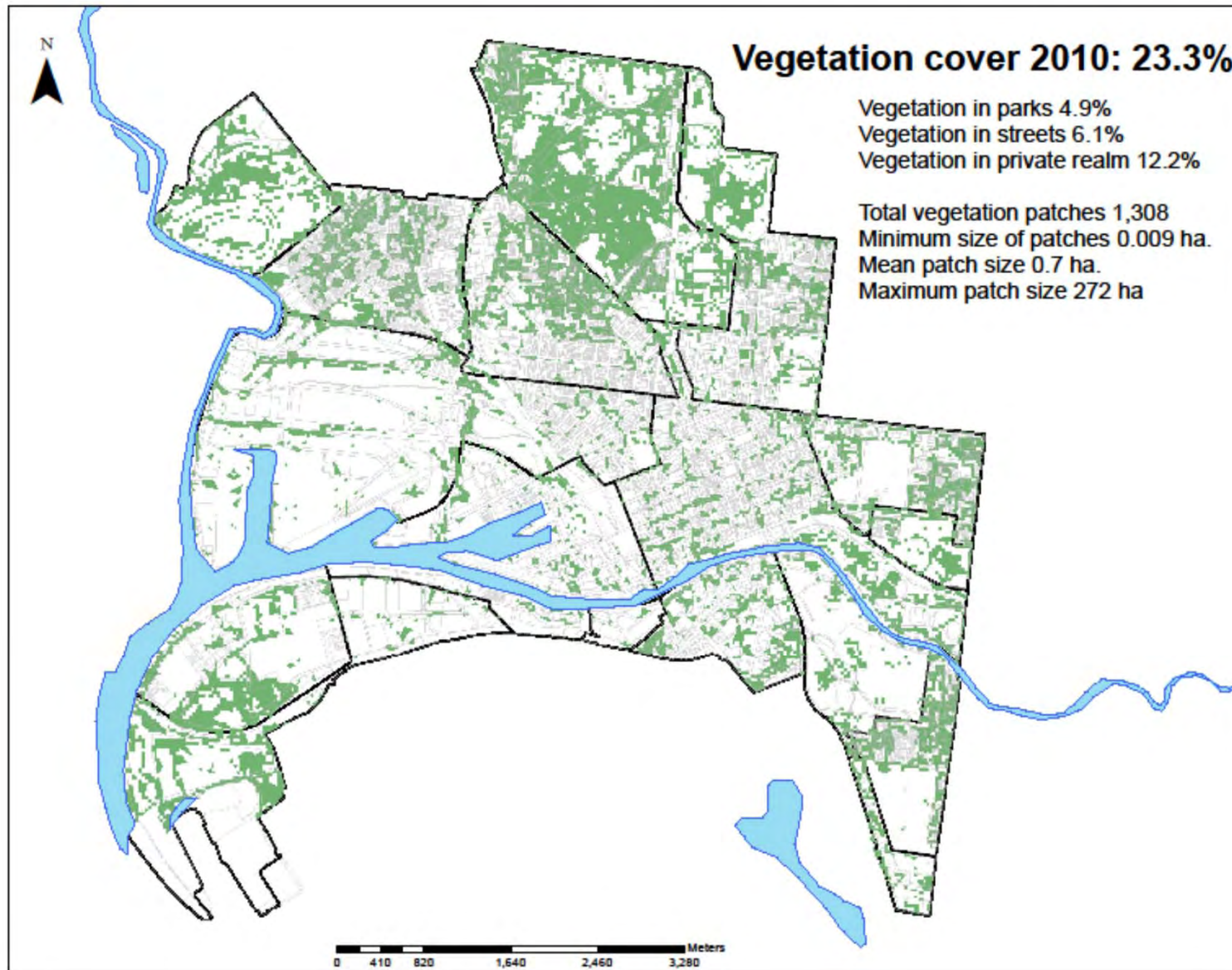


Landsat

Landsat TM 30x30 m resolution

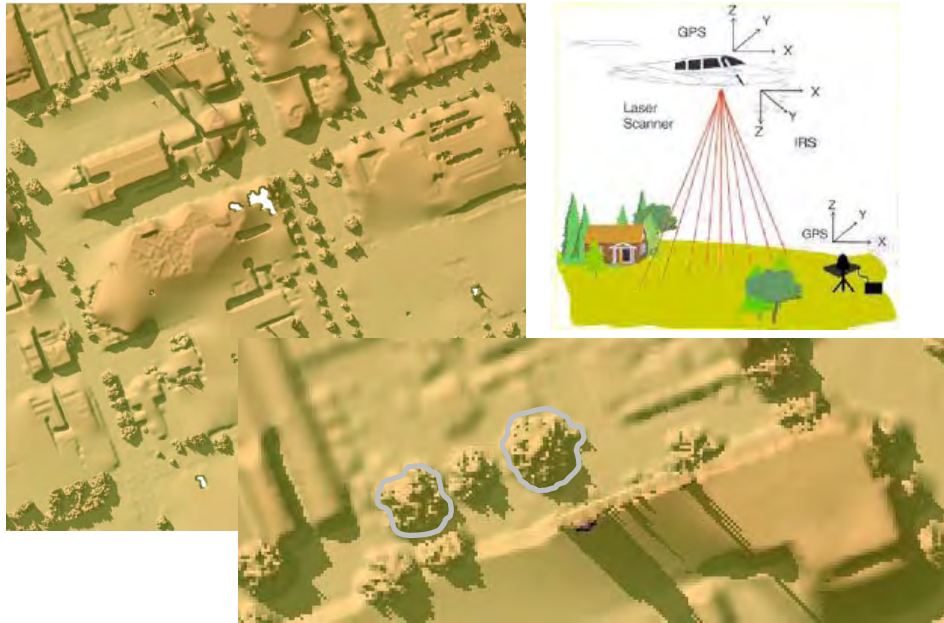


Landsat



LIDAR

LIDAR light detection & ranging



Aerial mapping & 3-D imaging

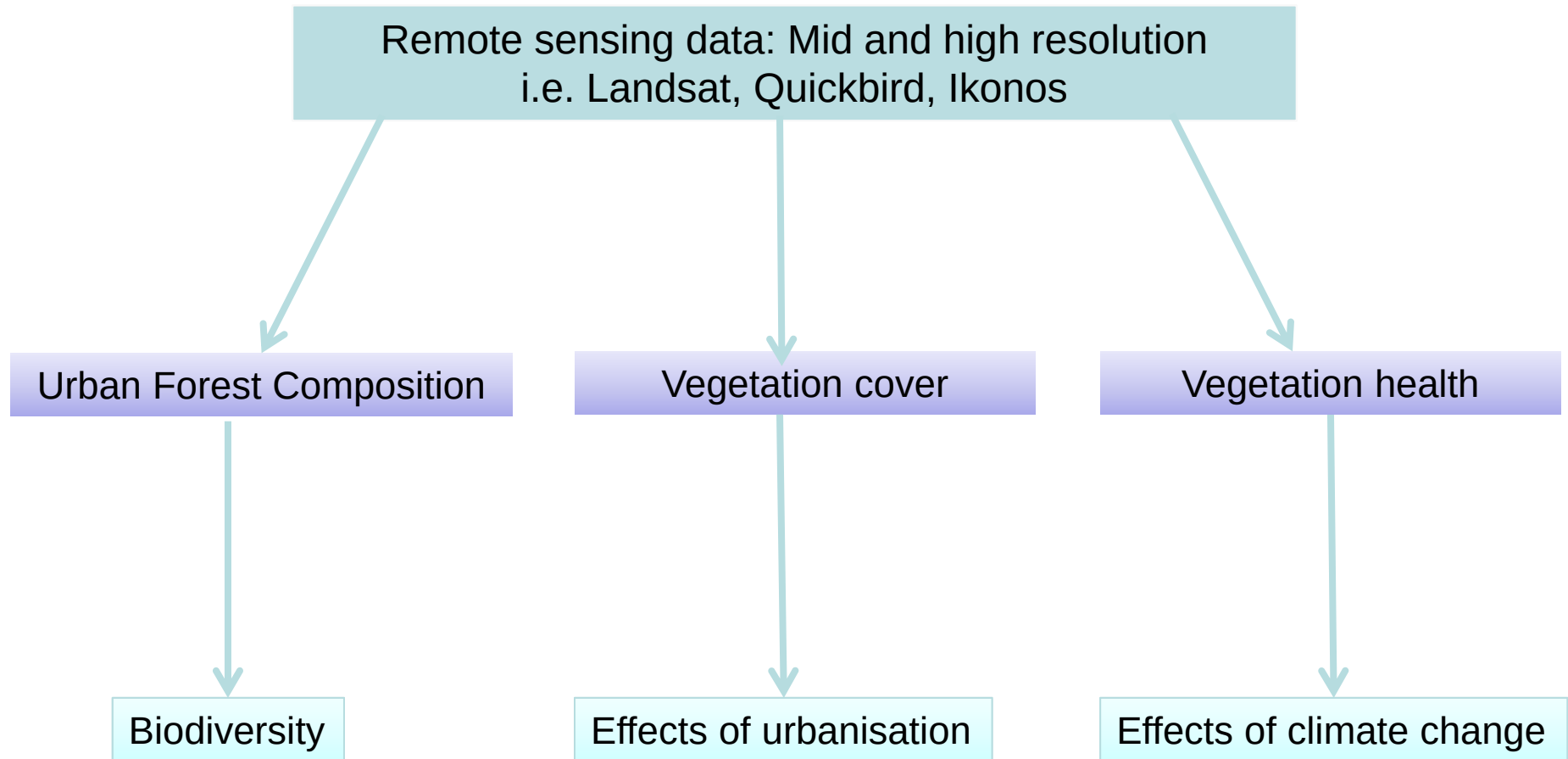


Aerial photography

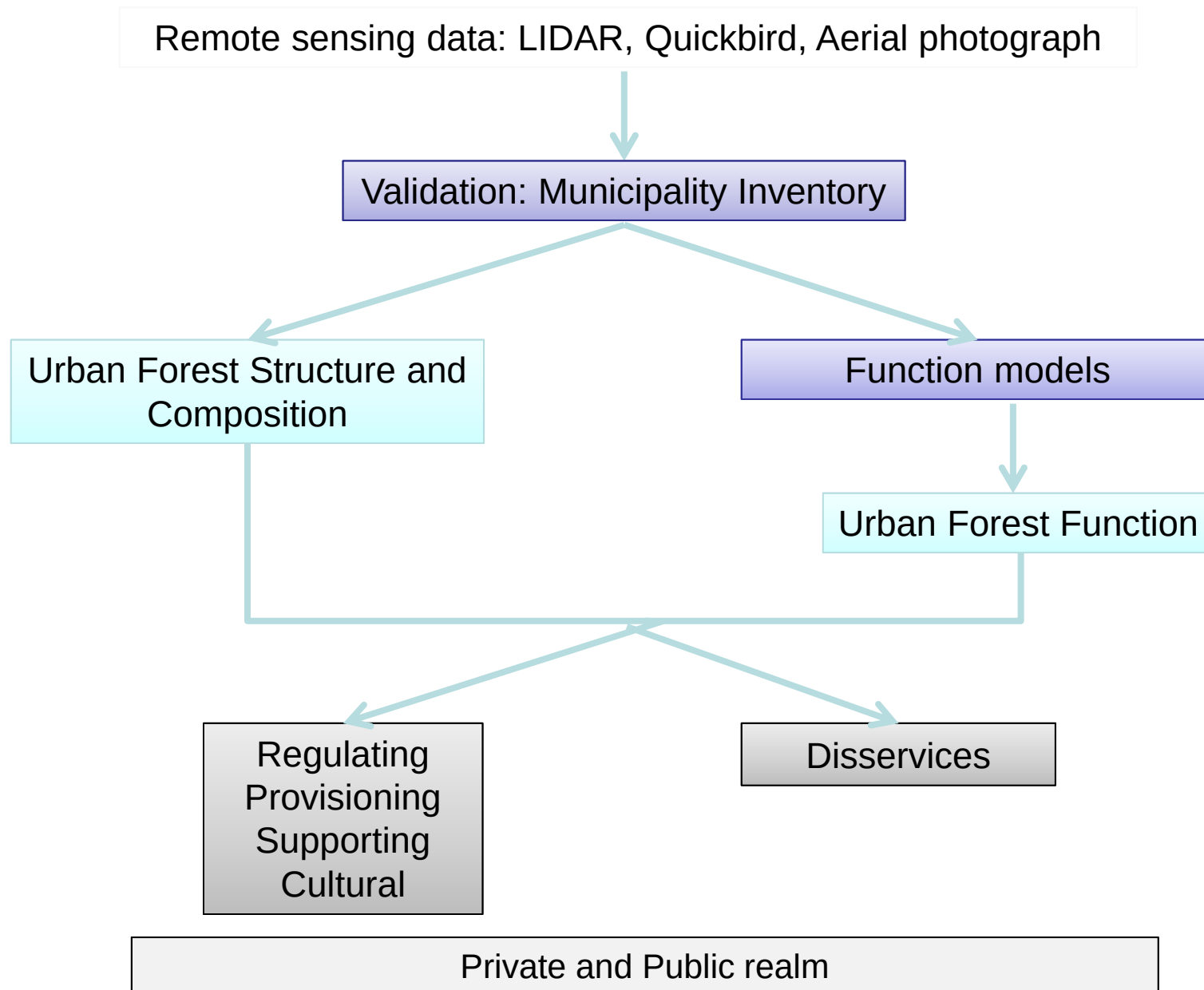
Canopy mapping: tree cover, crown diameter, connectivity



Urban forest mapping



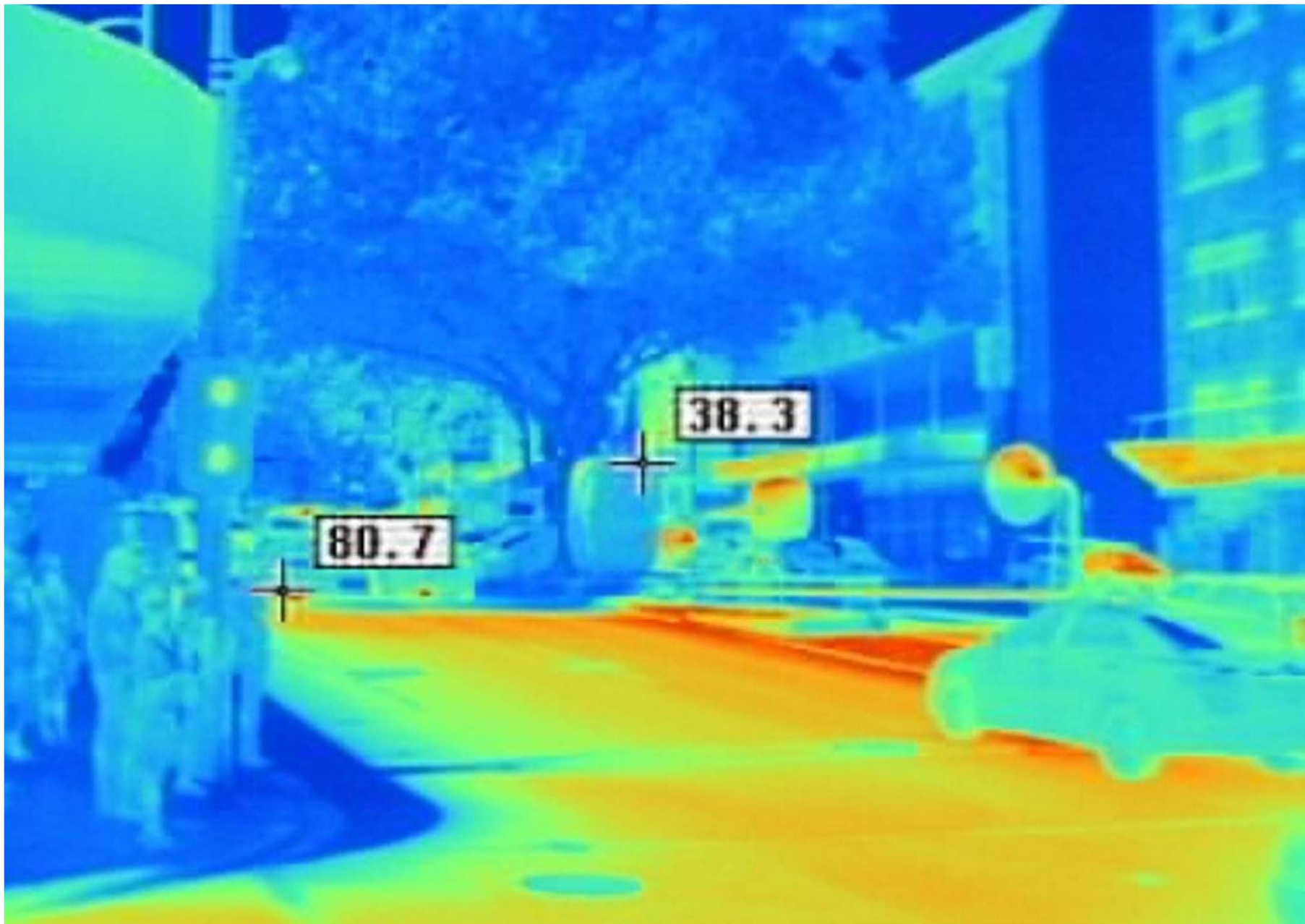
Urban forest mapping



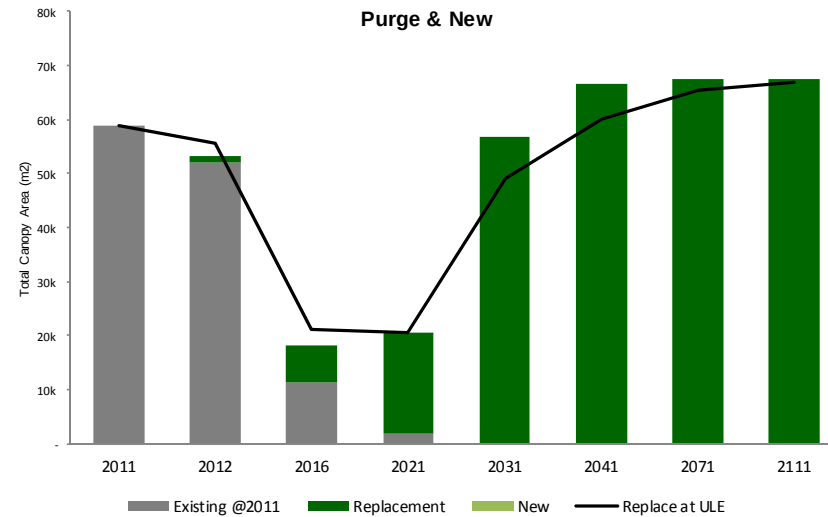
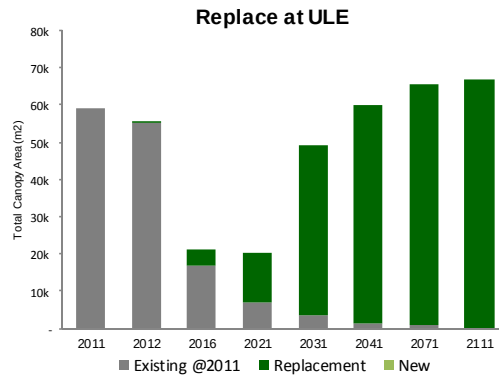
Urban tree responses



Urban tree responses



Increasing tree canopy efficiently

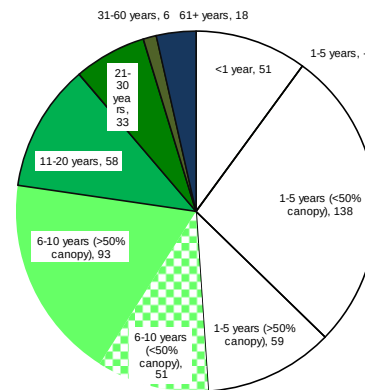


The Numbers

		2012	2016	2021	2031	2041	2071	2111	Total
Scenario Planting (qty)	ULE	51	197	144	58	33	6	18	507
	Purge	94	245	143	25	-	-	-	507
	New	-	-	-	-	-	-	-	-
P & N		94	245	143	25	-	-	-	507
Scenario Cost \$('000)	ULE	87	335	245	99	56	10	31	862
	Purge & New	160	417	243	43	-	-	-	862
	Diff	(73)	(82)	2	56	56	10	31	-
	Old	456	259	115	57	24	18	-	ULE
	Replacement	51	248	392	450	483	489	507	
	Total	507	507	507	507	507	507	507	
	Old	413	168	25	-	-	-	-	Purge & New
	Replacement	94	339	482	507	507	507	507	
	New	-	-	-	-	-	-	-	
Total		507	507	507	507	507	507	507	
Av cost/tree planted		17k	17k	17k	17k				

Useful Life Expectancy @2011

Tree (qty)



Increasing tree canopy efficiently



Increasing tree canopy efficiently



Benjamin Street,
Parkville

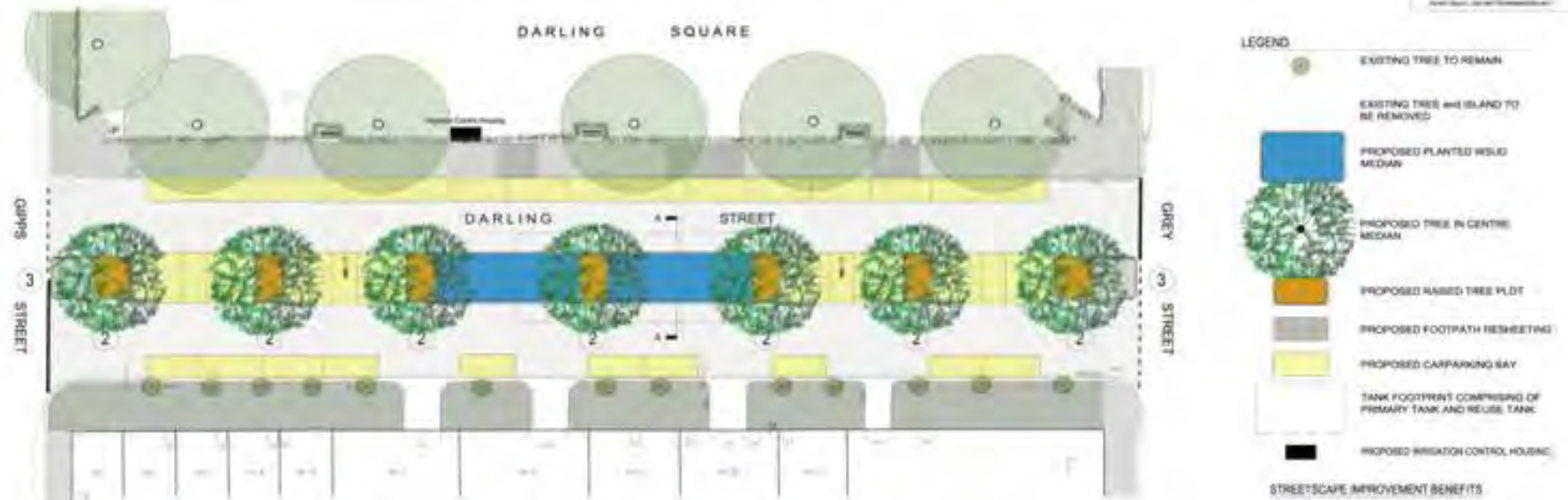
12 trees – 55%

26 trees – 36%

WSUD & stormwater harvesting



Stormwater harvesting



LANDSCAPE & IRRIGATION SERVICES

Design & Urban Environment

Project Information

Project Name: **Darling Square**

Project Location: **Darling Square**

Project Description: **Stormwater Harvesting**

Project Details

Project No: **LUS1002**

Project Date: **10/02/01**

Project Status: **Final**

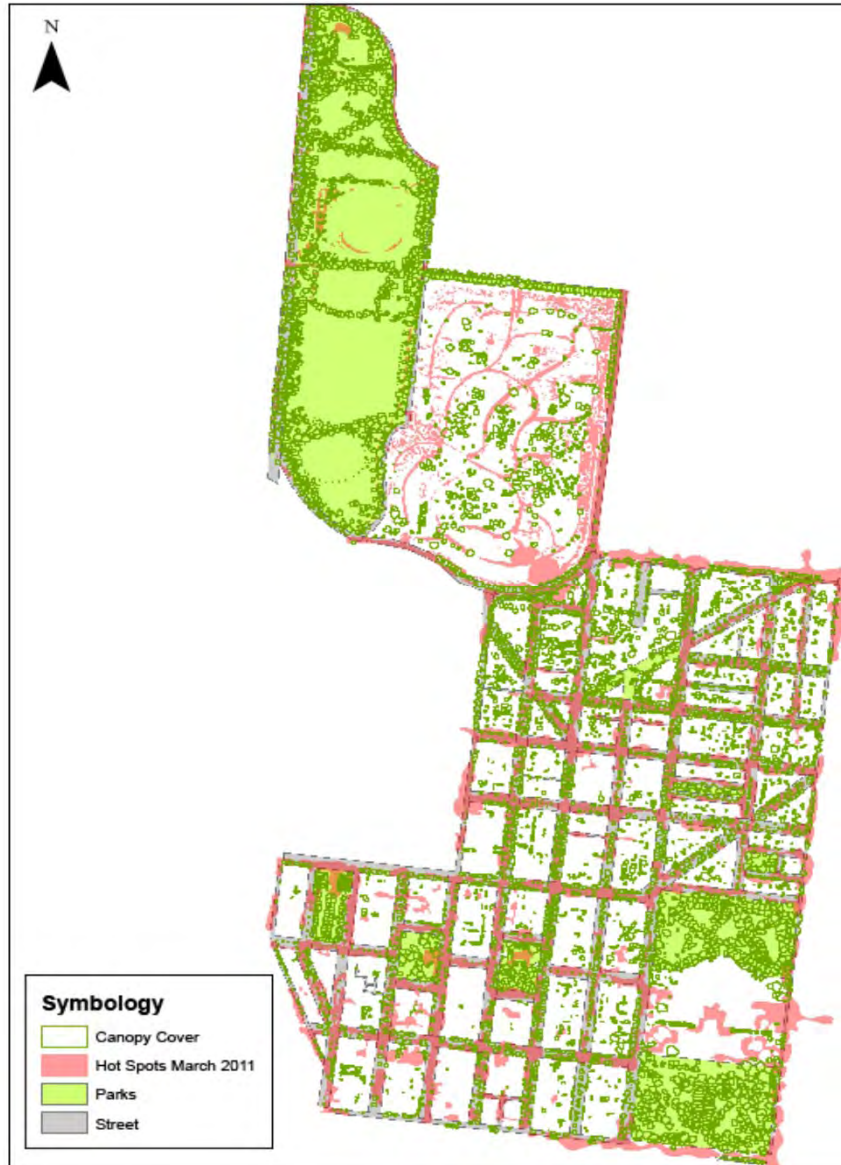
Project Scale: **1:100**

Project Sheet: **A**

Landscape adaptation



Precinct planning



Total canopy cover 17%

Canopy cover parks 9.3%

Canopy cover streets 5.4%

Canopy cover private 2.3%

Hot spot cover 18%

Total number trees 7,473

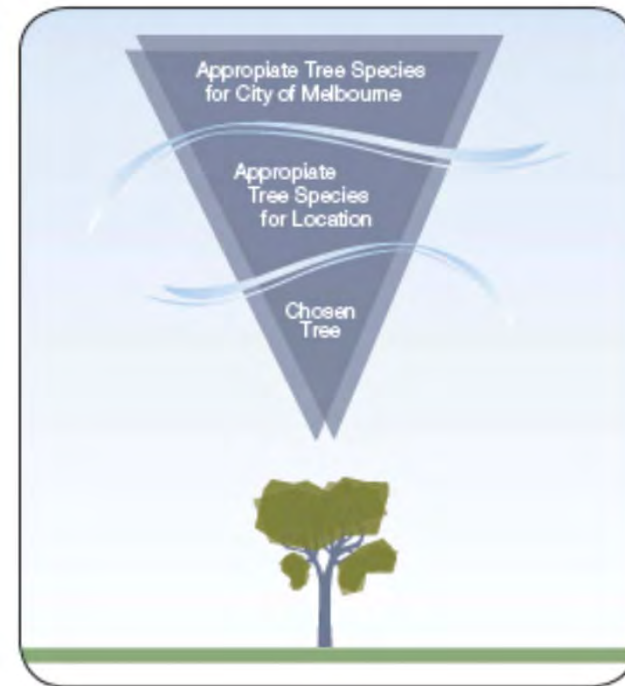
Trees in parks 2,527

Trees in streets 2,812

Trees in private 2,134

Species selection – scientific matrix

1. Drought tolerance
2. Heat tolerance
3. Wind tolerance
4. Longevity
5. Pollution tolerance
6. Pathogen and pest susceptibility
7. Potential as allergen
8. Shade cast
9. Maintenance required
10. Tree litter
11. Shade Tolerance
12. Size & location of planting site
13. Prunability for Vehicle Clearance
14. Waterlogged Soil Tolerance
15. Soil Compaction Tolerance
16. Power Lines



Modelling technology – local streets



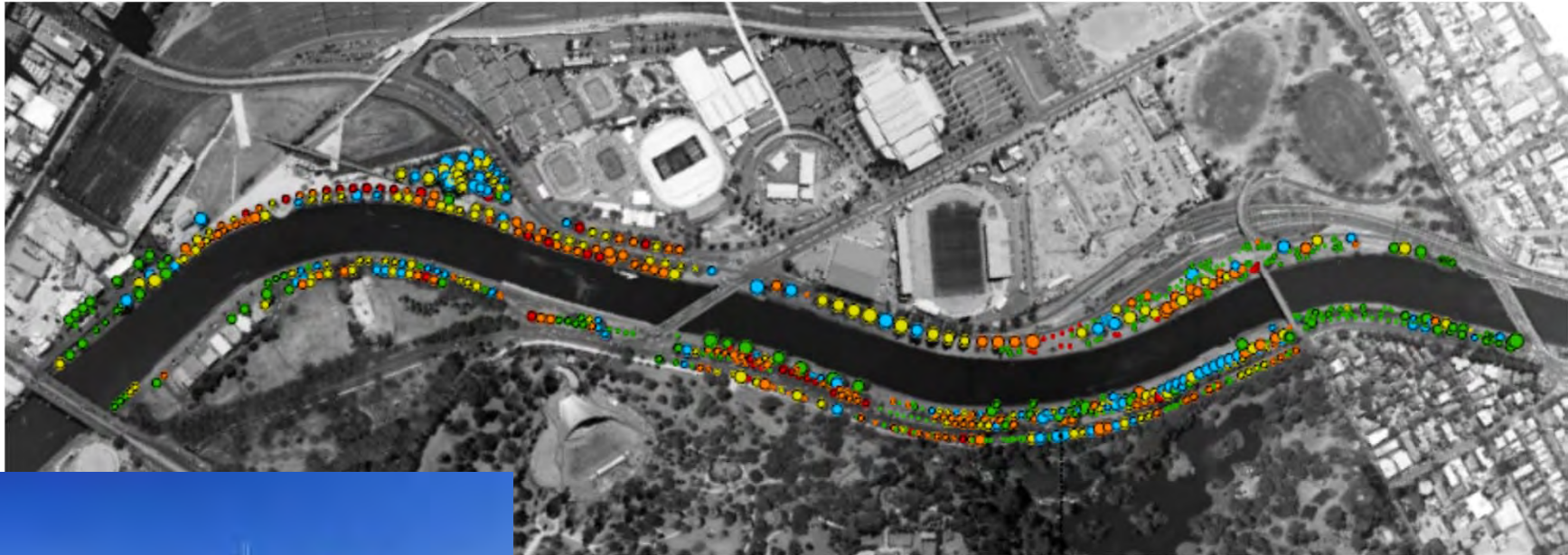
Curtain Street, looking west to Nicholson Street

Goal: 40% canopy cover



Curtain Street – artist's impression

Modelling technology – Yarra River



Yarra River banks - ULE



Potential tree loss – years 1-5



Potential tree loss – years 6-10



Potential tree loss – years 11-20



Potential tree loss – years 20+



New trees – year 1



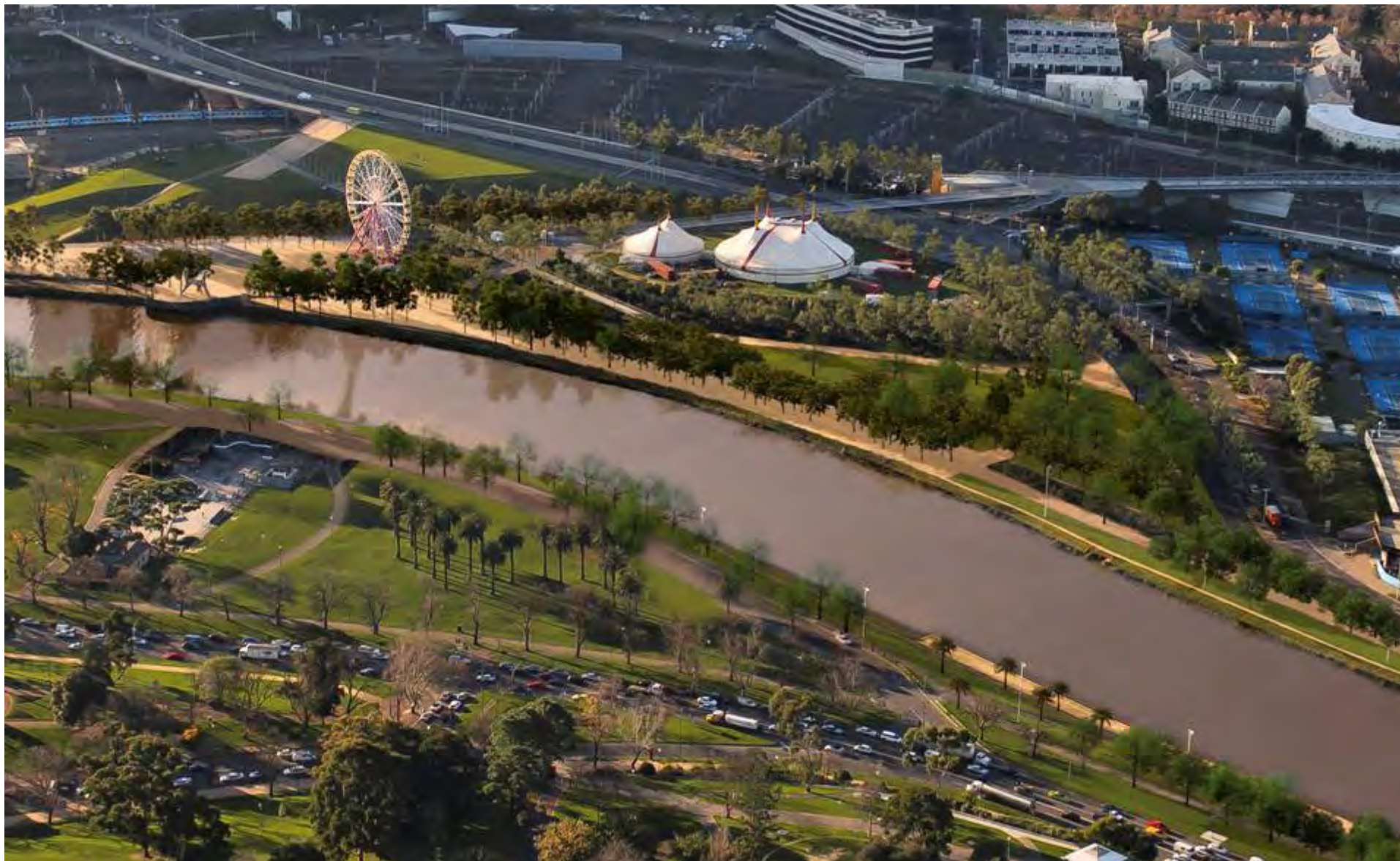
New trees – year 2



New trees – year 5



New trees – year 10



New trees – 20+ years



Final potential mature landscape



Community engagement

- Diverse programs and processes for active engagement and democratic participation
- Full partnership in determining the future urban forest for Melbourne

Engaging with people



Community engagement principles

1. Build understanding of the challenges
2. Gauge community support for the strategy
3. Understand the community's thoughts, perceptions and concerns
4. Engage the community in a **meaningful** way



International Association
for Public Participation
Australasia

IAP2 Public Participation Spectrum

Developed by the International Association for Public Participation

INCREASING LEVEL OF PUBLIC IMPACT

INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
Public Participation Goal:	Public Participation Goal:	Public Participation Goal:	Public Participation Goal:	Public Participation Goal:
To provide the public with balanced and objective information to assist them in understanding the problems, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
• Fact sheets • Web Sites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberate polling	• Citizen Advisory Committees • Consensus building • Participatory decision-making	• Citizen juries • Ballots • Delegated decisions

Communication tools & strategies

- **Advertising:** local press, council phones, email, Art & Design Competition
- **Mass media:** Press releases, briefings & interviews, Champions
- **Online:** Dedicated website, Twitter, YouTube Video
- **Face to face:** Town Hall Forum, 'World Café', Community meetings, Champions



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Join the conversation about Melbourne's Urban Forest Strategy

Join the conversation about Melbourne's Urban Forest Strategy

Read this: [Urban Forest Eco-City Forum](#) (422.026 KB)

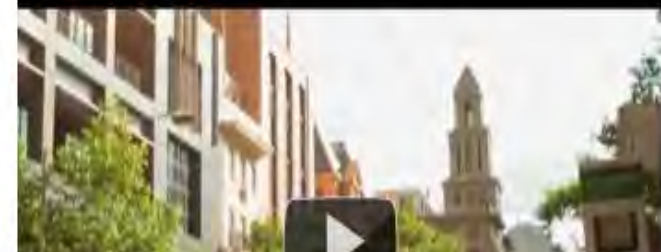
Share [f](#) [t](#) [in](#) [v](#)

The City of Melbourne's draft Urban Forest Strategy provides a robust strategic framework for the evolution and longevity of Melbourne's urban forest.

Melbourne's tree population is vast – we have 60,000 council owned trees, worth around \$650million. Trees are a defining part of Melbourne. We live in the world's most liveable city and our parks, gardens, green spaces and tree-lined streets contribute

REGISTER to get involved!

Melbourne's Urban Forest Strategy



MELBOURNE'S URBAN FOREST



60,000

COUNCIL TREES



\$650m

AMENITY VALUE



22%

CANOPY COVER

LOW DIVERSITY
Just three species – plane, elm and red river gum make up more than 35% of Melbourne's trees



AGEING
Some of our grandest trees are nearing the end of their lives



HIGH VULNERABILITY

Fitzroy Gardens now



CITY OF MELBOURNE EXPECTS TO LOSE

- 27% of trees in 10 years
- 44% of trees in 20 years

If no action is taken



CHALLENGES

Pests & Disease

Myrtle rust could affect almost 45% of Melbourne's trees



Climate change

Victoria's temperatures are predicted to increase into the future

Victoria has recorded five of its ten hottest years since 1999**

**Ranked according to average daily temperature



Increasing Population & Density



THE FUTURE

OUR VISION

The City of Melbourne's urban forest will be resilient, healthy and diverse and will contribute to the health and wellbeing of our community and to the creation of a liveable city.

URBAN FOREST STRATEGY TARGETS

1. Increase canopy cover – 40 per cent by 2040.
2. Increase diversity – no more than 5% of one tree species, 10% one genus, 20% one family.
3. Improve vegetation health – 90 per cent of tree population healthy by 2040.
4. Improve soil moisture.
5. Improve biodiversity.
6. Inform and consult with the community.



HAVE YOUR SAY: melbourne.vic.gov.au/urbanforest

 **CITY OF MELBOURNE**



<http://www.youtube.com/watch?v=BplUmxFCE8A>



Browse

Melbourne's Urban Forest Strategy

MelbourneCityCouncil



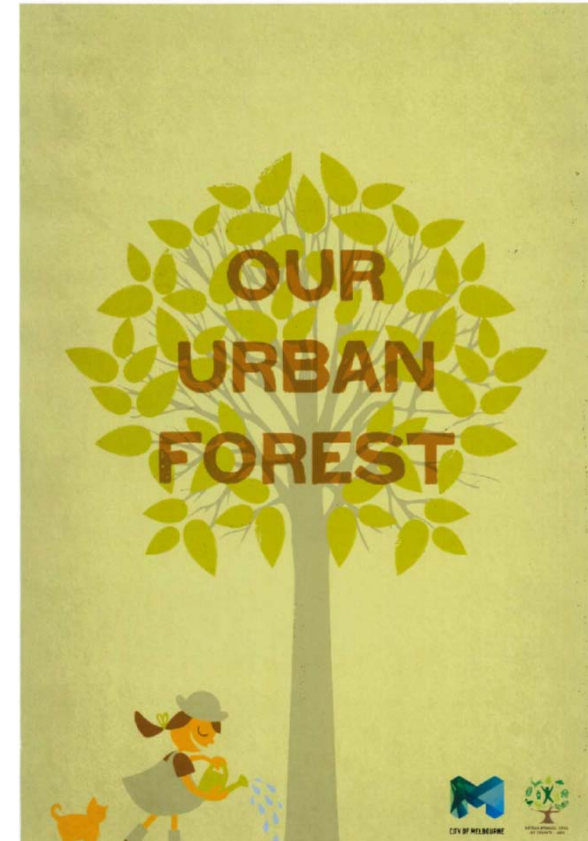
Subscribe

59 videos ▾



Art and design competition

- On display during late 2011
- Highlighted the urban forest and set the scene for a conversation with the community





‘Yarn bombing’



What did the community say?

Comments (123)

[Expand All Replies](#)

Prof. Lindsay Falvey 20 Nov 2011, 2:04 PM

A COMMENDABLE AND VISIONARY PLAN WORTH READING BEFORE ENGAGING IN EMOTIVE REACTION

It is pleasing to see a plan with a 60 year time horizon that is based on maintaining our heritage in the light of experience of more than a century, and is informed by applied science. The subject is difficult to relay in short public gatherings, such as the recent Residents 3000 meeting, simply because it is complex and emotive. Emotional responses about 'our' Plane trees, denial of long evidence of dying Elm trees, and assumptions that the majority of the City's trees are popular European species may be normal for many of us who have grown up in an around the City – but they seem to be misconceptions. Planned replacement, with multi-decade budgetary commitments, is the only responsible response that I can see; the authors of the report are to be commended. Failure to act would be to deny the legacy of even greater foresight by our forefathers and their adventurous vision for what has become a fine City. from – Prof. Falvey, formerly Dean of the Faculty of Agriculture, Forestry and Horticulture, University of Melbourne.

“This is a fantastic and comprehensive strategy. I am so pleased.”

“I strongly support this strategy. I particularly support the push for greater diversity of species.”

“I think it's a great idea and one that I'm sure we'll see replicated in Sydney in the not too distant future.”

“I commend you for the vision and the planning and research which underpins the strategy.”

“The plan to look after our existing forest is excellent as an ongoing activity and I can see things happening already, which is a great thing to see and feel. Great Stuff!”

9 January 2011

Nurturing the spirit of our garden city



ROBERT DOYLE

IT'S tough being a tree in our city. Our trees live in an alien (urban) environment, have been through a drought of more than 10 years and many of them are getting on in age. There is no doubt, though, that we love the trees of Melbourne, all 65,000 of them.

It would be impossible to think of our city without thinking of the magnificent stands of trees that line our great boulevards such as Alexandra Ave, St Kilda Rd and Victoria Pde, or those in the beautiful parks such as Fawkner and Royal parks. Then there are our treasured gardens, Fitzroy, Carlton, Flagstaff and Treasury. And the crown jewels, the Royal Botanic Gardens and the Shrine Precinct, King's Domain.

The new State Government has asked Victorians to come up with a new slogan for our number plates. I wouldn't mind betting that many people will want to go back to the future: The Garden State. It sums up our love of trees, whether in our back yard or a local park or street.

There is a major tree challenge before us.

Drought has ravaged many of our trees. This year, the City of Melbourne put an extra \$7.2 million into watering, mulching, replanting and replacing trees. That's on top of the \$11 million we spend every year.

While the recent rains have bought our trees some time, many are coming to the end of their natural lives.

We have employed the best science — thermal imaging fly-overs to map our city's forest, collaboration with the US Department of Agriculture's Forest Service, installation of weather stations, working with the CSIRO and the Bureau of Meteorology for long-term data analysis, harvesting storm water to drought-proof streets, stimulating trees with soil additives and shrinking trees' canopies so they need less water.

But it is a losing battle.

Take the Lombardy Poplars along Birdwood Ave, next to the Shrine, that were planted in 1938. They needed replanting and we replaced like with like. Sixty per cent of the replacements have failed in the past four years.

The trees of Alexandra Ave, planted in 1901, are coming to the end of their lives and this has been accelerated by drought.

The plane trees in Carlton South Gardens are more than 100 years old and are failing.

The elms in Fitzroy Gardens and Victoria Pde were planted in the 1880s and are old for urban trees.

The trees of St Kilda Rd are in terrible condition and have reached replacement time.

The beautiful elms in Carlton North Gardens may be more than 150 years old and are at the end of their generation.

Though elms and planes are tough, hardy trees, they are not bullet proof. And the elms and planes together comprise 20 per cent of our tree total.

So we have to continue adapting

Frequency: -----S

and protecting, but also to plan for our next urban forest. And this time, plant so that they don't all fail at the same time in one more tree generation, which is about three human generations.

This time, we also have to factor in problems our forebears didn't face — lower rainfall, more heat, the effects of pollution and natural pests such as Dutch elm disease and the sycamore lace bug.

Do we want 75 per cent of our city trees as planes, given that plane trees are diabolical when they seed in hot, windy conditions? As any hay fever sufferer knows.

We have been given a heritage of trees by Melbourne's planners and builders. Now it's time for us to provide for our successors in the same way.

The good news is we are working hard on our tree challenge.

In some parts of Melbourne, you will see like-for-like replacement. St Kilda Rd is an example. New plane trees are appearing along our great boulevard of entry to the city; for example, immediately outside the NGV.

Elms will be another example. Sometimes, better species work.

The Lombardy poplars of Birdwood Ave have been replaced by lemon-scented gums. They work, the replacement poplars didn't, so we were determined not to let the past disable the future, even in such a sensitive planting.

In other areas, depending on soil, climate and local conditions, a combination of three, four or five different species may work.

We often think of the trees as the lungs of our city, but they are also, in some ways, our heart and soul.

The whole community owns our trees and our future trees.

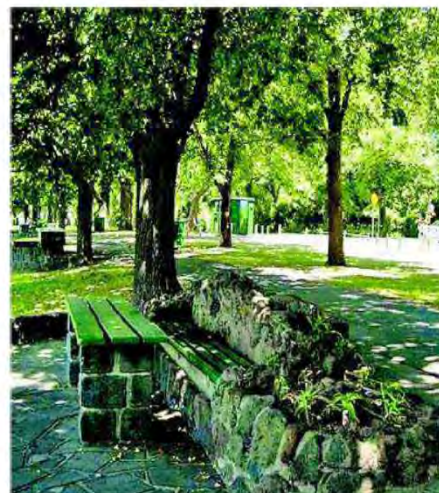
So over the next six months, we at "city hall" are going to talk to, debate with and work with the whole community to develop a new urban forest strategy.

I hope *Sunday Herald Sun* readers become involved. We would welcome it.

There are few political, budget or policy decisions that must deliver for people in 100 years.

In politics, so much is driven by the artificial three or four-year election cycle. Not this plan. Our trees are too important.

Robert Doyle is the Lord Mayor of Melbourne.



Ravages of time: A stand of Melbourne's trees in 2004 (left) and now. Drought and age have left their marks and many must be replaced.

THE AGE

New shade of green for the city

6 January 2012

It's out with the old and in with a new tree canopy for Melbourne, writes **Megan Backhouse**.

NOW that the solitary, gangly pine tree — 30 metres tall and all that remains of the celebrated Takata Matsubara forest in north-east Japan after the tsunami last March — is dying, all hopes are being pinned to grafting the tree and raising seedlings.

The pine, which until 10 months ago was just one amid 70,000, has come to mean more than its lean trunk and thin crown, something more than its materiality. It has become a symbol of hope and, for a time at least, survival.

Just as trees provide the bones of many private gardens, they help set the tone of the wider public landscape. Like the Japanese pine, this can be because of the emotions we pin to them as well as their physical presence.

When 43 elms in Yarra Park were to be spray-painted blue for the 2006 Commonwealth Games, for example, such was the dismay that the art project was shelved. And, as has been shown time and time again, there is no surer way to prompt an outcry than when councils suggest replacing existing exotic street trees with native ones.

So with the City of Melbourne expecting 44 per cent of its trees to die, or at least be at the end of their "useful life", within the next 20 years, what to do? Architects from Christopher Alexander to Jan Gehl have spoken about how positive urban spaces must

provide for people, their feelings and a multitude of uses. Trees are often central to this.

In November the council released its Draft Urban Forest Strategy 2012-2032, setting out how Melbourne can become "a city within a forest rather than a forest within a city" now that more than a century has elapsed since much of Melbourne's open space was landscaped.

To this end, the City of Melbourne's strategy proposes almost doubling public canopy cover to 40 per cent by 2040 and introducing a 5 per cent limit on the proportion of its trees devoted to any one species, as well as limits on the proportion of trees devoted to any one genus or family. While there are currently more than 250 species represented among the city's 60,000 public trees, 21,000 of them consist of elms (12 per cent of the tree population), planes (12 per cent) and river red gums (11 per cent).

On the one hand, these trees help create what we consider the character of Melbourne, but, on the other, the dominance of such a narrow band of species leaves them susceptible to pests, diseases, heatwaves and droughts. Under the strategy, no particular species would ever have such a strong presence in again. But if nothing is done, whole avenues of trees will soon be lost anyway, with more than half of Melbourne's elms, for example, expected to be removed within 10 years.

Dr Greg Moore, chairman of

the National Trust's Register of Significant Trees and a senior research associate at the University of Melbourne, says there is a fine balance between meeting the needs of the current population and appropriate planning for the future.

He says the strategy is a bold one that will have a positive impact on the landscape for many generations to come, even though it will require the sacrifice of some "magnificent" canopies for a time.

"People of this time I think have been remarkably short-sighted and given no recognition to the sacrifices of the previous era and not been prepared to make their own sacrifices for future generations," he says.

Trees — ever-changing and ultimately dying, as they do — can never be viewed as a static part of the landscape and, under the strategy, the emphasis will be on increasing biodiversity and introducing a much wider range of plant species (both natives and exotics) with varying life expectancies, growth rates and growing conditions. Green roofs, walls and balconies will also play a bigger role.

Perhaps in a sign of the species to come, when it came to planting additional trees in my City of Melbourne street — currently dominated by elderly elms — earlier this year, residents were given the choice of white cedar (*Melia azedarach*) or October glory red maple (*Acer rubrum* October glory). It went to the vote and, this being East Melbourne,

the North American maple with its autumn colour was chosen.

While the council's strategy acknowledges that trees physically define a space and help define a city's character in the same way as architecture and other aspects of urban design, there is an implicit understanding that personal taste and current fashion for particular species is a moveable feast. The

City of Melbourne outlines environmental, economic, social and health reasons for its strategy, but sensibly steers clear of the question of the aesthetic appeal of specific trees.

What it does dwell on though, is how to keep the community informed so the public is more engaged with the city's vegetation and its process of evolution. To this end, an online consulta-

tion forum has been developed, a physical forum held, a video produced (it was viewed 800 times in its first two weeks) and submissions sought. The public has until the end of February to express an opinion.

LINK

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Imagine the cityscape with a green roof (above picture), or City Road (below) taking on an urban forest appearance, or city as a large green roof (below) or Westside industrial complex in Frankfurt, Germany (below).



Create spaces for people



Green verandah



Coexisting with nature

