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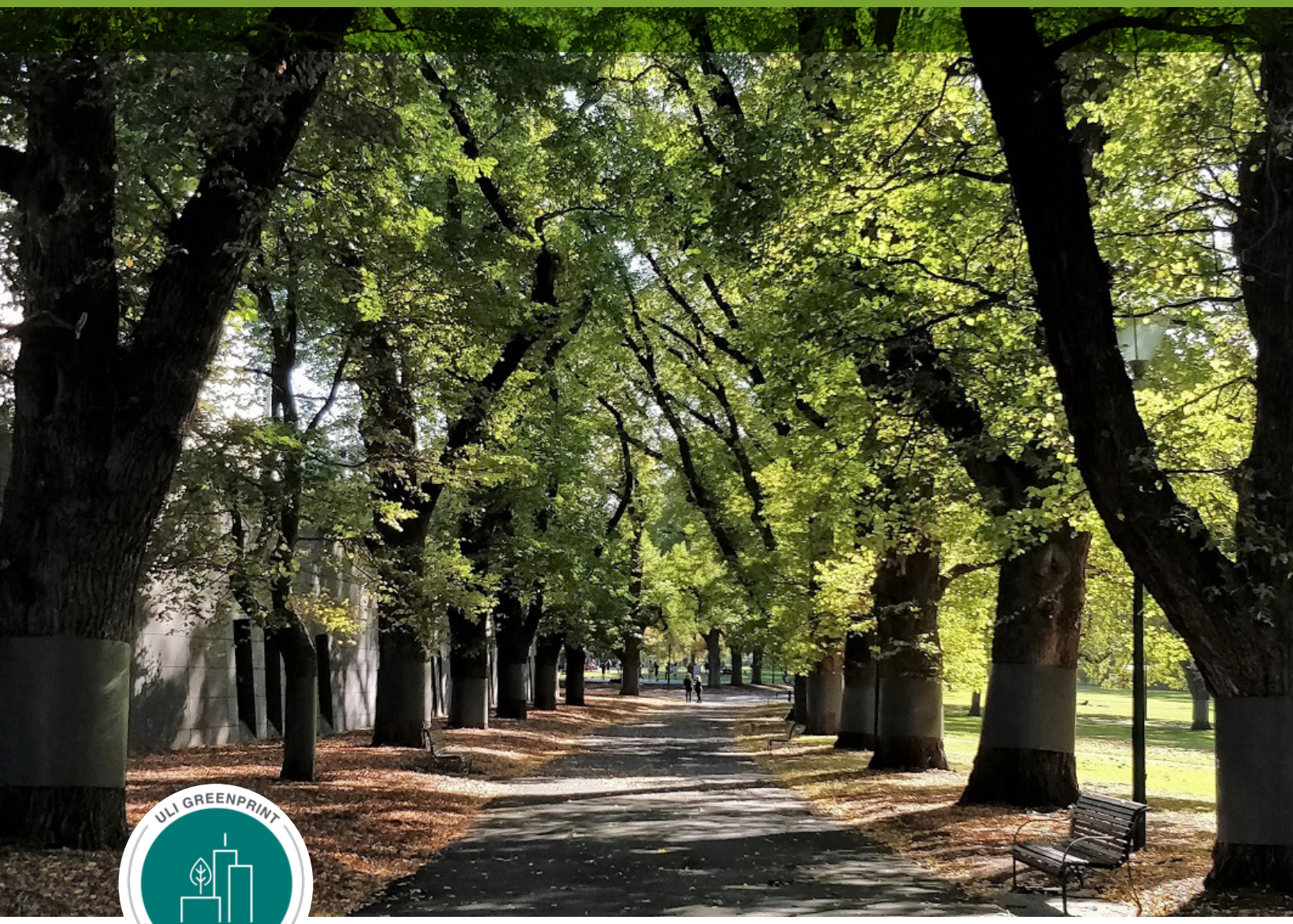
VICTORIA STATE GOVERNMENT DEPARTMENT OF TRANSPORT AND PLANNING

Urban Land Institute Net Zero Imperative Technical Assistance Panel



ULI GREENPRINT NET ZERO IMPERATIVE

Technical Assistance Panel Report | 28 NOVEMBER 2024

THIS REPORT IS PREPARED BY:
ULI Australia

ON THE COVER: Melbourne Trees. *(Victoria State Government Department of Transport and Planning)*.

Disclaimer

The views, opinions and conclusions expressed in this report are those of the Urban Land Institute Technical Assistance Panel authors and do not necessarily reflect the views or policies of the Department of Transport and Planning. The Technical Assistance Panel was convened to prepare recommendations on the concept of Street Trees being considered as an Essential Service and approaches for implementation by the Department of Transport and Planning and are subject to further consideration by the Department of Transport and Planning. The content of this report is provided for strategic advice and informational purposes only and should not be construed as an endorsement by the Department of Transport and Planning.

Acknowledgement of Traditional Owners

ULI Australia and the Department of Transport and Planning respectfully acknowledges the Traditional Owners of the land we govern, the Barengi Gadjin, Bunurong / Boon Wurrung, Dja Dja Wurrung, Eastern Maar, Millewa Mallee, Gunaikuranai, Gunditkj Mirring, Taungurung, Wadawurrung, Wamba Wemba, Wurundjeri Woi-wurrung and peoples of the Kulin/ Yorta Yorta Nation and pays respect to their Elders past and present. We acknowledge and honour the unbroken spiritual, cultural and political connection they have maintained to this unique place for more than 2000 generations. We accept the invitation in the Uluru Statement from the Heart and are committed to walking together to build a better future.

About the Urban Land Institute

The ULI is a global nonprofit education and research organisation that focuses on land use, real estate, and urban development with a history of independent research and solutions that are not political. The ULI connects public and private sectors with pragmatic land use expertise and a commitment to global knowledge sharing.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics.

Established in 1936, the Institute has a presence in the Americas, Europe, and the Asia Pacific region, with members in 80 countries. More than 45,000 real estate and urban development globally minded practitioners are dedicated to advancing the Institute's mission: shape the future of the built environment for transformative impact in communities worldwide.

More information is available at uli.org. Follow ULI on Twitter, Facebook, LinkedIn, and Instagram.

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The ULI Australia is governed by a National Executive Committee made up of leaders who have a commitment to and experience in delivering the goal of the ULI nationally and globally. Leadership of the Council is provided by the Chair and ULI Global Governing Trustees domiciled in Australia with representation by Chairs of the Melbourne District Council, Brisbane District Council and Sydney District Council.

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The ULI Advisory Services Program provides strategic global best practice advice on complex land use planning and real estate development issues.

For 75 years the ULI Advisory Services Program has provided philanthropic strategic advice and delivered more than 700 expert panels featuring 2000 real estate leaders in 47 states, 12 countries and 4 continents. Panels are praised for their comprehensive, pragmatic approach to solving land use challenges.

ULI Australia conducts a range of Technical Assistance Panels (TAPs), providing global perspectives and objective, responsible advice to local decision-makers on a wide variety of land use and real estate issues, from site-specific projects to public policy questions. The TAP program is intentionally flexible to provide a customised approach to specific land use and real estate issues. In fulfilment of the ULI global mission, this TAP report is intended to provide objective advice that will promote the responsible use of land to enhance the environment.

Learn more at https://australia.uli.org/programs/advisory-services/.

Acknowledgment

The Department of Transport and Planning are the beneficiary of this thought leadership work. The TAP would like to thank and acknowledge the Department of Transport and Planning for their work in preparation, support and coordination leading up to and during the TAP. The TAP would also like to thank the stakeholders and strategic advisors who shared their perspectives, experiences, and insights with the TAP.

Technical Assistance Panel

Strategic Advisers and members of the TAP are volunteers dedicated to providing a professional service to government in support of civic and industry sustainability transformation.

Distinct from Advisory Services panels, TAPs leverage local expertise through a half-day to three-day process.

Technical Assistance Panel, Strategic Advisers and Stakeholders

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Stockland

Frasers Property Australia

Hume City Council

City of Casey

Yarra Valley Water

Tree Net

Greening the West

RMIT

SA Water

WA Local Government Association (WALGA)

WA Department of Planning, Lands and Heritage

Victorian Planning Authority

Infrastructure Victoria

Queensland Government Department of Planning

University of Melbourne

Circular Australia

A Message from TAP Chair

It is with great pleasure that we present this ULI Net Zero Imperative Technical Assistance Panel Report.

As passionate industry professionals who have been working on street tree canopy projects for over twenty years, we are incredibly excited to present these findings for consideration to the Department of Transport and Planning.

Whilst the recommendations of this report are informed by the global case study review, national case study review, national stakeholder interviews and workshops undertaken by the Technical Assistance Panel and Strategic Advisers, we would like to acknowledge the abundance of work undertaken on this topic across the industry, both locally and internationally.

We are thankful to all those who have volunteered their time to participate in the preparation of this Technical Assistance Panel Report and to those who have undertaken prior research.

We feel that this report is the first time that such a breadth of consultation and analysis has been brought together to form tangible and actionable recommendations. We are excited by the opportunities that these recommendations present in bettering the communities of Victoria.

We look forward to continuing this conversation with the ULI, Department of Transport and Planning and the broader industry to create lasting change to our urban environment.

Victoria Cook (TAP Chair)
Senior Development Adviser,
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Street with tram tracks in Melbourne.

IMAGE SOURCE: PEXELS

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THE TECHNICAL ASSISTANCE PANEL ASSIGNMENT AND KEY RECOMMENDATIONS

The Department of Transport and Planning (DTP) set the assignment for the ULI Net Zero Imperative TAP. The TAP was assigned the challenge to explore recommendations and suggested next steps to give higher priority and status to the role of street trees in our communities and to offer suggestions as to how to unlock some of the existing barriers to delivering sustainable street tree outcomes.

This poses a range of challenges from the complexities of construction, Australia's essential services landscape and existing policy frameworks. These recommendations will be considered by DTP for inclusion in Plan Victoria – A regional planning document which will define the way Victorians live, work and connect in a sustainable way to 2050. The key objectives of the TAP assignment are outlined below.

The TAP Objectives

- Explore the concept of street trees being considered an essential service and the structures, systems, funding, and implementation plans associated with this.
- Leverage experts both internationally and from within the ULI Australia Net Zero Cohort to identify and discuss the concept of street trees as an essential service and the associated opportunities and challenges.
- Develop a range of tools and recommendations to assist in prioritising street trees. This could include recommendations for a coordinated approach to street tree management, amendments to existing statutory requirements to give greater priority to street trees and/or the development of a Street Tree Essential Service Practice Note (or similar) concept for use locally and nationally. This would be the first of its kind in Australia.
- These findings are also intended to be shared with other Local and State Government Authorities and service providers nationally to promote change to current street tree design practices.

The Tap Focus Areas

To inform the development of options and recommendations, the TAP was asked to focus on the following key themes:

- **Space and health** – the need to allow trees enough space to grow and thrive and to access water (such as locating water and sewer services under the road, permeable pavements, integrated water management techniques and solutions for passive irrigation etc) and the barriers to achieving this.
- **Funding** – the cost of implementing the measures to improve the space and health aspects as noted above, and the cost and responsibility of ongoing care and maintenance.
- **Implementation** – currently all government organisations (state, local and service authorities) are working independently on this issue with different policies rules and regulations. It is largely up to the developer and their consultants to negotiate an outcome.

Aerial view of a suburb in Melbourne.

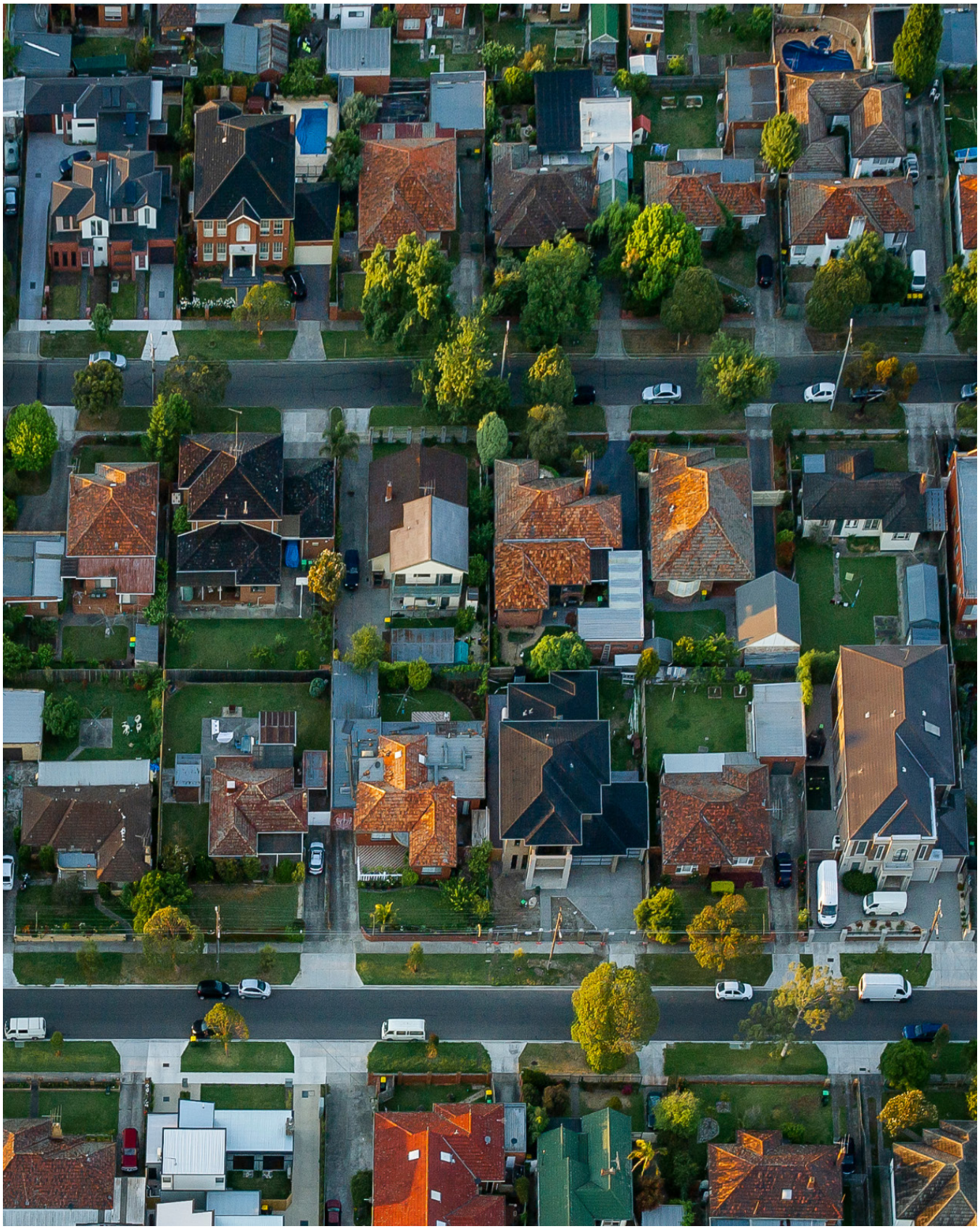


IMAGE SOURCE: GETTY IMAGES

TAP Key Insights and Takeaways

The current challenges being faced in Victoria to prioritise street trees are not exclusive. Through our local, national, and international review, many localities are experiencing the same challenges from policy direction to human behaviour.

The technical solutions exist. In fact, these technical solutions are already being delivered in some localities around Australia and across the globe. The challenge is leadership, policy direction and the need for coordination across government departments, councils, and agencies.

Street trees are often considered last in the design and construction of roads. However, there is a unanimous view that street trees are the most important aspect of a street from an environmental, health and wellbeing, economic and social perspective and this position needs to change.

Street tree canopy coverage targets and data is key. Without tree canopy targets and the associated data collection of changes over time, we cannot strive to improve the current situation or measure the impact that these changes will have on our local communities over time.

Whilst the TAP assignment is focused on recommendations for Plan Victoria and specifically explores the growth area context, the TAP would like to acknowledge that tree canopy targets are an issue for areas other than the growth areas (such as inner urban, infill, industrial and regional areas) and implementation issues exist for locations other than local streets (such as connector and arterial roads, waterway corridors and local parks). Whilst the TAP did not explicitly explore these issues, the TAP would like to emphasise the importance of addressing them and the need to also explore implementation strategies to assist in improving the tree canopy outcomes for all communities within Victoria.

TAP Key Insights

Derived from case study reviews, strategic advisor and stakeholder interviews and workshop discussions on how DTP can support street trees as a higher priority in greenfield areas, below is a summary of the key insights.

The TAP highlights the importance of addressing and exploring strategies to improve tree canopy outcomes across Victoria's communities.

TAP Key Recommendations

The following six key recommendations were identified and selected by the TAP as having the most potential for impact and accelerating change. These have been investigated and developed by the TAP members into more detailed recommendations in the report.

DTP can support street trees as a higher priority in greenfield areas.

01.	**A Tree First Approach.**	Street trees need to be considered an essential service, prioritised first in the planning and design of road infrastructure to ensure their survival in the urban landscape. Other services should then be planned around the street tree rather than the other way around.
02.	**Tree Canopy Cover Targets.**	Tree canopy cover targets are an essential element of effective urban forest strategies and plans. They explicitly describe a desired future state for urban greening. Appropriate canopy cover targets set at a spatial scale coupled with regular data collection is critical to achieving better street tree outcomes for our communities.
03.	**Urban Design Outcomes to Address Street, Lot, and Housing Design to Achieve Enhanced Street Tree Coverage.**	Signature streets with continuous street tree canopies should be introduced to ensure the highest levels of liveability and promote general health and well-being.
04.	**The Road Management Act 2004 (RMA) Code of Practice for the Management of Infrastructure in Road Reserves (MIRR) 2016 reform.**	A revision to the MIRR is critical to changing the current process of considering street trees last in the planning and design phases. It will provide the opportunity to "reset" the importance as street trees as "non road infrastructure" and provide clear and consistent guidelines for the locations and clearances of other services (such as sewer and water) within the street.
05.	**Development of Street Tree Guidelines.**	To provide clarity to the industry, a consistent State-based street tree guideline should be developed. The guideline should respond to Victoria's diverse climate and geology and should set minimum requirements to allow street trees to thrive across the State.
06.	**Governance.**	The technical solutions to improve street tree and canopy coverage outcomes already exist and are being implemented in various localities across Australia and globally. However, the real challenge lies in leadership, policy direction, and the need for effective coordination and collaboration.

A street-level perspective of Hallam, Victoria, showcasing its tree canopy and landscape.

IMAGE SOURCE: GETTY IMAGES

INTRODUCTION

Trees are the most affordable, efficient, accessible, and actionable solution for carbon removal and sequestering. They combat climate change through the absorption of carbon dioxide from the air which is stored in their roots, leaves and trunks. This process results in conversion rates of 50% of their weight into carbon and releasing oxygen into the atmosphere. Trees effectively trap carbon, reducing the amount of CO2 in the atmosphere.

Increasing tree canopy in urban communities will support government agencies to achieve their stated carbon emissions objectives.

In addition, benefits from greener streets include the regeneration of natural systems and biodiversity, improving public health and amenity. The shift to consideration of street trees as an essential service can significantly change planning opportunities to improve canopy cover in communities and enable funding for maintenance of these vital natural assets.

Street trees, often regarded as visual adornments to urban landscapes, actually serve as essential components of thriving communities, warranting recognition as integral municipal services. Their benefits extend far beyond aesthetics, encompassing environmental, social, and economic dimensions that are crucial for sustainable urban development.

Street trees play a pivotal role in mitigating environmental challenges prevalent in urban areas. Through photosynthesis they release oxygen, improving air quality. Their presence helps combat the urban heat island effect by providing shade, reducing temperatures, and conserving energy by lowering the need for air conditioning in nearby buildings. Moreover, street trees intercept rainfall, reducing runoff and alleviating strain on stormwater management systems, thereby mitigating the risk of flooding. Additionally, they act as natural filters, capturing airborne pollutants and particulate matter, thereby improving overall air quality and public health.

Beyond environmental considerations, street trees foster social cohesion and well-being within communities. They provide spaces for recreation and relaxation, encouraging outdoor activities and promoting physical and mental health. Research indicates that exposure to green spaces, including street trees, correlates with reduced stress levels, improved cognitive function, and enhanced overall quality of life. Moreover, street trees offer opportunities for social interaction and community engagement, serving as gathering spots for residents to connect and build relationships. They contribute to a sense of place and identity within neighbourhoods, fostering civic pride and a shared commitment to urban greening efforts.

From an economic perspective, street trees offer substantial returns on investment. They increase property values and attract businesses, contributing to economic vitality and local prosperity. Studies have shown that properties with well-maintained street trees command higher selling prices and shorter time on the market compared to those without.

Moreover, street trees have the potential to reduce energy costs for both residents and businesses by providing natural shade, cooling, and wind speed reduction, leading to potentially significant savings on

SOURCE: GETTY IMAGES

Aerial view of Greater Melbourne.

heating and cooling expenses.

In conversations with various sectors of the development industry, there is widespread recognition of the pivotal role street trees play in urban environments. Their benefits are diverse, encompassing enhancements to street aesthetics, local amenities, pedestrian and cyclist comfort with shade provision, mitigation of heat island effects, improved public health outcomes, and fostering ecological diversity.

However, our communities often grapple with subpar street tree outcomes, attributable to issues like inadequate tree selection, planning, planting distribution, clashes with existing services and ongoing maintenance and management. This deficiency has cascading effects on the aforementioned benefits.

Fortunately, many industry stakeholders are actively addressing this challenge. The wealth of existing research in this domain underscores the importance of informed action. From studies demonstrating the health benefits of tree-lined streets to reports highlighting the efficacy of canopy coverage in mitigating heat islands, ample evidence exists to guide decision-making. Technical manuals detailing best practices in street tree selection and planting

Street trees are vital for urban areas, improving air quality through photosynthesis and mitigating the urban heat island effect by providing shade, lowering temperatures, and reducing energy use.

further equip industry professionals with the tools needed to effect positive change.

So, what are the barriers?

The barriers to improving the street tree outcomes tend to relate to:

- **Space and health** – the need to allow trees enough space to grow and thrive and to access water (such as locating water and sewer services under the road, permeable pavements, integrated water management techniques and solutions for passive irrigation etc) and the barriers to achieving this.
- **Funding** – the cost of implementing the measures to improve the space and health aspects as noted above in item 1 and the cost and responsibility of ongoing care and maintenance.
- **Implementation** – currently all government organisations (State, local and service authorities) are working independently on this with different policies rules and regulations. It is largely up to the developer and their consultants to negotiate an outcome.

Industry stakeholders are united in their commitment to improving street tree outcomes, leveraging research insights and collaborative efforts to create more liveable and sustainable urban environments.

Recognising street trees as an ***'essential service'*** could assist in prioritising their consideration at the design and planning phase, their relationship to the placement of other essential services and their long-term care and maintenance. Adequate funding and resources should be allocated (as is with other essential services) to ensure proper planting, pruning, and upkeep, thereby safeguarding their longevity and maximising their benefits to our communities.

A tree lined street in Melbourne.

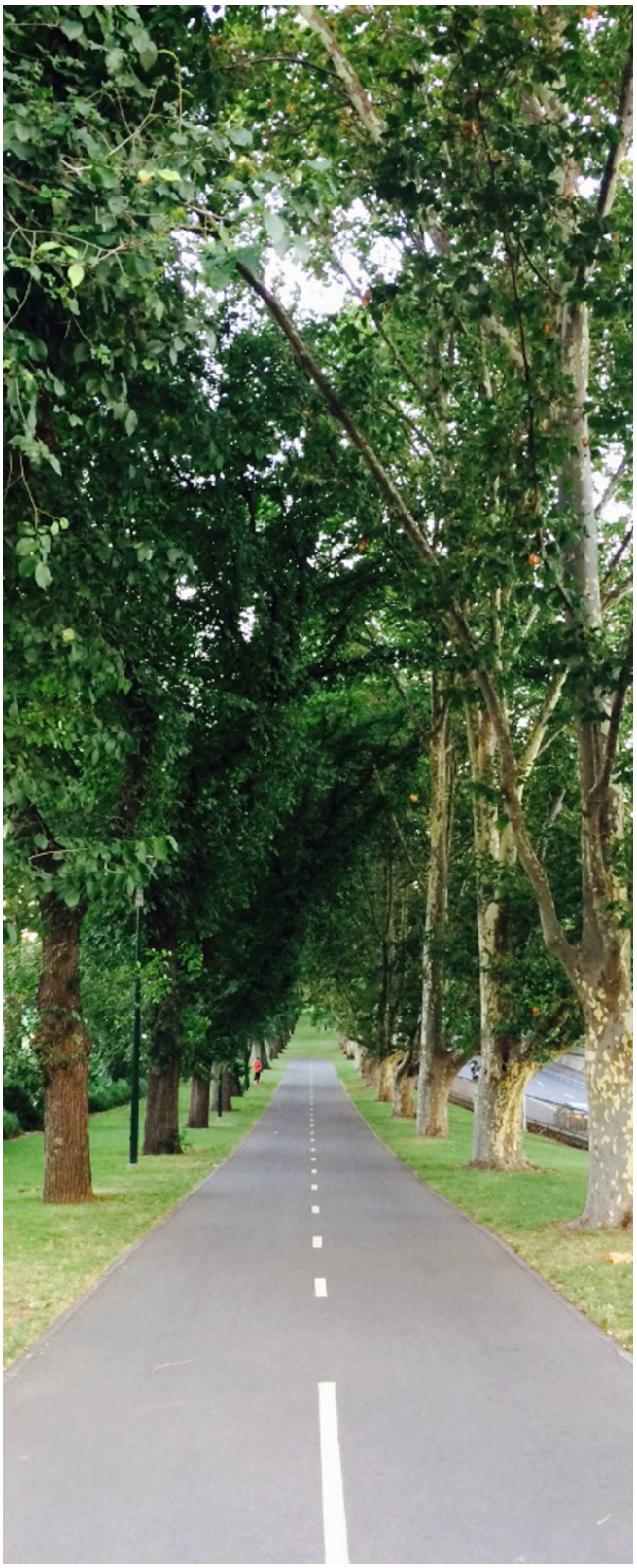


IMAGE SOURCE: GETTY IMAGES

A National Circular Economy Perspective on Street Trees

By Lisa McLean (Strategic Advisor)

Circular Australia Definition: Circular economy decouples economic growth from the consumption of finite resources and designs out waste. It is based on three principles:

- Design out waste and pollution at every stage of production and end use.
- Keep materials in the economy at their highest value for as long as possible;
- Regenerate natural systems.

Introduction

In a resource and carbon constrained future - circular economy is emerging as the best economic framework to grow industries and jobs while tackling the triple planetary crises. Seventy-five percent of G20 countries have circular economy policies to enshrine action across the three pillars of a circular economy: Design out waste and pollution; Keep materials at their highest value in the economy for as long as possible; and regenerate natural systems. Importantly, the circular economy provides opportunities to utilise First Nation's unparalleled knowledge and expertise, including how to Care for Country.

Street trees as an essential service

Enhancing canopy cover in urban communities will be a core action to regenerate natural systems, improving health, amenity, and biodiversity. Determining street trees as an essential service is a powerful approach that can significantly increase canopy cover in communities and enable viable funding for long-term maintenance and servicing of these critical natural assets. Unlike investment and planning in essential water, energy, waste and mobility infrastructure and services - green space, trees and canopy cover can be seen as an optional investment. It is not covered by development charges even though trees - like other essential services - are fundamental to the well-being and survival of individuals, communities, and nature. They ensure basic needs are met and contribute to the overall stability and quality of life in society.

Considering street trees as an essential service can significantly improve outcomes in growth areas including enhancing air quality, providing shade, improving aesthetic value, supporting biodiversity, and mitigating urban heat effects.

Benefits

The concept of treating street trees as essential services can greatly enhance urban environments, especially in growth areas where there is less canopy cover. This perspective highlights the critical roles trees play, including improving air quality, providing shade, enhancing aesthetics, supporting biodiversity, and reducing urban heat. By prioritising street trees, cities can achieve better urban planning, sustainable growth, health benefits for residents, increased biodiversity, and long-term cost savings.

How to implement: structures and systems required

- **Urban forestry management framework:**

Establish a comprehensive urban forestry management framework to include policies, goals, and strategies for maintaining street trees as essential components of urban infrastructure.

- **Statutory Amendments and Policy Recommendations:** Amend existing urban planning and development regulations requiring developers to include street trees in their plans, incorporate larger trees in infrastructure and roads development. Enforce tree preservation during construction and mandate tree replacement for any removed trees. Increase fines for vandalism.
- **Street Tree Essential Service Practice Note:** Develop a comprehensive practice note that defines street trees as an essential service, outlining best practices for planting, maintenance, and community involvement. Include guidelines for species selection, planting techniques, care and maintenance schedules, and performance evaluation metrics.
- **Cross-department/ agency collaboration:** Foster collaboration between urban planning, public works, environmental sustainability, and community services and government departments to ensure that street trees are integrated into all relevant projects.
- **Community engagement programs:** Implement programs that engage the community in tree planting, care, and education about the benefits of street trees, fostering a sense of stewardship among residents.
- **Data collection and monitoring:** Develop systems for collecting data on tree health, growth, and canopy coverage. This can inform maintenance strategies and help track the success of urban forestry initiatives.
- **Tree canopy targets:** Incorporate tree canopy targets into zoning and development regulations to ensure new developments include adequate space for trees and landscaping - particularly large trees. Design streetscapes that provide sufficient space for tree roots to grow. This includes using tree pits with ample soil volume and avoiding compacted soil conditions that can inhibit root development.
- **Prioritising native species:** Native tree species are best adapted to local climates and soil conditions. Most importantly they provide habitat for local wildlife. Native trees usually require less maintenance and are more resilient to pests and diseases.
- **Utilising green infrastructure:** Design green infrastructure that incorporates trees and vegetation, such as bioswales, permeable pavements, and green roofs. These features can enhance tree growth by improving soil conditions and managing stormwater.
- **Engage the community:** Involve local residents in tree planting and maintenance initiatives. Educational programs can raise awareness about the benefits of street trees, fostering a sense of ownership and responsibility.
- **Maintenance & longevity**
    - **Establish tree canopy assessment programs:** Regular assessments of existing tree canopy cover and health to identify gaps, timing of new plantings.

Kills rates and fertilisers

- **Maintenance programs:** Optimum maintenance programs for pruning, watering, and biodiversity management to ensure the long-term health of street trees. Adequate care is essential to maximise their growth potential.

- **Monitor & continuous improvement:** Continuously monitor the growth and health of street trees and evaluate the effectiveness of planting strategies. This information can be used to adjust practices and improve future outcomes. It can also assist in designing technical solutions and systems.
- **Tree ordinances:** Local regulations that protect existing trees and promote planting new ones, often requiring developers to include tree planting in their projects.
- **National and international agreements:** Participation in global initiatives, such as the Bonn Challenge or the UN's Billion Tree Campaign, which set targets for tree planting and forest restoration.
- **Legal rights for trees:** The concept of legal rights for trees is an emerging legal practice. Legal rights have typically been granted to individuals and entities, however some jurisdictions are beginning to recognise the rights of trees, waterways, and nature:
    - **Legal personhood:** Some countries and regions have granted legal personhood to natural entities, including trees and rivers. This means that these entities can be represented in court and have rights similar to those of a person. For example, in New Zealand, the Whanganui River was granted legal personhood, which has implications for the protection of the river and its ecosystems, including the trees along its banks.
    - **Environmental laws:** Many environmental protection laws indirectly recognise the importance of trees by regulating activities that could harm them. These laws often aim to preserve forests, protect endangered species, and maintain biodiversity. While these regulations do not grant trees rights per se, they do create a legal framework that recognises the value of trees in ecosystems.
- **Community rights:** Some communities have established rights for nature, arguing that local ecosystems, including forests and trees, should have a voice in decisions affecting them. This can lead to local ordinances that protect trees and forests from development or exploitation.
- **Advocacy and legal action:** Environmental organisations and activists often pursue legal action to protect trees and forests arguing for the rights of trees based on their ecological importance and the benefits they offer humanity. This can include lawsuits to stop deforestation or to enforce existing environmental laws.
- **Recognition of ecosystem services:** There is a growing recognition of the ecosystem services provided by trees, such as carbon sequestration, air purification, and habitat provision. While this recognition does not equate to legal rights, it influences policy discussions and the legal frameworks surrounding environmental protection.

Funding Mechanisms

- **Public-Private Partnerships:** Many cities have engaged in shared investment and resource partnerships with private organisations, businesses, and non-profits to fund urban forestry projects. For instance, in Seattle, the city collaborates with local businesses and non-profits to fund tree planting initiatives which enhances the urban canopy and supports local green space.
- **Tree canopy bonds:** Some municipalities have explored the use of green bonds specifically for funding tree planting and maintenance. These bonds allow cities to raise capital for urban forestry projects while providing investors with returns linked to environmental benefits. An example is the City of Paris, which has issued green bonds to fund its urban forestry initiatives, resulting in increased green space and improved air quality.
- **Community-based funding:** Engaging local communities in funding efforts can be effective. Crowdfunding campaigns and community fundraising events allow residents to contribute directly to tree planting projects. EG: Adopt-a-Tree Programs where residents sponsor the planting and maintenance of street trees. EG: in San Francisco, community organisations have successfully raised funds through local events to support tree planting and maintenance efforts in neighbourhoods, fostering community involvement and ownership.
- **Developer contribution:** Some cities require developers to contribute to tree planting and maintenance as part of their development projects. This can take the form of impact fees or in-kind contributions. For instance, in Austin, Texas, new developments are required to implement tree protection measures and contribute to urban forestry funds, which help enhance the city's tree canopy and improve community aesthetics.
- **Dedicated Budgets for Urban Forestry:** Establish dedicated budgets for urban forestry initiatives, ensuring consistent funding for planting, maintenance, and community engagement efforts related to street trees.
- **Public-Private Partnerships:** Encourage partnerships between local governments and private businesses or organisations to fund tree planting and maintenance initiatives, leveraging additional resources
- **Grants and Incentives:** Dedicated government funding/grants focused on circular economy, sustainability, health, liveable communities
- **'As a service' (AaS) business models:** These have proved to be highly successful business models where the residual value of the asset stays with the owner - driving ongoing revenue from products while improving material efficiencies and productivity and lowering the upfront capital costs to end users. Examples include lighting as a service, mobility as a service, energy as a service, fashion as a service. Extending AaS models to street trees could provide long term jobs, reduced capital costs.
- **Grant Programs:** Various Federal and State programs provide grants specifically aimed at urban greening and tree planting initiatives. For example, the USDA Forest Service

offers grants for urban forestry projects that enhance community tree canopies. These grants can fund both installation and maintenance, leading to improved environmental and health outcomes in communities.

- **Cities are increasingly recognising the role of trees in green infrastructure.** Funding models that incorporate trees into stormwater management and climate resilience projects can provide financial support for tree planting. For instance, Philadelphia's Green City, Clean Waters program integrates tree planting with green stormwater infrastructure, resulting in improved water quality and increased urban greenery
- **Community Benefit Agreements:** Developers enter into community benefit agreements outlining commitments to fund local environmental initiatives, including tree planting and maintenance efforts.
- **Incentive Programs for Building / landowners:** Policies that provide financial incentives or tax breaks for private landowners who plant trees or maintain existing tree cover on their property.

Circular Economy and Street Trees

Circular economy frameworks are successfully enabling communities and precincts to regenerate natural systems. Incorporating circular economy strategies can further enhance tree canopies by promoting sustainable practices, reducing waste, and engaging local communities. Circular strategies can assist in managing organic waste from landscaping and tree maintenance with composting or mulching of the waste. It can be used to nourish new tree plantings and support the health of existing trees. This practice not only reduces landfill waste but also chemical fertiliser use, improving soil quality, contributing to better tree growth and increased canopy coverage. NSW EPA Cool Compost project supported by Circular Australia[1] evidences the productivity benefits of organic waste replacing chemical fertiliser. Kill rates of shrubs and trees dropped from 25% to 4%. Additionally, some suburbs have adopted policies that promote the use of reclaimed materials for tree planting infrastructure. This includes using recycled materials for tree guards, planters, or other support structures. Such practices minimise resource consumption and help integrate circular economy principles into urban forestry efforts.

[1] Cool Compost, Circular Australia. Retrieved from https://circularag.com.au/compost/

International Examples

Cities worldwide have successfully implemented government targets for tree canopy coverage:

- New York City's "One Million Trees NYC".
- Los Angeles's Urban Forestry Program
- Melbourne's Urban Forest Strategy.
- Singapore's Urban Forestry Masterplan.
- United Kingdom "London Urban Forest" initiative.
- NSW Australia NSW Department of Planning is working with councils and Resilient Sydney to achieve a 40% tree canopy cover for Greater Sydney by 2036.
- Liverpool, Australia: "The Tree Management Framework" aims to achieve a 30% tree canopy cover by 2050.
- City of Sydney: overall green cover to 40% and the tree canopy to at least 27% by 2050.
- Toronto, Canada, Urban Forestry Management Plan & circular economy.
- Paris, France, the city has adopted an "Urban Forest" strategy that aligns with circular economy principles.
- Amsterdam, Netherlands, the city has implemented a circular economy strategy that includes urban greening initiatives.
- Vancouver, Canada, the city has set goals to increase tree canopy cover through its Urban Forest Strategy.
- Freiburg, Germany, the city has embraced sustainable urban development through its Environmental Protection Program.
- Portland, Oregon, developers are required to contribute to urban forestry efforts as part of their projects.
- Chicago US - developers of large projects may agree to invest a portion of their profits into local greening initiatives, contributing to the overall urban canopy.

Huge trees on the streets of Singapore.

IMAGE SOURCE: GETTY IMAGES

Street view in Toronto.

IMAGE SOURCE: GETTY IMAGES

The Federal Context

The current Federal Government has a strong reform and funding agenda for urban Australia and is 'committed to establishing genuine partnerships between the three levels of government, business and the community.'[2] The draft National Urban Policy (May 2024)[3] focuses on equity, belonging, safety, sustainability, health, wellbeing and productivity for all urban areas, and is underpinned with a wide range of funding and partnerships opportunities (refer Appendix 1.0 p.119).

The 2021 Australian Infrastructure Plan[4] also prioritises place-based outcomes for communities to unlock the potential of every location and address place vulnerabilities.

There is strong alignment between these federal government policies and the findings and recommendations of this report, unlocking the potential for new forms of collaborations and partnerships, and to access valuable federal funding to support implementation and optimised street tree, place and community outcomes.

The Victorian Context

Victoria is known as the Garden State and Melbourne in particular is defined by its parklands, tree-lined boulevards, waterways, and garden suburbs. These open spaces and urban forests of the city are the result of visionary planning and long-term investment from all sectors of society (Greening the Garden State p. 12)[5].

Despite this, recent analysis has shown that tree canopy is highly variable across Melbourne, with the highest cover being in the east and north, and much lower levels in the west. This includes tree canopy on private land, trees on public land such as parks and public spaces, and street trees.

Whilst Melbourne's leafy suburbs are highly valued, they are rapidly diminishing due to a range of pressures. In established areas, the redevelopment of larger house lots to accommodate townhouses and apartments, in addition to larger houses, has directly impacted tree canopy coverage on private property. A 2017 study of inner suburban Melbourne found that as the density of a development increased, both the proportion of trees on a lot, and the soft landscaping, decreased (Stanford and Bush, 2017)[6]. Further, the established street trees in these leafy suburbs are vigorously pruned if they are co-located with electricity poles and wires to provide clearance between the branches and the wires.

In Melbourne's greenfield areas, there is typically limited existing tree canopy and trees need to be proactively required in both public and private land to achieve similar rates of tree canopy cover as the established parts of Melbourne. However, the tree canopy coverage has been lower than expected

[2]Department of Infrastructure, Transport, Regional Development, Communication and the Arts, Cities, 2024.
[3]National Urban Policy, Consultation Draft, Australia Government, May 2024. Retrieved from https://www.infrastructure.gov.au/sites/default/files/documents/draft-national-urban-policy.pdf
[4]From Deficit to Equity, National Growth Areas Alliance, 2024. Retrieved from https://ngaa.org.au/application/third_party/ckfinder/userfiles/files/20241119_FINAL_EMBARGOED%20until%2021%20November%20-%20NGAA%20Policy%20Position%20Paper%202025.pdf
[5]Greening the Garden State: A Roadmap to a Greener Victoria, Nursery and Garden Industry Victoria. Mosaic Insights, 2024.
[6]Trees, Townhouses and Apartments: The effect of development density on private property tree distribution in Melbourne. Melbourne, The University of Melbourne. Stanford, H. & Bush, J., 2017.

in both private property and street trees. This is generally due to unfavourable planting conditions for trees thrive in road reserves, and smaller lots in greenfield areas with houses representing a larger proportion of the lot.

This has resulted in goals or targets for tree canopy to be included in the recent reviews of strategic planning frameworks guiding land use and development in Melbourne's established areas and greenfield suburbs.

Separately, in September 2023 the Victorian Government released Victoria's Housing Statement which included a target of delivering 80,000 new dwellings annually over the next ten years, with 70 percent of this to be accommodated in Melbourne's established areas and 30 percent in greenfield areas. This target is significantly higher than the new dwellings delivered annually over the past five years and will require substantial redevelopment of houses in established areas to accommodate townhouses and apartments.

There is a risk that the focus on redevelopment and increasing dwelling density in established areas will conflict with the tree canopy targets and exacerbate the loss of existing tree canopy while also restricting the opportunities for new tree canopy. Further, a lack of tree canopy will adversely affect the housing as there will be no shade, wind speeds will be higher, resulting in poor living conditions (air quality) and higher energy costs.

Similarly, dwelling density in Melbourne's greenfield areas will be increased to meet these housing targets. This is also likely to conflict with increasing canopy cover in these areas due to smaller residential lots and a higher proportion of townhouse developments restricting the planting of trees on private land, and narrower lot frontages with more frequent kerb crossovers limiting the number of street trees.

In addition to the potential conflict between the targets for new housing and increased canopy cover, there is a disconnect between the targets adopted in terms of planning strategy, and the implementation of these through the statutory planning requirements and other instruments.

Plan Melbourne 2017-2050[7] is the overarching metropolitan planning strategy that outlines the strategy for integrating long-term land use, infrastructure and transport planning in both established areas and designated greenfield areas.

The strategy outlined in Plan Melbourne is implemented through the Victoria Planning Provisions (VPP). These are the standard provisions that form the framework for all of Victoria's planning schemes, which include a range of statutory planning requirements relating to land use and development throughout Victoria. Each Local Government can develop a planning scheme using the VPPs.

For Melbourne's established areas, this is the primary mechanism for managing tree canopy cover on private land, and Local Governments control the planting and management of street trees.

Melbourne's designated greenfield areas are also subject to the directions of Plan Melbourne and Local Planning Schemes, however there is an additional layer guiding land use and development to facilitate the transition from rural to urban land uses. This is the Precinct Structure Plan (PSP) which facilitates the planning for new neighbourhoods, guiding the form of subdivision and development of land over the long term. They are incorporated into the relevant local planning scheme and implemented primarily through

[7] Plan Melbourne 2017-2050, Victoria State Government. Retrieved from https://www.planning.vic.gov.au/guides-and-resources/strategies-and-initiatives/plan-melbourne/the-plan

planning permit applications. This is the primary mechanism for managing tree canopy cover on private land.

Due to the nature of development in Melbourne's greenfield areas, the road network often needs to be developed or augmented, requiring the construction of many new roads. The design of new or augmented roads must meet the requirements outlined in the Engineering Design and Construction Manual for Subdivision in Growth Areas (EDCM)[8]. This manual includes typical road cross-sections that specify where each of the services and utilities must be located, including electricity, water, sewer, stormwater, telecommunications, footpaths, road reserves, and finally street trees.

The design process for new or augmented roads forms part of the planning permit, and the utility providers must approve the designs as part of their roles as Referral Authorities. Further, these utilities are considered essential services, and as a result the relevant Referral Authorities have the power to refuse to approve the design.

There is no equivalent authority acting on behalf of street trees in these negotiations, therefore the requirements of the utility providers are met even if it results in poor outcomes for street trees. It also often results in inadequate tree selection, planning, planting distribution and ongoing maintenance and management.

Key Challenges facing DTP

Overall, the key challenges to increasing tree canopy cover in the established areas of Melbourne and greenfield areas include:

- Ensuring the tree canopy targets outlined in the strategic planning documents are effectively translated to statutory planning requirements and implemented through planning permits. This applies to both established areas and greenfield areas.
- Considering the impact of above-ground poles and wires on street trees in established areas.
- Considering the impact of the housing targets on housing density which will result in redevelopment in established areas and smaller lot sizes (but not necessarily houses) in greenfield areas. Both of these outcomes limit the opportunities for tree planting on private land.
- Designating a department or a division of a department to act on behalf of street trees to ensure they have equal consideration when designing new or augmented roads in greenfield areas.
- Creating a hierarchy of design making where there are a range of competing targets or requirements in strategic and statutory planning documents.

Street trees lack representation in negotiations, leading to utility-driven decisions that often result in poor outcomes, including inadequate tree selection, planning, planting, and maintenance.

[8]Engineering Design and Construction Manual for Subdivision in Growth Areas, Victoria Planning Authority, December 2019. Retrieved from https://vpa-web.s3.amazonaws.com/wp-content/uploads/2020/04/Engineering_Design_and_Construction_Manual-for-subdivision-in-Growth-Areas-FINAL-December-2019.pdf

Street view near the Royal Botanic Gardens, Melbourne.

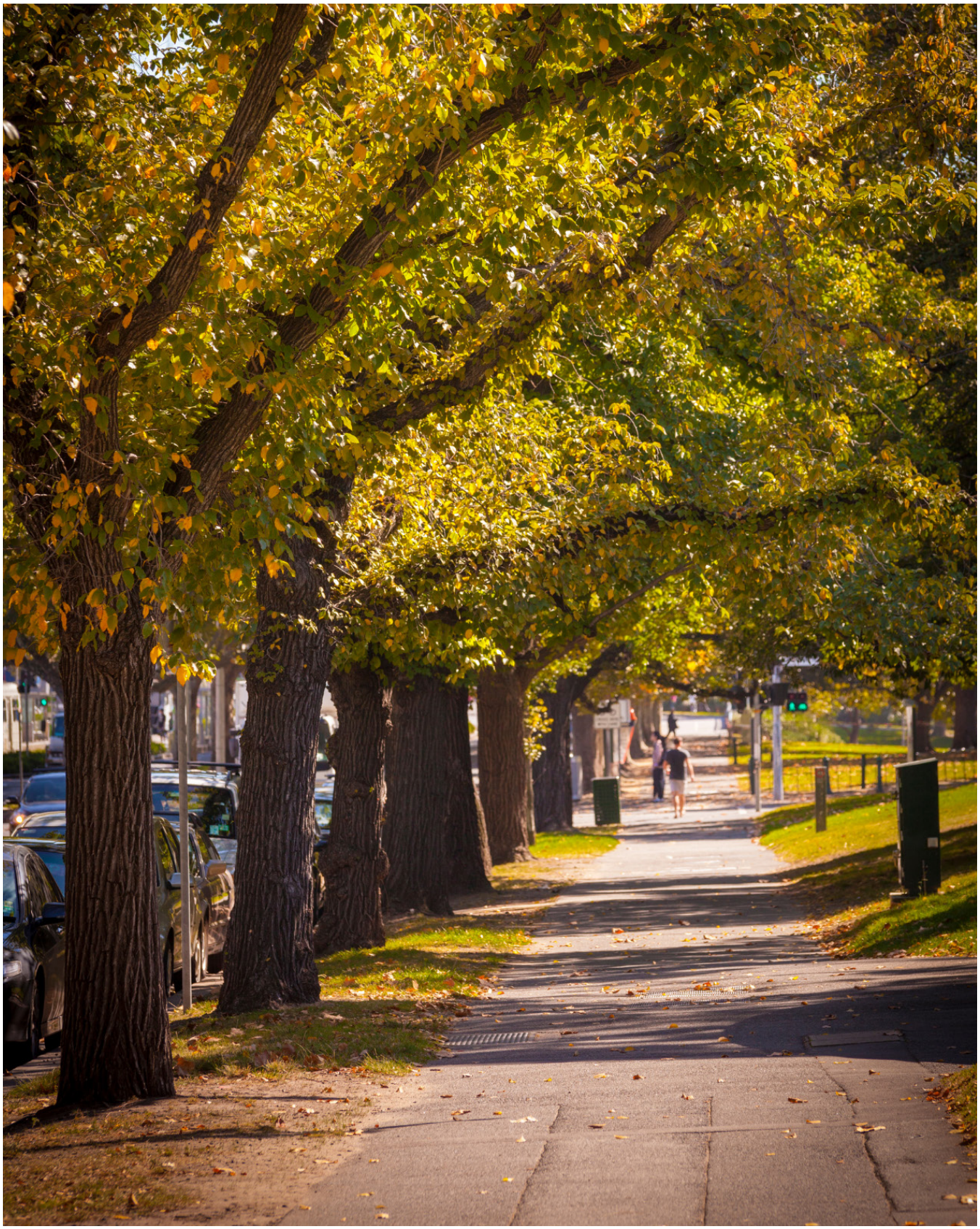


IMAGE SOURCE: GETTY IMAGES

PLAN VICTORIA

Plan Melbourne 2017-2050

Plan Melbourne 2017-2050 is the overarching metropolitan planning strategy that outlines the future shape of the city and State over the next 35 years. Plan Melbourne sets out the strategy for supporting jobs and growth by integrating long-term land use, infrastructure and transport planning in both established areas and designated greenfield areas.

The plan includes:

- 9 principles to guide policies and actions.
- 7 outcomes to strive for in creating a competitive, liveable and sustainable city.
- 32 directions outlining how these outcomes will be achieved.
- 90 policies detailing how these directions will be turned into action.

Plan Melbourne was updated in 2019 with an addendum that includes the most recent population and employment projections. It includes additional information on industrial and commercial land requirements, and information that was not available in 2017 which further support Plan Melbourne's directions and policies.

Of relevance, it also seeks to embed the 20-minute neighbourhood concept into major infrastructure projects, helping to create and connect neighbourhoods that enable people to meet most of their everyday needs within 20 minutes of their home.

A key feature of 20-minute neighbourhoods is creating well designed pedestrian friendly neighbourhoods that address local transport, health, environmental and economic issues. ULI Building 15-Minute Communities: A Leadership Guide[9] shares promising insights and

SOURCE: GETTY IMAGES

Aerial view of a inner suburb in Melbourne.

The Plan recognises that Melbourne's growth and climate change strain its resilience, causing habitat loss, biodiversity decline, extreme weather, and increased waste.

strategies for leveraging infrastructure investments and real estate development to create walkable, transit-oriented, sustainable, and complete communities.

In addition to this, *Outcome 6: Melbourne is a sustainable and resilient city* seeks to protect the State's natural environment for future generations. It acknowledges the city's growth, in combination with climate change, is testing the resilience of Melbourne's natural and built environment, causing habitat loss and biodiversity decline, higher urban temperatures, reduced rainfall, more frequent and extreme weather events, increased consumption of resources and more waste and pollution.

Supporting this outcome, Plan Melbourne makes specific reference to trees or tree canopy in two sections - Direction 5.4 and Direction 6.4 (refer to box below).

Direction 5.4 provides guidance to include the community in efforts to green streetscapes and convert disused public land into parkland.

Direction 6.4 has a broader remit and seeks to green the city to mitigate the impact of increased temperatures and includes a policy to integrate greening into planning frameworks and balance this with safety risk priorities. Of relevance, it notes that trees and greening are an afterthought in the planning and design of urban areas, and that concerns about safety risks often outweigh the benefits of tree canopy.

Direction 5.4

Deliver local parks and green neighbourhoods in collaboration with communities

Greening Melbourne's neighbourhoods enhances beauty and amenity and provides more places where people can meet, exercise and relax. They give city dwellers a chance to enjoy natural environments, support biodiversity, and improve the quality of air, water and soil.

Residents should be included in community landscaping and revegetation opportunities such as community gardens, vegetable patches, play areas for children and greening streetscapes with tree planting and nature strip gardens. Communities can also convert disused public land into parkland to green their neighbourhoods and increase public open space.

[9] Building 15-Minute Communities: A Leadership Guide, Urban Land Institute, 2023. Retrieved from https://knowledge.uli.org/-/media/files/research-reports/2023/ulireportbuilding15minutecommunitiesleadershipguidefinal-august-2023.pdf?rev=2203507a714448e7b8a155c1d5cdeb02&hash=B63F63FBFA06F108BA151F0832792ACD

Direction 6.4

Make Melbourne cooler and greener

The urban heat-island effect is created by the built environment absorbing, trapping and, in some cases, directly emitting heat. This effect can cause urban areas to be up to four degrees Celsius hotter than surrounding non-urban areas.

Within the City of Melbourne alone, the urban heat-island effect is projected to result in health costs of $280 million by 2051.

Urban intensification will add to the urban heat-island effect unless offsetting measures are implemented. Greening the city can provide cooling benefits and increase the community's resilience to extreme heat events.

Temperature decreases of between one degree Celsius and two degrees Celsius can have a significant impact on reducing heat-related morbidity and mortality.

To mitigate the impacts of increased average temperatures, Melbourne needs to maintain and enhance its urban forest of trees and vegetation on properties, lining transport corridors, on public lands, and on roofs, facades and walls. Other methods of cooling the city include the use of special heat-reflective coatings for dark building surfaces to reduce the amount of heat absorbed.

Policy 6.4.1

Support a cooler Melbourne by greening urban areas, buildings, transport corridors and open spaces to create an urban forest

A number of local councils are already promoting urban greening through actions such as developing urban forest strategies.

Greening must be integrated into planning frameworks and balanced with safety risk priorities. Too often, trees and greening are an afterthought in the planning and design of urban areas. In some cases, such as along transport corridors, concerns about the safety risks presented by trees can result in tree pruning and removal or the limitation of new plantings. In other cases, such as in established areas, tree canopy is lost through the process of replacing single dwellings and multi-dwelling redevelopment.

Residential development provisions must be updated to mitigate against the loss of tree canopy cover and permeable surfaces as a result of urban intensification.

The city must establish and maintain canopy trees along transport corridors, green buildings (roofs, facades and walls) and plant up open spaces—including parks, waterway corridors, school grounds and utility easements—together with the provision of a public open space network across Melbourne.

The drought from 1995 to 2009 (the Millennium Drought) highlighted the importance of water in providing a liveable, cooler, greener city. Adopting water-sensitive urban design will maximise alternative water use in vegetated areas and support the growth of healthy trees and vegetation.

The outcome, directions and policy outlined above are to be implemented through Action 91 - Whole-of-government approach to cooling and greening Melbourne. It seeks to create urban forests throughout the metropolitan area by:

- Assembling and disseminating spatial data on the green space network, existing tree cover and surfaces. This data will be the baseline for modelling future greening strategies and their impacts on amenity of our urban areas including cooling effects.
- Working with local government to establish greening targets for each of the metropolitan regions.
- Liaising with water corporations to identify opportunities for use of alternative water supply to support greening strategies.
- Supporting development of municipal urban forest strategies using a coordinated approach with VicRoads, private road operators and other public landowners and managers.
- Preparing greening strategies for state-owned public land, including schools, parkland, road, rail and utility corridors, achieving an appropriate balance between asset protection and urban greening.
- Investigating a targeted grants program to support innovation and actions for greening neighbourhoods.
- Investigating demonstration projects including green roofs, green walls and landscapes.
- Preparing new guidelines and regulations that support greening new subdivisions and developments via landscaping, green walls, green roofs and increase the percentage of permeable site areas in developments.

Plan Melbourne Implementation Challenges

The outcomes, directions and policy outlined in Plan Melbourne 2017 – 2050 are primarily implemented through the statutory planning requirements known as the Victoria Planning Provisions (VPPs). The VPPs are a State-wide reference to ensure that consistent provisions for specific aspects of land use and development are maintained across Victoria and that the construction and layout of planning schemes is always the same.

Each Local Government area has its own local Planning Scheme drawn from the VPPs that is prepared by the relevant Local Government. A planning scheme is a statutory document that sets out objectives, policies and provisions relating to the use, development, protection and conservation of land in the area to which it applies. A planning scheme regulates the use and development of land through planning provisions to achieve those objectives and policies.

To date, the following actions relating to tree canopy have been implemented or partially implemented through the Planning Schemes:

- All local councils in the Eastern Metro Region have adopted the Living Melbourne Urban Forest Strategy, specifying targets for the Eastern Metro Region of 30 per cent total tree canopy and 50 per cent total tree and shrubs canopy by 2050 (The Nature Conservancy and Resilient Melbourne, 2019)[10].
- The City of Melbourne has implemented a targeted grants program to support greening neighbourhoods.
- The Victorian Planning Authority (VPA) released updated Structure Planning Guidelines that include a tree canopy target for new greenfield subdivisions of 30 percent.

[10] Living Melbourne - Our Metropolitan Urban Forest, The Nature Conservancy and Resilient Melbourne, 2019. Retrieved from https://www.nature.org/content/dam/tnc/nature/en/documents/australia/2019LivingMelbourne_Strategy_online.pdf

SOURCE: GETTY IMAGES

Aerial view of a suburb in Melbourne.

- The Victoria Planning Provisions include tree canopy requirements for apartment developments (Clause 55.07), including deep soil planting areas for canopy trees.
- An alliance of advocates from the western municipalities of Brimbank, Hobsons Bay, Maribyrnong, Melton, Moonee Valley, and Wyndham developed the Greening the West Strategic Plan. The plan identifies eight key goals and targets that the alliance has committed to working towards to contribute to a green and healthy west. Key goals include increasing green space by 25% by 2030, increasing the supply of alternative water for green space by 25% by 2030, and doubling tree canopy cover by 2050.
- The City of Melbourne's Urban Forest Strategy 2012–2032 was an outcome of the city's overall plan and vision to be one of the top ten most liveable and sustainable cities in the world. Strategy 1 in the Urban Forest Strategy is to increase the public realm canopy cover from 22% to 40% by 2040.
- Thirteen councils have some form of urban forest strategy, and the primary focus is on trees and canopy cover. The existing strategies tend to be long-term (>10 years), use a broad definition of an urban forest, have performance measures such as typically canopy cover and tree diversity, and address vegetation to some degree on private land. For many, though, there is still a heavy focus on street trees and the public realm (Living Melbourne p. 33).

These actions are to be commended as a good start; however, they do not go far enough to implement the substantial change required to deliver a significant increase in tree canopy, particularly street tree canopy. There appears to be a disconnect between the targets adopted in terms of planning strategy, and

the implementation of these through the statutory planning requirements.

Transitioning to the Plan for Victoria

At the time of preparing this report, the Plan for Victoria was in the process of being developed. This is expected to be released late 2024 or early 2025 and will replace Plan Melbourne 2017-2050 as the overarching planning strategy for the whole of Victoria.

Throughout the engagement for Plan for Victoria, there have been opportunities to provide feedback about the value of trees and tree canopy. The public consultation process in relation to the 'Big Ideas for Victoria' noted the feedback to date showed the top priorities included leafy green streets with trees, parks and open space.

Whilst it is unclear whether there will be a stronger focus on tree canopy, it is encouraging to see the clear feedback about the community perception of trees and tree canopy and how valuable this is.

Precinct Structure Planning Guidelines

New Communities in Victoria

The Precinct Structure Planning Guidelines: New Communities in Victoria (PSP Guidelines) was released in November 2021 and provide an integrated framework for practitioners and planning authorities to guide the preparation of Precinct Structure Plans (PSPs) for new communities across Victoria in designated greenfield areas.

The revised PSP Guidelines include a focus on creating 20-minute neighbourhoods and ensuring neighbourhoods are resilient and adaptable to a changing climate.

The PSP Guidelines provide a series of principles and targets that seek to embed climate resilience measures into a PSP, including the UN Sustainable Development Goals. PSPs will improve climate resilience of new communities by seeking outcomes that achieve nominated targets in the following focus areas:

- Creating a future urban structure that supports living locally through the 20-minute neighbourhood concept.
- Ensuring new neighbourhoods are walkable with housing density and distribution aligned with accessibility to services.
- Providing street layouts and road cross sections that maximise active transport, walkability and increase connectivity to key destinations.
- Maximising canopy tree planting on public land in streets, local parks and public places through the PSP to support amenity objectives and improve resilience during extreme heat events with shading and cooling.
- Ensuring best practice integrated water management and water sensitive urban design outcomes are built into the planning and design of land uses and infrastructure.

In terms of applying these principles to a PSP, F11 Green Streets and Spaces seeks treatment of the public realm (including public infrastructure) that creates a safe, comfortable, high amenity and resilient environment. This is supported by two General Principles - F11.1 and F11.4 - which are outlined in the box below. Both of these General Principles provide guidance to facilitate an increase in street trees and tree canopy in new PSPs, in particular the aim to identify opportunities for alternative street engineering design to achieve high amenity outcomes, and that public land should be optimised and include both infrastructure and amenity. General Principle F11.4 in particular requires that consultation must be undertaken with utility and service agencies to identify opportunities for innovative approaches to multifunctional use of space and co-location opportunities.

F11.1

Design of the public realm, public infrastructure amenity and open space should:

- Support climate change adaptation and integrated water management opportunities (for example, greening and tree canopy for cooling and shade and to manage urban heat island effect, integrated use of water resources, renewable energy infrastructure, etc.)
- Be responsive to the land use context and interfaces (e.g. types of uses, intensity of uses, etc.)
- Identify opportunities for alternative street engineering design to achieve high amenity outcomes.
- Be sensitive and responsive to interfaces with valuable rural landscapes, waterways and green wedges.
- Be designed to encourage passive surveillance by adjoining land uses and activity.
- Be responsive to the different needs of the forecast future community.
- Consider the movement and place function of roads and streets.
- Identify opportunities to incorporate productive vegetation, community gardens or urban agriculture where possible.
- Identify opportunities to incorporate existing healthy and safe canopy trees where possible. Relevant VPP: Clause 56.04-4.

F11.4

Public land set aside for utility or service infrastructure should be optimised and designed to be multifunctional where possible; providing land for infrastructure, amenity, environmental systems and for passive recreation (where safety risks can be managed).

Infrastructure should be designed and located to make efficient use of existing asset capacity and to withstand the impacts of predicted climate change.

While commendable, these actions fall short of driving the substantial change needed to significantly increase tree canopy, revealing a gap between planning targets and their implementation.

The performance targets in relation to this are that the potential canopy tree coverage within the public realm and open space should be a minimum of 30 percent (excluding areas dedicated to biodiversity or native vegetation conservation).

This target is expected to be tested through the preparation of a Public Realm and Water Plan that should illustrate and quantify canopy tree coverage for the PSP area (for example, illustrating expected canopy tree coverage in road reserves and local parks) assuming suitable tree species for the PSP area at maturity and during the summer months. Guidance may be provided in relation to a target tree canopy species diameter to achieve the desired performance target.

The PSP Guidelines highlight an opportunity to meet the target through alternative street scape and landscaping approaches which may be considered to achieve a specific place-based vision or objective. Vegetated verges, green buildings (including green walls and roofs) can be considered to provide further greening in the public realm.

PSP Guidelines Implementation Challenges

The policy principles to facilitate an increased delivery of street trees and tree canopy are clearly outlined in the PSP Guidelines, as well as the target for a minimum of 30 percent tree canopy. Given the PSP Guidelines were released in late 2021, and the timeframe for a PSP to be prepared and gazetted can be two to four years, we would expect PSPs being gazetted from 2024 to reflect this target.

Two current PSPs include a reference to the tree canopy target, being the draft Croskell (Employment Precinct) and Greenvale North (Part 2) precinct.

The draft Croskell Employment PSP includes the objective of creating a high-quality public realm which is supported by the following place-based guidelines:

- G18 - Subdivision and development should respond to significant landscape features and existing vegetation in a way that:
    - Provides for increased provision of tree canopy cover in the public realm over time.
- G19 - The design and layout of roads, road reserves, and public open space should optimise water use efficiency and long-term viability of vegetation, tree canopy and public uses to contribute to a sustainable and green urban environment.

Additionally, 'tree canopy coverage' is noted under 'Other PSP Targets' and that these targets are to be achieved at the planning permit stage, however the target itself was not specified.

The draft Greenvale North (Part 2) PSP also includes the objective of creating a high-quality public realm which is supported by the following place-based requirements:

- R9 - Canopy tree coverage within the public realm must achieve a minimum of 30% (this excludes uncredited/encumbered areas, areas within the secure Greenvale Reservoir site or those dedicated to biodiversity or native vegetation conservation).
- R10 - Street trees must be provided on both sides of all roads/streets (excluding laneways) in accordance with the cross-sections, and at regular intervals appropriate to tree size at maturity.
- R11 - A landscape plan must specify tree species which are suitable to the local climate and soil conditions, to the satisfaction of the responsible authority.

The objective of creating a high-quality public realm is also supported by the following place-based guidelines:

- G12 - Canopy trees should have an average canopy of foliage diameter of 6.4m at maturity

in summer. Where this cannot be achieved because of local climate and soil conditions, a suitable species should be selected which closest achieves suitable canopy cover, to the satisfaction of the responsible authority. The requirement for a minimum 30% canopy tree coverage within the public realm must still be met.

- G15 - The design and layout of roads, road reserves, and public open space should optimise water use efficiency and long-term viability of vegetation, tree canopy and public uses to contribute to a sustainable and green urban environment. This should be achieved by adopting Water Sensitive Urban Design initiatives such as overland flow paths, rain gardens and/or locally treated stormwater for irrigation.

The draft Greenvale North (Part 2) PSP includes clear requirements to achieve the 30 percent tree canopy target, however this will ultimately be implemented through the street cross sections which are designed in accordance with the Engineering Design and Construction Manual for Subdivision in Growth Areas (EDCM).

The EDCM was last updated in 2019 and specifies the locations for utilities under nature strips in Addendum 4 which was published in January 2016 (Refer to the excerpt below). Of relevance to the health and location of street trees, the 'tree zone' is 600mm deep which is typically insufficient to support the tree root growth zone (root ball) of a canopy tree, and five metres in diameter that overlaps with the footpath and road pavement.

Further, the street cross section shows the gas, water and recycled water located 600mm beneath the root growth zone, with telecommunications services permitted to be closer to the surface and the stormwater slightly deeper in the root growth zone. These are all considered essential services, and the relevant agencies and authorities take priority when designing the cross sections for streets in new communities, with no agency or authority currently empowered to advocate for the location of street trees.

It is understood the EDCM is currently being reviewed. (See Figure 1).

"Tree canopy coverage" is listed under other targets, to be addressed at the planning permit stage, but no specific target is provided.

Figure 1 - Service Locations in Access Streets

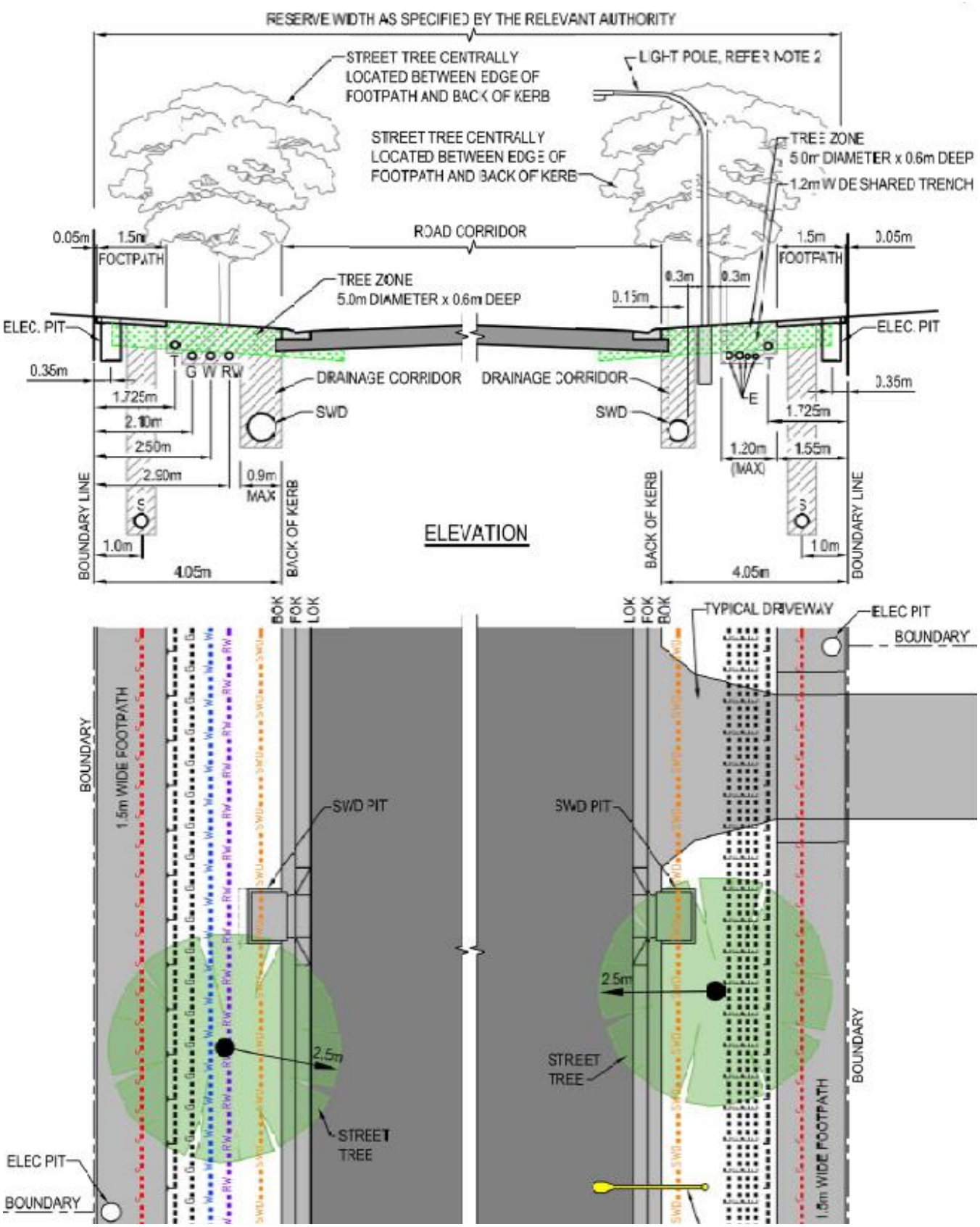


IMAGE SOURCE: ENGINEERING DESIGN AND CONSTRUCTION MANUAL FOR GROWTH AREAS - ADDENDUM 4

The Victorian Planning Context

By Tim Peggie (Strategic Advisor)

Summary of Findings

The benefits of Street Trees and tree canopy cover has been the subject of specific interest across literature and within the Victorian Planning system for at least the last decade. Specifically, the growth areas of Melbourne have achieved much greater planting of trees within streets than compared with previous decades. Despite this, Ethos Urban research of several strategic and statutory planning instruments from Australia and globally has found a disconnect between the aspiration of greater street tree canopy targets and ultimately implementation. Our research suggests that there is no shortage of high-level, strategic targets for canopy coverage, even going as far as plans for the planting, maintenance, and protection of trees in the streetscape. However, when observing statutory provisions and detailed implementation of these targets, far fewer localities provide such information.

Some key themes of implications to street tree canopy coverage that have appeared include:

- The competition of street trees with existing or proposed essential services and infrastructure.
- Growing environments (referring to impervious ground cover, services competition, climate etc.) having an adverse impact on the health of street trees.
- Community knowledge and appreciation of the value of street trees.

Sydney and San Francisco deserve mention for their publicly available interactive mapping platforms that enable communities to identify a street tree's location, species, general height, and canopy coverage. Other positive actions that are found across varying strategies include adding a value to street trees and approaching the challenge of street tree planting from a water sensitive urban design and traffic-slowing perspective, rather than just a piece of infrastructure competing with other services in nature strips and verges.

Tree Canopy Targets across Australia

Australia wide there is a strong appreciation in strategic policy for the planting, maintenance, and protection of street trees at a local and state level. A number of these strategies define key challenges such as competing infrastructure, growing conditions, and community education, with many of these referring to established communities. While new communities are typically found to be 'greener' than previous subdivisions and suburbs developed before the turn of the century a key obstacle for greenfield street tree coverage is the size of lots and the space provided between crossovers and other essential services. Having Plan Victoria make direct reference to street tree canopy targets would further reinforce the notion of trees as an essential service however, the critical aspect is implementation. Taking the targets and requirements and having clear statutory requirements for implementation is essential.

Our research has determined that most street

tree canopy targets, are found within strategy planning documents, not statutory planning schemes. An exception to this is the Western Sydney Aerotropolis Development Control Plan 2022 where specific canopy percentages are provided as benchmark solutions.

Additionally, the Victorian Planning Authority's (VPA) Precinct Structure Planning Guidelines: New Communities in Victoria provides guidance for local governments to implement street tree canopy targets. The Croskell (Employment) Precinct Structure Plan is currently in draft for community consultation and includes a requirement that 'canopy tree coverage within the public realm must achieve a minimum of 30% (excluding areas dedicated to biodiversity or native vegetation conservation)'. In the case of other planning schemes, the relevant strategy will identify a target, and this will be interpreted in the scheme via specific outcomes/requirements.

Our experience is that the more reference to and objectives regarding street trees, the more likely a target will be achieved through development.

A review of the current Victorian standard Engineering Design and Construction Manual for Growth Areas (EDCM)[8] has found that it clearly articulates the challenge and number of competing services within the road reserve. What is clear from the diagrams within this document (refer Figure 1 p. 37) is that there is a competing priority for services and trees within the footpath and verge of proposed local streets, whilst the carriageway does not carry any services. The EDCM website lists an upcoming update to the document in 2024, but this is not published as of November 2024. Any changes to the EDCM would have a direct effect on outcomes, as it provides a standard manual for all new subdivision development proposals and engineering plan submissions received by growth area councils in Victoria. In a Victorian context, the VPA is best placed to coordinate efforts toward developing new policies or procedures relating to the provision of street trees and increased canopy cover in growth areas. Consideration of some services in the carriageway (as is the case in other states, namely South Australia) would allow for greater capacity to plant trees more frequently and without the competition with other services.

When it comes to the protection of new or existing street trees during construction, there are numerous examples of developers planting these trees early in the project with positive results. It is understood that it may be easier to wait until the project nears completion, but an important component of street tree canopy growth is time. The earlier trees are planted, the sooner canopies can begin to form.

The capacity of Councils to properly assess and account for the development of street trees and measure the improvements to street tree canopy cover is critical in providing the community with measurable performance and improvement. Sydney and San Francisco are two locations where there are publicly available interactive mapping platforms that enable communities to identify a street tree's location, species, general height, and canopy coverage. An ambition of Plan Victoria could well be the implementation of a similar system in growth areas where such accountability and measurement would have real impact and benefit.

[8]Engineering Design and Construction Manual for Subdivision in Growth Areas, Victoria Planning Authority, December 2019. Retrieved from https://vpa-web.s3.amazonaws.com/wp-content/uploads/2020/04/Engineering_Design_and_Construction_Manual-for-subdivision-in-Growth-Areas-FINAL-December-2019.pdf

Aerial view of Melbourne CBD.

IMAGE SOURCE: GETTY IMAGES

STAKEHOLDER CONSULTATION AND FEEDBACK

The ULI Australia brought together over twenty stakeholders including industry experts, civic and community leaders, and public sector officials, to combine expertise and knowledge to inform the development of key recommendations relating to street tree canopy coverage. The TAP engaged in interviews with leading sector stakeholders and strategic advisors to understand the opportunities and challenges relating to improving street tree canopy coverage in the growth areas and to develop key recommendations to be considered by the TAP.

Key Questions

The following key questions (see Table 1) were used to guide discussions with stakeholders and strategic advisers from a range of organisations including developers, government representatives, industry institutes, universities and consultancies.

Table 1 - Stakeholder interview questions.

01.	From your organisation's perspective, what are they key barriers to improving street tree planting and increasing street tree canopy coverage? This may cover the following themes/topics: • Policy Reform • Planning and Design • Infrastructure • Construction • Maintenance • Funding
02.	Does your organisation have a tree canopy target or are you working within tree canopy targets on your projects? • How was the target formed? • How is it being implemented? • Are you/your projects meeting this target?
03.	What if street trees were given a higher priority and treated as an essential service (like sewer and water)? From your organisations perspective: • What are the opportunities? • What are the challenges?
04.	What needs to change in order to improve street tree canopy coverage in the growth areas? This may include the following themes/topics: • Space and health • Funding • Implementation
05.	What are the key recommendations you would make to DTP for inclusion for Plan Victoria regarding street trees?

Key Stakeholder Insights

The responses gathered from the stakeholder and strategic adviser interviews are summarised in the table below in ten key areas (see Table 2).

Table 2 - Key Stakeholder Insights.

Street Trees as Essential Infrastructure	• Trees are increasingly viewed as essential to urban infrastructure, providing ecological, economic, and social benefits. • Stakeholders advocate for trees to be considered as important as other essential services (and in many cases, more important), particularly in combatting urban heat islands and improving public health. • Stakeholders did not feel that trees should be treated like an essential service from a statutory perspective due to the potential 'red tape' and delays with a dedicated street tree authority. • However, there was consistency regarding the need for leadership, advocacy, direction, coordination and funding for street trees which could be dealt with by a specific department within State Government.
Challenges in Policy and Implementation	• There is a gap between policy intentions and actual implementation. • In lieu of policy direction, there is no clear guidance with respect to canopy coverage targets. The VPA provide guidance within more recent PSPs and practice notes, but it is difficult to achieve these targets within the existing engineering standards. • Many councils lack the resources and regulatory support to enforce tree-planting and canopy maintenance targets effectively, despite having high-level guidelines. • In addition, fragmented approaches between utilities, councils, and state authorities have hindered progress in urban greening. • Stakeholders call for a more unified approach, with better coordination among water, power, and municipal agencies to facilitate tree-friendly designs.
Setting Canopy Targets	• Stakeholders emphasise the need for a significant urban tree canopy to mitigate the urban heat island effect, particularly in Victoria. • However, there are challenges in policy enforcement and infrastructure planning, which sometimes conflicts with tree planting goals. • Tree canopy coverage targets should be set but should be evidence based and should take into consideration the land use and local context.
Evidence-Based Policy Making	• Comprehensive data on urban heat, canopy coverage, and green infrastructure benefits are essential for informed decision-making. • Stakeholders emphasise using evidence to set realistic canopy targets, model climate resilience benefits, and justify investments in green infrastructure. • Stakeholders reinforced the need for current data that shows change over time.

Table 2 - Key Stakeholder Insights (continued).

Refresh of and Flexibility within Design Standards	• Rigidity in infrastructure standards restricts the integration of trees in engineering design. • Calls for a refresh of the EDCM was consistent from stakeholders to ensure trees were considered along with all other essential services. • Consideration of alternative service alignments such as deeper sewer and water alignments or alignments under road pavements, were consistent comments in order to allow more space for street trees within the street. • Calls for flexible and alternative standards, such as those that accommodate root growth and innovative water management, could make tree planting feasible within existing infrastructure frameworks.
Impact of Heat and Climate Resilience	• Stakeholders highlight the critical role of urban trees in mitigating climate impacts, especially as Australia faces increasing temperatures. • Urban greening can serve as a natural buffer against extreme heat, enhancing the health and safety of city residents while aligning with broader resilience planning. • Stakeholders referred to the need to acknowledge a 'climate crisis' and for the role of street trees in addressing this crisis to be acknowledged.
Economic Value of Trees	• Economic valuation of trees has become crucial for justifying urban greenery. Studies and stakeholder discussions suggest that trees boost productivity, reduce energy costs, and enhance well-being. • Assigning a clear economic value to trees could help secure resources and prioritise green infrastructure.
Water Management and Passive Irrigation	• Effective water use is critical for sustaining urban green spaces. • Stakeholders discussed passive irrigation and stormwater systems that could direct water to support street trees. • Green infrastructure, including urban forests, swales, and nature strips, offers alternative approaches for stormwater management and cooling. Examples include directing stormwater to support street trees and integrating water-efficient practices to ensure green infrastructure thrives even during droughts. • However, aligning green infrastructure and water management strategies with tree and servicing policies requires cooperation across municipal and state levels.
Behavioural and Cultural Barriers	• Beyond policies and regulations, cultural attitudes toward street trees and green spaces need to evolve. • Public perception and behavioural habits challenge tree maintenance and planting efforts. • Residents may remove trees for parking or fear property damage, which complicates efforts to improve street tree outcomes. • Encouraging residents to value and protect trees, discouraging parking on nature strips, and fostering a culture of environmental responsibility are necessary for long-term success in greening urban areas
Public Awareness and Community Engagement	• Improving public education on the importance of trees and green spaces can foster community support for urban greening initiatives. • Strategies like "Your Tree" programs with QR codes on trees to convey their benefits are examples of engagement tools that can deepen residents' connection to urban greening efforts. • Educational programs are suggested to help communities understand and value trees.

GLOBAL CASE STUDIES - SUMMARY OF FINDINGS

To develop recommendations for DTP on improving street tree canopy outcomes in growth areas, the TAP analysed global case studies to explore challenges, opportunities, and innovative approaches across various regions. The objective was to identify best practices in policy, funding, and implementation of street tree canopy coverage worldwide and provide practical strategies to strengthen policy execution. Each case study demonstrated unique methods for addressing this issue, offering valuable insights for effective implementation.

Table 3 - Common themes identified across jurisdictional case studies.

Targeted Tree Canopy Goals	**Driving Public Engagement and Funding**	**Continuous Urban Forestry Management**
A Model for Urban Resilience	**Collaborative Governance**	**Green Infrastructure Integration**
Sustainable Benefits	**Comprehensive Multi-Channel Funding Solutions**	**Policy Commitment**

Cincinnati's Trees: A Model for Urban Resilience in the Face of Climate Change

Cincinnati, like many cities worldwide, faces the mounting challenges of rising temperatures and increasingly severe storms, placing intense pressure on its infrastructure.

Particularly strained is the city's combined storm-sewer system, not originally designed to manage today's volumes of stormwater. These climate-induced events have also intensified landslides, causing significant damage to roads and other infrastructure. In response, Cincinnati has adopted a proactive approach to urban resilience, integrating green infrastructure solutions that stabilise hillsides and support natural stormwater management.

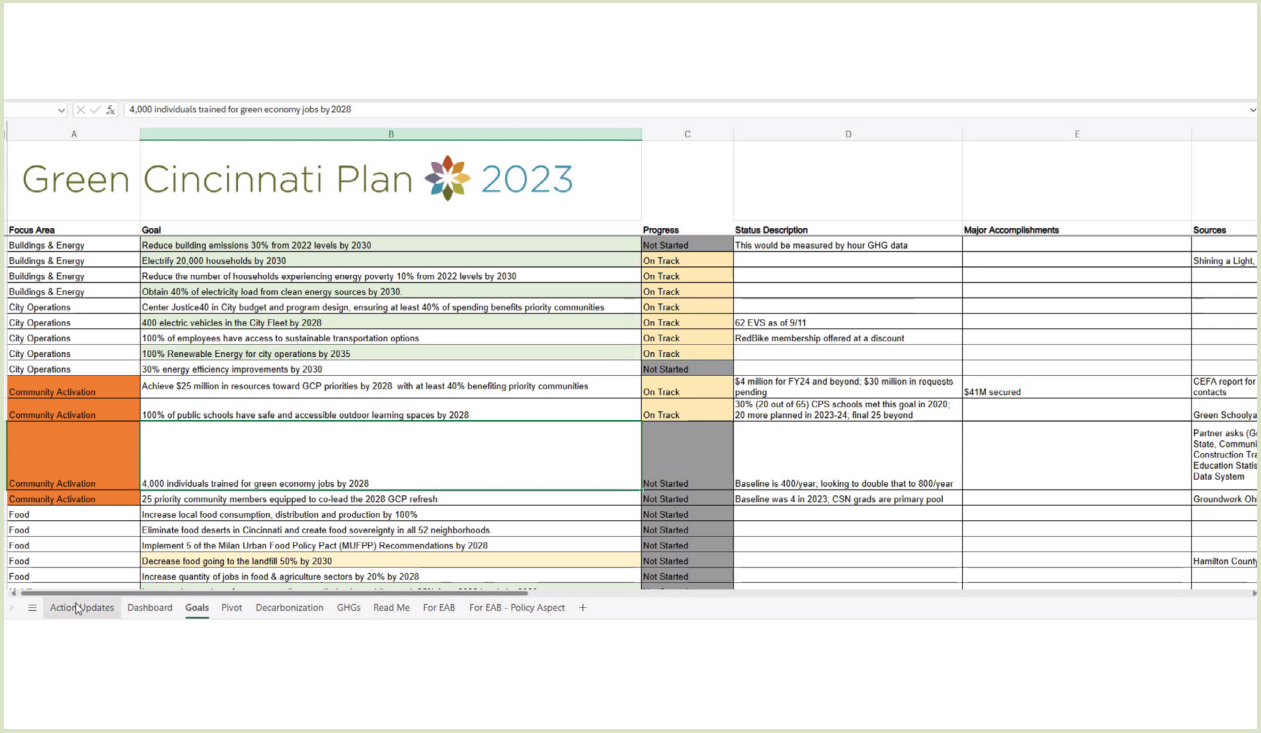
At the heart of this strategy is Cincinnati's renowned urban forestry and street tree program—managed by Cincinnati Parks Urban Forestry—which is recognised as one of the best in the United States. Established in 1980, the Urban Forestry Program has evolved, backed by comprehensive city-wide policies, funding, and assessment frameworks.

How does it work?

Central to this initiative is the Green Cincinnati Plan (GCP)[11], a community-driven framework

[11]Green Cincinnati Plan 2023, Green Cincinnati and City of Cincinnati (2023). Retrieved from https://www.cincinnati-oh.gov/oes/climate/climate-protection-green-cincinnati-plan/green-cincinnati-plan-2023-spreads/

Figure 2 - Green Cincinnati Plan 2023 Action Updates Dashboards.



4,000 individuals trained for green economy jobs by 2028

Green Cincinnati Plan 2023

Focus Area	Goal	Progress	Status Description	Major Accomplishments	Sources
Buildings & Energy	Reduce building emissions 30% from 2022 levels by 2030	Not Started	This would be measured by hour GHG data		
Buildings & Energy	Electrify 20,000 households by 2030	On Track			Shining a Light.
Buildings & Energy	Reduce the number of households experiencing energy poverty 10% from 2022 levels by 2030	On Track			
Buildings & Energy	Obtain 40% of electricity load from clean energy sources by 2030.	On Track			
City Operations	Center Justice40 in City budget and program design, ensuring at least 40% of spending benefits priority communities	On Track			
City Operations	400 electric vehicles in the City Fleet by 2028	On Track	62 EVS as of 9/11		
City Operations	100% of employees have access to sustainable transportation options	On Track	RedBike membership offered at a discount		
City Operations	100% Renewable Energy for city operations by 2035	On Track			
City Operations	30% energy efficiency improvements by 2030	Not Started			
Community Activation	Achieve $25 million in resources toward GCP priorities by 2028 with at least 40% benefiting priority communities	On Track	$4 million for FY24 and beyond; $30 million in requests pending	$41M secured	CEFA report for contacts
Community Activation	100% of public schools have safe and accessible outdoor learning spaces by 2028	On Track	30% (20 out of 65) CPS schools met this goal in 2020; 20 more planned in 2023-24, final 25 beyond		Green Schoolya
Community Activation	4,000 individuals trained for green economy jobs by 2028	Not Started	Baseline is 400/year; looking to double that to 800/year		Partner asks (G State, Communi Construction Tra Education Statis Data System
Community Activation	25 priority community members equipped to co-lead the 2028 GCP refresh	Not Started	Baseline was 4 in 2023; CSN grads are primary pool		Groundwork Oh
Food	Increase local food consumption, distribution and production by 100%	Not Started			
Food	Eliminate food deserts in Cincinnati and create food sovereignty in all 52 neighborhoods.	Not Started			
Food	Implement 5 of the Milan Urban Food Policy Pact (MUFPP) Recommendations by 2028	Not Started			
Food	Decrease food going to the landfill 50% by 2030	Not Started			Hamilton County
Food	Increase quantity of jobs in food & agriculture sectors by 20% by 2028	Not Started			

Action Updates | Dashboard | Goals | Pivot | Decarbonization | GHGs | Read Me | For EAB | For EAB - Policy Aspect

SOURCE: CITY OF CINCINNATI

addressing climate change and ecosystem enhancement. The GCP prioritises green infrastructure and sets ambitious targets for tree canopy coverage within its Natural Environment focus area. Additionally, the city's Urban Forestry Assessment provides a framework for levying a special tax dedicated to the management of street trees along public rights-of-way. This assessment also funded the Urban Tree Canopy Assessment (UTC), an essential baseline study that identifies strengths and areas for improvement in the city's urban forestry efforts.

Although Cincinnati's urban planning guidelines recommend optimal placement of street trees alongside utilities and stormwater drainage on public rights-of-way, these trees are not yet classified as essential infrastructure. However, the city relies on the combined efforts of the GCP, Urban Forestry Assessment, UTC, and ongoing maintenance by Parks Urban Forestry to expand its urban tree canopy. Together, these initiatives underscore Cincinnati's commitment to strengthening its climate resilience by treating street trees as vital components of its urban ecosystem.

Turning Vision into Action

Cincinnati's approach to implementing the Green Cincinnati Plan (GCP) offers valuable insights into turning a high-level framework into measurable progress. Launched initially in 2008, the GCP is now in its fourth and most ambitious iteration as of 2023. This latest

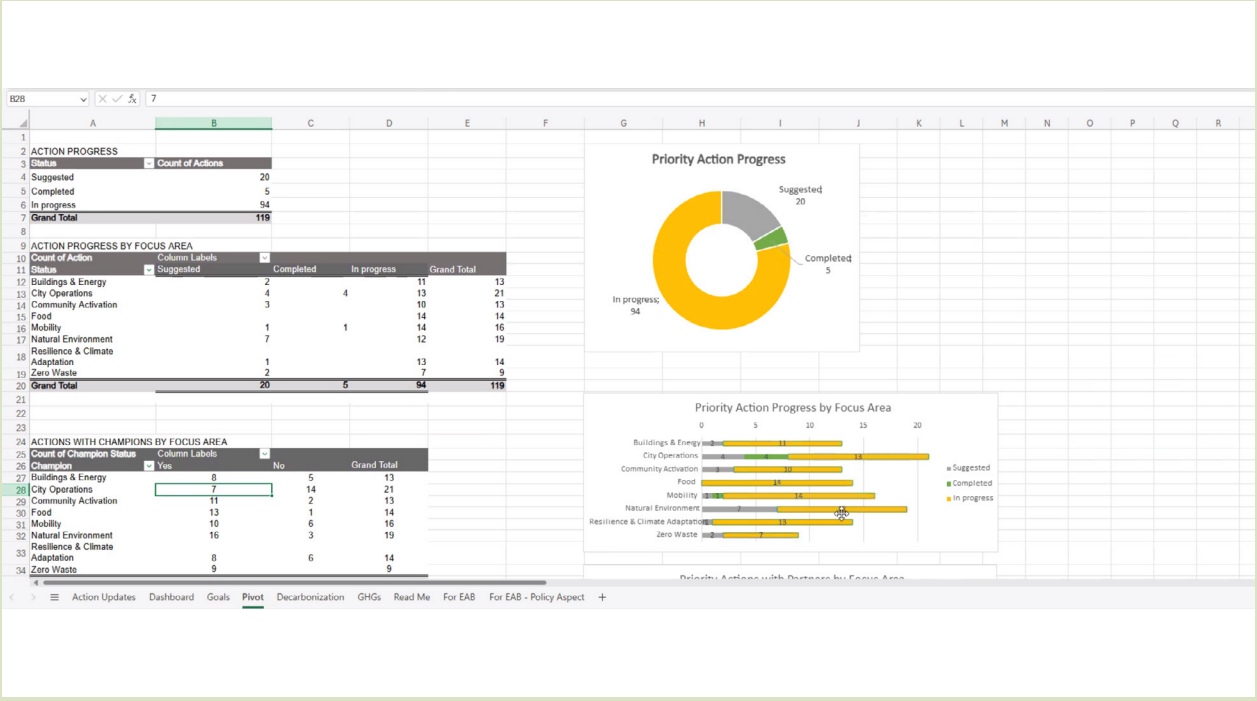
version is organised into eight focus areas, with tree canopy coverage a primary goal under the Natural Environment focus area.

Developed through extensive community engagement, the plan involved active input from 60 industry and public sector partners and generated over 3,000 suggestions, ultimately refined into 130 actionable and feasible initiatives.

To ensure effective implementation and tracking, the GCP assigns specific actions to community members and organisations, who act as 'champions' for their completion. Regular city-led meetings and tracking spreadsheets monitor each action's status, with progress updates recorded in the Action Updates Dashboards (See Figure 2). Cincinnati's Office of Environment & Sustainability oversees the broader alignment of initiatives with the GCP's priorities, evaluating progress across focus areas. The team can also estimate high-level carbon reduction based on the completion rate of the plan's actions, tracked in a Pivot Dashboard (See Figure 3).

Targeted Tree Canopy Goals: Driving Public Engagement and Funding

From an urban forestry management perspective, Cincinnati relies on its Urban Tree Canopy Assessment (UTC) to set targeted canopy goals, which are vital for both public messaging and the effective allocation of city funding. The UTC provides evidence-based data to support the canopy coverage targets set in the 2023 Green Cincinnati Plan (GCP), which aims to maintain a 40% overall urban tree canopy. Additionally, the GCP targets specific canopy coverage goals by area, aiming for 40%



SOURCE: CITY OF CINCINNATI

Figure 3 - Green Cincinnati Plan 2023 Pivot Dashboard.

in residential zones, 25% in mixed-use and industrial areas, and 10% in the Central Business District (CBD).

The UTC, a mapping tool that tracks changes in canopy coverage over time, offers a comprehensive aerial view of Cincinnati's green infrastructure. Beyond trees, it also maps impervious surfaces, agricultural land, bare soil, grasslands, and water resources, providing an integrated understanding of the city's landscape. Setting tree canopy targets based on UTC findings is crucial for Cincinnati's communication with the public and guides decisions on funding allocation. For instance, by mapping the Urban Heat Map alongside existing tree canopy coverage across communities (as shown in Figure 4 - Green Cincinnati Plan's "Improve Tree Canopy"), the UTC reveals a direct correlation between lower canopy cover and increased urban heat. This visual evidence not only strengthens public engagement in tree canopy campaigns but also presents tree coverage as a tangible solution to climate challenges, thereby informing and justifying city funding allocations for tree planting and maintenance in high-priority areas.

Securing Long-Term Funding for Sustainable Urban Forestry

The long-term care of Cincinnati's tree canopy, including the maintenance of 85,000 public street trees along public rights-of-way, and is managed by Cincinnati Parks Urban Forestry. This department also oversees a comprehensive tree inventory system using Geographic Information System (GIS) technology, which tracks critical data on each tree's condition, species type (including invasive status), plantability, and location. Trees are maintained on a six-year preventative cycle, ensuring that each one is reviewed and tended to at least once within this timeframe.

Such an extensive and complex urban forestry program requires a stable, long-term funding source. Recognising this need, the Urban Forestry Assessment was established in 1981, creating a dedicated funding channel through a special tax assessment permitted under the Ohio Revised Code Chapter 727[12]. This assessment, contributed to by both public and private property owners based on their property's linear footage, averages around $15 annually at a rate of $0.31 per front foot (0.0929 m^2). Despite a recent slight increase in this rate, the program maintains strong public support, with minimal resistance from property owners who see the tangible benefits of an enhanced urban tree canopy. The positive impact on neighbourhoods is evident, with academic studies even linking increased tree cover to reductions in crime rates. This long-term funding model underpins Cincinnati's capacity to sustain and expand its urban forestry management, ensuring that its tree canopy remains a resilient, health-promoting asset for the city.

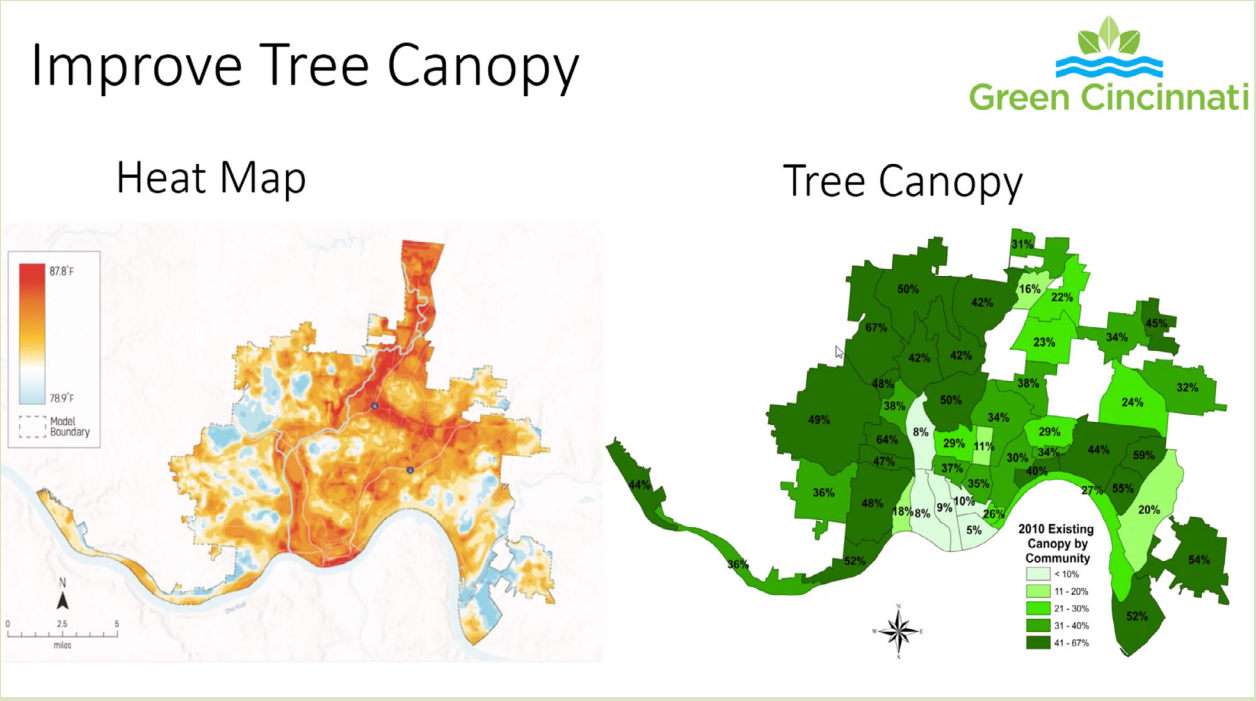
Cincinnati has recognised that urban forestry and street trees are essential to building urban

[12]Ohio Revised Code. Chapter 727 | Assessments – Generally. Retrieved from https://codes.ohio.gov/ohio-revised-code/chapter-727

resilience against climate change. Through a comprehensive framework—including a climate action plan, urban tree canopy assessment, and a special tax assessment to fund the long-term care of the city's urban forest—Cincinnati has ensured that dedicated resources and government bodies are in place to advance these efforts. This cohesive approach reflects the city's vision of addressing climate change by positioning tree canopy and green infrastructure as foundational pillars of resilience.

Cincinnati's commitment to investing in ecosystem creation, preservation, and regeneration, supported by clear policy and resource allocation, highlights an effective model for protecting public health, well-being, and the natural environment. Cincinnati's framework offers valuable insights for the State of Victoria as it explores climate-driven urban forestry initiatives. This could include conducting targeted greenhouse gas (GHG) inventories and developing strategies rooted in robust climate data. By prioritising urban forestry within their resilience strategies, cities can set a strong course towards a healthier, climate-resilient future, safeguarding both community and environment against the evolving impacts of climate change.

We thank Oliver Kroner, Director of the City of Cincinnati's Office of Environment & Sustainability for his insights and contribution.



SOURCE: CITY OF CINCINNATI

Figure 4 - Green Cincinnati's 'Improve Tree Canopy'.

'Federation of American Scientists' Building a Whole-of-Government Strategy to Address Extreme Heat'

The "Building a Whole-of-Government Strategy to Address Extreme Heat"[13] by Federation of American Scientists (FAS) proposes a comprehensive approach to enhance urban resilience against extreme heat through inter-agency collaboration, policy reforms, and focused funding. A key recommendation includes establishing an interagency task force led by the Council on Environmental Quality (CEQ), alongside USDA Forest Service, Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), Department of Commerce, Office of Management and Budget (OMB), and National Oceanic and Atmospheric Administration (NOAA), to develop a national urban forestry strategy. This plan emphasises ecosystem evaluation, tree canopy expansion, and strategic resource allocation.

Key learnings

- **Interagency Task Force and Strategic Urban Forestry Plan:** Directed by CEQ, agencies would evaluate ecosystem services and disservices and create an inventory of urban forests to inform policy decisions.
- **Resource Allocation and Assessment Tools:** Decision support tools and natural capital assessments will guide urban forestry funding, prioritising projects with community benefits.
- **Funding Prioritisation:** Leveraging Inflation Reduction Act (IRA) tax credits and Bipartisan Infrastructure Law (BIL) funds ensures investments in high-impact urban forestry projects.
- **Policy Development for Resilient Cooling:** Resilient cooling methods combined with tree canopy expansion target both immediate cooling needs and long-term heat mitigation.

MillionTreesNYC

MillionTreesNYC[13], an initiative under PlaNYC, aimed to plant one million trees across New York City to improve air quality, enhance green spaces, and tackle urban environmental challenges. By engaging communities, leveraging partnerships with city agencies and nonprofits, and securing political support, the program successfully achieved its goal by 2015. Implementation involved planting strategies, community stewardship programs, and green job training. The initiative demonstrated a strong return on investment, addressing public health and resilience needs, while fostering environmental literacy and workforce development. (Refer to Appendices for further details).

Key learnings

- **Collaborative Governance:** Partnerships with agencies like NYC Parks, nonprofits such as New York Restoration Project (NYRP), and advisory boards ensured cohesive planning and execution.
- **Community Engagement:** Workshops, volunteer initiatives, and education programs empowered residents, particularly in underserved areas.
- **Targeted Implementation:** Planting focused on low-coverage, high-need areas, integrating stormwater management and climate resilience.
- **Sustainable Funding and ROI:** Strong political backing and demonstrable environmental/social benefits secured funding and long-term commitment.

[12] Building a Whole-of-Government Strategy to Address Extreme Heat, Federation of American Scientists (2024). Retrieved from https://fas.org/publication/strategy-extreme-heat/
[13] MillionTreesNYC, The Integration of Research and Practice (2014). Retrieved from https://www.fs.usda.gov/nrs/pubs/jrnl/2014/nrs_2014_campbell-MTNYC_Research.pdf

Austin Urban Forestry Management

Austin's Climate Equity Plan[14] integrates urban forestry to achieve net-zero emissions by 2040, targeting 50% tree canopy coverage by 2050. The Heat Resilience Playbook[15] emphasises planting in high-heat neighborhoods and integrating green infrastructure into rights-of-way (ROW)[16] to combat urban heat. Challenges include decentralised management, reliance on unstable funding, and inadequate maintenance. Policies aim to streamline ROW planting and unify green goals across departments. Financing alternatives like grants and maintenance fees are essential. Inspired by global strategies, Austin seeks robust inventories and interdepartmental coordination to recognise trees as critical infrastructure. (Refer to Appendices for further details).

Key learnings

- Decentralised management limits effective urban forestry implementation.
- Integrating green infrastructure into ROW requires unified policies.
- Fluctuating funding highlights the need for alternative financial models.
- Robust inventories and coordination are vital for long-term canopy growth.

Minneapolis Urban Forest Policy and Street Design Guide

The Minneapolis Urban Forest Policy (2016)[17] designates urban forests as public utilities, prioritising their integration into city infrastructure planning, alongside water and sewer systems. The policy includes strict standards for planting, maintenance, and construction to ensure sustainability. The 2021 Street Design Guide[18] emphasises green infrastructure and promotes sustainable practices such as stormwater management, permeable pavements, and expanded tree coverage, particularly in underserved areas. Both initiatives align with broader goals like the Climate Action Plan[19] , Vision Zero[20] , and the Transportation Action Plan[21] to enhance environmental sustainability, safety, and accessibility. (Refer to Appendices for further details).

Key learnings

- **Urban Forest as Utility:** Trees are treated as critical infrastructure, ensuring their prioritisation in urban planning.
- **Green Stormwater Infrastructure:** Features like rain gardens and permeable pavements manage runoff and improve water quality.
- **Equitable Canopy Expansion:** Efforts focus on increasing tree coverage in underserved neighbourhoods.
- **Collaborative Implementation:** Success relies on partnerships among city departments, developers, and community groups.

[14] Austin Climate Equity Plan
https://www.austintexas.gov/sites/default/files/files/Sustainability/Climate%20Equity%20Plan/Climate%20Equity%20Plan%20Full%20Document__FINAL.pdf
[15] City of Austin Heat Resilience Playbook (2024) - https://www.austintexas.gov/sites/default/files/files/Resilience/Austin-heat-resilience-playbook.pdf
[16] A right-of-way refers to both a transportation corridor that facilitates the movement of people, animals, vehicles, watercraft, or utility lines, and the legal authority granting the right to use it.
[17] The Minneapolis Urban Forest Policy (Revised 2016) - https://www.minneapolisparks.org/_asset/6kfzed/Urban-Forest-Policy.pdf
[18] City of Minneapolis Street Design Guide, February 2021 - https://sdg.minneapolismn.gov/application/files/6716/1288/1118/Street_Design_Guide_web.pdf
[19] Minneapolis Climate Action Plan, Adopted in 2013
https://www².minneapolismn.gov/media/content-assets/www2-documents/government/Minneapolis-Climate-Action-Plan-1.pdf
[20] Minneapolis Vision Zero Action Plan 2023-2025 - https://lims.minneapolismn.gov/Download/RCAV2/31027/18-Vision-Zero-Action-Plan-2023-2025.pdf
[21] City of Minneapolis Transportation Action Plan, Adopted in 2020 - https://go.minneapolismn.gov/application/files/6016/0753/2020/MPLSTAP_Final_v8_redline.pdf

City of Guelph Urban Forest Management Plan Implementation and Tree Technical Manual

The City of Guelph Urban Forest Management Plan (UFMP)[22] is a 20-year strategy to enhance and sustain the city's urban forest. It addresses management, policy, legislation, protection, and community engagement with 22 targeted recommendations. Implementation involves regular reviews, community outreach, and updates. Key policies include a 3:1 tree replacement rule and biodiversity strategies, supported by transparent tree inventories and guidelines in the Tree Technical Manual[23]. Financially, UFMP relies on tax-supported capital and operational budgets. The manual specifies technical standards for tree protection and planting during development, ensuring urban forest integration and compliance with environmental objectives. (Refer to Appendices for further details).

Key learnings

- **Implementation:** Phased progress tracking every five years ensures canopy growth and informs the next phase of implementation.
- **Policy:** Biodiversity rules (30-20-10) and bylaws integrate trees early in urban planning.
- **Financing:** Tax-supported budgets and incremental increases fund long-term urban forest growth.
- **Community & Standards:** GIS tree inventory and the Tree Technical Manual ensure transparency and compliance.

Stockholm Urban Planting and Sustainable Drainage Systems

The Stockholm Urban Planting and Sustainable Drainage Systems (SuDS)[24] focuses on urban tree growth and stormwater management through innovative structural soil systems. The "Stockholm System"[25] integrates biochar-enriched soil and an aeration layer for optimal root health, water retention, and sustainable drainage. This method supports stormwater use for irrigation, enhancing tree growth while reducing urban runoff. By utilising local materials like macadam and biochar, it minimises environmental impact and maintenance requirements.

Key learnings

- **Implementation:** The system uses structural soils with biochar and macadam, forming cavities for water and gas flow, essential for tree health.
- **Infrastructure:** Stone-based structural soils, aeration wells, and water pathways accommodate urban traffic and underground services.
- **Maintenance:** Regular inspections, fines for damage, and nutrient management are crucial for sustainability.
- **Sustainable Benefits:** The system supports urban biodiversity, filters pollutants, and can be reused, offering a resilient alternative to crate systems.

[22] City of Guelph Urban Forest Management Plan 2013 – 2032 (2012). Retrieved from https://guelph.ca/wp-content/uploads/151012_UFMP_-Attachment4.pdf
[23] City of Guelph Tree Technical Manual (2019). Retrieved from https://guelph.ca/wp-content/uploads/Tree-Technical-Manual.pdf
[24] Planting beds in the City of Stockholm, a handbook 2017 (translated 2022). Retrieved from https://www.tdag.org.uk/uploads/4/2/8/0/4280686/planting_beds_in_the_city_of_stockholm_v4.5.pdf
[25] Tree Pits with Structural Soils | Practice Note. Retrieved from https://stockholmtreepits.co.uk/assets/downloads/tree-pits-with-structural-soils-practice-note-V1-4.pdf

Green Space Factor and Green Points System - Malmö

The Green Space Factor (GSF) and Green Points System[26] [27] in Malmö are urban planning tools designed to incorporate green infrastructure in developments, initially implemented in the Bo01 neighborhood of Västra Hamnen. The GSF mandates a 0.6 score, meaning 60% of surfaces in new projects must be green, while the Green Points System specifies biodiversity-supportive features like animal habitats. These policies arose from collaborative planning between Malmö's government and developers, enabling a legally binding "Quality Program." The initiative was municipally funded initially, later attracting private investment. While GSF effectively increased green spaces, its impact on biodiversity remains inconclusive, prompting updates for future resilience.

Key learnings

- **Implementation:** Collaborative planning facilitated practical green infrastructure in Bo01, setting a precedent for sustainable urban design.
- **Policy:** The GSF and Green Points System establish binding requirements, enhancing green and blue spaces citywide.
- **Financing:** Malmö initially funded Bo01's development, transitioning to private investment as the model proved viable.
- **Replication Potential:** Malmö's model has inspired similar frameworks in other cities, emphasising green space integration in urban planning.

Singapore's Nature Ways

Nature Ways[28] are carefully designed routes planted with trees and shrubs to replicate natural forest ecosystems, fostering wildlife movement between biodiverse areas like the Western Catchment (SAFTI Live Firing Area), Central Catchment Nature Reserve, and Bukit Timah Nature Reserve. With multi-tiered planting along roads, these corridors create habitats that support birds, butterflies, and other species, while enhancing urban greenery. Currently, Singapore has 50 Nature Ways covering 210 km. Part of the Singapore Green Plan 2030, this initiative cools urban streets and strengthens ecological connectivity.

Key learnings

- **Strategic Design:** Multi-tiered planting replicates natural forest layers, providing food, shelter, and nesting sites for diverse wildlife while beautifying roads.
- **Urban Integration:** Nature Ways connect seamlessly with road and park networks, enhancing green connectivity.
- **Policy Commitment:** Guided by the Singapore Green Plan 2030, Nature Ways align with sustainable urban development goals.
- **Funding Support:** National Parks invests in developing and maintaining these corridors, showcasing governmental backing for biodiversity conservation.

[26] GRaBS Expert Paper 6 - The Green Space Factor and The Green Points System by Annika Kruuse (2011). Retrieved from https://tcpa.org.uk/wp-content/uploads/2021/11/EP6_FINAL.pdf

[27] Green Space Factor and Green Points System - Malmö, Urban Governance Atlas. Retrieved from file:///Volumes/My%20Book/Miscellaneous/D/ULI/STREET%20TREE%20CANOPY%20TAP02/Research/Sweden/Malmo%CC%88/Green%20Space%20Factor%20and%20Green%20Points%20System%20-%20Malmo%CC%88%20_%20Interlace%20Hub.html

[28] About our parks, nature reserves and park connectors, National Parks, Singapore. Retrieved from https://beta.nparks.gov.sg/visit/when-visiting-parks/about-parks-nature-reserves-pcns/nature-corridors-ways

Figure 5 - Singapore Nature ways multi-tiered planting.

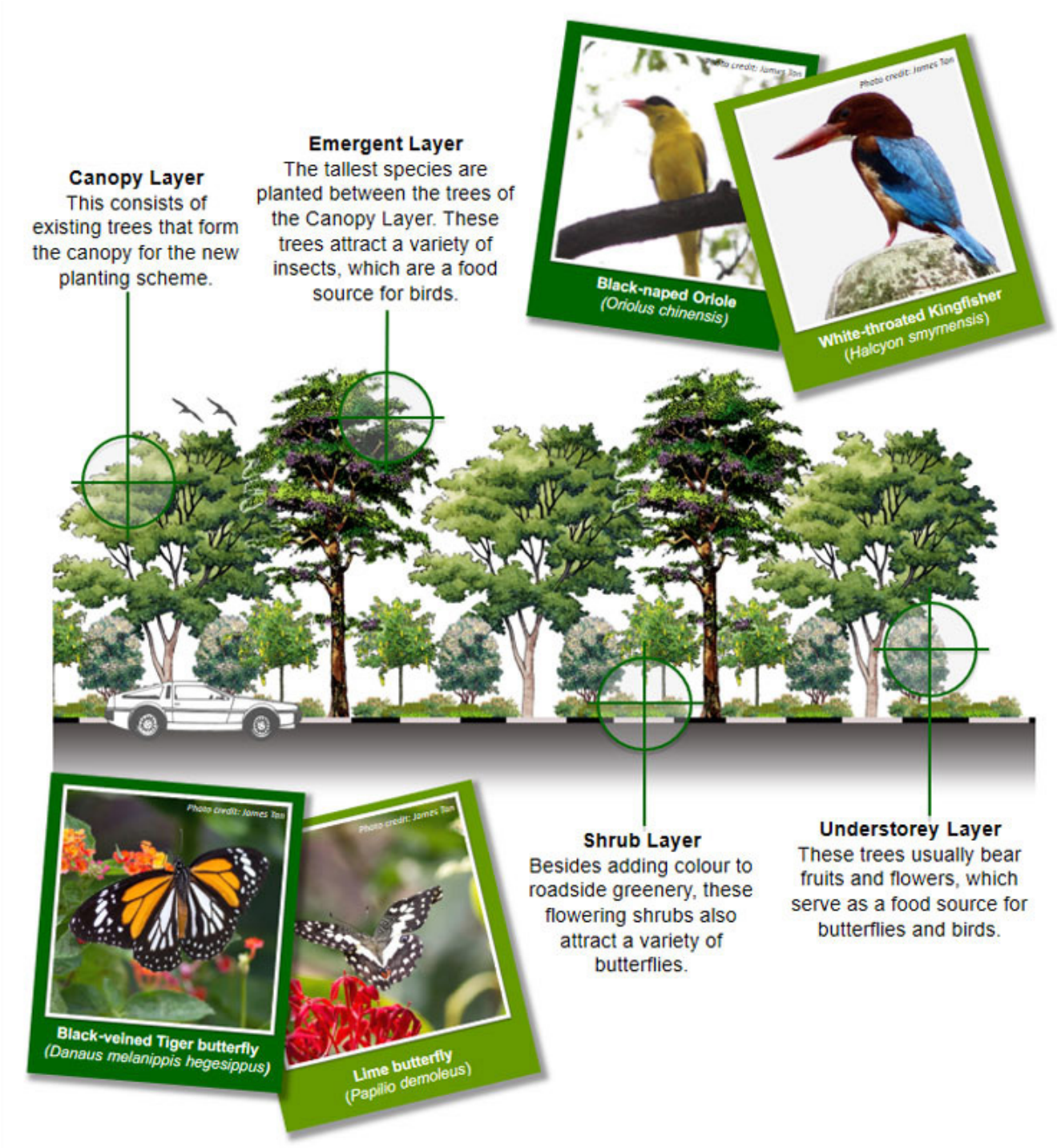


IMAGE SOURCE: NATIONAL PARKS, SINGAPORE.

Aerial view of a suburb in Victoria.

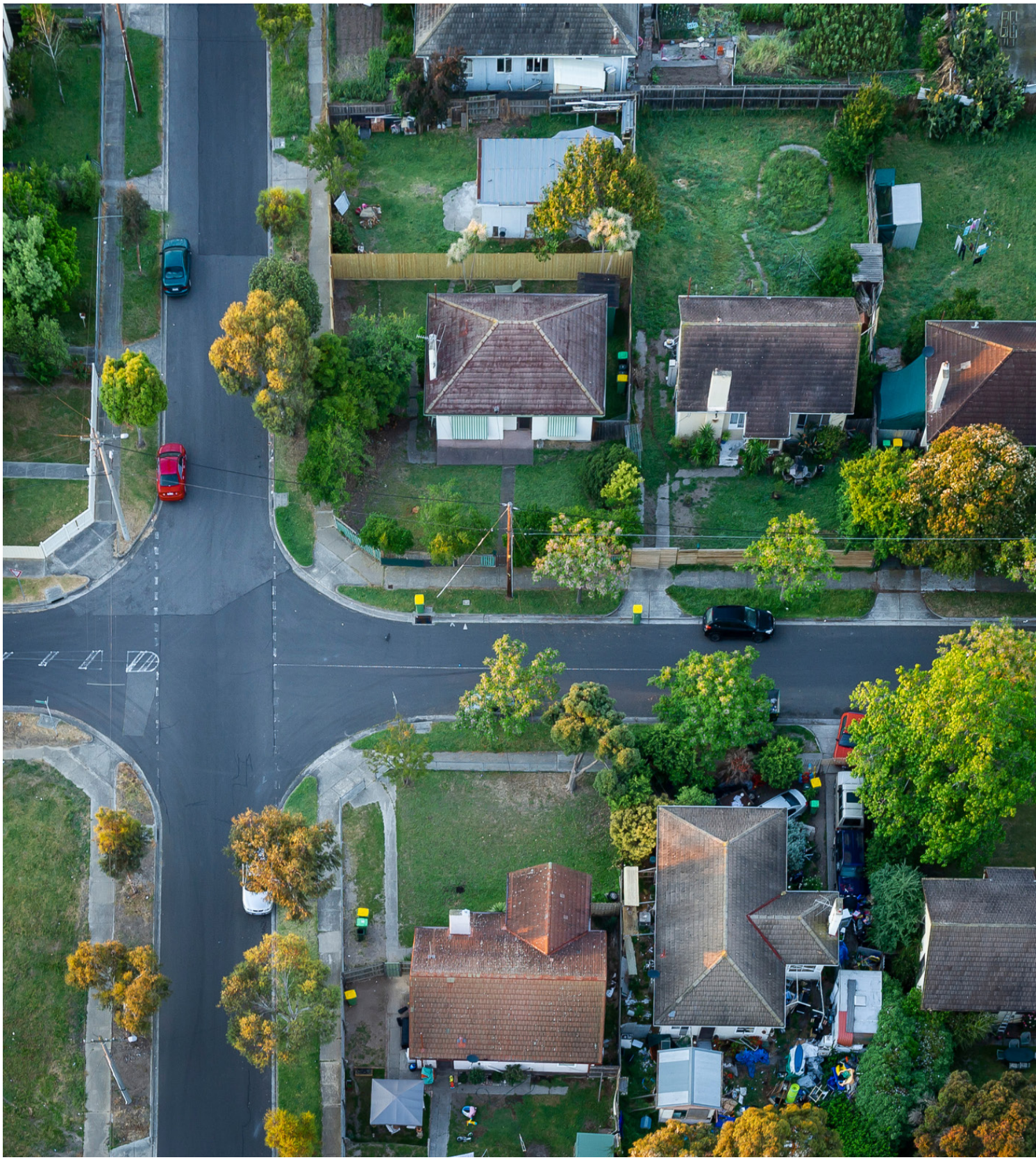


IMAGE SOURCE: GETTY IMAGES

AUSTRALIAN CASE STUDIES - SUMMARY OF FINDINGS

Victoria

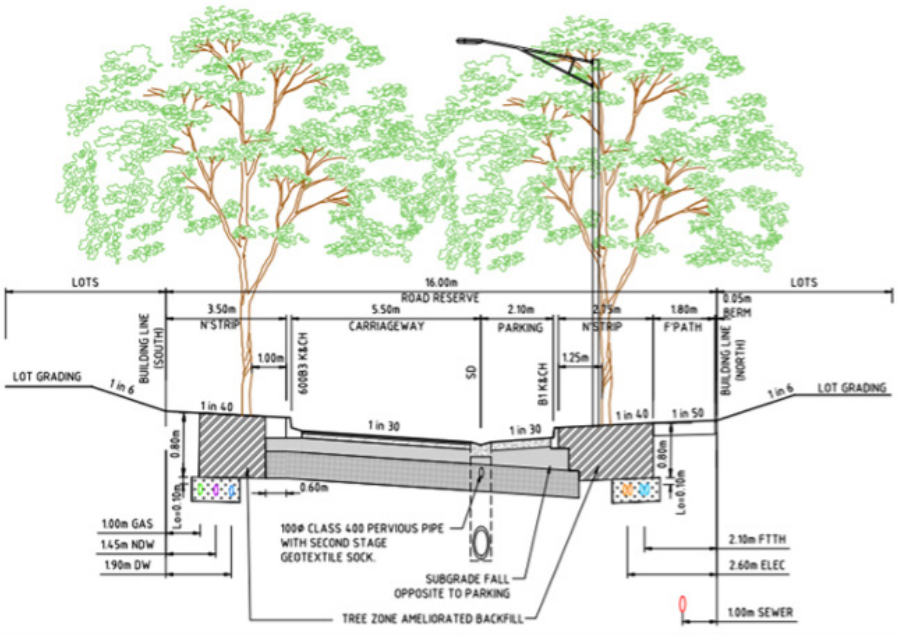
Orana Project - City of Cassey

Balcon Property Group

The Orana Project located in Clyde North in the City of Casey, is a residential development designed to provide a sustainable, connected community with a wide range of amenities. Led by the Balcon Group, this project spans over 275 hectares and aims to support around 4,000 households. The Orana Project includes 6 parks, and a mixed-use town centre with a range of retail, commercial and residential offerings. Construction commenced in late 2019 and the Orana project was launched in February 2020.

What makes this project different?

The Orana Project has an Urban Forest Initiative which targets 30% mature tree canopy cover across all public spaces. This has been developed in conjunction with the City of Casey and key project consultants including Verve Projects. The initiative is a result of a Memorandum of Understanding (MoU) which was facilitated



SOURCE: ITY OF CASEY

Figure 6 - Typical 16.0m road reserve velvet circuit.

through the Growing Casey Program. The MoU aims to explore innovation and collaboration on projects such as street tree canopy and integrated water management outcomes. The MOU Program is a fee for service program where developers pay a yearly fee based on the resources required (planning, engineering, landscaping etc.) to service their project needs. A MOU agreement between Council and the developer is then signed and executed with service level agreements and references to any other initiatives (e.g. innovations such as the implementation of 30% canopy cover).

The approach the Orana Project has taken has been to consider the tree first within the streetscape and design from there. The approach also considered what the community may look like if the streets were for people first. This assisted in setting agreed values for urban design, engineering and landscape outcomes from the beginning.

Key outcomes from this approach include:

- An alternative street cross section referred to as a "green street" was proposed for streets with less than 30 lots.
- This enabled the design to be based on an "Access Place" standard section to be adopted per clause 56.06-8 Table C1 of the Casey Planning Scheme.
- The Access Place standard section only works with reduced visitor carparking ratio and lot frontages minimum 12.5 metres. The City of Casey reduced the parking provisions to 0.7 per lot and the developer adopted a minimum 12.5 metre frontage lot for "green streets"
- An alternative "green street" section was then developed that aimed to increase the "tree growth zone" and increase permeability.
- The City of Casey required passive irrigation, however Verve Projects (Project Engineers) recommended an improved soil volume, quality and permeability approach due to the higher rainfall in Casey and existing examples of good tree outcomes in the area (namely Parklands Drive in Berwick that adopted a similar street section in the early 1990's).
- Verve Projects engaged a soil scientist and devised a method to ameliorate site won topsoils for reuse in tree growth zones. The modified topsoil was backfilled to achieve adequate densities for engineering whilst not overlay compacted for the horticultural needs. Tree growth zone drainage was also added to drain any excess water from the tree pits.
- Site won topsoil was ameliorated to Soil Scientist specification to improve tree growth zone quality. Soils were compacted to achieve minimum engineering requirements which approximated natural soil density levels. (See Figure 7).
- Verve Projects negotiated with the service authorities and the City of Casey to increase depth of assets to maximum covers (typically 600 mm minimum to 800 mm maximum) and to approve the use of a site won, modified and ameliorated topsoil for backfilling trenches in nature strips. This removed the issue of backfilling in site clays then digging out for tree planting.
- Modified topsoil was used in backfilled tree growth zones between driveway cross

Figure 7 - Site won topsoil being ameliorated to Soil Scientist.

SOURCE: VERE PROJECTS

overs. Topsoil stockpiles ready for trench backfill can be seen in Figure 8.

- Verve Projects also recommended changes to the connector street urban design and green street interface that improved design outcomes and overall canopy cover. It is estimated that the design changes in the study area (473 lots) have improved canopy coverage by 20% over the business-as-usual approach. The estimated public realm canopy coverage is 60% (based on 8 metre mature canopy size) versus the VPA 30% minimum public realm requirement.

A key to the success of this strategy has been to regularly test concepts both from an engineering and financial perspective to ensure deliverability and refine the concept stage by stage.

The outcomes achieved at the Orana Project were possible due to the City of Casey's vision and interest in supporting better street tree outcomes in their municipality. This approach has led to the City of Casey developing their own strategy, Greening Casey which was endorsed by Council in August 2024. This strategy was developed in lieu of any State Government policies or targets apart from direction from existing PSPs and *The Living Melbourne: our metropolitan urban forest strategy*[10].

The purpose of this strategy is to:

- Set targets and track progress;
- Educate and advocate;
- Best practice management of trees;
- Protect trees in the private realm; and
- Advocate for best practice trees in future developments and subdivisions.

Considerations for the TAP

- **Adopt learnings from Orana:** Growth area councils can benefit from Orana's approach

Figure 8 - Modified topsoil backfilled in tree growth zones between driveway cross overs.

SOURCE: VERE PROJECTS

by working with developers and consultants on innovative approaches to standard engineering designs to make more space for trees. For instance, removing a footpath on one side of the road (as done by the City of Casey) to increase space and soil volume for trees, where connectivity is not essential on both sides.

- **Consider Greater Depth for Services:** Consider maximum dispensations to lay services deeper, providing space for tree roots to grow.
- **Adapt Backfill Materials:** Work with authorities to adjust backfill materials to better support tree growth.
- **Start Planning Early:** Begin conversations on tree canopy and space allocation at the initial stages of project planning.
- **Secure Funding for Canopy Mapping:** Allocate funds to map the current street tree canopy and continue updating in future years to assess the success of these projects over time.
- **Create Custom Strategies if Standards are Lacking:** Follow the example of the City of Casey, which created its own street tree canopy strategy due to the absence of official guidelines.
- **Pursue Innovation through Trial Projects:** Test new approaches to enhance urban amenity, as the Growing Casey Program has done.

Thank you to Ray Verratti of Verve Projects and Timothy Sinnappu of the City of Casey for their contributions to this case study.

[10] Living Melbourne - Our Metropolitan Urban Forest, The Nature Conservancy and Resilient Melbourne, 2019. Retrieved from https://www.nature.org/content/dam/tnc/nature/en/documents/australia/2019LivingMelbourne_Strategy_online.pdf

New South Wales and Australian Capital Territory

Ethos Urban were tasked with exploring the NSW and ACT street tree policies and strategies. A summary of their findings is included below.

Western Sydney Aerotropolis Development Control Plan 2022

The Western Sydney Aerotropolis Development Control Plan 2022[29] features multiple performance outcomes and benchmark solutions relating directly to the provision, protection, and maintenance of street trees. Of particular note is the focus given to street trees through a lens of stormwater management and water sensitive urban design, with outcomes that seek to 'utilise stormwater for passive irrigation of street trees to promote healthy trees, optimise canopy cover and contribute to streetscape'.

2.3.2 Stormwater Management and Water Sensitive Urban Design

- Objective 3 – Utilise stormwater for passive irrigation of street trees to promote healthy trees, optimise canopy cover and contribute to streetscape, urban cooling and amenity.
- Benchmark solutions: Development includes the following stormwater management measures within each lot created by the development - (c) Passively irrigated street trees are provided in accordance with the provisions of clause 2.4.5 of this DCP.

2.4.5 Street Tree Planting Requirements

- Objective 1 - Utilise stormwater for passive irrigation of street trees to promote healthy trees, optimise canopy cover and contribute to streetscape and amenity.
- Objective 2 - Facilitate canopy street tree planting that reaches a mature height that is commensurate with the width of the street and the height of development fronting that street, to enhance the amenity and identity of the street.
- Objective 3 - In preparation for planting the site is to be de-compacted to ensure that a growing environment capable of supporting the sustainable growth of a tree is provided.
- PO 1 - Development is to incorporate street trees within public road reserves, designed to be passively irrigated through the stormwater drainage system and maximise stormwater losses through evapotranspiration.
- Street tree heights and canopy spread are to be commensurate with the road reserve dimension.
- Street trees are to be planted at a maximum of 10m intervals (trunk to trunk) on all local streets and designed in accordance with specifications below:
  - PO2 - Continuous tree canopy cover is achieved along both sides of the street.
    - Provide verge street trees as shown in Figure 9.
    - Provide kerb extension trees as shown in Figure 10.
    - Provide carriageway trees as shown in Figure 11.
    - Provide median street trees as as shown in Figure 12.
    - Retain and supplement trees along all proposed streets so that they provide green linkages across Aerotropolis.
  - PO3 – Street trees mitigate urban heat.
    - Provide 50% of north-south oriented streets with shade for active transit users during the hottest times of the day.

[29] Western Sydney Aerotropolis Development Control Plan 2020, Department of Planning and Environment, NSW Government, November 2022. Retrieved from https://shared-drupal-s3fs.s3.ap-southeast-2.amazonaws.com/master-test/fapub_pdf/NSW+Planning+Portal+Exhibitions/Western+Sydney+Aerotropolis+Development+Control+Plan+-+Phase+2.pdf

SOURCE: CITY OF SYDNEY

Figure 9 - Verge street trees.

SOURCE: CITYGREEN

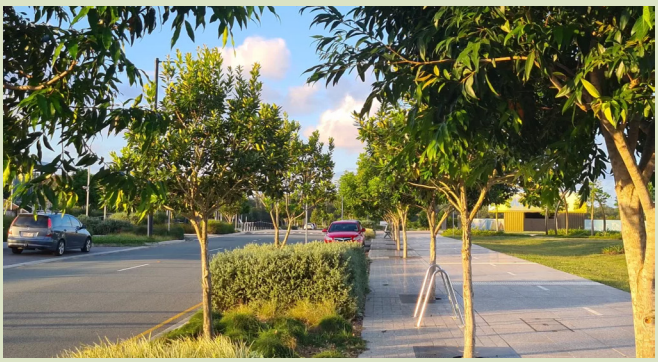


Figure 10 - Kerb extension trees.

SOURCE: PDT ARCHITECTS

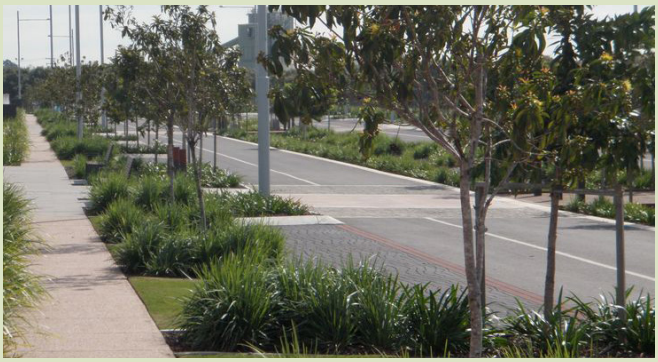


Figure 11 - Carriageway trees.

SOURCE: CITY OF SYDNEY

Figure 12 - Median street trees.

- Provide 80% of east-west oriented streets with shade for active transit users during the hottest times of the day. Aerotropolis Phase 2 DCP
- Provide for deep soil planting within the streetscape, to enable trees to reach mature heights and contribute to canopy cover.
- Provide landscaping within at-grade car parking areas.

2.7 Parking design and access

- Objective 5 - Ensure vehicle access arrangements are appropriate and minimise any adverse impact on infrastructure, road networks, safety, adjoining properties, amenity, and street trees.
- PO7 - Vehicle access arrangements and queuing areas on a site shall minimise any adverse impact on infrastructure, road networks, safety, adjoining properties, amenity, and street trees.

2.13 Smart places

- PO1 - Implement multi-function poles (Smart Poles) where street poles are required that accommodate multiple functions.
- (b) Placement avoids impacts on existing and future mature street tree canopies.

3.2 Parking and travel management

- PO3 - To minimise the impact of vehicle access points on the quality of the public domain and streetscape.
- Driveways should be: Located considering any services within the road reserve, such as power poles, drainage inlet pits and existing street trees.

4.3.5 Shelter and shade

- PO1 - Provide continuous weather protection

within centres that is integrated into building entrances and frontages, to optimise the provision of shade and shelter to the public domain.

Turn Down the Heat Strategy and Action Plan (2018) (NSW)[30]

- **Economic benefit of increased tree cover:** Research undertaken by AECOM that focused on three Sydney suburbs (Blacktown, Willoughby and Annandale) has led to a conservative estimate that just a 10% increase in the leaf canopy of street trees could increase the value of properties by an average of $50,000.
- **Cool Streets Blacktown:** Discusses a successful program where residents were engaged in supporting and selecting street trees for their street and in overcoming the stigma around street trees in local neighbourhoods.

Western Sydney (NSW)

- The NSW Western Sydney approach encompasses coordinated governance, strategic and policy alignment and then technical implementation/ coordination.
- The Western Sydney City Deal (urban governance across three tiers of government) is leading an initiative with Western Sydney Planning Partnerships (urban governance across multiple councils) overseeing the Western Sydney Engineering Design Manual, along with the Western Sydney Street Design Guidelines (Street Design Guidelines)[31].

Canberra's Living Infrastructure Plan[32]

- Action 2 - 30% tree canopy cover in Canberra's urban footprint by 2045.
- Action 6 - Requires multi-unit dwellings, mixed-use, and commercial development applications to demonstrate how tree canopy targets will be met.
- Action 9 - Urban Forest Strategy to be implemented via an adaptive management approach. Considers species selection and climate change data.
- General implementation of other actions through a review of planning policy and mechanisms at all levels of planning, and a review of relevant development and design guidelines.

Urban Forest Strategy (ACT)[33]

- Commits to planting 54,000 trees across the ACT between 2020 and 2024.
- Divides implementation into immediate, short, medium, and long term:
- Immediate actions (within two years) largely centre around updates to policy, laws, and processes. It also mentions the potential for a canopy contribution framework.
- Short term actions (within five years) focus on incentives, planting programs, shading key active transport routes, and community education/ involvement.
- Medium term actions (within 10 years) focus on building indigenous engagement, development rain gardens and swales, strategic planting to

[30] Heat Strategy and Action Plan, The Western Sydney Regional Organisation of Councils' (2018). Retrieved from https://wsroc.com.au/media-a-resources/reports/send/3-reports/286-turn-down-the-heat-strategy-and-action-plan-2018

[31] Western Sydney Engineering Design Manual, Western Sydney Planning Partnership, April 2021. Retrieved from https://theparks.nsw.gov.au/wp-content/uploads/2022/05/EDM_PostPCG_03_210421_1445.pdf

[32] Canberra's Living Infrastructure Plan: Cooling City, ACT Government (2019). Retrieved from https://www.climatechoices.act.gov.au/__data/assets/pdf_file/0005/1413770/Canberras-Living-Infrastructure-Plan.pdf

[33] Urban Forest Strategy 2021-2045, ACT Government (2021). Retrieved from https://hdp-au-prod-app-act-yoursay-files.s3.ap-southeast-2.amazonaws.com/5616/1710/4101/Urban_Forest_Strategy_2021-2045.pdf

Aerial view of a residential neighbourhood in Sydney.

IMAGE SOURCE: GETTY IMAGES

support wildlife movement, and the creation of spatial mapping.

- Long term actions (within 20 years) focus on maintaining a tree register, developing a sustainable planting program, mapping suburbs at risk of losing canopy, cross-government collaboration, and expanding volunteer programs.

Considerations for the TAP

- **Stormwater and Urban Cooling:** Passive irrigation of street trees using stormwater supports healthy growth, maximises canopy cover, and mitigates urban heat with targeted shading goals for streets.
- **Street Tree Planning:** Trees must achieve mature heights suitable for street dimensions, be planted at regular intervals (10m max), and create continuous canopy cover to enhance streetscape and identity.
- **Infrastructure Compatibility:** Parking, vehicle access, and light poles should be located to minimise impacts on street trees and the streetscape, ensuring long-term tree health and functionality.
- **Economic and Community Benefits:** Increasing tree canopy boosts property values (e.g., 10% canopy equals ~$50,000 increase) and fosters community engagement through programs like Cool Streets Blacktown.
- **Governance:** Broader initiatives, such as Canberra's goal of 30% canopy cover by 2045 and the Urban Forest Strategy, emphasise the need for and benefit of established governance structures and cross-government collaboration.

Queensland

Shaping SEQ, South-East Queensland Regional Plan 2023

The Shaping SEQ Regional Plan 2023[34] is a strategic planning document which outlines a framework for sustainable growth and development across South East Queensland (SEQ), focusing on accommodating population increases, enhancing liveability and protecting the natural environment.

Key priorities include creating compact urban areas to reduce urban sprawl, improving infrastructure and transport networks, and strengthening resilience to climate change. The plan emphasises housing affordability, economic growth, and sustainable use of resources, while prioritising green spaces and biodiversity conservation.

Through targeted policies, it seeks to balance economic development with social and environmental goals, fostering a resilient and vibrant future for SEQ communities.

What makes this project different?

Shaping SEQ Regional Plan 2023 is a regional plan, similar to the aspirations of Plan Victoria. Shaping SEQ includes policy directions, outcomes and actions relating to urban tree canopy coverage.

Outcome 5 - Working with and enhancing natural systems (p. 143) includes outcome 5.4 which states:

> *Increase tree canopy coverage within centres and residential areas to achieve a minimum of 15% in the capital city centre, 25% in urban residential and light commercial areas and 50% in suburban residential areas.*

The Plan also includes a policy statement around the importance of urban tree canopy (p. 144):

Street view of a suburb in Brisbane.

IMAGE SOURCE: GETTY IMAGES

[34] ShapingSEQ 2023, Queensland Government Department of Housing, Local Government, Planning and Public Works. Retrieved from https://www.planning.qld.gov.au/planning-framework/plan-making/regional-planning/south-east-queensland-regional-plan

Shaping SEQ 2023 seeks to encourage higher standards for greening and cooling in urban environments through increasing tree canopy cover. The benefits of increasing tree canopy coverage include mitigating urban heat through trees reducing the temperatures of the surfaces they shade, as well as improving walkability and how communities look and feel. Increasing urban tree canopy coverage will ensure our communities are more sustainable, resilient and promote an enhanced sense of place and wellbeing.

The Plan then includes Priority Action 12 (See Figure 13) which makes reference for the need to establish a baseline of data.

Considerations for the TAP

- **Inclusion of Policy Statements:** The benefit of including policy statements in regional plans is to outline priorities and commitments, communicate goals, guide decisions, and direct planning efforts. This will highlight the importance of street trees in combating urban heat island issues whist improving the walkability and liveability of a community.
- **Inclusion of Canopy Targets:** The importance of including targets to set the agenda for tree canopy coverage and as a goal for future development to aspire to. In addition, being mindful of different tree canopy targets for different settings.
- **Establishing a Baseline and Ongoing Data Collection:** In order to assess how policy is being addressed and implemented, the centralised and regular collection and assessment of data is critical for all stakeholders.

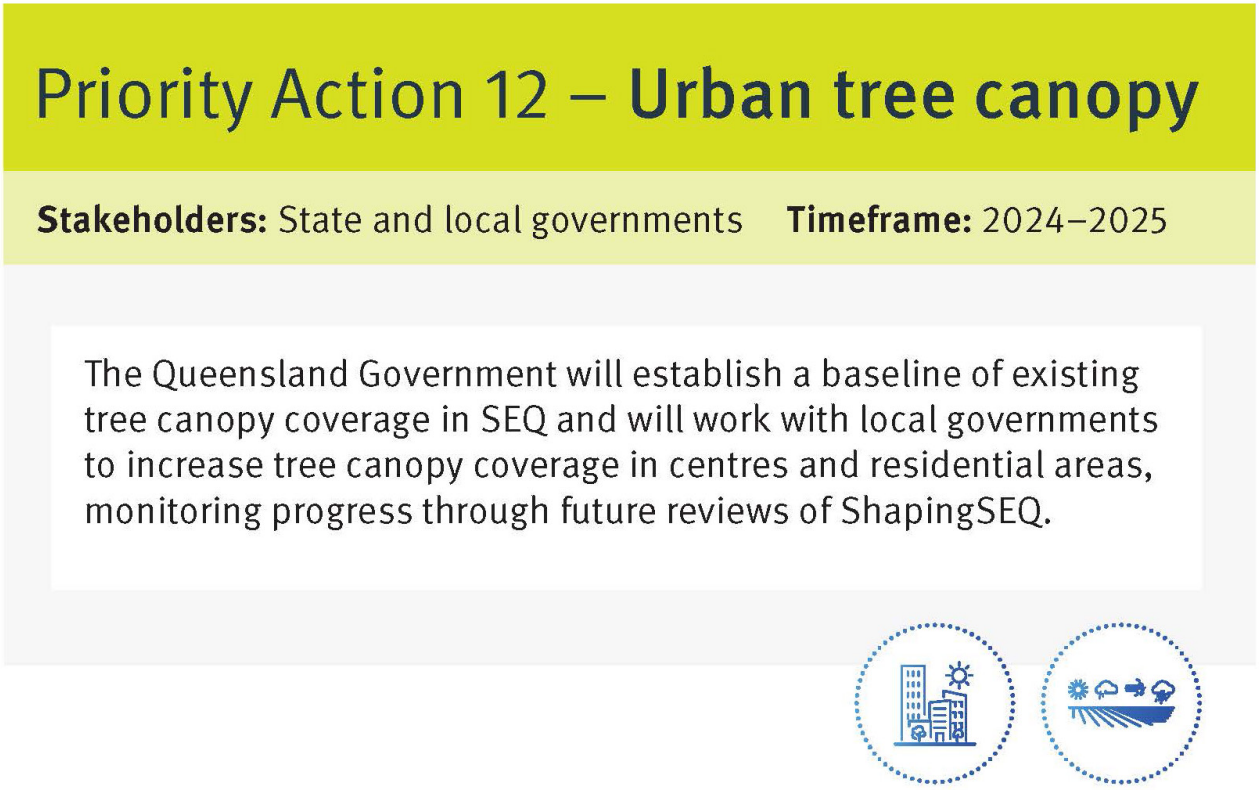


IMAGE SOURCE: QUEENSLAND GOVERNMENT

Figure 13 - ShapingSEQ 2024 Priority Action 12.

SOURCE:FRANZ VAN DEN BRINK

Forest Lake aerial view.

Forest Lake - Brisbane

Delfin Lend Lease

Forest Lake by Delfin[35], established in the early 1990s in Brisbane's southwest, is recognised as one of Australia's first master-planned communities.

Forest Lake was a pioneering project which aimed to create a self-sustaining community with a strong environmental focus. Its most iconic feature, the 10-hectare lake, is surrounded by extensive parklands, providing a central iconic landmark and valuable green space for residents. This approach was innovative at the time, as the focus of the master plan was to achieve a blend of urban and natural elements.

Delfin's vision for Forest Lake included a comprehensive range of amenities designed to foster a sense of community. Schools, shopping precincts, sports facilities, and medical services were considered, ensuring that residents had everything they needed within close proximity to where they lived.

The master plan also prioritised environmental sustainability, with extensive tree planting, wildlife corridors, and efforts to protect local flora and fauna.

Forest Lake's success has influenced urban development across Australia, serving as a model for how master-planned communities can provide sustainable living with convenient access to essential services and nature.

[35] The Living Forest, Forest Lake, Brisbane, Delfin Lend Lease (2007). Retrieved from http://www.celestephilp.com/pdf%20files/Forest%20Lake%20Book.pdf

What makes this project different?

Delfin's commitment to tree preservation shaped the development of Forest Lake, with a strong emphasis on the long-term benefits of retaining young trees to allow them to strengthen over time in an urban setting. This approach aligned with the CEO's direction to prioritise trees, despite challenges in balancing infrastructure needs with tree preservation from a local council and service perspective.

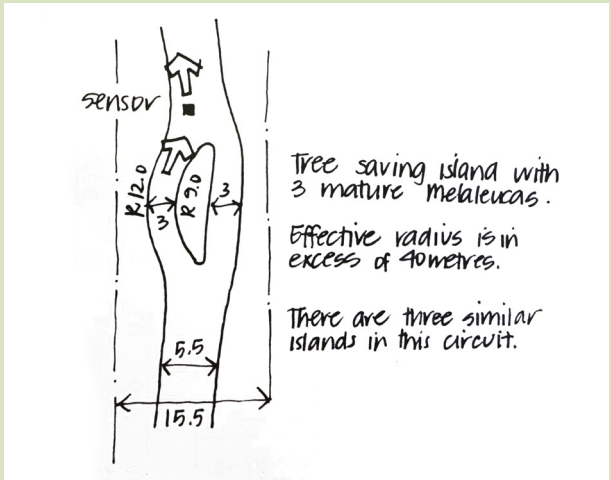
The support from Delfin's Board empowered the development team to make tree retention a priority. This philosophy led to the creation of pedestrian-friendly, tree-lined streets that were designed with people in mind, reinforcing Delfin's vision of a community that values green spaces and a sustainable urban environment. Some of the strategies developed to prioritise street trees and tree retention at Forest Lake included:

- Working closely with the local council and service authorities to prioritise street trees and tree preservation at Forest Lake, including efforts to educate stakeholders on mutual benefits.
- Standards were adjusted to prioritise trees, with a 4–6-page document being created to document all agreements between local council and service authorities, creating a project-specific mini engineering code. This document covered adjustments such as sewer and water alignments, protocol for trees in construction areas, and parameters for permissible changes. These included:
    - Water infrastructure on the low side of the road.
    - Sewer infrastructure on the high side of the road.
    - Flexibility to move the kerb to protect trees.
    - Speed control devices located close to the tree retained clumps to prevent damage and car parking on nature strips.
    - Moving both sewer and water infrastructure to one side of the street to protect the trees.
    - Flexibility to amend width of verges to protect and/or plant more trees on one side of the road.
    - Tunnel boring under trees rather than removing trees.
    - Utilising an old council standard of placing services under the road pavement.
- At initial engineering design meetings, Delfin gathered all stakeholders, including council representatives, to review site plans with contours and trees. They walked the sites to adjust road layouts and lot sizes, specifying trees for protection.
- Trees under 300mm outside building envelopes were safeguarded, but issues arose with builders who sometimes removed trees despite protections, emphasising the ongoing challenge of managing construction impacts on preserved green spaces.

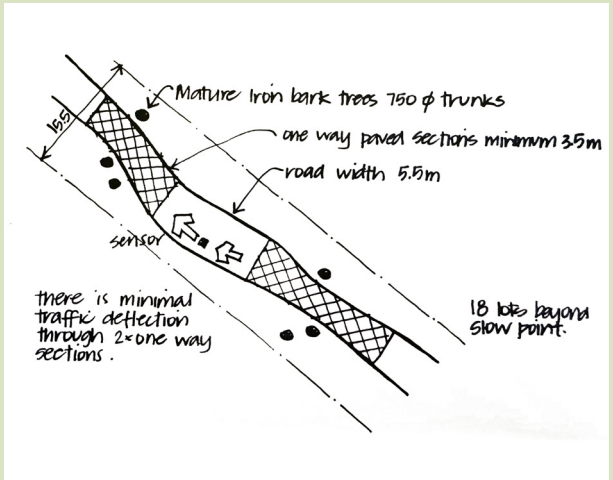
However, it is important to note that the progression of engineering standards in South-East Queensland means that the strategies identified above would not be able to be delivered in today's context. Due to stringent standards, road grade standards, bulk earthwork

Forest Lake tree preservation.

SOURCE: THE LIVING FOREST (2007) DELFIN LEND LEASE.



SOURCE: FRANZ VAN DEN BRINK



SOURCE: FRANZ VAN DEN BRINK

Left and Right: Alternative road designs putting tree protection first.

requirements and other priorities, such as service installations, mowing, maintenance, and garbage collection, overshadow street tree initiatives.

Considerations for the TAP

- **Streets are for people; trees are for people:** Decision making should be based on people and place first rather than maintenance and management considerations.
- **The value in flexibility with defined parameters:** the process of defining the parameters with respect to the road cross sections and extent of change permitted allowed more than one solution to be delivered at Forest Lake. Knowing the 'book ends' of what was permissible and then operating within this space to deliver site specific responses resulted in an outcome where trees were considered a priority.
- **Leadership:** There are technical solutions for all the barriers relating to the lack of prioritisation of street trees. We just need leadership and direction.

Thank you to Franz Van Den Brink and Jaryd Collins for their contributions to this case study..

"In 1994, research showed that Forest Lake's beautiful landscaping and expansive range of parks and bushland areas were the main reasons why people were choosing to live at Forest Lake. Today, the only difference is that strong property values are now just as important."

Michael Chapman
Landscape Architect and Urban Designer Forest Lake 1990-2007 (p.50)

SOURCE: FRANZ VAN DEN BRINK

Forest Lake street view.

South Australia

South Australia Water

South Australia Water (SA Water) is the government-owned corporation responsible for providing reliable water and wastewater services across South Australia. SA Water serves metropolitan, regional, and remote communities, supplying clean drinking water to over 1.7 million people and treating wastewater for safe environmental discharge. With a mission to deliver high-quality, sustainable water solutions, SA Water is committed to supporting public health, environmental protection, and economic growth.

SA Water's infrastructure includes extensive networks of pipes, reservoirs, treatment plants, and pumping stations, spanning urban and rural areas to ensure equitable water access.

In addition to water delivery, SA Water focuses on conserving South Australia's water resources, managing catchment areas, and promoting water-saving practices among customers. SA Water's efforts contribute to a resilient water future, adapting to the demands of climate change and urban growth.

What makes this project different?

SA Water operates under the ***Services in Streets Code of Practice*** which was adopted in 1997 and forms the basis of all SA Water technology standards. These standards were agreed to by multiple parties concerned with service alignment and the delivery of residential streets.

The ***Services in Streets Code of Practice*** was developed by The Public Utilities Advisory Committee (PUACC) which acted as a forum for service agencies and Local Government to develop a co-operative protocol for planning, placement and maintenance of services, plant and infrastructure within streets and roadways.

The Local Government Association played a key role in the facilitation of this Code due to the importance of coordination of works undertaken in residential streets.

The Code includes a number of chapters which deal with service alignments and results in a 'one-stop-shop' for direction regarding street design. The Code includes:

- Urban design context including defining the streetscape, the role of streets and landscaping.
- Common service trench construction guidance.
- The **location of street trees** to:
    - Kerb clearances
    - Footpath clearances
    - Common service trench clearances
    - Sewer clearance
    - Water main clearance
    - Property boundary clearance
    - Soil conditions

The Code demonstrates that trees are given priority and are the focus of the code and that the service requirements are measured from the tree, rather than the tree being the last aspect considered.

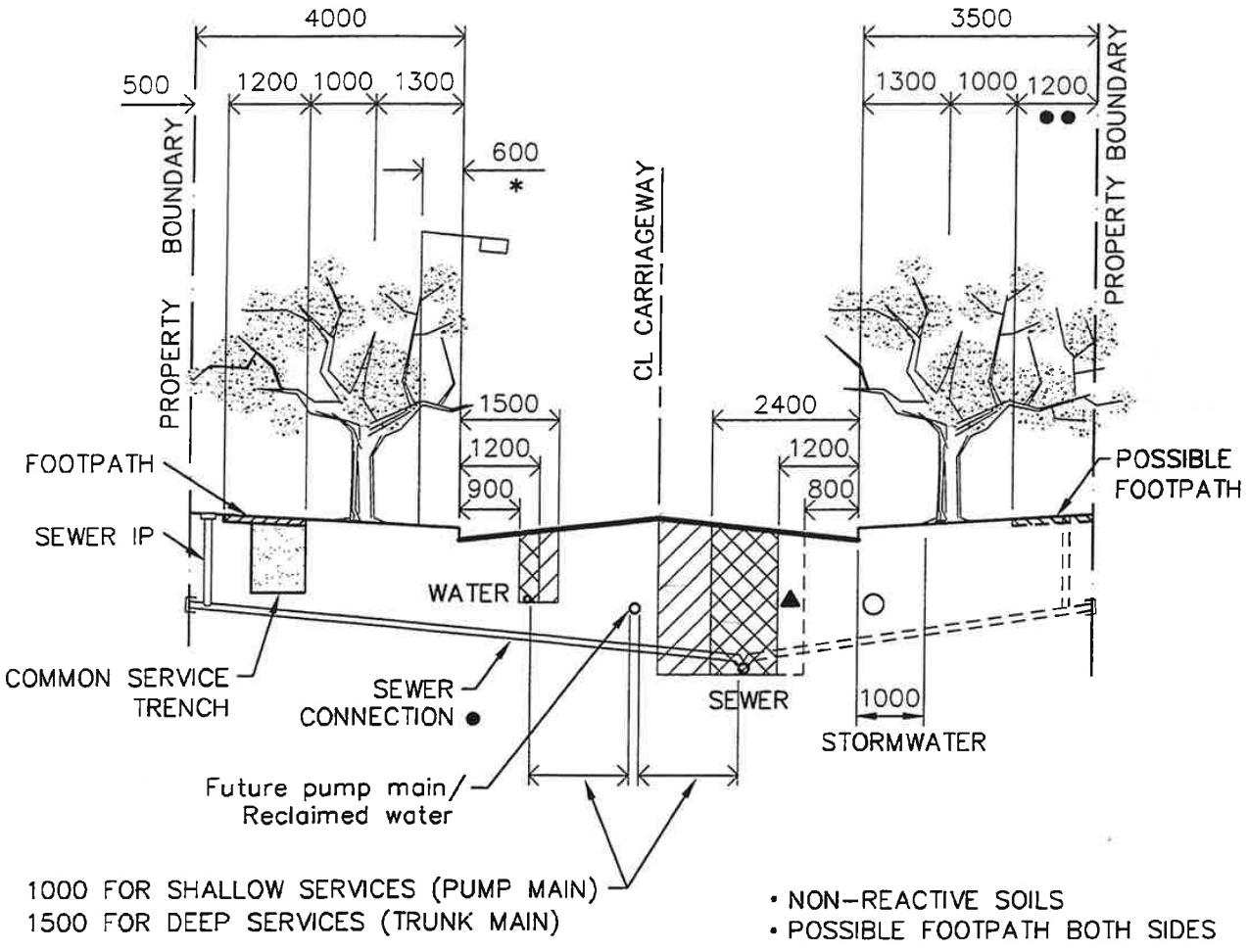
In addition, the business-as-usual approach within this Code is that the services are located under the road pavement rather than within the nature strip. (See Figure 14).

SA Water have a number of additional innovations including:

- A tree planting guide[36] which sets out further guidance and recommendations for street trees to prevent damage to infrastructure.
- A 12-month Defect Liability Period for all assets.
- GIS data regarding the location of assets to ensure ease of location for fault repairs.

[36] Services in Street manual, Street Tree planting guide 2021, SA Water. Retrieved from https://www.sawater.com.au/__data/assets/pdf_file/0006/53196/Tree-Planting-Guide.pdf

Figure 14 - Access Street (Condition A).



LEGEND

- ● Longitudinal separation of tree and :–
  - sewer main & connection pipe = 3500 clearance (schedule 2 trees)
  - water main & connection pipe = 1000 clearance
- ●● – Increase to 1700 (1200 min. path + 500 for services) for telecommunication pillars this side.
  - Increase by 100 if front fences
- * Increase lighting setback if co-incident with stormwater drain
- Band width for narrow carriageways
- Additional band width for wider carriageways (7.0m and greater) to increase clearance from kerb face
- ▲ Additional band width for curved/curvilinear roads (no A.C.'s in this band)

SOURCE: SERVICES IN STREET MANUAL

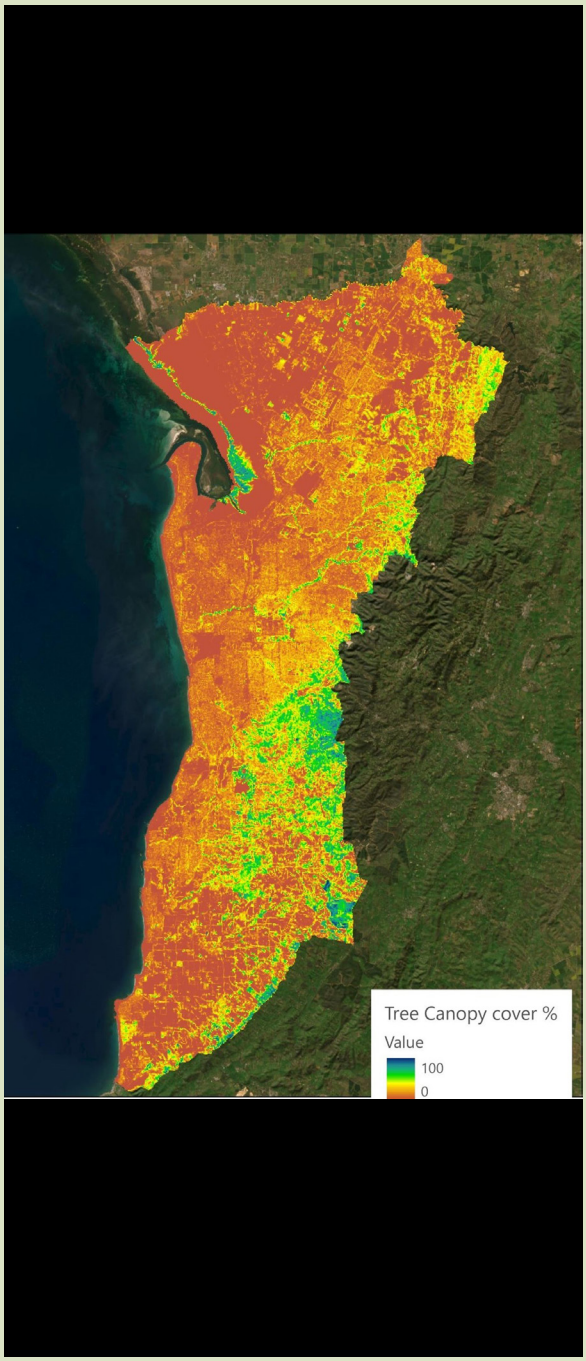
Considerations for the TAP

- **Prioritise Tree Protection in Asset Management:** Adopt asset protection strategies that balance tree preservation and access, placing an emphasis on tree health and performance in urban planning.
- **Create a Standard Code for Tree and Asset Interactions:** Establish a Code that defines best practices for balancing asset placement with tree root protection, especially in capital works projects.
- **Adopt Flexible Sewer and Water Alignments:** Default sewer and water alignments should ideally be in road pavements to keep maximum offset from tree roots, with exceptions only in private land where necessary for asset access.
- **Maximise Tree Growth Zones in Low-Traffic Areas:** Where feasible, place sewer and water beneath road pavements in low-traffic zones to increase space for tree root growth.
- **Mitigate Future Tree-Asset Conflicts:** Plan asset locations to avoid clashes with tree roots, minimising maintenance disruptions and enabling future replacements without impacting urban greenery.
- **Establish Comprehensive Defects Liability Periods (DLP):** Maintain a 12-month DLP for assets to ensure early identification and resolution of issues, particularly in high-risk areas.
- **Reduce Root Ingress in Sewer Connections:** Increase measures to mitigate root ingress in sewer lead-ins and connections while monitoring and protecting tree roots.
- **Avoid Asset Positioning in Wheel Tracks:** Place assets away from wheel tracking to reduce pavement impact and avoid “bumpy” road complaints from users.
- **Involve Arborists for Tree Preservation:** Consult arborists to assess root zones and use “dog-leg” layouts to protect trees rather than removing them.

Street view capturing autumn colours in Hahndorf, South Australia.

IMAGE SOURCE: GETTY IMAGES

Figure 15 - Metropolitan Adelaide tree canopy cover.



SOURCE: GREEN ADELAIDE

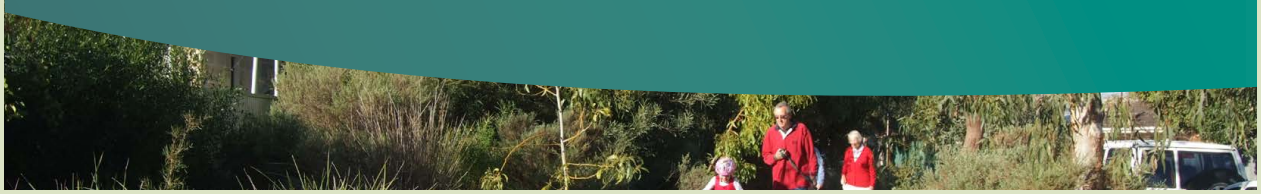
Green Adelaide

Green Adelaide[37] is a comprehensive initiative focused on enhancing Adelaide's urban landscapes by increasing greenery, biodiversity, and sustainable environments throughout the city and its surrounding areas. With a vision to create a cooler, greener, and more liveable Adelaide, the project aims to combat the effects of urban heat, improve air quality, and foster ecological resilience. A primary focus is on expanding tree canopy cover, which provides critical shade, reduces ambient temperatures, and mitigates the impact of extreme heat events. By increasing greenery in urban and suburban areas, Green Adelaide also seeks to support wildlife by creating habitats and connecting biodiversity corridors that enable species movement and resilience.

The initiative engages residents, businesses, and local governments in shared efforts, offering programs like tree planting events, education on sustainable gardening practices, and grants for greening projects. With goals aligned to broader environmental frameworks, Green Adelaide supports climate adaptation, public health, and urban sustainability through innovative approaches to land and water use. It also emphasises community engagement, encouraging local ownership and stewardship of green spaces. This holistic approach not only beautifies Adelaide but also strengthens its sustainability, preparing the city to meet the challenges of climate change and urban growth in the years ahead.

[37] Green Adelaide 2024. Retrieved from https://www.greenadelaide.sa.gov.au/

Key focus areas		Outcomes
G1	Drive coordinated, accelerated greening of streetscapes and public spaces	Improved regional coordination to achieve more climate-resilient, water smart and sustainable urban greening outcomes
G2	Influence the protection of trees and incentivise greater greening of private land through the new planning system and other levers	More new infill housing and commercial developments keep mature trees and plant more than the minimum landscaping requirements
G3	Identify priority locations for improved urban greening and define what success looks like in different contexts	Strategic, high quality climate-resilient greening reflective of local context and need



SOURCE: GREEN ADELAIDE

Figure 16 - Green Adelaide Regional Landscape Plan 2021-2026 key focus areas.

What makes this project different?

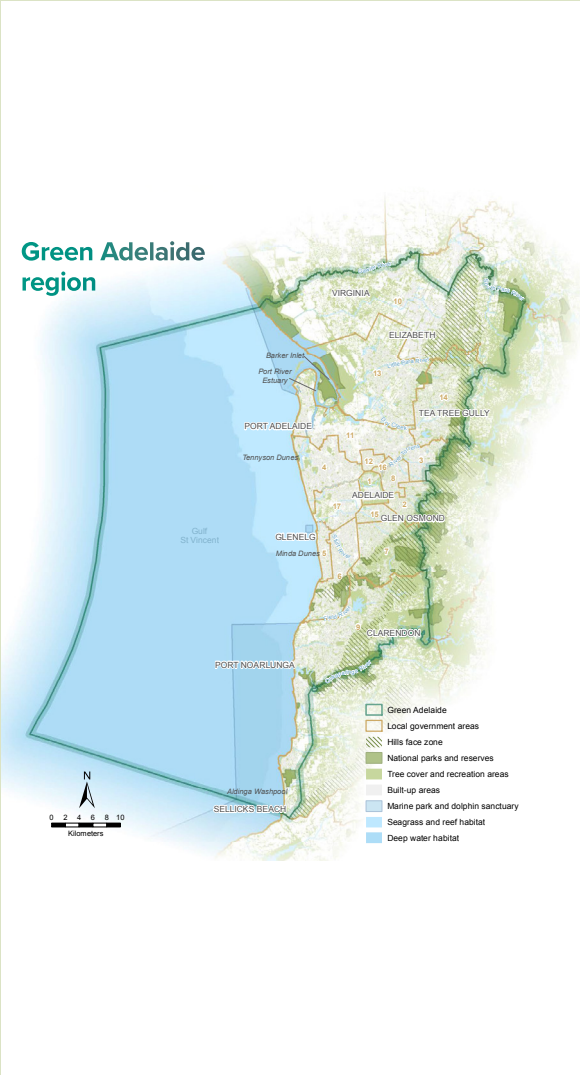
Green Adelaide is South Australia's first government urban environmental organisation, and its area of responsibility covers Adelaide's 17 metropolitan councils.

Green Adelaide was established as part of the 2019 South Australian natural resources management reform, and the introduction of the Landscape South Australia Act 2019 and its role and function are summarised below:

- Funded by landscape levies which are collected from rate payers by metropolitan councils and water levies which are collected from water licence holders in metropolitan Adelaide.
- Coordination of an urban heat and tree canopy mapping project to map the urban forest and built environment across metropolitan Adelaide. (See Figure 15).
    - Multispectral imagery, LiDAR technology and thermal imagery were used to map the existing conditions in 2022.
    - The data was then analysed to calculate the percentage and total area of canopy cover, green cover, permeable and impermeable surfaces, and building footprint across the study area
    - Coordinated by Green Adelaide, the study is the first time that local and state government have partnered to capture tree canopy data for the entire metropolitan Adelaide area in a single study to provide a regionally consistent

Green Adelaide enhances the city's beauty and sustainability, preparing it for climate change and urban growth challenges.

Green Adelaide Region.



SURCE: GREEN ADELAIDE

dataset and full picture of the urban environment.

- Development of the Green Adelaide Regional Landscape Plan 2021-2026[38] which includes a number of policy statements and goals with respect to street tree canopy coverage including:
  - Inclusion of statements regarding the emerging 'climate emergency' and that many local government organisations have made this declaration within the region.
  - A goal to increase the extent and quality of urban green cover and several key focus areas to achieve this including (p.16). (See Figure 16).

Considerations for the TAP

- **Inclusion of Policy Statements:** The benefit of including policy statements in regional plans highlighting the emerging climate emergency and the role that street tree canopy coverage can play.
- **Establishing a Baseline and Ongoing Data Collection:** In order to assess how policy is being addressed and implemented, the centralised and regular collection and assessment of data is critical for all stakeholders.
- **Funding Sources:** Consideration and utilisation of existing levies to assist in funding a dedicated part of government to address urban heat island and tree canopy initiatives.

[38]Reginal Landscape Plan 2021-26, Pathway to a cooler, greener, wilder and climate-resilient Adelaide, Green Adelaide. Retrieved from https://cdn.environment.sa.gov.au/greenadelaide/images/GA-Regional-Landscape-Plan_approved.pdf

Western Australia

Better Urban Forest Planning

Department Planning, Lands and Heritage (DPLH)
Western Australian Planning Commission (WAPC)
Western Australian Local Government Association (WALGA)

Better Urban Forest Planning[39] in Western Australia (WA) is an initiative aimed at improving urban greening strategies to create resilient, sustainable cities that can better cope with climate change, urban heat, and population growth. As urban areas expand, WA's cities face a reduction in tree canopy cover due to development pressures, leading to increased urban heat island effects. This initiative focuses on strategic planning, policy frameworks, and community engagement to enhance and protect urban forests.

Better Urban Forest Planning also promotes collaboration between councils, urban planners, developers, and the community to align urban development with environmental goals. Through better planning and targeted policy changes, WA aims to foster greener, cooler, and more liveable urban spaces that improve the quality of life for residents.

What makes this project different?

Better Urban Forest Planning key goals include increasing tree canopy cover, integrating green spaces into urban designs, and ensuring that public infrastructure supports tree health and longevity.

More specifically, the Better Urban Forest Planning document includes:

- Commentary regarding the need for area specific targets (See Figure 17).
- Commentary regarding the need for data on tree

Figure 17 - Area-Specific Targets.

BOX 4: AREA-SPECIFIC TARGETS

Canopy or other vegetation targets can be developed for specific areas within a Local Government's control or in partnership with stakeholders. Targets could be set for areas such as:

- Private land such as residential, commercial or industrial land in consultation with residents.
- Car parks – this can be challenging because of large areas of impermeable surfaces, however, providing shade in these areas is also an opportunity that allows for great environmental and health benefits to be realised.
- Road reserves and verges – a general target of one canopy tree per lot on residential, commercial or industrial land is encouraged in local road design guidelines. In many cases this could be increased subject to the lot frontage. The design and installation of cross-overs should cater for one tree per lot.
- Public recreational reserves – while sporting space needs to be maintained, increasing canopy on park edges provides further opportunities to enhance parkland amenity.
- Private recreational reserves and landowners, such as golf courses, often cover large areas and provide an opportunity for canopy enhancement
- Land owned by public utilities – these areas commonly contain or are planned to incorporate water, power or telecommunications infrastructure. They also represent opportunities for canopy development in partnership with utilities, subject to specific restrictions.
- Precinct opportunities - a defined precinct that contains a range of land uses and provides an opportunity to enhance canopy cover through redevelopment plans or as a strategy to enhance the public realm.

Other measures can include:

- A reduction in the percentage of canopy lost
- The number of trees planted within specific areas
- Percentage of canopy gained in specific areas.

Specific initiatives geared towards these areas would likely allow Local Governments to reach its canopy cover goals within a shorter timeframe.

SOURCE: BETTER URBAN FOREST PLANNING

[39] Better Urban Forest Planning - A Guide to Support the Enhancement of Urban Forests in Western Australia, Western Australian Planning Commission, November 2018. Retrieved from https://www.wa.gov.au/system/files/2021-05/PRJ_Better_Urban_Forest_Planning.pdf

CITY OF STIRLING – TREE BONDS

DESCRIPTION

The City of Stirling requires a bond for the protection of street trees where development or other activities may have a potential impact. The bond is held by the City prior to the commencement of development for the duration of the works and is incorporated into the existing verge bond, required as part of the verge permit process.

OUTCOMES

If a street tree is damaged, pruned, dies or is removed without authorisation, part or all the bond may be retained. The costs borne by the landowner or developer is determined by the following elements.

- removal costs –incurred by the City for physically removing the tree;
- amenity value – calculated in accordance to the City's amenity tree calculation (currently the Helliwell method or other City approved valuation system). If the tree has a higher Helliwell value than the retained bond, further action may be taken to recover costs; and

CITY OF MELBOURNE – EXCEPTIONAL TREE REGISTER

DESCRIPTION

In recognition of around 20,000 trees on private land, the City adopted its Exceptional Tree Register in July 2012. Trees in Local Government parks and reserves and schools, universities and churches are also eligible if they are nominated.

OUTCOMES

Trees on the register are protected through the City'splanning scheme via an environmental significance overlay that applies to any property with an exceptional tree or other properties in the tree protection zone. The environment significance overlay operates in a similar manner to a special control area in Western Australia.

SOURCE: BETTER URBAN FOREST PLANNING

Figure 18 - Case studies.

canopy coverage for monitoring, measuring, and implementing tree canopy targets. Specifically, the report refers to geographic information system (GIS) data and the CSIRO developed three-dimension high resolution digital photography product - Urban Monitor TM.

- The report includes a range of case studies including the City of Stirling Tree Bond strategy and the City of Melbourne Exceptional Tree Register (p.29-30). (See Figure 18).

Local governments across WA are encouraged to adopt urban forest strategies that prioritise tree preservation during development, include native vegetation to support biodiversity, and use data-driven approaches to monitor tree canopy health.

Considerations for the TAP

- **Utilise Data:** Leverage data such as the CSIRO's Urban Monitor TM research to inform urban greening strategies, ensuring evidence-based planning and policy.
- **Establish a Coordinating Body:** A central organisation to oversee urban greening efforts across regions for more cohesive implementation.
- **Demonstration Projects on Government Land:** Use government-owned land as model sites for sustainable greening practices, showcasing innovative approaches to urban tree canopy and street tree targets.
- **Expand Public Education Initiatives:** Explore education programs such as the WALGA WA Tree Fest to reach more local governments (LGAs) and promote educational programs statewide.
- **Engage Decision Makers through Training:** Enhance decision-maker understanding of urban greening complexities through programs such as the WALGA Masterclass Series and specialised training for elected officials.
- **Consider Strategies such as Tree Bonds and Exceptional Tree Registers:** Tools already in place in local government areas to encourage greater respect for and protection of existing trees.

OneOneFive Hamilton Hill

Development WA

OneOneFive Hamilton Hill, located in Fremantle, Western Australia, is an innovative residential project focused on sustainability and community engagement. Developed by Development WA (State Government Developer), the project transforms the former Hamilton Senior High School site into an eco-conscious neighbourhood featuring diverse housing options.

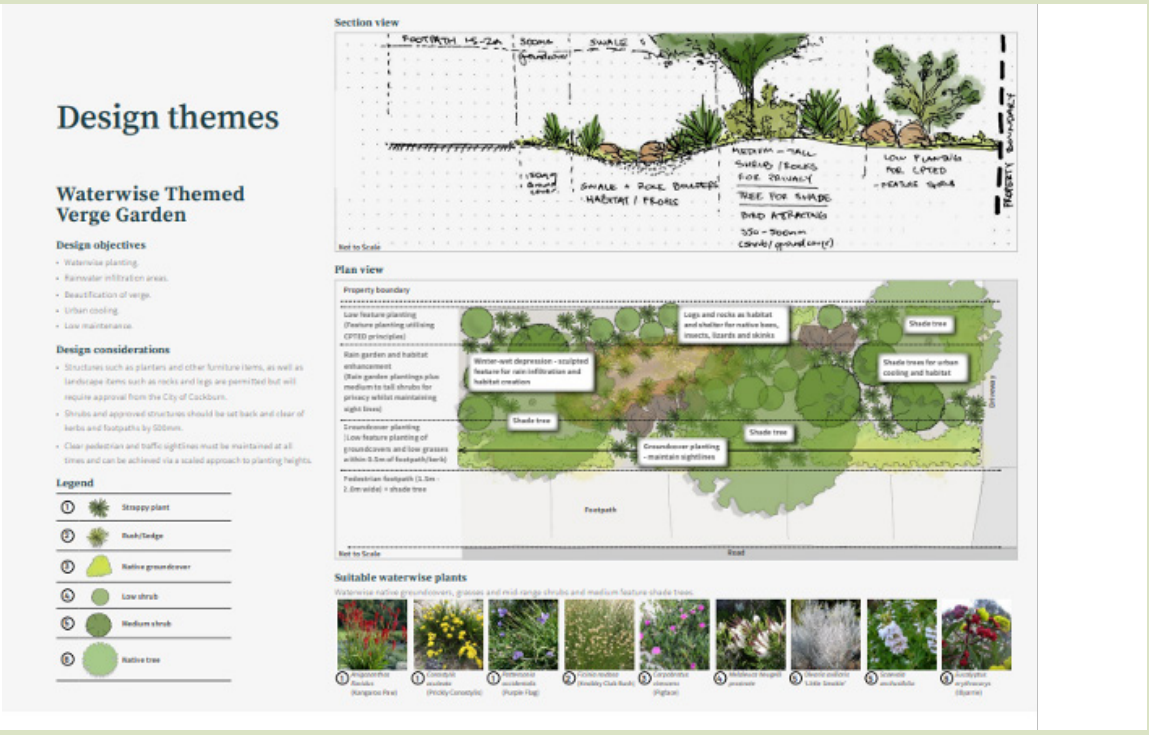
The project emphasises water and energy efficiency, tree preservation, and extensive green spaces, which include nature play areas, parks, and cycling paths. Recognised as a Waterwise Platinum development, OneOneFive also respects the site's heritage through public art and indigenous-themed streets. The project exemplifies sustainable urban planning, creating a vibrant, environmentally friendly community.

What makes this project different?

OneOneFive Hamilton Hill has a strong focus on tree retention, planting, biodiversity, and water sensitive design. Some of the initiatives which assist in achieving these outcomes include:

- **Tree Retention and Enhancement** - A third of the existing mature trees on the former school site have been retained through careful planning. Around 350 new trees will be planted in public areas.
- **Biodiversity and Habitat Creation** - The landscaping will feature retained local and exotic trees, with a diverse understorey of endemic plant species. This planting mix reflects the site's rich history, both Indigenous and European. New planted trees will double the size of the existing canopy

Figure 19 - Design Themes, Waterwise Streetscape Design Manual.



SOURCE: DEVELOPMENT WA

SOURCE: DEVELOPMENT WA

Figure 20 - Verge Trees, Waterwise Streetscape Design Manual.

cover over the site, providing protected and shaded areas for residents, as well as creating feeding, roosting, and nesting sites for birds and other animals.

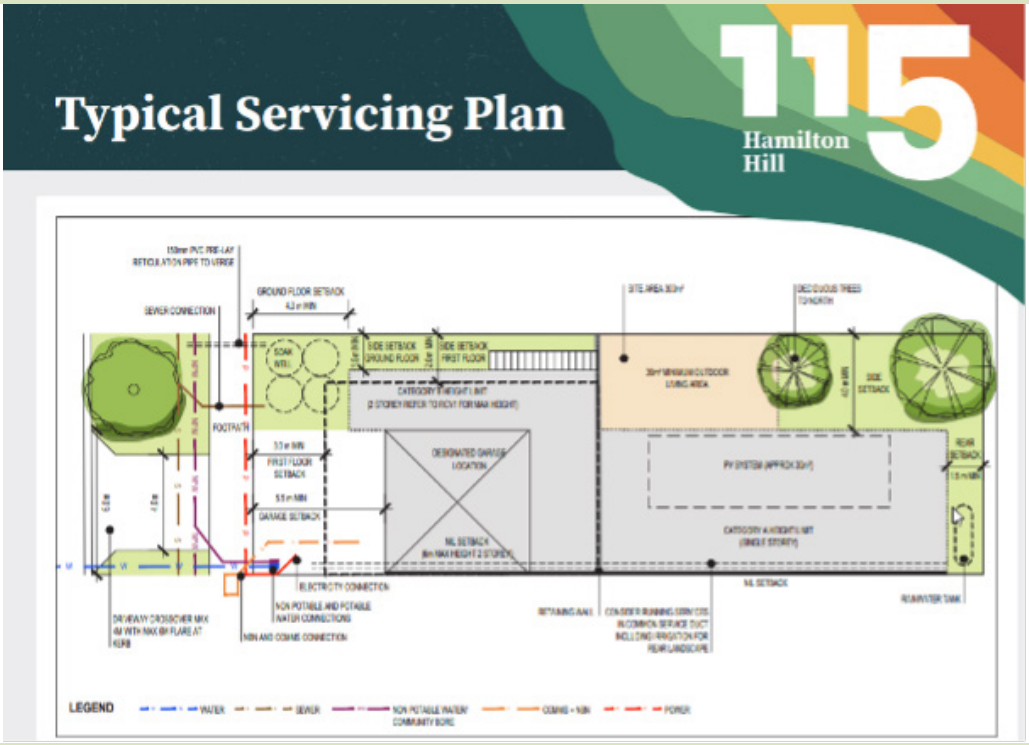
- **Water Sensitive Urban Design** - WSUD features to increase soil moisture, helping the growth of mature trees and new plantings, and reducing pressure on local council's stormwater infrastructure.
- **Urban Greening** - Water management will consider neighbouring areas and bushland, and appropriate vegetation will be maintained and enhanced to maximise shading and cooling effects.
- **Landscaping and Smart Irrigation** - Landscapes will be 'hydrozoned' to ensure appropriate plants are selected and water is allocated in public open spaces, streetscapes, and private gardens. In addition, efficient smart metering systems will be installed to help detect leaks, measure soil moisture, and consider weather forecasts.

In order to achieve the above with respect to the public realm, the project includes a Waterwise Streetscape Design Manual which includes designs for verge planting and instructions around installation and ongoing care and maintenance for street trees. (See Figure 19 & 20).

Further to the above, OneOneFive Hamilton Hill has taken into consideration the location of services and street tree locations with a Typical Servicing Plan noting the location of a street tree in front of the dwelling and the service location away from the root system of the tree. (See Figure 21).

Considerations for the TAP

- **Prioritise Tree Retention and Enhancement:** Encourage the retention and enhancement of existing trees through thoughtful planning.
- **Promote Biodiversity and Habitat Creation:** Integrate diverse local and exotic tree species with an endemic understorey to support a range of wildlife and provide residents with natural habitats.
- **Implement Water Sensitive Urban Design (WSUD):** Incorporate WSUD features to support tree growth, manage stormwater, and reduce pressure on local infrastructure.
- **Use Smart Irrigation and Landscaping:** Adopt hydrozoning principles for landscaping to ensure efficient water use and apply smart irrigation systems to monitor soil moisture, prevent leaks, and adapt to weather conditions.
- **Develop a Comprehensive Streetscape Manual:** Provide detailed guidelines for verge planting, installation, and maintenance to ensure long-term care of street trees and sustainable water management.
- **Coordinate Services with Tree Locations:** Use a Typical Servicing Plan to ensure that service infrastructure is appropriately positioned to avoid conflicts with tree root systems.



SOURCE: DEVELOPMENT WA

Figure 21 - Typical Servicing Plan.

Aerial view of a suburb in Melbourne.

IMAGE SOURCE: GETTY IMAGES

KEY CHALLENGES AND OPPORTUNITIES

The TAP identified a series of key issues, challenges and opportunities for the development and delivery of policy and implementation recommendations for improved street tree canopy in growth areas. These key issues, challenges and opportunities were identified following the interviews with key stakeholders and strategic advisors and a review of the global case studies. These have been summarised below.

It is worth noting that through this TAP journey, new information is coming to light on a daily basis regarding the need for and importance of tree canopies in our city. In addition, the conversation seems to be gaining momentum with the media discussing the issue and raising awareness.

For example, while preparing this report, The Conversationalist published an article entitled "We rated the urban forests of 8 global cities – only Singapore passed the 30% canopy test" (19th November 2024)[40] which highlights the urgent need to create greener, healthier cities through the "3+30+300 rule," a benchmark gaining global attention in urban planning discussions. This standard requires views of at least three trees from buildings, 30% canopy cover in neighbourhoods, and a park within 300 meters. Testing the rule in eight global cities revealed widespread failure to meet these criteria, underscoring a critical lack of tree canopy. Singapore was the only city to pass all three components, with 75% of buildings achieving adequate canopy cover, compared to 45% in Seattle and just 3% in Melbourne.

As such, the opportunities and challenges as defined below reflect the real-time considerations for improving tree canopy coverage policy and implementation strategies for our communities.

Table 3 - Opportunities and challenges identified by the TAP.

	Challenges	Opportunities
Urban Heat	Climate change and the impacts of urban heat pose a significant risk to our suburbs. Urban heat has impacts on the health and wellbeing of the community which in turn has an economic impact on productivity and creates a burden on the health system.	Street trees have proven benefits in mitigating the impacts of climate change. There is opportunity to maximise tree canopy coverage to cool our communities.
Densification	The issue of housing affordability is driving a densification of the growth area suburbs, with lot sizes steadily decreasing. The reduction in lot frontage decreases the space available for trees.	There is an opportunity for the State Government to respond to the issue of densification by: • Reviewing policy to recognise street trees as infrastructure. • Review design standards to maximise space for trees.

[40] We rated the urban forests of 8 global cities – only Singapore passed the 30% canopy test, November 2024. Retrieved from https://theconversation.com/we-rated-the-urban-forests-of-8-global-cities-only-singapore-passed-the-30-canopy-test-243829

Table 3 - Opportunities and challenges identified (continued).

	Challenges	Opportunities
State Policy	A lack of state government policy with regards to street trees and canopy coverage has meant that local governments have developed disparate policies creating confusion for industry and irregular outcomes.	Plan Victoria presents a unique opportunity for the State Government to take the lead on the issue of tree canopy cover by undertaking the following: • Develop an overarching street tree policy for Victoria. • Establish a team / department to advocate and drive outcomes for street trees.
Design Standards	Existing design standards, in particular the Engineering Design and Construction Manual (EDCM) and Infrastructure Design Manual (IDM) do not consider trees as infrastructure and prioritise cost and ease of infrastructure maintenance. Existing standards are prescriptive and do not allow flexibility for innovation.	The State Government can take the lead in updating existing design standards that recognise trees as critical infrastructure and allow for innovative outcomes that maximise tree canopy coverage.
Policy Settings	Government documents such as the Road Management Act (2004) and Management of Infrastructure in Road Reserves (2016) have not been updated to address the current issues of climate change and tree canopy cover.	Plan Victoria presents an opportunity for the State Government to update existing policy to address the important issue of climate change and prioritise tree canopy coverage as an important mitigation tool.
Data	There is a lack of data and awareness within government, industry, and key stakeholders regarding tree canopy cover in Melbourne and the change over time.	In addressing this data awareness gap, the State Government may seek to undertake the following: • Establish a clear baseline of tree canopy coverage. • Partner with an organisation like CSIRO to focus on data collection through more sophisticated digital platforms for collection, management and sharing of data. • Review tree canopy change over time.
Governance	A connection needs to be made between urban and systems governance throughout policy, strategy, implementation and ongoing place management stages.	DTP is in a prime position to provide leadership and governance to a new approach – a tree first approach to design and implementation.
Growing Conditions	Current construction standards and processes result in poor growing conditions for trees in road reserves.	In order to give trees the best chance for successful establishment, design standards should address: • Soil volume • Soil quality • Watering • Tree maintenance i.e. formative pruning and tree protection.

Table 3 - Opportunities and challenges identified (continued).

	Challenges	Opportunities
Elevation of the Status of Trees	As trees are not considered as critical infrastructure, they are typically the last consideration in the design process.	There is an opportunity to recognise street trees as critical infrastructure which will require designers to consider trees earlier in the design process. Existing infrastructure standards will need to change to accommodate this.
Risk	Current design standards and policy prioritises a low-risk outcome for infrastructure maintenance. Assumptions made around the possibility for tree roots to damage infrastructure, and the access requirements to maintain infrastructure limits tree planting opportunities.	There is an opportunity to reset the risk profile in asset management within the road reserve to prioritise the opportunities for tree planting. In responding to other issues, the relocation of assets may reduce the risk of damage to assets from tree roots and climate risks like extreme heat and high utility bills.
Car Dependence	Existing street design prioritises cars and parking over connected and safe walkable neighbourhoods.	There is an opportunity for Plan Victoria to encourage walkable neighbourhoods by promoting the adoption of alternative urban design layouts that allow for continuous tree canopies that shade paths.
Canopy Targets	Current street tree canopy targets lack nuance and apply a 'one size fits all' approach.	To better respond to site specific characteristics such as climate and land uses, tree canopy targets should be nuanced to promote maximum tree coverage whilst being realistic based on specific site conditions.
Incentives	The current 'tick box' approach to development approvals results in applicants resorting to minimum standards as alternate design solutions or innovative outcomes increase approval timeframes.	To promote design innovation, government should develop an incentive scheme that rewards outcomes that exceed minimum standards. An approval framework needs to allow Council planners to be able to make informed decisions so that approval timeframes are not protracted.
Streets as liveable public domains	Street trees contribute significantly to reshaping streets from car dominated environments to a welcoming place where people come first. This is becoming a more prevalent issue with the densification of our communities. However, until street trees are prioritised, the existing circumstances will continue to be repeated.	DTP can play a leadership role with Plan Victoria and include policy directions around streets being safe, activated public domains where people come first and the establishment of healthy street tree outcomes as the priority.

FINAL TECHNICAL ASSISTANCE PANEL (TAP) RECOMMENDATIONS

The TAP is pleased to provide the following recommendations for consideration by DTP. The recommendations have been grouped into three categories:

Part A – Plan Victoria Recommendations

Those recommendations specifically developed for consideration by DTP for inclusion in Plan Victoria.

Part B – TAP Recommendations (Beyond Plan Victoria)

Those recommendations which are beyond the scope of Plan Victoria but are critical for the success of the Plan Victoria recommendations and broader improvements to street tree and canopy coverage outcomes.

Key Recommendations

The TAP have also identified **six key recommendations or 'big ideas'** which would fundamentally change the approach to street tree design, implementation and delivery in Victoria. The TAP believes that DTP is in a prime position to take a leadership role in further exploring and progressing these ideas.

Part A – Plan Victoria Recommendations

Include the following policy statements highlighting:

- The importance of tree canopy cover to address and mitigate the emerging heat and climate issues Australia is facing. Recognise the benefits that trees provide in addressing these issues and recognise the important role street trees play for biodiversity, amenity, walkability, and liveability.
- Street trees being as important as other infrastructure (i.e. water, sewer, and electrical services) and/or that street trees are to be considered an essential asset.
- Streets should be conceived as shared spaces for all modes of movement, with walking and cycling recognised as the preferred and privileged modes. This will ensure safe and more liveable environments resulting in more equitable outcomes rather than decisions being made through a maintenance and management lens.

Set a clear target for a minimum of 30% tree canopy across urban areas in Victoria.

- Include further direction for street tree canopy targets but note that variation/ flexibility is required to cater for site specific circumstances.
- Include a State-wide data collection approach to assist Councils set localised targets and report

Street trees are as vital as water, sewer, and electrical infrastructure and should be treated as essential assets.

Encourage rear lanes or small streets with secondary dwellings to minimise kerb cuts and preserve continuous street tree canopies.

and monitor progression over time.

- Further information regarding this can be found in Key Recommendation 2 below.

Encourage innovation with respect to road cross sections, particularly when better street tree outcomes can be demonstrated.

- This could take the form of a 'street tree as an essential assets practice note' with a range of alternative cross sections.
- Further information regarding this can be found in Key Recommendation 1 below.

Develop pathways and incentives for innovation with respect to better street tree canopy coverage such as:

- Expedited planning approval timelines – champion and celebrate Councils that offer priority planning approval to demonstration and pilot projects that exceed standard tree canopy and sustainability provisions.
- Increased density – Councils could allow a developer to increase density of dwellings or add additional levels to a building if certain sustainability goals are met.
- Other requirement dispensation – dispensation can be granted to reduce car parking requirements for example, should certain other targets like tree canopy coverage be exceeded.
- Promote the use of activated rear lanes or small streets with secondary dwellings to reduce street front kerb cuts and driveways which severely restrict the introduction of a continuous canopy of street trees.

Include an overarching street tree policy for Victoria that would ensure consistent best practice across Councils, acknowledging that allowance needs to be made for geological and climatic variances and differences across the State. Key Recommendation 5 below.

Whilst the TAP assignment is focused on recommendations for Plan Victoria and specifically explores the growth area context, the TAP would like to acknowledge that tree canopy targets are an issue for areas other than the growth areas (such as inner urban, infill, industrial and regional areas) and implementation issues exist for locations other than local streets (such as connector and arterial roads, waterway corridors and local parks). Whilst the TAP did not explicitly explore these issues, the TAP would like to emphasise the importance of these issues and the need to also explore implementation strategies as part of Plan Victoria and subsequent strategies to assist in improving the tree canopy outcomes for our communities.

There are a series of items which need to be addressed in order for the policy recommendations above to be implemented and for the street tree canopy coverage vision and objectives to be achieved. These have been summarised below.

Part B – TAP Recommendations (beyond Plan Victoria)

Key Recommendations

The following six key recommendations were identified and selected by the TAP as having the most potential for impact and capacity to accelerate change. These recommendations have been further investigated and developed by the TAP members and are included following the recommendations below.

Include a State-wide data collection approach to assist Councils set localised targets and report and monitor progression over time.

01.	**A Tree First Approach.**
02.	**Tree Canopy Cover Targets.**
03.	**Urban Design Outcomes to Address Street, Lot, and Housing Design to Achieve Enhanced Street Tree Coverage.**
04.	**The Road Management Act 2004 (RMA) Code of Practice for the Management of Infrastructure in Road Reserves (MIRR) 2016 reform.**
05.	**Development of Street Tree Guidelines.**
06.	**Governance.**

1.0 Policy Reform

1.1 Establish a dedicated department within DTP to prioritise street trees.

1.1.1	Further to the above recommendations, trees should be considered an essential service and treated the same way we do our built service assets.
1.1.2	A dedicated department within DTP which prioritises street tree management and addresses systematic barriers at a State level would assist in elevating the status of street trees.
1.1.3	This department to be accountable for the implementation of all Plan Victoria recommendations relating to street trees and canopy targets as well as the recommendations contained within this TAP report.
1.1.4	This department can also explore and unlock new forms of public-private partnerships and innovative funding including access to Federal funding and grants and leading State-wide education programs to further emphasise the importance of street trees and canopy coverage.
1.1.5	It could also lead collaborative regional and/or metropolitan data initiatives including canopy assessments, whole-of-life tree health and safety management (e.g. SULE ratings); plus, associated Net Zero and circular economy innovations.

1.2 The development and adoption of an Australian Standard for Tree Canopy Targets.

1.2.1	Standardise tree canopy targets to provide certainty for design, approval and maintenance processes.
1.2.2	Acknowledge trees as assets/infrastructure so that both the private and public sector have certainly with respect to design and approvals.
1.2.3	Provide a clear framework for developers, councils, and policymakers to integrate canopy targets into urban designs with long-term maintenance in mind.

1.3 Consider using State projects as demonstration projects to deliver best practice urban canopy coverage and street tree outcomes.

2.0 Planning and Design

2.1 Increase Permeability by Reducing Hard Pavements.

2.1.1	Review and adjust housing typologies and traffic management practices to minimise unnecessary hard pavements.
2.1.2	Consider alternative designs for vehicle parking and waste management in order to prioritise permeability.
2.1.3	Promote permeable surfaces and green infrastructure in urban planning to balance functional requirements with environmental benefits.

2.2 Consider a pathway towards new planning permits within growth areas to include urban heat island modelling as part of the permit application process to demonstrate meeting street tree canopy coverage targets.

3.0 Landscape

3.1 Implement Flexible Water Management Practices.

3.1.1 Adopt adaptable irrigation strategies to meet diverse site-specific needs.

3.1.2 Encourage the exploration and adoption of passive irrigation systems where appropriate.

3.1.3 Develop guidelines allowing case-by-case assessments of water management needs for better street tree outcomes.

3.1.4 Invest in innovative water management technologies to enhance efficiency and sustainability.

3.2 Recognise Street Trees as Council Assets.

3.2.1 Elevate the status of trees in urban planning and resource allocation.

3.2.2 Explore the integration of urban trees into council asset registers as valuable infrastructure.

3.2.3 Advocate for funding and management strategies that reflect the long-term value of trees to communities.

4.0 Building and Construction

4.1 Explore ways of creating more accountability during the construction and handover stage.

4.1.1 Similar to other assets, investigate ways in which street trees could require certification.

4.1.2 Consider ways to increase the accountability of the building and construction if a self-certifying system is maintained.

4.1.3 Consider ways of providing more resources to Councils to ensure quality control and tree protection during construction.

4.2 Enhance Industry Awareness and Training in Subdivision Design and Delivery.

4.2.1 Foster interdisciplinary collaboration and ensure engineers take a leading role in integrating urban tree considerations into subdivision design and construction.

4.2.2 Foster interdisciplinary collaboration and ensure engineers take a leading role in integrating urban tree considerations into subdivision design and construction.

4.2.3 Encourage engineering leadership in driving sustainable design practices across all aspects of subdivision projects.

4.3 Explore tree protection concepts during the house construction phase.

4.3.1 All approved landscape plans have a TPZ introduced during the 2-year maintenance period to protect the street tree.

4.3.2 Street trees are bonded by the developer and planted once 90% of the residential building works in the street are completed.

4.3.3 The ability to start home construction simultaneously to civil works being undertaken, which means that homeowners could move in faster, but it also means less conflict with landscape works as the trades that typically do the most damage to trees, (concreters, bricklayers, etc.) are all out of the way by the time the trees were installed.

5.0 Funding

5.1 Establish Dedicated Funding Sources for Tree Management.

5.1.1	Explore Federal Government Resilience Funding. In the growth areas, the heat issues can be considered a hazard. As such, explore accessing Federal Government funding to assist in street tree canopy initiatives due to their ability to assist in mitigating heat related issues (such as improving public health, resilience of infrastructure and service systems, etc.).
5.1.2	Provide sustainable financial support to councils for tree maintenance and urban greening initiatives.
5.1.3	Develop a State or Federal funding program specifically targeted at urban tree management and maintenance.
5.1.4	Encourage public-private partnerships to generate additional funding for tree planting and care.
5.1.5	Street trees as well as WSUD, rain gardens, etc. should be understood as part of parks and recreational reserves and therefore receive the appropriate budgeting for maintenance.
5.1.6	Further investigate the existing funding pathways as included in Appendix 1 (P.119).

5.2 Prioritise Funding for Innovative Councils.

5.2.1	Consider implementing Key Performance Indicators (KPI's) for councils and a Performance Tracking Dashboard. This could create a sense of competition between councils and ensure accountability via annual reporting requirements.
5.2.2	Reward councils actively pursuing innovative approaches to urban greening with incentives.
5.2.3	Allocate priority funding to councils, that demonstrate a commitment to innovative urban forestry practices.
5.2.4	Use funding criteria that recognise and incentivise councils implementing best practices and new technologies.

5.3 Introduce a Memorandum of Understanding (MOU) Fee for Service Program.

5.3.1	Formalise support for councils developing innovative approaches to urban greening.
5.3.2	Implement an MOU fee for service program, similar to the City of Casey's funded by developer contributions, to fund and encourage innovation in tree management and green infrastructure.

5.4 Explore Innovative Funding Models.

5.4.1	Use landscape levies or similar mechanisms to fund State-wide urban greening programs.
5.4.2	Study the Green Adelaide initiative to assess its applicability in other regions, adapting its landscape levy model to local needs.
5.4.3	Use funds raised to support councils and community-driven greening projects that promote innovation and address urban challenges.
5.4.4	Explore innovative solutions to bolster Local Government budgets for planting (including optimised soil volumes, quantity of planting and maintenance) such as ways to access and utilise State or private sector contributions.
5.4.5	Explore whether 'green infrastructure' can be included in existing planning and funding mechanisms like ICP (Infrastructure Contribution Plan) and GAIC (Growth Areas Infrastructure Contribution).

6.0 Education

6.1 Foster Cultural Attitudes that Value Street Trees.	
6.1.1	Promote the importance of trees and green spaces to residents through public campaigns that emphasise environmental, aesthetic, and health benefits.
6.1.2	Develop community programs that encourage residents to view trees as assets rather than nuisances.
6.1.3	Advocate for policies discouraging parking on nature strips and protecting urban trees.
6.2 Enhance Public Education.	
6.2.1	Implement community engagement strategies to reduce behaviours like tree removal for parking or due to fears of property damage.
6.2.2	Launch programs such as "Your Tree" that use tools like QR codes on trees to share information about their benefits, fostering a personal connection to urban greenery.
6.2.3	Collaborate with local organisations and schools to promote hands-on environmental stewardship activities..

Introduce KPIs and a Performance Dashboard for councils to foster transparency and ensure accountability through annual reporting.

Aerial view of Melbourne cityscape.

IMAGE SOURCE: GETTY IMAGES

Recommendation 01

A TREE FIRST APPROACH

By Matthew Bradbury (TAP Vice Chair) and
Ray Verratti (Strategic Advisor)

Trees should be prioritised as infrastructure by realigning services to maximise benefits.

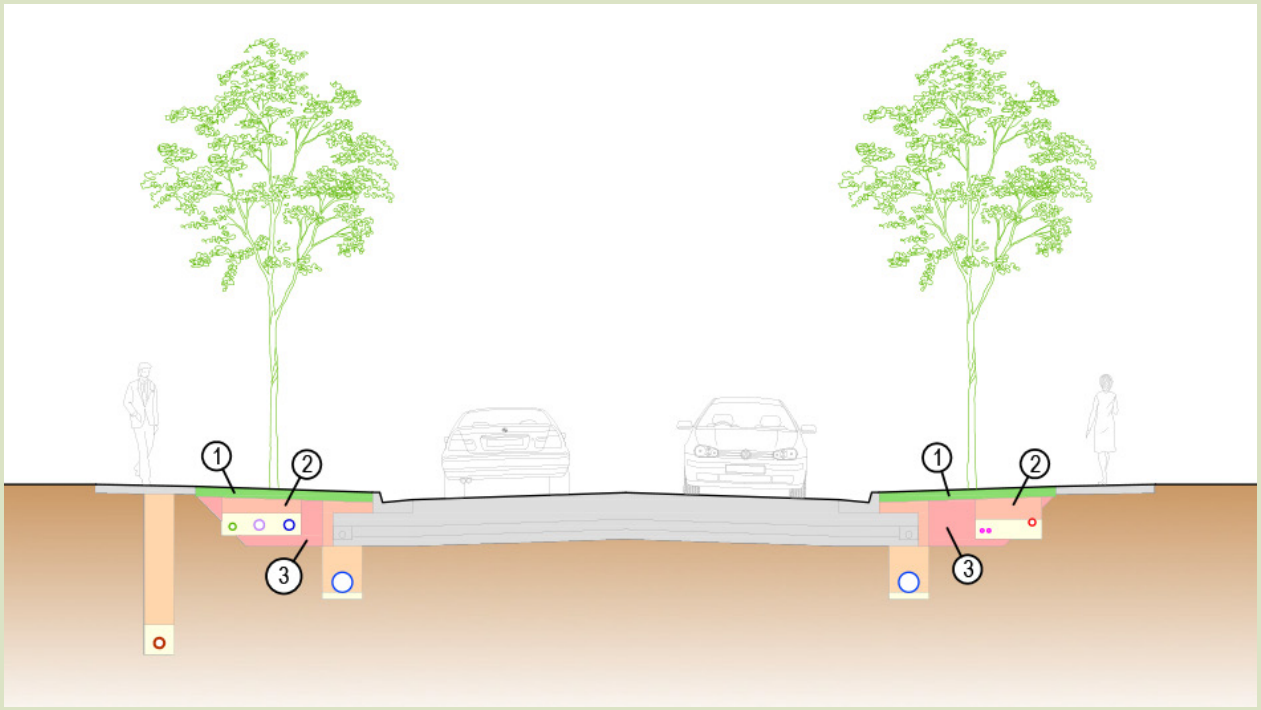
The current risk management approach to tree provision prioritises maintenance of constructed assets (particularly service utilities) over the provision of trees. The opportunity cost of not providing trees with regards to the community value that trees offer has not been considered in the current approach. In recognising trees as essential infrastructure, trees will need to be considered as equally important as other assets within the road reserve and treated as such with regards to setting maintenance priorities.

To reduce the risk of conflicts in asset provision, a different approach to service alignments is required. The area beneath the road pavement, driveway crossovers and footpaths should be utilised for service alignments to create more space for trees within the nature strips. The standard cross section within the Engineering Design and Construction Manual (EDCM)[8] and the Infrastructure Design Manual (IDM)[41] should be updated to reflect this. As per the South Australia example, sewer and water services should be provided

IMAGE SOURCE: THE CONVERSATION

A street in Melbourne adorned with a lush canopy of trees.

Cross section 01 – Business as usual (16m road reserve).



SOURCE: ALDE

Legend

1 Thin layer of topsoil (i.e. 150mm).

2 Engineered trench backfill.

3 Poor quality backfills material (i.e. unsuitable for filling elsewhere).

Advantages

i) Universally accepted by councils and authorities.

ii) Minimises costs for developers.

iii) Easy access to services for utility asset owners.

Disadvantages

i) Low volume of suitable soil for street trees.

ii) May require passive irrigation to compensate for low soil volume.

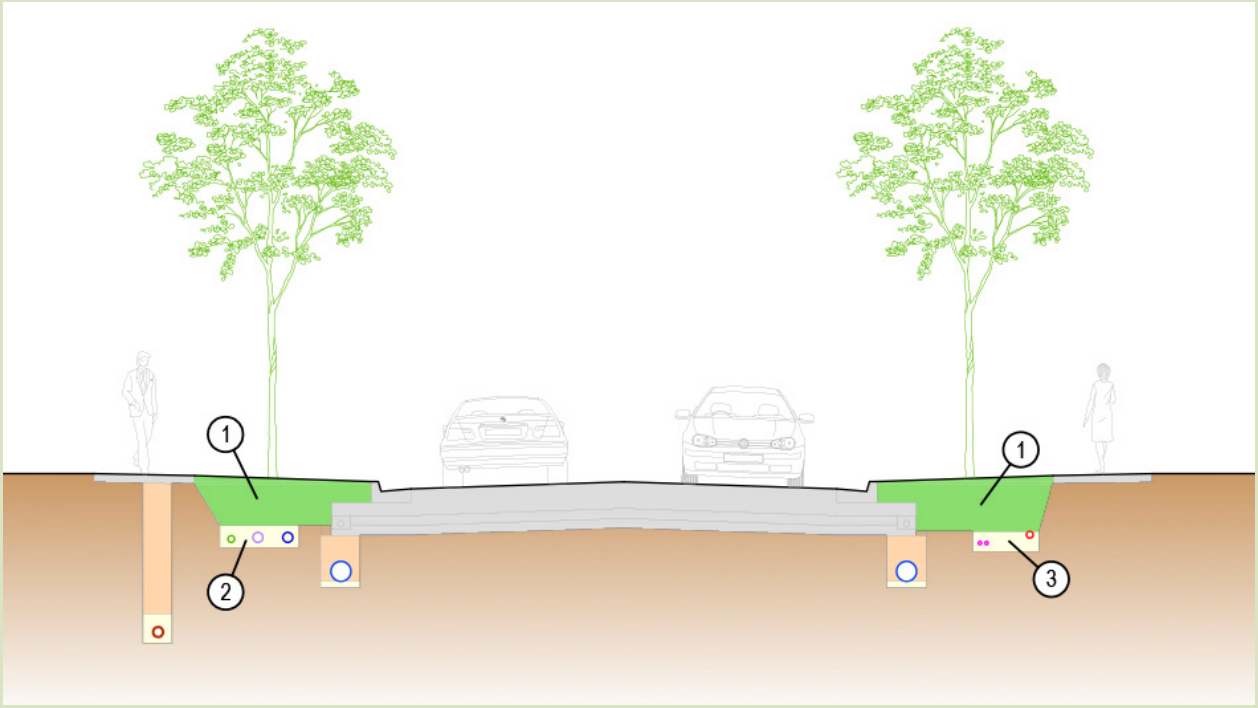
iii) Obstructions to tree roots at a shallow level.

iv) Potential for conflict between tree roots and services.

[8]Engineering Design and Construction Manual for Subdivision in Growth Areas, Victoria Planning Authority, December 2019. Retrieved from https://vpa-web.s3.amazonaws.com/wp-content/uploads/2020/04/Engineering_Design_and_Construction_Manual-for-subdivision-in-Growth-Areas-FINAL-December-2019.pdf

[41]Infrastructure Design Manual, Local Government Infrastructure Design Association, September 2022. Retrieved from https://www.designmanual.com.au/assets/files/documents/IDM/IDM_Version_5.4_.pdf

Cross section 02 – Deepened services (16m road reserve).



SOURCE: ALDE

Legend

1 Significant depth of topsoil/suitable soil (approx. 700mm).

2 Water and gas mains lowered to have 800mm min. cover.

3 Electricity and communications lowered by 350mm.

Advantages

i) Increases volume of suitable soil dramatically.

ii) Increased soil volume may negate the need for passive irrigation (a potential cost saving).

iii) Relatively easy to implement/accept.

iv) Can be implemented in existing estates (i.e. with gas).

Disadvantages

i) Increased construction cost due to additional excavation and/or more unsuitable material to dispose of offsite.

ii) Obstructions are still there, albeit at a lower level.

iii) Increased excavation required during maintenance.

iv) Deeper services may require drainage to be lowered further.

v) Still some potential for conflict between tree roots and services (albeit reduced).

vi) Potential for contractors to ignore the backfill requirements and continue to backfill nature strips with low quality material (i.e. as per business as usual).

beneath the road pavement and electrical and telecommunications services provided beneath the footpaths. House connections should be run beneath the driveway crossovers. As a priority, this service arrangement should be applied to streets of low traffic volumes and low speeds (circa 60% of all streets in growth areas).

To further prioritise trees, other requirements such as car parking ratios need to be reviewed to allow for increased tree canopy. The current requirements for one visitor car park per lot reduces the opportunity for innovation in street landscapes and improved permeability/WSUD elements. Dispensation should be provided where increased canopy cover is the result, particularly where walkable neighbourhoods are the desired outcome.

Ultimately, an acknowledgement that trees are "non road infrastructure" (as the current MIRR puts it) and applying the specific needs of each asset measured from the tree in setting alignments and depths would be a positive move for elevating the status of street trees. This approach has been demonstrated in the South Australian context.

It should be acknowledged as part of all policy, code and standards reviews (including the Road Management Act 2004[42] and the Code of Practice for the Management of Infrastructure in Road Reserves 2016[43] – refer recommendation 3) that trees are "non road infrastructure" and the specific needs of trees as an infrastructure asset are considered in setting alignments and depths of other assets rather than the traditional approach of trees being considered last.

ALDE have conceptualised what a 'tree first' approach may look like with respect to a standard road cross section. These cross sections are included on the following pages.

We thank ALDE for their insights and contribution.

Cross section 02 – Deepened Services changes required.

1.0 State Government

1.1 Revise Management of Road Management Act Code of Practice - Infrastructure in Road Reserves to reflect increased cover requirements.

2.0 Councils

2.1 Revise EDCM to reflect placement of suitable soil in nature strips (i.e. specifications, depths, and compaction requirements).

2.2 Ensure enforcement, both on design plans and during construction.

3.0 Water Authorities

3.1 Revise MRWA edition of WSAA water code to increase minimum cover requirements.

4.0 Utilities

4.1 Accept increased cover requirements.

5.0 Consultants

5.1 Education.

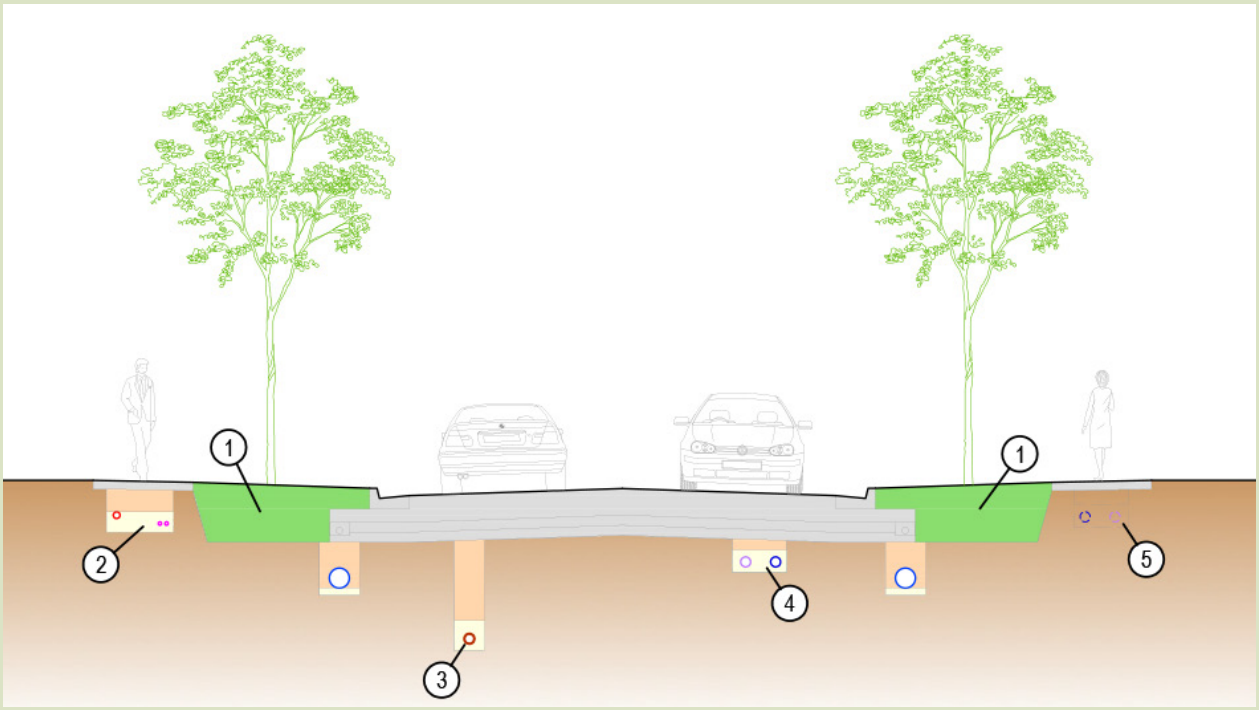
5.2 Enforcement during construction..

6.0 Contractors

6.1 Education.

[42]Road Management Act 2004, Victoria Leguslation. Retrieved from https://content.legislation.vic.gov.au/sites/default/files/2024-11/04-12aa066-authorised.pdf
[43]The Code of Practice for the Management of Infrastructure in Road Reserves, Road Management Act 2004, Victoria Government Gazette, April 2016. Retrieved from https://www.gazette.vic.gov.au/gazette/Gazettes2016/GG2016S117.pdf

Cross section 03 – Revised service locations (16m road reserve).



SOURCE: ALDE

Legend

1 Significant depth of topsoil/ suitable soil.

2 Electricity & communications relocated to beneath footpath.

3 Sewerage relocated to beneath road pavement (similar to SA Water).

4 Water mains relocated to beneath road pavement (similar to SA Water).

5 Alternative water main location.

Advantages

i) Increases volume of suitable soil dramatically.

ii) Increased soil volume may negate the need for passive irrigation (a potential cost saving).

iii) Removes any obstructions to downward growth by tree roots.

iv) Protects electricity communications assets beneath footpaths, and sewer & water assets beneath roads (i.e. reduces risk of damage by tree roots).

Disadvantages

i) Can't be implemented in existing estates (i.e. with gas).

ii) Increased construction cost due to inability to dispose of unsuitable material in road reserves.

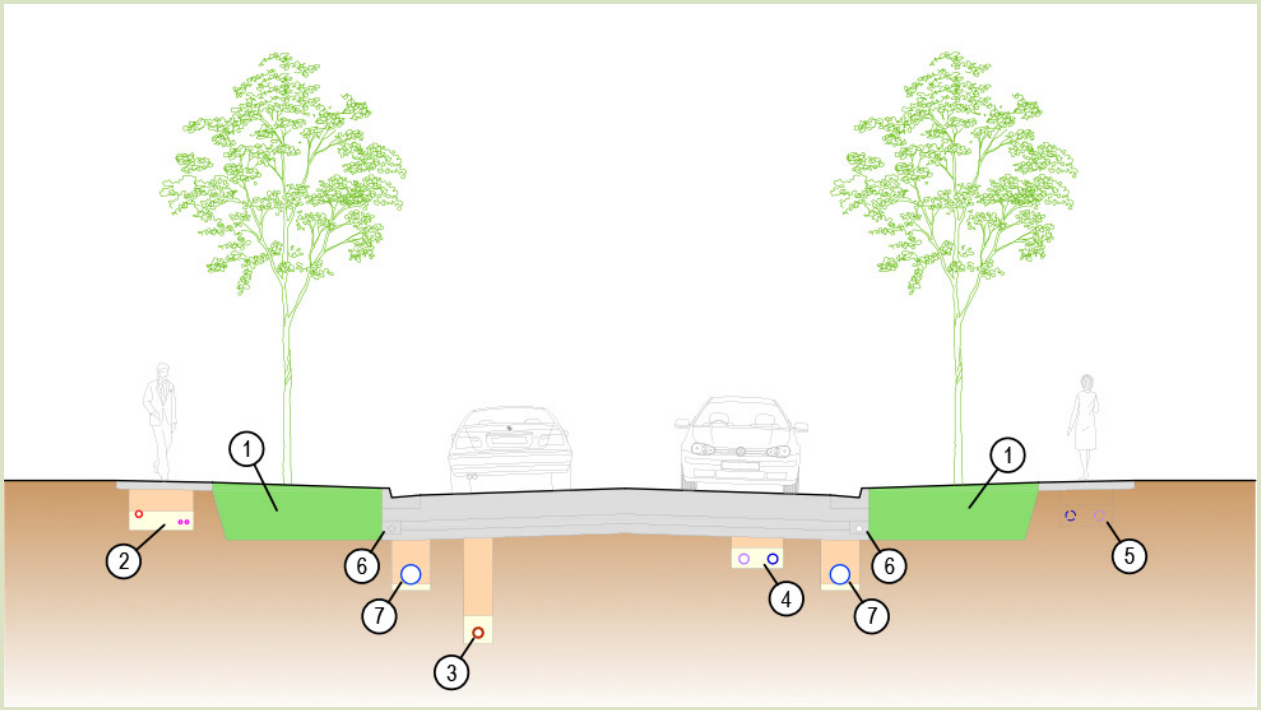
iii) Maintenance for services may entail replacing the footpath (potentially offset by less maintenance required).

iv) Maintenance access to sewer structures will require traffic management (i.e. covers located in road - offset to prevent need for road closure).

v) Increased items in footpath (e.g. communications pits).

vi) Complex implementation (i.e. major changes for a number of asset owners).

Cross section 04 – Revised service & drainage locations (16m road reserve).



SOURCE: ALDE

Legend

1 Significant depth of topsoil/ suitable soil.

2 Electricity & communications relocated to beneath footpath.

3 Sewerage relocated to beneath road pavement (similar to SA Water).

4 Water mains relocated to beneath road pavement (similar to SA Water).

5 Alternative water main location.

6 Review subsurface drainage to bring beneath/closer to kerb.

7 Relocate drainage to beneath road pavement.

Advantages

As cross section 03, with the addition of:

i) Increased subsurface permeability and soil volume available for trees.

ii) Potential for reduced pavement costs.

Disadvantages

As cross section 03, with the addition of:

i) Revised pit lids may increase construction costs.

ii) Maintenance access to drainage pits will require traffic management.

Note: Revising the location of the subsurface drainage would need to be based on sound geotechnical advice, and avoid reducing the lifespan of the road.

Cross section 03 – Revised service locations changes required.

1.0 State Government

1.1 Revise Management of Road Management Act Code of Practice - Infrastructure in Road Reserves to reflect new service locations.

2.0 Councils

2.1 Revise EDCM to reflect placement of suitable soil in nature strips (i.e. specifications, depths, and compaction requirements).

2.2 Ensure enforcement, both on design plans and during construction.

3.0 Water Authorities

3.1 Revise MRWA editions of WSAA sewer and water codes to reflect revised locations.

4.0 Utilities

4.1 Accept revised service locations.

5.0 Consultants

5.1 Education.

5.2 Enforcement during construction..

6.0 Contractors

6.1 Education.

Cross section 04 – Revised service & drainage locations changes required.

As cross section 03, with the addition of:

1.0 State Government

1.1 Revise Management of Road Management Act Code of Practice - Infrastructure in Road Reserves to reflect new drainage locations.

2.0 Councils

2.1 Agreement on new drainage location and revised subsurface drainage.

2.2 Agreement on new drainage location and revised subsurface drainage.

Autumn hues along a tree-lined street.

IMAGE SOURCE: GETTY IMAGES

Recommendation 02

TREE CANOPY COVER TARGETS AND EFFECTIVE MONITORING AND REPORTING

By Dr Dom Blackham (Strategic Advisor)

Tree canopy targets are vital for guiding urban greening, addressing gaps, and ensuring equitable green spaces.

Tree canopy cover targets are a central element of effective urban forest strategies and plans (e.g. the Mornington Peninsula Shire urban forest strategy endorsed in September 2024)[44]. They explicitly describe a desired future state for urban greening. When combined with a clear understanding of the current situation, tree canopy cover targets allow:

- The adequacy of the current provision of canopy cover to be understood and communicated to stakeholders and the community.
- Areas with deficiencies in tree canopy cover to be identified.

Tree canopy targets should reflect the variable levels of canopy cover that currently exist between and within urban areas in Victoria.

IMAGE SOURCE: GETTY IMAGES

Aerial view of a growth area in Melbourne.

- Actions to increase canopy cover to be prioritised where they are most needed.
- The level of investment required to achieve the desired future state to be accurately estimated.
- A clear narrative to be developed which details the scale of change we have to achieve each year and how different our cities and streets need to look as a result.

Effective canopy targets are evidence-based, specific, measurable and timebound, and are supported by an effective and reporting system that accurately measures the current level of tree canopy and allows changes over time to be monitored. Monitoring must be at the right spatial and temporal scales: if targets are being set at the scale of individual streets, then change must be measured at that scale.

Tree canopy targets should reflect the variable levels of canopy cover that currently exist between and within urban areas in Victoria. These variations reflect a range of historical factors such as pre-European vegetation communities and post-European settlement and urban development patterns. In common with many other cities, higher levels of canopy in metropolitan Melbourne are generally located in more affluent areas of the city.

There are currently no clear, consistent, and enforceable tree canopy targets in urban areas in Victoria. The lack of consistent targets (and effective monitoring and reporting) means:

There is a fragmented approach to investment and prioritisation in increased urban tree canopy across the metropolitan Melbourne and regional councils.

- Optimal investment priorities that cross council boundaries cannot be identified.
- Inequities in canopy cover that result from past land management and urban development practices remain entrenched.
- Significant inefficiencies exist in terms of baseline data collection and analysis. For example, individual councils must fund the collection of tree canopy data to establish the baseline level of canopy cover, and a patchwork approach emerges with different Councils typically using different measurement approaches that are not easily comparable.
- Progress towards targets cannot easily or cost-effectively be measured because a consistent and regular canopy measurement program is not in place.

It is important that targets are set at appropriate spatial scale. If targets are set for large areas (e.g. an entire local government area) it means the benefits of tree canopy (which can be quite localised) may not be equally distributed, and there will be a natural inclination to invest in areas where planting trees and increasing canopy is easiest (and cheapest), rather than where is it most needed. Canopy targets should ideally be set for SA1[45] or at least suburb scales.

Canopy cover provided by trees in streets plays an important role in achieving wider tree canopy outcomes and has direct benefits of encouraging walking and cycling on hot days by increasing the thermal comfort, reducing UV exposure, increasing the amenity value of streets and providing ecological links. Setting canopy targets for streets and breaking down the barriers to high levels of tree canopy in streets is critical to resilient and liveable communities.

[44]Our Urban Forest 2024-2034, Mornington Peninsula Shire (2024). Retrieved from https://www.mornpen.vic.gov.au/Environment/Climate-Change/What-is-the-Shire-doing-about-climate-change/Urban-Forest-Strategy

[45]SA1 stands for Statistical Area Level 1, which is a geographic area used to release Census of Population and Housing data. SA1s are the smallest unit of geographic area used for this purpose. SA1s in remote and regional areas generally have smaller populations than those in urban areas. Source: Australian Bureau of Statistics.

SOURCE: NSW GOVERNMENT GREENER NEIGHBOURHOOD GUIDE

Land-use Category	Minimum Canopy Target
Existing Residential Streets	
12 m–20 m reserve* with overhead powerlines	Minimum 40% canopy cover
12 m–20 m reserve* with underground powerlines	Minimum 50% canopy cover
Existing Industrial Streets	
20 m–25 m reserve with overhead powerlines	Minimum 35% canopy cover
20 m–25 m reserve with underground powerlines	Minimum 45% canopy cover
New Residential Streets	
12 m–20 m reserve* with underground powerlines	Minimum 70% canopy cover
New Industrial Streets	
20 m–25 m reserve with underground powerlines	Minimum 60% canopy cover

Table 4 - Minimum targets for tree canopy cover in different types of streets.

Recommendations to State Government:

- Set a clear target for a minimum of 30% tree canopy across urban areas in Victoria. The headline target should be supported by more nuanced targets that apply at SA1 or suburb scales and reflect the need to increase greening where it is needed most (for people and the environment). The targets should reflect the varying capacity of different land use types to support tree canopy, and address the current inequity in the provision of tree canopy across metropolitan Melbourne.
- Applying targets at a spatial scale that will drive change in a way that makes a difference to people's lives, in the places they visit most, while recognising that regional scale avoids inequities between councils with different land use patterns and finds the most economically efficient location for planting.
- Adopt minimum targets for tree canopy cover in different types of streets as developed for and set out in the NSW Government Greener Neighbourhood Guide[46], (originally developed in the Urban tree canopy targets & development controls report (set out in the table 4).The target should be expressed in a way that supports areas with existing tree canopy greater than 30% to maintain and increase cover beyond this target where possible. The timeframe for achievement of the target should vary to reflect the significant variability in current canopy cover with intermediate targets established to demonstrate continued progression towards 30% where coming

[46]Greener Neighbourhoods Guide, NSW Government (2023). Retrieved from https://www.planning.nsw.gov.au/sites/default/files/2023-10/greener-neighbourhoods-guide.pdf

from a lower base.

- Update the Victorian Planning Authority (VPA) Guidelines for Precinct Structure Plans (PSPs) to include the 30% tree canopy target across entire PSPs (i.e. all land use types not just the public realm).
- Develop and fund a consistent reporting framework that includes regular capture of tree canopy cover using an appropriate technology (for example aerial image interpretation, CSIRO, or LiDAR data analysis).
- Provide certainty to councils on the timing of tree canopy data capture and provision i.e. 3 or 5 years to enable timely responses to localised change in tree canopy.
- Provide the regular data collection to local Councils to assist in setting and achieving Key Performance Indicators (KPI's) for councils and a Performance Tracking Dashboard as per recommendation 5.2 above (P.89).
- Develop and fund the collection of consistent tree inventory data to fill gaps across the urban areas of Victoria.
- Develop annual tree planting targets to connect long-term canopy targets to short-term actions and funding.

Street tree canopies boost overall canopy cover, promote walking and cycling by enhancing thermal comfort, reducing UV exposure, improving street amenity, and supporting ecological connections.

Aerial view of Carrum, Victoria.

SOURCE: GETTY IMAGES

Recommendation 03

THE ROAD MANAGEMENT ACT 2004 (RMA) CODE OF PRACTICE FOR THE MANAGEMENT OF INFRASTRUCTURE IN ROAD RESERVES 2016 REFORM (MIRR).

By Ray Verratti (Strategic Advisor)

Clear statutory guidance is needed to align planning documents with MIRR recommendations for effective post-PSP delivery.

Background

The Code of Practice for the Management of Infrastructure in Road Reserves (MIRR)[43] dated 28 April 2016 was established under section 28 of the Road Management Act 2004 and replaces the previous MIRR Code of 6 October 2008.

The Purpose of the Code is to "provide practical guidance and identify benchmarks of good

IMAGE SOURCE: GETTY IMAGES

Tree-lined bicycle lane along St Kilda Road.

practice for utilities, providers of public transport and road authorities, who are expected to work together cooperatively to facilitate the installation, maintenance and operation of road and non-road infrastructure within road reserves."

Whilst the MIRR Code of Practice is a statutory document governed via the RMA; it does have limitations in terms of the enforceability of the provisions within the MIRR.

The MIRR provides a lot of detail with regards to the creation and maintenance of "non road infrastructure" which predominantly consists of service utilities. However, with regards to street trees, the detail is minimal and not consistent with good street tree design practice. These are limiting long term street tree outcomes.

A revision to the MIRR is important because it will then influence design guidelines used by the land development and infrastructure industry such as the Engineering Design and Construction Manual (EDCM) and the Infrastructure Design Manual (IDM). It will also provide the opportunity **to "reset" the importance of street trees as "non road infrastructure"** and provide the same detail for issues such as clearances and maintenance in line with all other road assets.

Road Management Act 2004 (RMA)

The RMA[42] sets out the responsibilities for the "co-ordinating road authority" (being mostly Councils in growth area settings) and the "infrastructure managers" (being service authorities in most cases).

Ultimately it is the "co-ordinating road authority" that provides consents for the location of any proposed infrastructure given regard to various factors. An "infrastructure manager" can remedy a dispute with the "co-ordinating road authority" via a process that ultimately leads to the Minister administering the Local Government Act. This is relevant because most Councils will accept service authority offsets which do not consider street tree needs or Councils themselves do not consider the impact of the utility service offsets on trees.

The RMA does not refer to street trees in any detail other than an inference that Councils are responsible for street trees in urban areas.

MIRR and Street Trees

The MIRR provides a great deal of commentary for "non road infrastructure, however the commentary and detail for street trees is minimal and technically not consistent with good practice. A key example is in Appendix 1, Clause 3 paragraph 2 (b) Street trees summarised as follows;

- Reference to one street per allotment frontage. This is often then extrapolated to "one tree per lot" which is limiting maximum canopy cover opportunities. The MIRR should not dictate tree numbers.
- The 'tree zone' is defined as a 5-metre diameter area of roadside and with a depth of 600 mm. This is also shown in a section and plan. The 'tree zone' is not defined by any specification and in practice the specific requirements of the MIRR are not achieved particularly in a small lot context (i.e., utility service infrastructure tappings/ connections and joints are to be located outside of the tree zone).

[42]Road Management Act 2004, Victoria Leguslation. Retrieved from https://content.legislation.vic.gov.au/sites/default/files/2024-11/04-12aa066-authorised.pdf
[43]The Code of Practice for the Management of Infrastructure in Road Reserves, Road Management Act 2004, Victoria Government Gazette, April 2016. Retrieved from https://www.gazette.vic.gov.au/gazette/Gazettes2016/GG2016S117.pdf

SOURCE: REDDIT

Abruptly trimmed tree crowns to accommodate powerlines are a common sight across Victorian suburbs.

- Other requirements such as the 'tree zone' have been defined to enable the inclusion of street trees into the streetscape and to minimise the impact of street trees due to future maintenance of utility services, which are counter intuitive especially when services are placed at minimum cover where trees are to be planted.

Recommended Service Offsets in MIRR

Whilst there is a lot of detail with regards to recommended service offsets and alignments in road reserves, street trees do not have the same attention. **If street trees were considered just as important as the utilities, then they would logically have their own offset requirements and minimum standards.**

This is important because there are some basic tree needs that are currently not being met in the MIRR and by extension in the EDCM and IDM.

This is in contrast with other jurisdictions that recognise street trees as infrastructure and have developed Codes of Practice that consider them equally with utilities. A good example is the "Code for the Placement of Infrastructure Services in New and Existing Streets"[47] prepared by the Public Utilities Advisory Committee, South Australia first published in 1969. The current version is 1997 and it is a good example of how engineering can develop solutions when the terms of reference are consistent for all assets in the road reserve.

The key observations are;

- Trees are acknowledged as assets.

[47] Services in Streets – A Code for the Placement of Infrastructure Services in New and Existing Streets, Local Government Association of South Australia (1997).

- Trees need adequate offsets from services (predominately from a risk point of view).
- Maintenance of assets in road reserves are considered in detail.

The secondary outcome of this approach is that the "tree zone" volume is improved significantly thereby contributing to improved street tree outcomes (and potentially improved utility asset performance).

Standard Reform and Planning Scheme Considerations

The hierarchy of documents and how they fit into the planning scheme is important in the practical application of design, approval and delivery. The complex nature and multi-disciplinary factors may necessitate an Australian Standard or a dedicated section within the EDCM and IDM design guidelines for the land development sector. The statutory application of these guidelines needs to be reviewed in the context of the recommendation made in the MIRR review (TAP recommendation 1). A policy requirement coupled with a PSP requirement is not enough to make delivery post PSP and planning permit effective.

As such, the key recommendations are:

- Reset the expectations in the MIRR by the acknowledgement of trees as "non road infrastructure".
- Establish what good practice for street trees is and incorporate these findings into the MIRR.
- Update the EDCM/IDM to reflect best practice.
- Develop a separate Code of Practice (or other statutory mechanism) for the calculation of canopy targets, tree selection methods, soil specifications and other technical issues that the private industry can be guided by, and the public sector can approve and accept.
- Commission research, if required, to understand what the real cost of repairing tree damage to assets is to assist in supporting alternative service alignments.

Protesters were out in force the day after Mornington Peninsula Shire chopped down a tree it said was a traffic hazard in Balnarring Beach.

SOURCE: MPNEWS

Recommendation 04

URBAN DESIGN OUTCOMES TO ADDRESS STREET, LOT AND HOUSING DESIGN TO ACHIEVE ENHANCED STREET TREE COVERAGE

By Mike Day (Strategic Advisor)

Walkable neighbourhoods with tree-lined streets and rear-lane access are key to fostering liveability, health, and community interaction.

The best way to create signature streets with continuous tree canopies is through activated rear lanes or 'small streets' with secondary dwellings, offering attainable housing and enhanced lane surveillance.

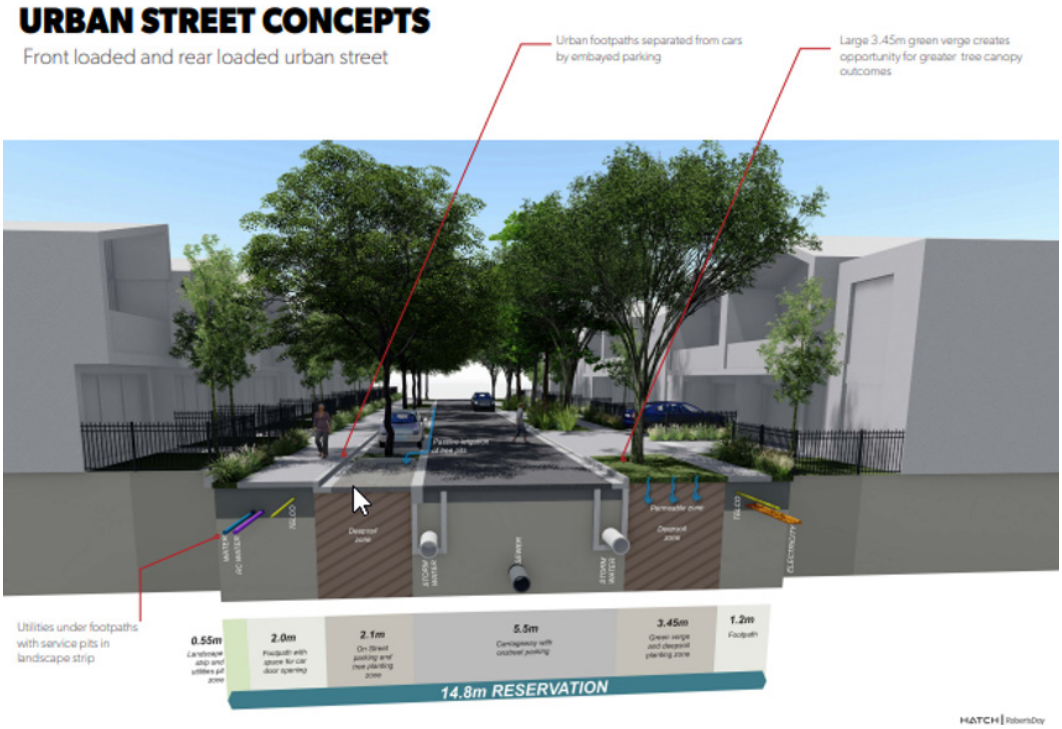


IMAGE SOURCE: HATCH

Urban street concepts: Front-loaded and rear-loaded designs optimised for street tree growth.

Urban street concepts: Removing curb cuts to prioritise extended landscape verges and enhance street tree growth, fostering greener and more walkable neighbourhoods.

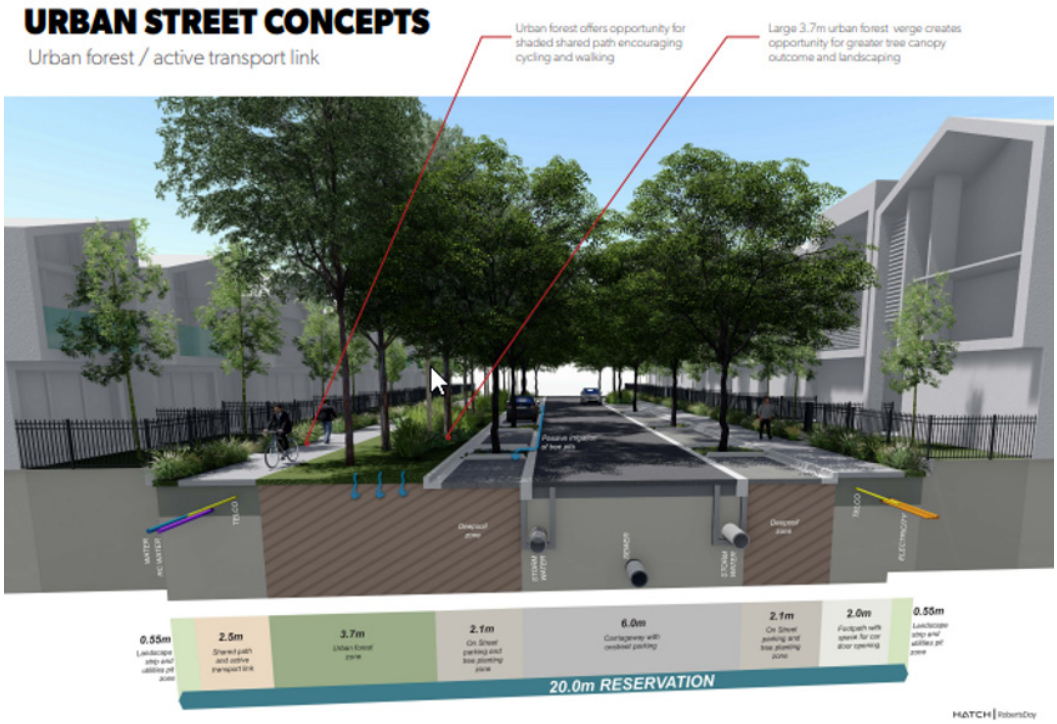


IMAGE SOURCE: HATCH

In any extensions to the growth areas of Melbourne and Victoria's regional towns and villages it is imperative that the layout of the urban fabric should be configured as a series of walkable neighbourhoods, allowing for walking, and cycling to be the preferred and privileged modes of movement.

In order to lay the foundations for urban settings that foster the ability for children to walk and cycle to school, and eminently walkable environments for residents, it is recommended that signature streets with continuous street tree canopies be introduced to ensure the highest levels of liveability and promote general health and well-being.

The most effective method of delivering signature streets with continuous street tree canopy is to introduce activated rear lanes or 'small streets' with secondary dwellings | IMBYs [In My Back Yard], an effective form of attainable housing which enables vital surveillance along the lanes.

Moreover, rear lanes provide for vehicle access and parking which alleviates the need for frontage street curb cuts and driveways which drastically reduce the ability to introduce regular interval tree planting and continuous tree canopy coverage along streets, and in turn, footpaths. The removal of driveways also eliminates the cost of driveway construction and the inconvenience, and interrupted continuous movement, for pedestrians and cyclists or cars parking in driveways across footpaths.

The accommodation of cars at the rear of residential

Urban street concepts: Highlighting the benefits of removing curb cuts and adopting rear-loaded designs to enhance street tree growth, create greener continuous canopies, and promote more walkable neighbourhoods.

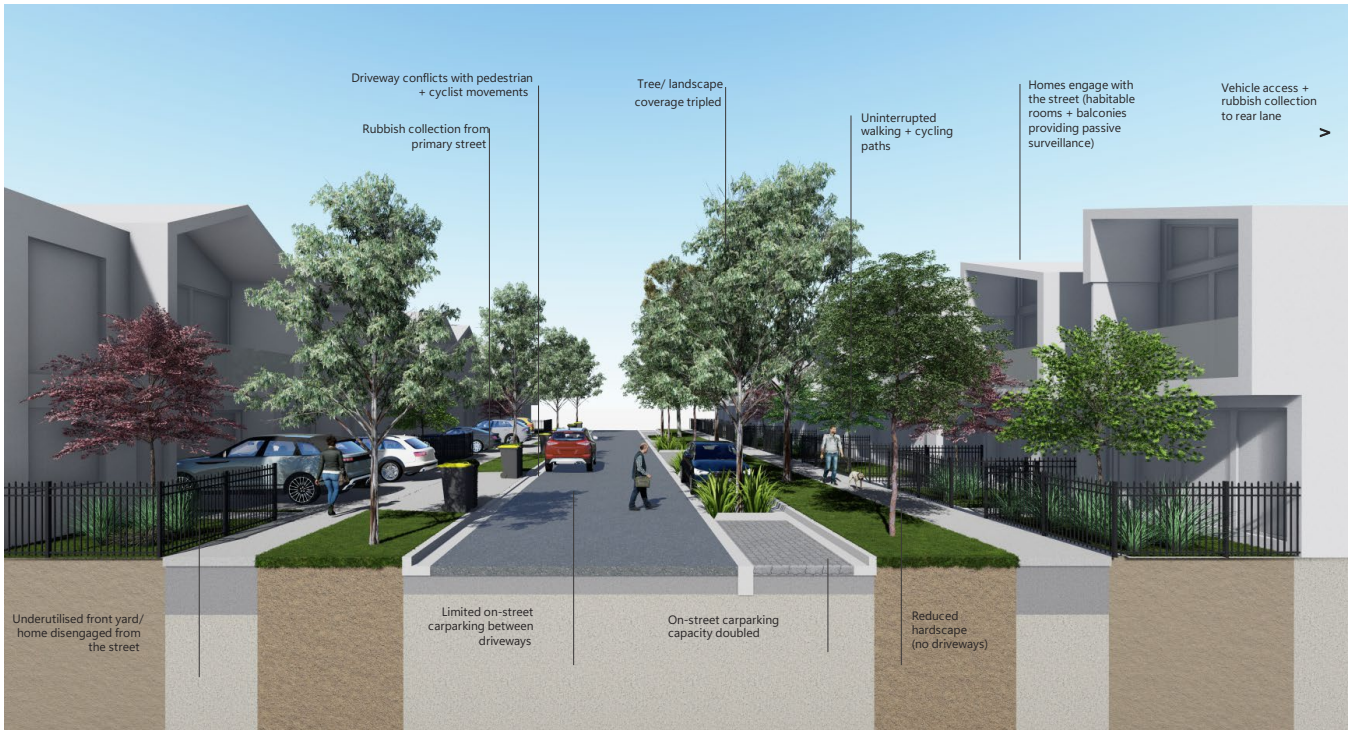


IMAGE SOURCE: HATCH

properties also enables continuous footpaths on frontage streets which enables uninterrupted pedestrian and cycle movement along shaded streets.

The most effective method of promoting this form of urbanism on signature streets is for local authorities and the State Government to streamline the approval process for pilot/demonstration projects that showcase these design attributes, and to publicise them through local and regional media outlets.

There are exceptional national and international contemporary community exemplars that showcase the attributes of signature streets, with rear access for vehicles, resulting in vibrant streets with continuous and contiguous tree canopies providing inviting footpaths, and housing with deep front veranda's, encouraging active resident social interaction and providing vital street surveillance.

To promote urbanism on signature streets, local authorities and the State Government should streamline approvals for pilot projects showcasing these designs and publicise them via local and regional media.

A tree-lined street of terrace houses in Sydney.

IMAGE SOURCE: GETTY IMAGES

Recommendation 05

DEVELOPMENT OF STREET TREE GUIDELINES

By Matthew Bradbury (TAP Vice Chair)

A State-wide street tree guideline is needed to ensure thriving trees and efficient, consistent landscaping with expert input.

Trees require certain conditions to reach their full potential. Of particular importance are:

- Appropriate species selection that responds to the local climatic conditions.
- Soil volume.
- Soil quality (nutrients, air/water permeability).
- Watering and management (particularly during the establishment period).

In lieu of a State-based guideline, several local councils have developed their own guideline documents. The quality and detail provided in these documents varies and creates inconsistencies across the State. To provide clarity to industry, a consistent State-based street tree guideline should be developed. Such a guideline will still need to respond to Victoria's

Balancing hardscape, utilities, and horticulture offers a chance for more efficient and sustainable outcomes.

IMAGE SOURCE: GETTY IMAGES

The tree canopy along Adelaide Street in Brisbane has become a city landmark.

diverse climate and geology but should set minimum requirements to allow street trees to thrive across the state.

The relationship between hard and soft landscape, utilities backfill requirements and horticultural needs provides a great opportunity to get better outcomes more efficiently and sustainably. The way this is currently done in the land development industry is not efficient and does not maximise the street tree potential. In development of the guidelines, input is required from horticulturalists, soil scientists, geotechnical engineers, hydrologists, and pavement designers to ensure that soil specifications meet the requirements for trees without detrimentally impacting other infrastructure and the road pavement.

Species Selection

Selecting the right tree species for a specific location is critical for the future success of that tree. The street tree guidelines should provide species lists that respond to soil types (geology), drainage, rainfall, available water, and available space (see soil volume below). In considering climate, species selection must allow for the impacts of climate change to ensure long-term success of tree planting. Tools such as the 'Which Plant Where' web tool are useful resources. Landscape officers within local councils are also good sources of information of what trees are performing well in specific areas.

Another key consideration in species selection, is nursery availability. Government should work closely with the Nursery & Garden Industry Victoria to ensure that industry is able to supply the required trees. Tree stock needs to be of a minimum standard and should conform with AS2303:2018 Tree stock for landscape use[48].

Soil Volumes

Any tree planting location needs to have enough available soil volume to sustain the tree in the long-term. For a tree to develop a full mature canopy, it needs enough soil volume to support its growth. Soil volume can be constrained by the width of the verge and the presence of underground services. There is good research available in the calculation of soil volume requirements, and a street tree guideline should provide advice on the soil volume required to support different tree species.

The best way to maximise soil volume is to relocate underground service outside of the nature strip. This will eliminate the need for utility backfill and allow for greater soil improvement (refer to below section on Soil Quality).

Soil Quality

One of the biggest barriers impeding tree growth in our growth area suburbs is soil quality. Currently, topsoil is placed by the civil works contractors and only minor amelioration, if any is undertaken at the time of tree planting. Soil quality is typically poor and compacted which inhibits healthy root development.

High quality soil should present a healthy structure that allows for aeration, water permeability and contains the necessary nutrients to support tree growth. A street tree guideline should provide a performance specification for soils that responds to geographic variability (this should be developed in consultation with soil scientists). Amelioration should

[48]AS 2303:2018 Tree stock for landscape use, Standards Australia, 21 December 2018.

SOURCE: WWF AUSTRALIA

Native tree species, supported by favourable soil and environment, promote canopy growth and support native habitats.

be undertaken on-site as part of the civil works with soil samples provided to demonstrate compliance.

Watering and Ongoing Management

Watering, particularly during the establishment period (first 24 months) is essential. Reliance on rainfall is insufficient, and supplementary watering is required (either manually or via an irrigation system). Specifications should also be provided regarding, fertilising, pest management and pruning. Consistent reporting requirements across the state will result in more consistent outcomes.

Many local councils have begun to mandate the use of passive irrigation systems to provide additional water to trees during rainfall events. There is a lack of consistency in the detail of these systems. A State-based approach is required and should consider the use of overflow stormwater from roof surfaces rather than only utilising stormwater from road surfaces.

Protection of trees during adjacent house construction is critical to ensure survival of newly planted trees. Guidelines should allow for:

- Protection measures such as temporary fencing placed around newly planted trees.
- Deferral of tree planting until adjacent house construction is complete.

A State-based consistent approach to street trees will provide much needed consistency and clarity to industry and will give trees the greatest chance for success.

Protection of trees during adjacent house construction is critical to ensure survival of newly planted trees.

Recommendation 06

GOVERNANCE

By Victoria Cook (TAP Chair)

Improving street trees requires strong leadership and coordinated governance.

The technical solutions to improve street tree and canopy coverage outcomes already exist and are being implemented in various localities across Australia and globally.

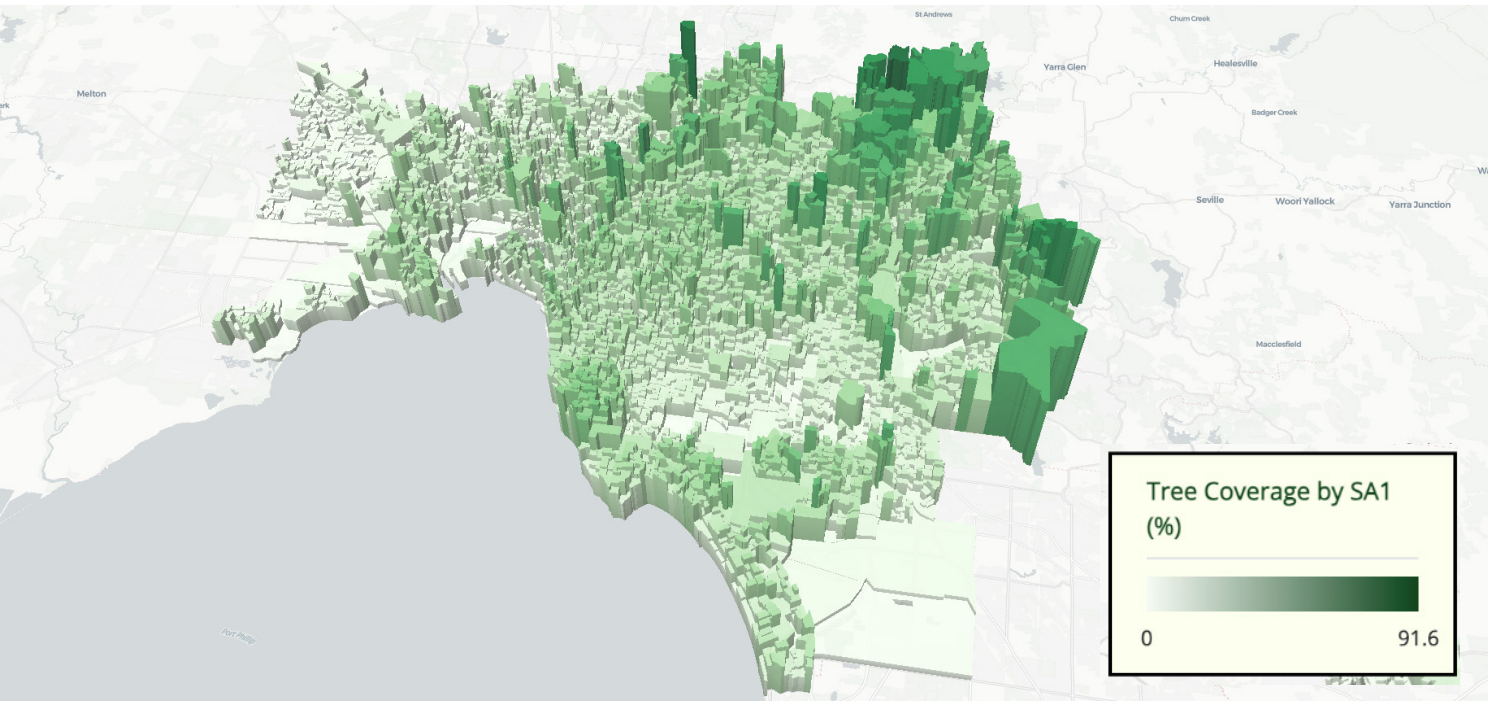
However, the real challenge lies in leadership, policy direction, and the need for effective coordination and collaboration. While technology offers the tools, it is governance and decision-making that require the most significant attention to ensure these solutions are adopted and scaled effectively.

Urban governance remains one of the most significant barriers, with decision-making and funding presenting deep and complex challenges. This issue extends beyond simple collaboration, demanding innovative forms of urban governance that engage various tiers of government, utilities, developers, and other stakeholders.

The recommendations contained within this report all require some level of leadership and governance to ensure that long-lasting and meaningful change is achieved within our communities. The TAP believes that DTP is in a prime position to provide this governance to improve the street tree outcomes in our communities.

The implementation of any recommendations in Plan Victoria regarding street trees and canopy coverage targets, must include considerations for sustainable governance also.

Overview of current tree distribution across Melbourne.



SOURCE: YIMBY MELBOURNE

A street in Victoria's High Country adorned with golden autumn leaves.

IMAGE SOURCE: GETTY IMAGES

CONCLUSION

This TAP assignment has provided a comprehensive investigation into the challenges to delivering street trees in both the urban and growth areas of Victoria. The assignment has identified key challenges and opportunities, as well as potential solutions which will accelerate the street tree outcomes in Victoria.

The challenges Victoria faces in prioritising street trees reflect a broader issue encountered globally.

Across local, national, and international contexts, similar obstacles arise, spanning policy gaps, standard engineering and service designs, human behaviour, and a lack of strategic prioritisation.

Despite their undeniable benefits, street trees are often considered last during the design and construction of a street, taking a backseat to other infrastructure elements. Yet, there is widespread consensus that street trees significantly contribute to environmental health, public well-being, economic vitality, and social cohesion of our communities, emphasising the need for a shift in perspective and approach.

Technical solutions for integrating street trees exist and are already being successfully implemented in some parts of Australia. However, the core challenge lies in the absence of strong leadership, cohesive policy frameworks, and coordinated efforts across government departments, councils, and agencies. These elements are critical for overcoming the barriers to more widespread adoption.

To effectively prioritise street trees, particularly in the growth areas in Victoria and across Australia a paradigm shift is necessary.

A “Tree First” approach ensures that street trees are central to the community, with other services planned around them, safeguarding their survival, and enhancing urban liveability. Setting suitable tree canopy cover targets is another critical step. These targets articulate a clear vision for urban greening and, when combined with regular data collection, provide a measurable path toward improved outcomes for communities. Achieving these goals requires alignment at a spatial scale and a commitment to long-term monitoring.

Revising the Road Management Act 2004 (RMA) Code of Practice for the Management of Infrastructure in Road Reserves (MIRR) is vital. Such reforms would reposition street trees as essential infrastructure, ensuring they are no longer treated as an afterthought. This would also establish consistent guidelines for service locations to better integrate trees into the urban fabric.

Complementing these reforms are urban design strategies focused on continuous tree canopies for “signature streets” that promote health, well-being, and enhanced liveability. Additionally, a State-wide street tree guideline tailored to Victoria’s diverse conditions will assist in creating attractive and green communities for all to enjoy.

The TAP members would like to thank ULI Australia, the Department of Transport and Planning, strategic advisors, stakeholders, and all who contributed to this report. We look forward to continuing our support and assistance with this important and meaningful discussion.

APPENDICES

Appendix 1.0 - Federal Government Urban Reform and Funding Programs

The current Federal Government has a strong reform and funding agenda for urban Australia. Recent policy and funding initiatives have included:

- Establishing the **Cities and Suburbs Unit** to deliver on its urban policy agenda.
- Preparing **State of Cities Report**, as an accurate and up-to-date picture of life in Australian cities.
- Preparing a (draft) **National Urban Policy**[49] to address urgent challenges facing our cities and urban areas. This is matched with new funding programs including:
- **Thriving Suburbs Program**[50] - $350 million over 3 years from 2024-25 to provide merit based and locally driven grants that address shortfalls in community infrastructure
- **Urban Precincts and Partnerships Program** (uPPP)[51] - $150 million to support transformative investment in urban Australia, based on the principles of unifying urban places, growing economies and serving communities.
- **Housing Support Program** (HSP)[52] - $1.5 billion to support the delivery of increased housing supply with a range of measures. Of relevance, $500 million is available for enabling infrastructure for housing including connecting essential services like water, power, sewer and roads.

There are also a range of regional and community programs including:

- **Growing Regions Program**[53] - $600 million over four years, from 2023–24 to deliver investment in infrastructure across Australia's regional, rural and remote areas.
- **Regional Precincts and Partnerships Program** (rPPP)[54] - $400 million to support transformative investment in regional, rural and remote Australia based on the principles of unifying regional places, growing economies and serving communities.

We note additionally that the National Growth Areas Alliance, the peak body for local governments in Australia's fast-growing outer metropolitan regions, is calling for prioritised funding to address the infrastructure deficit in growth areas.

(NGAA, From Deficit to Equity, Investment Solutions for today's Infrastructure needs and tomorrow's housing in Outer-Metropolitan Growth Areas)[55].

[49] National Urban Policy - Consultation Draft, Australia Government, May 2024. Retrieved from https://www.infrastructure.gov.au/sites/default/files/documents/draft-national-urban-policy.pdf
[50] Thriving Suburbs Program, Australia Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts (2024). Retrieved from https://www.infrastructure.gov.au/territories-regions-cities/cities/thriving-suburbs-program
[51] Urban Precincts and Partnerships Program, Australia Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts (2024). Retrieved from https://www.infrastructure.gov.au/territories-regions-cities/cities/urban-precincts-and-partnerships-program
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[55] From Deficit to Equity, Investment solutions for today's Infrastructure needs and tomorrow's housing in Outer-Metropolitan Growth Areas, National Growth Areas Alliance (2024). Retrieved from https://ngaa.org.au/application/third_party/ckfinder/userfiles/files/20241119_FINAL_EMBARGOED%20until%2021%20November%20-%20NGAA%20Policy%20Position%20Paper%202025.pdf

Appendix 2.0 - Global Case Studies

2.1 Minneapolis Urban Forest Policy and Street Design Guide

The 2016 Minneapolis Urban Forest Policy aims to elevate the urban forest to the status of a public utility, placing it alongside essential services like water and sewer systems. This policy seeks to balance the demands of urban development with the preservation of tree canopy, establishing a framework for defining and protecting the urban forest as critical infrastructure. The updated policy outlines comprehensive standards for planning, design, construction, and ongoing maintenance of urban forestry elements, ensuring that trees are prioritised and sustainably managed across the city.

Implementation Strategy

The policy mandates collaboration across city departments, public entities, and private stakeholders. For effective implementation:

- **Tree Management Standards:** Clear guidelines for planting, maintenance, and species diversity are established, including permits for planting and pruning. Strict spacing requirements and species limitations prevent over-representation and susceptibility to pests.
- **Infrastructure Integration:** Urban forest considerations are embedded in public infrastructure projects through standards like the Standard Supplemental Specifications for Construction of Public Infrastructure[56] and Standard Plates Manual[57]. This ensures trees are considered in all stages of public works.
- **Utility Placement and Concrete Work Around Trees:** Utility conduits must be installed outside the boulevard whenever possible, with handhole boxes placed at least 10 feet away from public trees. For concrete work near trees, roots over 2 inches in diameter must be inspected and may need to be removed, and tree rings are required for trees located near sidewalks.

Funding Mechanism

The Minneapolis Park and Recreation Board (MPRB) manages all city-owned trees, including boulevard trees located in the public spaces between curbs and sidewalks. MPRB's responsibilities encompass planting, pruning, removal, stump grinding, and general maintenance of approximately 200,000 boulevard trees. Funding for urban forestry initiatives comes from diverse sources, including property taxes, philanthropy, and local government aid (see Figure 22). Additionally, contractors provide refundable deposits for tree establishment, encouraging diligent care. Long-term sustainability is supported through annual budget allocations and collaborative partnerships with stakeholders.

Street Design Guide

The 2021 Street Design Guide in Minneapolis incorporates the city's Climate Action Plan (2013), Complete Streets Policy (2016), commitment to Vision Zero (2017), and Transportation Action Plan (2020) to guide street planning, ensuring infrastructure reflects priorities in sustainability, safety, and accessibility. Street trees play a central role in this vision, with guidelines prioritising tree placement on both sides of streets and setting minimum boulevard

[56]Supplemental Specifications For the Construction of Public Infrastructure In the City of Minneapolis 2024 Edition. Retrieved from https://www2.minneapolismn.gov/media/content-assets/www2-documents/business/MPLS_Standard-Supplemental-Specifications-2024-with-Appendix.pdf
[57]Chapter 7819, Public Rights-of-Way Standards, Minnesota Legislature. Retrieved from https://www.revisor.mn.gov/rules/7819/

Figure 22 - Minneapolis Park Board Budget & Funding Explainer.

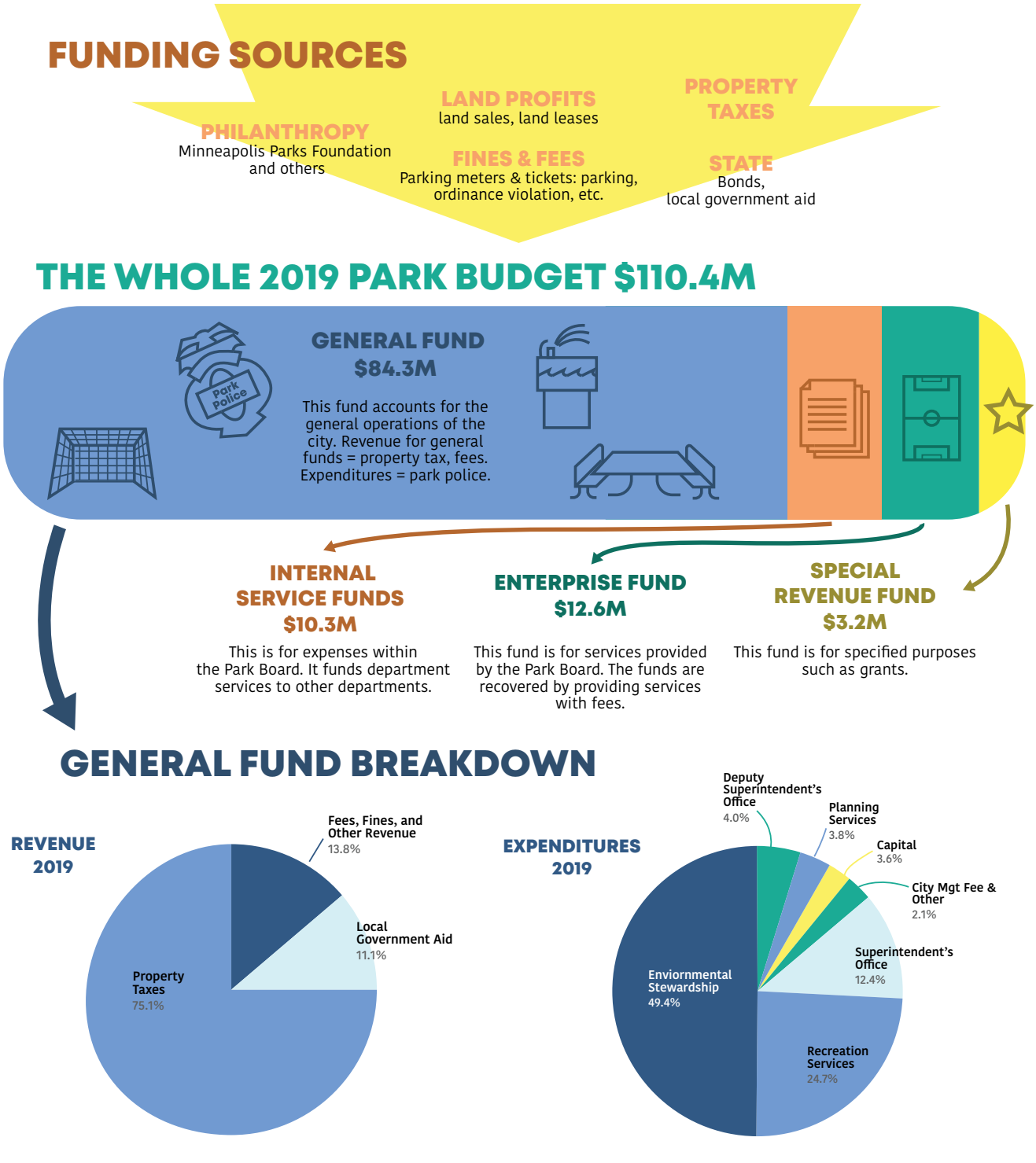

IMAGE SOURCE: PARKS AND POWER

widths to support tree health. Minneapolis aims to expand tree coverage, particularly in underserved areas, by implementing tree trenches for stormwater management and avoiding tree grates that can hinder growth. Tree species and maintenance standards are overseen by the MPRB to ensure sustainability.

In line with green infrastructure goals, the guide promotes Green Stormwater Infrastructure (GSI), which utilises natural hydrology to manage runoff through systems like bioretention and permeable pavement. GSI design criteria address water infiltration, quality treatment, and flood reduction, with stormwater directed to bioretention features like rain gardens and bioswales. Permeable pavements are also encouraged in pedestrian areas to improve water management, filtering stormwater through layers for storage and slow release, enhancing both environmental and aesthetic urban features.

Implementing urban forests as an essential public utility represents a groundbreaking approach to sustainable city planning, elevating trees to the same priority level as water and sewer systems. Minneapolis exemplifies this commitment, broadening its dialogue to engage multiple stakeholders and address urban forest challenges collaboratively. Over years of dedicated effort, the city refined and consolidated these conversations, ultimately shaping today's Minneapolis Urban Forest Policy. Achieving this vision requires policy reforms that institutionalise trees as critical infrastructure, backed by diversified funding sources like state bonds and environmental grants. Improved coordination among city departments, developers, and community groups ensures seamless implementation, while capacity building through training and resources maintains high standards of care. Minneapolis's achievements—through its Urban Forest Policy, Standard Supplemental Specifications for Construction of Public Infrastructure, and Street Design Guide—establish a comprehensive framework for managing street trees and right-of-way adjustments in collaboration with private development and utility work, setting a benchmark for other cities to follow in sustainable urban development.

MPRB responsible for all City-owned trees, they care for approximately 200,000 boulevard trees.

SOURCE: MPRB

2.2 MillionTreesNYC

MillionTreesNYC, part of PlaNYC, aimed to plant and care for a million trees in NYC. Managed by NYC Parks and the New York Restoration Project (NYRP), it focused on enhancing the city's "green matrix" by planting trees across various public and private spaces.

The Challenge

NYC faced environmental challenges like poor air quality, limited green spaces, and pollution. The initiative addressed these issues amidst pressures from climate change, population growth, and economic inequality.

The Public Impact

By 2015, MillionTreesNYC had planted a million trees, positively transforming neighbourhoods. Community outreach was key, with free workshops, volunteer engagement, and community care programs.

Stakeholder Engagement

NYC Parks and NYRP led the project, partnering with city agencies like the Department of Environmental Protection and Department of Transportation. Other nonprofits, such as TreeKit, used mapping to engage residents in tree care.

Political Commitment

Political support for the project was strong, with backing from top city officials who valued the environmental and social benefits, including a reported 500% ROI in these areas.

Clarity of Objectives

The project's name highlighted its clear objective: planting and caring for a million trees. There was initial resistance to naming it "MillionTreesNYC," but it ultimately underscored the program's ambitious goals.

Strength of Evidence

The 2005 Street Tree Census helped guide tree planting, focusing on public health and environmental goals. Long-term urban forest data was prioritised to manage and evaluate tree health and coverage.

Feasibility

Policymakers assessed feasibility by surveying community readiness, ensuring that citizens were engaged and involved in urban forest stewardship.

Implementation aspects from MillionTreeNYC

Collaborative Governance:

- Involved partnerships between NYC government agencies, NYC Parks, and the nonprofit New York Restoration Project (NYRP).
- Advisory Board and subcommittees facilitated coordinated planning in tree planting, stewardship, education, policy, and marketing.

Tree Planting and Ecological Corridors:

- Block-wide planting approach focused on areas with low tree coverage and high public health needs.
- Expanded to include diverse locations: city parks, private properties, NYCHA developments, and public spaces like schools and community gardens.

Research and Evaluation:

- Conducted regular assessments to refine strategies and track progress, including tree mortality studies and the urban canopy analysis.
- Tree survival rates improved through changes in planting practices and focus on stewardship.

Stewardship Initiatives:

- Emphasised public engagement through programs like TreeLC, providing tools and workshops for long-term care.

- Engaged volunteers and community organisations in caring for planted trees, particularly in underserved areas.

Educational and Outreach Programs:

- Education programs targeted students and aimed to build environmental literacy citywide.
- Public service campaigns raised awareness, with citywide events and social media.

Green Jobs Training:

- MillionTreesNYC Training Program provided workforce development for low-income young adults, emphasising green job skills and employment readiness.
- Adjusted training to include soft skills, mentorship, and projects within participants' communities.

Environmental and Health Focus:

- Targeted areas with high asthma rates for tree planting to improve air quality.
- Used urban canopy analysis to identify priority areas for tree planting to address pollution removal and public health improvements.

Stormwater and Climate Resilience:

- Integrated green infrastructure to manage stormwater and improve NYC's resilience to climate events.
- Utilised trees, green streets, and public right-of-way enhancements to capture stormwater effectively.

Private Land Planting and Stewardship:

- Collaborated with private landowners and distributed trees through community events, aiming to cover various types of properties.
- NYRP leveraged GIS technology for efficient tree management and outreach.

Sources:

https://centreforpublicimpact.org/public-impact-fundamentals/milliontreesnyc-planting-and-tending-the-urban-forest/

https://www.fs.usda.gov/nrs/pubs/jrnl/2014/nrs_2014_campbell-MTNYC_Research.pdf

Young stewards watering new trees in Long Island City.

SOURCE: MILLIONTREESNYC

2.3 Austin Urban Forestry Management

The Climate Equity Plan is a recently adopted initiative with an ambitious goal of equitably achieving net-zero community-wide greenhouse gas emissions by 2040. A key component of the plan is the Natural Systems section, which prioritises urban forestry strategies to guide future development in Austin.

The Urban Forest Plan, adopted a decade ago, outlines comprehensive goals to achieve an ideal urban forest by 2034. While it remains a foundational vision, it no longer serves as the driving force behind Austin's urban forestry efforts. Despite its strategic value, the plan operates at a high level, leaving room for improvement in technical and operational execution. Austin's decentralised urban forestry structure limits the effectiveness of the plan's implementation. The City's Urban Forester, part of the Development Services Department, lacks the authority to oversee the plan's full implementation. Without additional strategies aligned with the original vision, the plan cannot be fully realised.

The Austin's Heat Resilience Playbook identifies neighbourhood-based and citywide initiatives to address extreme heat. Two core pillars—"Prioritise Cooling Investments and Programs in High-Heat Neighbourhoods" and "Enhance Infrastructure and Ecology to Adapt to Extreme Heat"—inform strategies like expanding shade coverage through tree canopies and developing robust tree planting and maintenance programs. Adopted in 2024, the playbook serves as a guiding framework for future development, with enhancing street tree canopy coverage as a key action to support its goals.

Emily King, Urban Forester of the Community Tree Preservation Division in Austin's Development Services Department, shared insights on the city's urban forestry efforts. She emphasised the need for further implementation measures, such as a complementary forest inventory, a comprehensive tree maintenance program, targeted planting strategies, and alternative funding pathways to support Austin's urban forestry vision.

Austin conducts a citywide tree canopy coverage analysis every four years. The goal to achieve 50% canopy coverage by 2050 was informed by an assessment of available planting areas and the city's capacity to support tree growth. King highlighted the importance of setting ambitious targets to drive systemic change across departments and to foster tree growth on both public and private land. However, she cautioned that relying solely on satellite imagery for tree mapping offers only a static snapshot and limited insight into long-term growth trends. Challenges include the rapid pace of urban development, annexations and deannexations, and technological advancements that can render older studies as simply harder to compare with newer studies.

King praised the Melbourne Urban Forest Strategy 2014 for its use of future canopy projection scenarios to anticipate canopy loss and replacement over time. She advocated for more site-specific analyses of canopy coverage and tree inventories to enhance long-term tracking of growth trends in Austin. To support these efforts, the department leverages the Urban Forest Inventory Analysis (UFIA) to assess trends and conditions in urban forests. The NFI provides annual data on the costs and benefits of maintaining and expanding tree canopies, offering key insights to guide future urban forestry strategies.

Community Tree Preservation Division currently working in response to a council resolution which outlines a comprehensive approach to integrate green infrastructure, especially street trees, within Austin's urban right-of-way planning.

Urban Development and Green Infrastructure

- Austin is rapidly evolving with private and public projects. Future developments are urged to follow the city's goals for enhanced livability, connectivity, and sustainability.
- The Imagine Austin Comprehensive Plan and Austin Climate Equity Plan guide the city's green infrastructure, focusing on pedestrian and transit-friendly layouts, and promoting alternative transport modes.

Challenges with Right-of-Way (ROW)

- Current public ROW space faces conflicts among utilities, making it challenging to prioritise green infrastructure like trees.
- The extensive overhead power network often limits the potential for street trees, critical for mitigating the urban heat island effect.

Environmental and Social Benefits of Street Trees

- Street trees offer stormwater management benefits, reduce heat, and provide shade for pedestrian areas. They support vulnerable populations during extreme heat.
- Current planting standards are insufficient, often resulting in short tree lifespans (average 19-28 years in urban settings versus a potential 50-100 years).

Policy Goals for Improved ROW Management

- The City Council has directed the City Manager to create a ROW design and management plan to prioritise green infrastructure.
- Key strategies include:
  - Analysing barriers to street trees and proposing maintenance and funding solutions.
  - Reviewing existing policies to unify ROW goals, particularly around green infrastructure.
  - Studying mandates for tree-shaded ROW areas and utility placement to allow more space for green elements.
  - Encouraging green stormwater infrastructure like rain gardens and tree wells for sustainable stormwater management.

Operational and Administrative Improvements

- Simplifying the application processes and combining license agreements with site plans to reduce delays.
- Developing a dedicated team to manage green infrastructure within ROW spaces and explore sustainable lighting and paving options.
- Proposing to use Austin's existing Corridor Construction Program standards as a template for city-wide ROW tree planting.

Future Actions and Reporting

The City Manager is directed to update the Council Mobility Committee on progress, with a timeline for potential code amendments to be shared by September 19, 2024. The city will evaluate technical challenges and administrative criteria to support higher adoption of green infrastructure within Austin's ROW.

These efforts underscore Austin's commitment to sustainable urban planning, striving to balance infrastructure needs with environmental and community priorities. As a next step, further specifications will be defined, with the division

planning to bring on contractors to establish a technical advisory group and prioritise resolutions for inclusion in the 2025 plan.

King explained that Austin's current urban forestry funding primarily depends on fees from existing tree mitigation measures. This funding approach is less than ideal, as it fluctuates with new developments and tree removals, limiting long-term growth in citywide canopy coverage. She acknowledged that relying solely on funding from the city's General Fund is insufficient. Ideally, street trees should be recognised as part of Austin's green infrastructure, with dedicated maintenance funds similar to other essential services. To achieve this, King advocates for including trees as part of the city's critical infrastructure.

We thank Emily King, Urban Forester of the Community Tree Preservation Division in Austin's Development Services Department for her insights and contribution.

2.4 City of Gurlph's Urban Forest Management Plan (UFMP)

The City of Guelph's Urban Forest Management Plan (UFMP), approved in 2012, is a 20-year strategy dedicated to sustaining and enhancing Guelph's urban forest through targeted recommendations spanning management, legislation, protection, and community engagement. Since its inception, the plan has achieved significant progress, driven primarily by Parks Operations and Forestry, aligning closely with City plans and budgets while identifying opportunities for improvement and setting future goals.

This long-term plan includes short-term management and operational frameworks and comprises 22 recommendations to address gaps and opportunities across four core areas:

- Management and monitoring.
- Legislation and policy.
- Protection and enhancement.
- Community outreach and partnerships.

Key Strengths of the City of Guelph's UFMP

Aggressive Tree Replacement Policy: Guelph's 3:1 tree replacement rule requires that for every tree removed, three new trees are planted. This approach leads to a net gain in tree coverage, supporting urban forest expansion and ecological benefits throughout the municipality.

Publicly Accessible Tree Inventory: Guelph uses a GIS-based tree inventory system available online, allowing community members and planners to view and manage urban forestry. This transparency fosters community engagement and provides practical tools for city planning.

Biodiversity Strategy (30-20-10 Rule): Guelph employs a biodiversity rule to ensure no single tree family, genus, or species dominates the urban forest, enhancing resilience against diseases and pests. This approach promotes a sustainable and ecologically diverse urban forest ecosystem.

Flexible Approach to Species Selection: While preferring native species, Guelph's plan is open to non-native species that may offer unique benefits, further supporting biodiversity and ecosystem resilience.

Implementation of UFMP

Every five years, the City reviews key recommendations, assesses progress on the Urban Forest Management Plan (UFMP) through public outreach and surveys, and updates policies and practices to guide the next phase, focusing on the current state of the urban forest, completed work, ongoing initiatives, and any necessary adjustments to

recommendations.

Table 5 presents the gap analysis conducted by Parks Operations and Forestry staff, highlighting leadership and support roles within the UFMP regarding tree canopy cover and assessment. The analysis outlines the current status of the initiative from Phase One (2013-2019), goals, identified gaps, and recommended actions for Phase Two.

Table 6 illustrates the City's tracking of each UFMP recommendation, detailing the year initiated, work status, updates from Phase One (2013-2019), and targets for Phase Two (2020-2023). In the first phase, of the twenty-two recommendations, three were completed and 15 initiated due in large part to Council's budget approvals supporting increased staffing capacity in Forestry and support from other City departments.

Financial Implications

The Urban Forest Management Plan (UFMP) in Guelph is funded through a combination of tax-supported capital and operating budgets as part of the City's broader "City Building" funding strategy. This strategy often blends capital investments for initial asset development and increased operating costs for ongoing maintenance, aligning funding efforts with city priorities and future growth needs.

The UFMP requires ongoing funding from both capital and operating budgets, with $1,504,000 allocated for 2021-2023 and an additional $1,081,000 scheduled for 2024, along with operating impacts totalling $765,000 by 2024. This funding is projected to increase the tax rate by approximately 0.30% over four years to support UFMP implementation and maintenance.

Table 7 shows implementation of the second phase of the UFMP, which is to be aligned with the upcoming four-year budget cycle, will require continued investment through both operating and capital budgets.

Legislation, policies, and guidelines

The City of Guelph emphasises the integration of trees into urban planning to enhance greenery and ensure trees are considered early in development processes

Table 5 - UFMP recommendations update – management and monitoring.

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
1	Create a Senior Urban Forester position	2013	Complete	• Nov 2013, position since March 2015 overseeing Parks Operations in addition to Forestry	• Senior Forester position in place
2	Create an interdepartmental "Tree Team" of City staff	2014	Complete	• Quarterly meetings since June 2014 – combined with Urban Forest Advisory Committee since 2015	• Ongoing quarterly meetings
3	Increase capacity to complete an inventory of municipal street and park trees	2013	Complete	• Technical staff added (2014) • On-line tree ownership map available to the public (2016) • Completed comprehensive sample, GIS based (spatial data base) inventory of urban forest	• Ongoing management of urban forest inventory • Review street and park tree inventory protocol
4	Undertake targeted vegetation assessment and management of City parks and natural areas	2015	Ongoing	• Natural Areas Monitoring established and baseline report/data complete (2016 and 2018) • Implement beaver (tree) protection protocol	• Compile forested areas monitoring data to feed into future comprehensive natural area monitoring (NHAP) • Develop forest management plans in conjunction with NHAP related plans
5	Expand the City's capacity for planting and maintenance of municipal trees	2013	Partial	• One of two recommended additional arborists approved in 2015 budget	• Ongoing pursue increased funding to achieve canopy cover targets • Implement Tree Allocation Fund (cash-in-lieu from

SOURCE: CITY OF GURLPH

Current	Goal	Gap description	Action
Existing canopy estimated at less than 75 per cent of desired canopy objectives and no neighbourhood canopy objectives.	The existing canopy greater than 75 per cent to 100 per cent of desired canopy at individual neighborhood level as well as overall municipality.	Canopy currently estimated at less than optimal, missing canopy goals at a neighbourhood or land use level, and does not consider equitable distribution among neighbourhoods.	Complete Urban Forest Study for City canopy cover assessments, set canopy cover goals at multiple scales based on actual potential canopy possible, and identify priority areas for optimizing canopy benefits.
Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery and limited or no goal setting.	High-resolution assessments of the existing and potential canopy cover for the entire community or at smaller management scales.	Urban Tree Canopy (UTC) assessment not completed using high-resolution imagery.	Complete a detailed and spatially explicit UTC assessment based on high-resolution imagery and/or LIDAR.

SOURCE: CITY OF GURLPH

Table 6 - Tree canopy cover and assessment - gap analysis.

to mitigate conflicts with infrastructure.

Municipal Policies: The 2007 Strategic Plan supports urban forest sustainability by setting goals to benchmark municipal practices and achieve high tree canopy coverage. The Official Plan (OPA 42) includes policies for woodland protection, tree canopy targets, and guidelines for native tree planting. Tree inventories and protection plans are required for development proposals.

The Guelph Tree Removal By-Law (2010-19058):
The by-law aims to protect Guelph's urban canopy by regulating tree removal and injury within city limits.

Regulated Trees: Defined as coniferous or deciduous woody plants with:

- A height of at least 4.5 meters (or potential to reach that height).
- A minimum diameter of 10 cm at breast height (DBH).
- Located on parcels larger than 0.2 hectares (0.5 acres).

Application Requirements:
To remove or injure a regulated tree, submit an application including:

- Tree location.
- Applicant's contact information.
- Written consent from all tree owners.
- Reason for removal and details of intended action.

Additional Requirement for Multiple Removals:
If removing three or more trees, a Replanting, Replacement, and Landscaping plan may be needed.

Permit Conditions:

- Specific instructions for tree removal or injury.
- Replacement of each affected tree and maintenance per inspector guidelines.
- $500 compensation per tree if replacement is not feasible.

Non-Compliance: Failure to adhere to the by-law may result in substantial fines.

Guelph's Tree Technical Manual

Guelph's Tree Technical Manual sets out rules for protecting, planting and maintaining trees during development, construction, and maintenance activities on private and public properties. The City follows the practices set out in the manual for its own operations and refers to these practices when reviewing proposed development applications.

The tree preservation and compensation review process must take place in tandem with the preparation and review of preliminary development, construction or tree removal and/or injury to be effective. Consideration is required for possible constraints that existing trees may place on such activities well before the plan review stage, and opportunities to maximise the protection, preservation and planting of trees on site are encouraged.

Four types of plans relating to the assessment, protection and planting of trees (and other vegetation) on site may be required as part of the development or site alteration process:

- **Tree Inventory and Preservation Plan (TIPP):** where wooded features and/or individual trees greater than or equal to 10 cm DBH may be destroyed or injured by proposed development on or within 6m of a property regulated by the Tree By-law;
- **Landscape Plan (LP):** as part of Site Plan applications and other applications under the Planning Act;
- **Vegetation Compensation Plan (VCP):** where an approved TIPP identifies trees to be destroyed or injured, or where trees located on City-owned property may be destroyed or injured by proposed development; and
- **Street Tree Plan (STP):** when a small number of trees are to be planted on or fronting onto City streets and a general Landscape Plan is not applicable or required, or when street tree planting is proposed on a large scale.

Initial Layout

- The proponent responsible for the installation of trees will lay out locations of all trees by use of wooden stakes and/or paint, as appropriate based on site condition. Locations will indicate species to be planted, using code corresponding to the approved LP or STP;
- Locations laid out on site shall conform to locations proposed in the approved plans. All utility locates, including but not limited to public and private underground electric or telephone lines, gas lines, waterlines, or any other utilities, shall be secured prior to initial layout;
- The proponent shall notify the City of Guelph no later than three business days prior to beginning the installation of any street trees or trees in parks, open spaces or natural areas. The City of Guelph shall reserve the right to inspect the on-site layout for conformance with approved plans and potential on-site conflicts, as well as any planting stock for conformance with the guidelines and standards laid out in this document. No planting pits shall be dug or prepared until their location is approved by the City of Guelph, or until the City has declined the opportunity to inspect the layout;
- Upon receipt and approval of the submitted LP or STP, the proponent will be provided with written authorisation from the City of Guelph to proceed with the installation of the street, park, open space or natural areas trees during the next available planting season; and
- The proponent shall be responsible for all costs associated with transplanting plant material that

is deemed to have been installed in conflict with utilities, setback requirements, or the approved plan(s).

Sitting

The following minimum offsets are recommended for use in planning for tree sitting:

- Buildings and building entrances – 4 m;
- Overhead utilities – 4.5 m, except for low growing species that do not normally attain a height greater than 6 m;
- Underground services – 1.5 m;
- Utility and telecommunications trenches – 1.5 m;
- Water hydrants – 4 m;
- Hydro transformer – 3 m from opening side (door), 1.5 m from other sides;
- Light standards/utility poles – 3 m;
- Residential driveways – 1.5 m or in conformance with sight triangle;
- Commercial driveways – 3 m or in conformance to sight triangle;
- Stop signs/intersections – 15 m or in conformance with sight triangle;
- Drainage swales – 1.5 m or in conformance with grading design (top of slope);
- Property lines – 1 m;
- Sidewalk edge – 1.5 m; and
- Curb face – 0.75m.

Trees and other vegetation are not permitted to be planted in transmission corridors unless deemed compatible as determined in consultation with the regulating authority. The location of trees shown on plans may be relocated as required under the direction of City staff.

Sources:

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https://guelph.ca/city-hall/planning-and-development/how-to-develop-property/development-applications-guidelines-fees/treetechnicalmanual/

https://www.treemenders.ca/blog/by-laws/guelph-tree-removal-by-laws/

https://www.haveyoursay.guelph.ca/urban-forest-management-plan

https://qspace.library.queensu.ca/bitstreams/f1c35c8b-3954-459b-acde-b291d3c887b3/download

Table 7 - Summary of financial impacts of UFMP implementation 2021-2024.

Budget and FTEs	2021	2022	2023	2024	Total
Capital budget	$14,000	$657,000	$833,000	$1,081,000	$2,585,000

Budget and FTEs	2021	2022	2023	2024	Total
Operating budget	$0	$90,000	$255,000	$420,000	$765,000
FTE additions	**0**	**1**	**2**	**TBD**	**3**

OURCE: CITY OF GURLPH

READING LIST

National

Urban Monitor - CSIRO

https://www.csiro.au/en/research/technology-space/data/Urban-Monitor

NSW

Urban Greening - NSW Government Planning

https://www.planning.nsw.gov.au/policy-and-legislation/urban-greening

QLD

Brisbane's Urban Forest – Brisbane City Council

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Shaping SEQ – Queensland Government Department of Housing, Local Government, Planning and Public Works

https://www.planning.qld.gov.au/__data/assets/pdf_file/0024/86145/shapingseq-2023-Low.pdf

SA

Green Adelaide

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Services in Streets – A Code for the Placement of Infrastructure Services in New and Existing Streets (1997).

Tree Planting Guide - SA Water

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https://vpa-web.s3.amazonaws.com/wp-content/uploads/2022/03/Precinct-Structure-Planning-Guidelines-Barriers-and-Solutions-for-Increased-Tree-Canopy-in-Victorias-New-Communities-HIP-V.-HYPE-November-2021.pdf

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https://hdp-au-prod-app-csy-conversations-files.s3.ap-southeast-2.amazonaws.com/9017/2229/4692/21782_COC_Greening_Casey_final_1.pdf

Green Streets Situational Analysis – Undertaken by the VPA

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Living Melbourne

https://livingmelbourne.org.au/

NGIV Greening the Garden State report (Nursery & Garden Industry Victoria)

https://www.ngiv.com.au

Plan Melbourne 2017-2050

https://www.planning.vic.gov.au/guides-and-resources/strategies-and-initiatives/plan-melbourne

Precinct Structure Planning Guidelines: New Communities in Victoria – VPA

https://vpa.vic.gov.au/introducing-the-precinct-structure-planning-guidelines-new-communities-in-victoria/

Regen Melbourne Report

https://www.regen.melbourne/news/regen-streets-report-2024

Road Management Act 2004

Road Management Act https://www.legislation.vic.gov.au/in-force/acts/road-management-act-2004/059

Road Management Act 2004 – Code of Practice for Management of Infrastructure in Roads

https://www.gazette.vic.gov.au/gazette/Gazettes2016/GG2016S117.pdf

Spiire EDCM Green Streets Situational Analysis Report

The Nature Conservancy and Resilient Melbourne, 2019

https://www.natureaustralia.org.au/newsroom/living-melbourne/

Trees for Cooler and Greener Streetscapes – Department of Transport and Planning

https://www.planning.vic.gov.au/guides-and-resources/guides/all-guides/trees-for-cooler-and-greener-streetscapes

Urban Forest Strategy - City of Melbourne 2012–2032

https://www.melbourne.vic.gov.au/urban-forest-strategy

Victoria's Future Climate Tool

Victoria's Future Climate Tool update | Engage Victoria

Victoria's Housing Statement, The Decade Ahead 2024-2034

https://www.vic.gov.au/victorias-housing-statement

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WA

Better Urban Forest Planning – Western Australian Government Department of Planning, Lands and Heritage and WALGA

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https://knowledge.uli.org/-/media/files/research-reports/2022/nature-positive-and-net-zero_the-ecology-of-real-estate.pdf

ULI Enhancing Resilience through Neighborhood-Scale Strategies

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IMAGE SOURCE: ULI

ABOUT THE PANEL

Victoria Cook

(TAP Chair)
Senior Development Adviser,
Yarra Valley Water,
Chair ULI Australia Net Zero Imperative
Melbourne, Australia

Victoria is the Senior Development Advisor at Yarra Valley Water and serves as the Chair of the ULI Australia Net Zero Imperative. With a Master's Degree in Urban Design, Victoria brings over 20 years of experience in the property and development industry, having worked extensively in both the private and public sectors in various development management roles. Her expertise lies in providing strategic advice and managing complex urban development projects. Victoria is deeply passionate about advancing sustainable greenfield development that are both viable and fit-for-purpose. Her commitment to these areas is driven by a strong personal interest in creating sustainable and inclusive communities.

Matthew Bradbury

(TAP Vice Chair)
Business Manager Melbourne
Landscape Architecture, Spiire
Melbourne, Australia

Matt is an experienced landscape architect and leads Spiire's landscape architecture team and is a member of Spiire's leadership team. Matt has managed many major projects from their early conception through to final delivery. Working on large-scale urban development projects he often collaborates within multi-disciplinary teams. His design and documentation skills allow him to deliver projects to meet client expectations, environmental goals, and the needs of the local community. Matt's particular interest lies in the development of creative design and management techniques which lead to more sustainable development outcomes. Matt currently sits as the Australian Institute of Landscape Architects Victorian Executive and is committee member on both the UDIA Innovation and Sustainability Committee as well as the Greening the West Committee. Matt has also recently completed a Masters thesis at RMIT University which investigated mechanisms to increase the uptake of sustainability initiatives in greenfield urban development projects in Victoria.

Lindsay Brugger

Vice President Urban Resilience,
ULI Washington DC
Washington DC, USA

Lindsay Brugger is Vice President, Urban Resilience for the Urban Land Institute (ULI), a global nonprofit organisation comprising more than 45,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide. Ms. Brugger leads ULI's Urban Resilience Program to advance the real estate industry's understanding of climate risk, catalyse action to reduce vulnerability, and support communities in becoming more climate resilient. Prior to joining ULI, Ms. Brugger was the Director of Resilience Knowledge and Engagement at the American Institute of Architects.

Kate Drews

Regional Head ANZ,
SMEC SJ
Sydney, Australia

Kate Drews is the Regional Head for Australia and New Zealand for Surbana Jurong Group, a global consultancy company that delivers sustainable solutions covering the entire project life cycle. With more than 25 years' experience in the property, construction and infrastructure sectors, Kate is a senior executive and company director. She is the Chair of the Sustainability Global Council of Excellence which involves catalysing the transition to a regenerative future for clients and within the SJ Group. Kate is a well-respected voice in the industry and is sought after for her leadership insights and strategic and commercial acumen and knowledge. She has considerable experience delivering complex infrastructure for public and private sector clients including private, Commonwealth and State Government projects in the property, energy, transport, Defence, aviation, and justice sectors.

Rachel MacCleery

Executive Director, ULI Randall Lewis Center for Sustainability in Real Estate
Washington DC, USA

Rachel MacCleery is Co-Executive Director of the Lewis Center for Sustainability in Real Estate at the Urban Land Institute, where she leads the real estate industry in creating places and buildings where people and the environment thrive. In this role, Rachel provides strategic direction for the Lewis Centre's programs on sustainability, resilience, health, and the built environment. Between 2013 and 2022, she led ULI's Building Healthy Places program, which leveraged the power of ULI's global networks to shape projects and places in ways that improve the health of people and communities, and prior to that she led ULI's Infrastructure Initiative. Rachel has worked at ULI since 2008 and previously worked for AECOM and the District of Columbia Department of Transportation.

Christian Borchert

Global Design Lead,
McGregor Coxall
Melbourne, Australia

Christian is a German educated architect and urban designer with 20 plus years' experience delivering public realm projects that span from large scale strategic master planning to finely crafted hardscapes. He is driven to deliver design strategies that assist in connecting communities and individual humans through innovative and sensitive built outcomes with their natural environments. In his projects, Christian emphasises on drawing design initiatives from the histories of each site and project. Christian's work is defined by its considered responses, informed by curious listening, and understanding of past processes that shaped the site, such as natural, climatic, socio-economic, and political impacts.

Marianna Southwick

Director,
Southwick Advisory
Sydney, Australia

Marianna is an urban strategist, urban advisor, precinct specialist, program director and landscape architect with 30 years' experience leading major urban renewal programs and initiatives - to shape prosperous, sustainable and inclusive futures for our places and communities. She has worked nationally and internationally, within public and private sectors and brings deep urban domain expertise across governance, systems, sectors, disciplines, and scales to address urban complexity and integrate economic, social, cultural and environmental outcomes. She has an Executive MSc in Cities from the London School of Economics & Political Science, a Bachelor of Landscape Architecture, and is a Certified Practising Project Director and Company Director, sitting on various industry boards and committees.

Dr Robyn Mansfield

Principal Researcher
(Inclusive and Sustainable Ecosystems),
Includovate
Sydney, Australia

Dr Robyn Mansfield has over 25 years of expertise in climate resilience, disaster risk reduction, community participation, development of thriving public and urban spaces, livelihoods, informal settlement revitalisation, and post-disaster rebuilding. Dr Mansfield holds a PhD in Sustainable Development - Social Inclusion, focused on mainstreaming children's voices in urban planning processes in communities facing hardships. With degrees in International and Community Development, Disaster Design and Development, and Landscape Architecture, Robyn has a diverse background in local and state government, consulting, academia, and private practice.

Our Stakeholders

Our sincere gratitude to everyone who contributed to the panel.

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