



WOLLONDILLY URBAN TREE CANOPY PLAN BACKGROUND AND ANALYSIS

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1.0 INTRODUCTION

1.1. Background and Context

This document provides the background and analysis to support the Wollondilly Urban Tree Canopy Plan and Landscape Strategy Report.

This report aims to provide a consolidated review of the key existing planning and policy framework that impacts on the extent of urban canopy in Wollondilly.

It also provides an analysis of existing, relevant spatial data which allowed for identification of opportunities and challenges faced by Wollondilly in enhancing its urban canopy.

Lastly, this report documents the results of an existing tree canopy analysis for the Wollondilly study area based on tree canopy data extracted from LIDAR and assessed against different boundary polygons to understand the distribution of existing canopy across different landuses and on public and private lands.

This report should be read in conjunction with the Urban Tree Canopy Plan and Landscape Strategy Report.



1.2. Introduction to Wollondilly

Wollondilly Shire is located on the southern peri-urban fringe of metropolitan Sydney and comprises 256,000 hectares (ha), of which approximately two thirds is protected as National Park which holds extraordinary environmental and cultural value.

As this project applies to the existing and future urban areas of Wollondilly, the extent of this study has been limited to the approximately 81,000 ha of remaining land which is predominantly characterised by rural and peri-urban lands with approximately 14 towns and villages and some smaller communities dotted throughout. This area is referred to as the study area throughout this report and is shown in the adjacent map.

Wollondilly LGA:

256,000 Ha

National Parks:

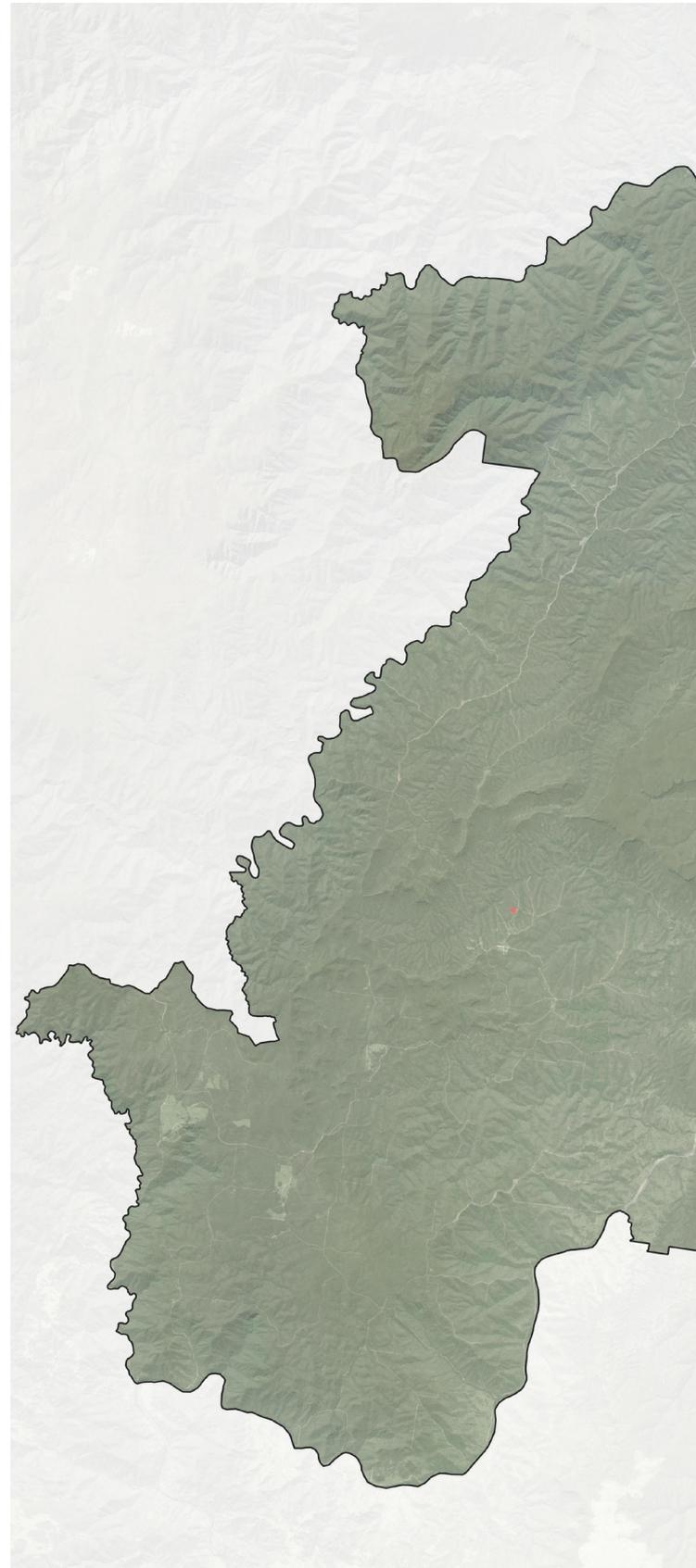
175,000 Ha

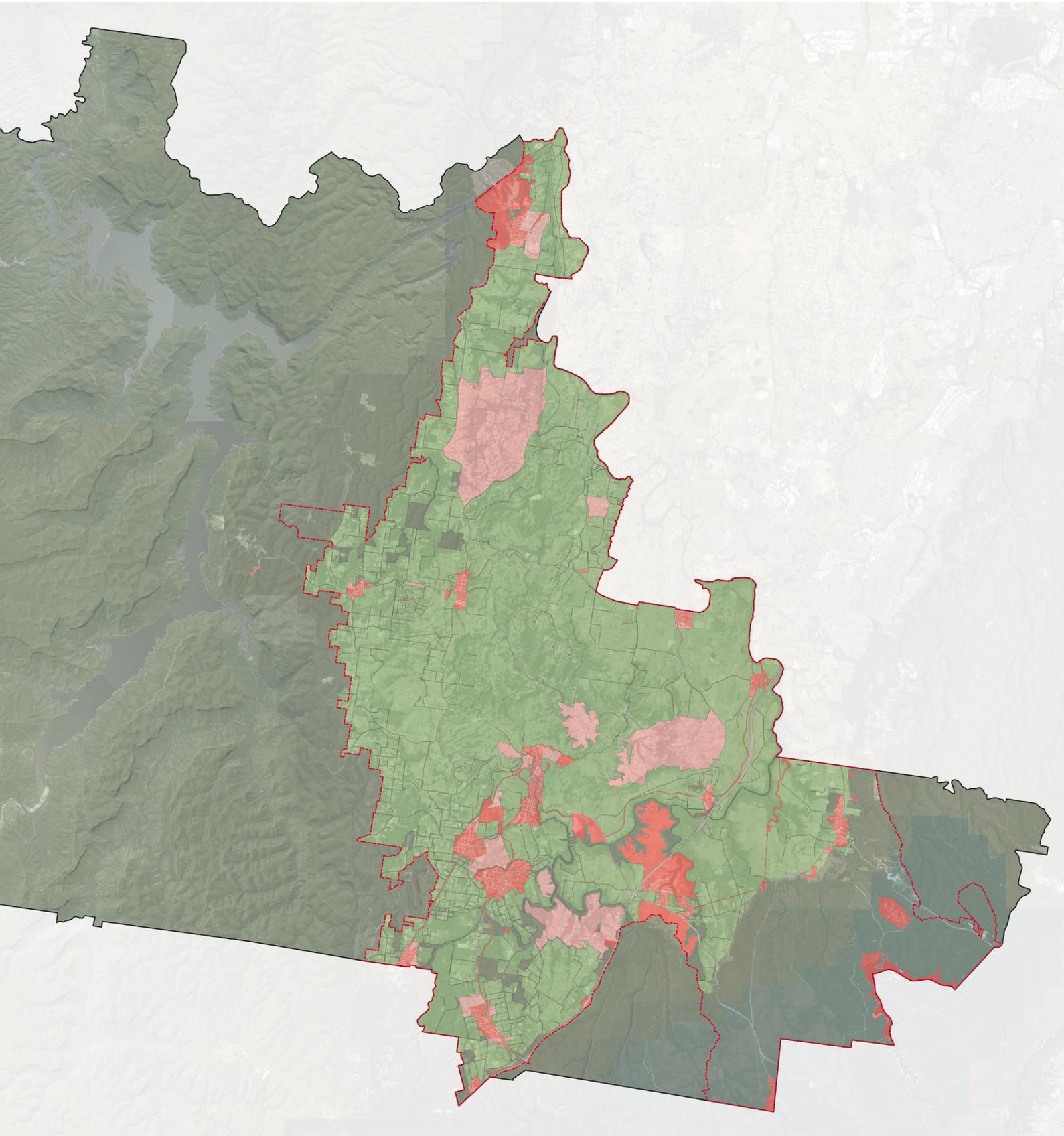
Study Area:

81,000 Ha

Legend

-  Urban Study Area
-  Wollondilly LGA
-  Wollondilly LEP Urban Zoning
-  Wollondilly LEP Peri-urban Zoning
-  Wollondilly LEP Rural/Other Zoning
-  Wollondilly LEP Bushland Zoning (includes National Park)





2.0 PLANNING CONTEXT

2.1. A Mandate for Urban Canopy

The State Government has created a clear mandate for Wollondilly Shire to prepare an Urban Canopy Plan to protect and enhance its urban canopy. Via a series of plans, policies and guidelines, the key documents have influenced the development of this Urban Canopy Plan to ensure alignment with state government mandates.

The 40-year vision for the Greater Sydney Region, set out in the Metropolitan Plan A Metropolis of Three Cities and the District Plans, acknowledges green infrastructure is essential infrastructure to mitigate urban heat, improve walkability, liveability, public health, biodiversity and attractiveness. The Plan includes a canopy target to adapt to Climate Change and manage urban heat.

The State Government's Draft Greener Places Policy (2017), Draft Greener Places Design Guide (2020), and the green grid in the Western City District Plan (2018) encourages green connected corridors through the urban landscape and an increase in tree canopy coverage

Western City District Plan planning priorities include the need to increase urban tree canopy to mitigate the urban heat island effect and reduce vulnerability to extreme heat; reduce exposure of natural and urban hazards; protect and enhance bushland, biodiversity and waterways; conserve and restore bushland corridors; and refine detailed design and delivery of the Greater Sydney Green Grid priority corridors.

Of the 14 NSW Premier's Priorities, the 11th aims to increase by 10%, the proportion of homes in urban areas within 10 minutes walk of quality green, open and public space by 2023. The 12th Priority aims to increase tree canopy and green cover across Greater Sydney by planting 1 million trees by 2022. In addition, the Western Sydney City Deal supports clean air and green spaces. The State Government has also made a commitment to the planting of 5 Million Trees to create a greener city by 2030.

2.2. Urban Canopy Target Guidelines

The Greater Sydney Regional Plan includes a target to increase tree canopy cover to 40% by 2056 up from the current 21% to adapt to climate change and manage urban heat island affect. The 40% target has been set based on international and national best practice and has been reinforced in the NSW draft Greener Places Policy (2017) and the draft Greener Places Design Guide (2020). It is noted that the Draft Wollondilly LSPS and draft Wilton DCP adopt a 40% canopy cover target across all urban areas.

This target has been set as an aspirational guide as setting targets needs to consider the context of different places. The draft Greener Places Design Guide has proposed indicative place based targets to respond to these differences as follows:

- >15% for CBD
- >25% for medium-high density
- >40% for low density

Where up-zoning occurs, it is not the intention of the Government Architect targets to reduce, or support the reduction of existing canopy cover (GA 2020).

Wollondilly's existing towns would fall overall into the low density classification with a recommended target of >40% canopy cover. When determining an appropriate canopy cover target for Wollondilly's urban areas, it is important to consider the following key factors:

- climatic conditions: are the climate and rainfall conducive to large canopy bearing trees? Or does high vulnerability to urban heat require greater canopy to mitigate those health and well-being impacts?
- urban density: is there physical space above and below ground in streets, plazas, and private lots for trees to thrive?
- resources: are there adequate resources available to manage and maintain a healthy tree canopy?
- desired landscape character: is the desired landscape character leafy and green?
- bushfire hazard: is the target achievable in relation to the constraints of bushfire prone land

Further to setting canopy cover targets, in order to address urban canopy resilience through species diversity and to incentivise appropriate tree maintenance and care planning some local governments have adopted diversity and survival targets e.g. City of Sydney adopts diversity targets of no more than 40% planting of the same family, 30% planting of the same genus and 10% planting of the same species (UFS, 2013). The City of Bendigo adopts a survival target of 90% within 12 months of planting.

KEY GOVERNANCE DOCUMENTS SUPPORTING URBAN CANOPY PLAN DEVELOPMENT

Sydney Region

Greater Sydney Commission
Metropolitan Plan

Premiers Priorities

NSW Government
Architect Sydney
Green Grid

NSW Government
Architect Urban Tree
Canopy Guide

Western Sydney

Greater Sydney Commission
Western City District Plan

Western Sydney Region of Councils
Turn Down the Heat

Western City Deal

Current state of urban tree canopy in the Greater Sydney Region is 21%.

The new target is 40%.

Greater Sydney

Regional Plan, 2018

Wollondilly Shire Council / DPIE

Local Strategic Planning Statement

Community Strategic Plan

Wilton DCP 2040 / Wilton Green Plan

Wilton Health and Wellbeing Strategy 2019

2.3. Wollondilly Planning Context

A complex framework of legislation at the Commonwealth, State and local government level has the potential to impact on the extent of canopy in Wollondilly Shire.

Commonwealth

At the Commonwealth level, the Environment Protection and Biodiversity Conservation Act 1999 is applied to matters of National Environmental Significance. In Wollondilly Shire the legislation can be triggered for World Heritage, migratory species, threatened species and endangered ecological communities listed under the Act. Within the study area, Shale/Sandstone Transition Forest, Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest are listed as critically endangered ecological communities under the Act.

A referral under the EPBC Act is required when proposed works have the potential to significantly impact these ecological communities or other matters of National Environmental Significance. This Act is not applicable to the protection of other vegetation within the study area.

State

At the State level, a complex web of legislation exists, some of which have different intent and therefore outcomes for urban canopy. Some instruments protect the environment and people from impacts due to development or hazards, whilst others are designed to streamline the planning process and assist with housing affordability. Instruments that influence the urban canopy are discussed in Section 2.5.

The Environmental Planning and Assessment Act 1979 is the over-riding instrument which aims to:

- Protect and promote a better environment,
- Facilitate Ecologically Sustainable development.
- Promote good design and amenity.

Local

Wollondilly Shire Council has the greatest ability to influence its urban canopy through local planning policies, strategies and plans. In 2019, Council prepared its draft Local Strategic Planning Statement (LSPS) that sets out the 20-year vision for land-use in the Shire, the special character and values that are to be preserved and how change will be managed into the future.

The LSPS guides planning decisions and the preparation of development controls in Wollondilly Local Environmental Plan (LEP), a statutory instrument, and Development Control Plan (DCP), a non-statutory instrument.

The LSPS also sets up the framework for an Urban Canopy Plan and associated objectives, targets, and strategic focus areas that will be implemented at all planning levels from the LEP and DCP to precinct plans, master plans, plans of management and operations plans etc.

As a key document influencing the Urban Canopy Plan, the core messages of the LSPS as they relate to urban canopy are discussed in more detail in Section 2.4.

Furthermore, existing strategies such as for biodiversity are being amended and new strategies and plans such as the Green Grid Strategy, Greener Place Plan and Koala Plan of Management will be prepared to implement measures to achieve urban canopy targets that could also influence statutory planning controls.

The Urban Canopy Plan includes a suite of possible amendments to the local planning instruments for Council to consider in its endeavour to protect and enhance urban canopy in Wollondilly Shire and implement the Local Strategic Planning Statement vision.

Planning Hierarchy

Federal

Environmental Protection and Biodiversity Conservation Act 1999

State

Environmental Planning & Assessment Act 1979

Regional

**A Metropolis of Three Cities
The Greater Sydney Region Plan**

District

Western City District Plan
Planning Priorities and Actions

Local

**Wollondilly 2040
Local Strategic
Planning Statement**

Wilton 2040

Statutory (EPI)

Wollondilly LEP

**Growth Centres
SEPP**

Planning Proposals
(Council or proponent initiated)

Planning Proposals
(DPIE, Proponent or Council initiated)

**Precinct Structure or
Neighbourhood Plans**

Site Non- Statutory

Wollondilly DCP

Wilton DCP

Policies & Guidelines

Development Applications

2.4. Wollondilly Strategic Planning Instruments

Wollondilly Local Strategic Planning Statement

The Wollondilly 2040 Local Strategic Planning Statement (LSPS) is a key local government document that will guide the future of Wollondilly's landuse planning over the next 20 years. It is a strategic document that has been mandated by the State Government and that aligns with regional and district directions. Importantly it considers and responds to the physical, cultural, social and economic uniqueness of Wollondilly, including existing towns, rural and agricultural lands and bushland areas.

The LSPS sets out the overarching vision, structure plan planning priorities, specific actions and information regarding the implementation and monitoring of actions.

A number of the vision statements and planning priorities particularly under the theme of liveability and sustainability that are set out in the LSPS relate to how Wollondilly's urban canopy is considered. These are summarised in the table opposite and the objectives, commitments and actions proposed under these planning priorities have been considered in development of this plan.

The LSPS was developed in consultation with the community and as such reflects and responds to their ideas and values. Key ideas and values from the community related to urban canopy include:

- love of the village feel and rural character
- historic visual character of the many heritage sites
- more trees in urban areas to mitigate urban heat impact
- appropriate responses to the changing climate and extreme weather events
- greater walking and cycling mobility opportunities
- protection of the natural environment and rural landscape.

'Enhancing active links and open spaces that contribute to health and happiness'

Wollondilly LSPS - Bargo

Summary of Strategic Objectives

From review of the relevant vision statements and planning priorities, the following objectives relating to canopy have been identified:

- Protect, retain and increase urban tree canopy in growth areas and existing towns and villages
- Increase species diversity and age spread of street and park trees for a strong and healthy tree coverage
- Protect and maintain biodiversity and habitat corridors in growth areas and smaller scale developments
- Create high quality and well-connected open spaces through a green grid and Wilton Green Plan
- Create a more healthy and resilient community and environment, living with climate change
- Support and encourage physical activity by
 - a. providing a high quality and safe public domain;
 - b. providing opportunities for recreation, culture and entertainment;
 - c. integrating the natural environment through green spaces and networks
- Keep our community safe from acute shocks e.g. bushfires and heatwaves.
- Well planned and designed street trees, trees in open spaces and trees on residential blocks



Vision statements relevant to Urban Canopy

Preserving and Enhancing	Improving
Vegetation, open space and connections to waterways and natural areas	Quality multipurpose open spaces and community and recreational facilities
A distinct landscape setting of towns and villages	The tree canopy
The bushland environment	How fire, water and the impacts of climate are managed
Native wildlife and their habitats	Awareness of the unique landscape

Planning Priorities relevant to Urban Canopy



Liveability	Planning Priority
Planning Priority 1	Creating vibrant, healthy and sustainable communities in our new town in Wilton
Planning Priority 6	Embedding health and wellbeing considerations into land use planning for healthy places
Planning Priority 7	Cultivating a creative and cultural destination connecting people with places
Planning Priority 8	Enhancing vibrant and sustainable local towns and villages

Sustainability



Planning Priority 12	Valuing the ecological health of Wollondilly's waterways
Planning Priority 13	Protecting biodiversity and koala habitat corridors
Planning Priority 14	Planning high quality well connected open spaces
Planning Priority 15	Delivering an urban tree canopy
Planning Priority 16	Enhancing and protecting the diverse values of the Metropolitan Rural Area
Planning Priority 17	Planning resource recovery options to serve local and district needs in appropriate strategic locations
Planning Priority 18	Living with climate impacts and contribution to the broader resilience of Greater Sydney

Wollondilly Local Environment Plan (LEP 2011)

The Wollondilly LEP 2011 is a legal instrument that implements the objects of the Environmental Planning and Assessment Act. The LEP guides planning decisions for Wollondilly local government area through land use zoning and development controls, which provide a framework for the way land can be used.

In relation to urban canopy, an LEP may be used to reserve land for open space or environmental conservation, identify environmentally sensitive land as well as protect trees and vegetation through land use zones and planning provisions for buffers, setbacks, deep soil area and landscaping. All principal LEPs must be made in a standard form prescribed in the Standard Instrument (Local Environmental Plans) Order 2006. The standard form is broad enough to facilitate new and innovative ways to protect and enhance urban canopy.

Since 2011 when the LEP was gazetted, urban heat and the loss of urban canopy cover have become major policy issues for the State Government. The role of the Sydney Green Grid in enhancing liveability, resilience and biodiversity has become a key factor in urban design as urban development pressure increases. Furthermore, biodiversity loss, fragmentation of bushland, declining koala populations, bushfire and climate change predictions have all become more dire.

Although Wollondilly LEP 2011 aims to protect the natural landscape character and protect, conserve, and enhance landscape, it does not mention canopy cover, its values or identify areas that require canopy improvements or protection (unless within an identified area of biodiversity significance). The definitions in the plan and the zone objectives do not incorporate canopy, the Green Grid or urban heat island effect or their specific consideration in the planning process. Areas identified as environmentally sensitive are limited and the definition could be applied more broadly to better protect areas with canopy value from exempt and complying development which can have detrimental impacts on urban canopy and overrides Councils Development Control Plan (Refer Section 2.5 State Government Policies and Schemes).

Wollondilly LEP Revision

Council is currently considering changes to the Wollondilly LEP based on the land use vision and planning priorities set out in the Greater Sydney Region Plan, the Western City District Plan, Ministerial Directions and the draft Wollondilly local strategic planning statement. The Urban Canopy Policy and Planning Directions section in the Wollondilly Urban Canopy Plan will assist in identifying amendments that will more effectively protect and enhance canopy cover in the planning and development assessment process by:

- aligning with the Sydney Region and Western City District Plan
- Council's strategies on the Green Grid, biodiversity, active transport, greener places, heritage and landscape as well as the planning framework for Wilton
- The Wollondilly Koala Plan of Management
- Best practice guidelines e.g. on street design and greener places
- The RFS Planning for Bushfire Protection 2019 and other relevant Australian Standards

Proposed amendments for Council's consideration include:

- Mapping areas to protect existing canopy
- Mapping areas for targeted canopy embellishment e.g. areas impacted by urban heat or identified along the Green Grid
- Including urban canopy and urban heat in the LEP aims, zoning objectives and definitions
- Planning provisions that create environments suitable for trees through appropriate setbacks, and minimum and contiguous landscaped areas.

Wollondilly Development Control Plan (DCP 2016)

The Wollondilly LEP is supported by the Wollondilly DCP 2016, which provides more detailed standards and controls for seven specific types of development:

1. urban release areas
2. land subdivision
3. residential development
4. commercial and community uses
5. tourism and events
6. industry and infrastructure and
7. primary agricultural and rural uses.

Although tree removal and landscaping provisions are included in the DCP, along with a list of recommended plants, the concept of an urban canopy and the contributions each lot plays in creating that canopy is not addressed. Furthermore, although the DCP calls for the landscape character in some areas to be retained, it does not identify areas where landscape character requires more trees, nor does it include future character statements calling for more trees.

Wollondilly DCP Revision

Council is currently considering changes to the Wollondilly Development Control Plan based on the Local Strategic Planning Statement and the progressive precedents set by planning controls for Wilton. The Urban Canopy Policy and Planning Directions in the Wollondilly Urban Canopy Plan will assist in identifying amendments that will more effectively protect and enhance canopy cover in the planning and development assessment process. The amendments for Council's consideration include:

- Identifying priority areas for targeted canopy improvement and protection
- Including planning controls for urban heat, green grid, biodiversity corridors, koala habitat and tree planting offsets
- Amendments to controls for landscaping to ensure adequate deep soil area, top soil and setbacks to allow for more trees
- Considering existing and desired urban canopy on a precinct basis in neighbourhood/ local character statements, future character statements and heritage conservation areas for example, with associated design guidelines that respond to town and precinct needs, the environment and community preferences.

2.5. State Government Policies and Schemes

As mentioned in Section 2.3, some State Government planning instruments protect the environment and people from impacts due to development or hazards, while others are designed to streamline the planning process and assist with housing affordability and provision.

While the policies listed below achieve their goals, some can contribute to the loss of urban canopy. The key risks of these policies for urban canopy are acknowledged below to assist Council to negotiate around these pieces of legislation to achieve our canopy targets as existing plans and policies are updated.

10/50 Vegetation Clearance Code of Practice:

- Allows property owners to remove trees in designated 'vegetation clearing entitlement area' on bushfire prone land without a permit within 10m from existing homes and remove underlying vegetation within 50m.

State Environmental Planning Policies:

- **Affordable Rental Housing** - By facilitating granny flats, this policy erodes the potential for backyard trees. One in five developments in the first half of 2019 in Wollondilly Shire were granny flats. This policy applies to residential zoned land but can exclude land zoned E3 Environmental Management and E4 Environmental Living if justified as incompatible with the local area.
- **Senior Housing** – Senior housing developments tend to be heavily developed which can erode the potential for trees and deep soil areas. This policy is temporarily excluded from heritage areas.
- **65 Design Quality of Residential Apartment Development** – Streamlines requirements to build apartments. It provides minimum setbacks and deep soil area that limit potential for large canopy trees
- **Low Rise Medium Density Housing Code** - Allows dual occupancies, manor houses and terraces to be carried out under a fast track complying development approval. The Code applies to Wilton along with the Greenfield Housing Code. It provides minimum setbacks and deep soil area that limit potential for canopy trees. When landscaped areas are divided amongst residents into small court yards, the opportunity for canopy trees is limited even further.

SEPP (Exempt and Complying Development Codes) 2008

This policy is applied to approximately one quarter of developments in Wollondilly Shire. Under a complying development certificate, a tree can be removed, overriding tree provisions in Council's Development Control Plan (unless it is listed on a significant tree register) if it:

1. Is within 3m of the proposed development and
2. Is less than 8m high

Council's Development Control Plan defines a tree as 3m high, therefore quite large trees are being lost through complying development. This policy does not apply to Wilton Urban Development Zone, heritage areas or environmentally sensitive land.

SEPP (Koala Habitat Protection) 2019

In 2020 SEPP (Koala Habitat Protection) 2019 came into force which aims to protect koalas and their habitat. It contains a definition of 'core koala habitat' and includes a new Koala Development Application Map and Site Investigation Areas for Koala Plans of Management Map, to initially identify koala habitat before more detailed mapping occurs by Council. The SEPP includes a list of feed trees used to identify these habitats.

The SEPP requires decision makers to ensure development applications are consistent with Koala Plans of Management (which Wollondilly Council is currently preparing for adoption during the 20/21 financial year). Koala habitat however can still be cleared or offset under the NSW Biodiversity Assessment Method and offsets scheme. The new SEPP only applies to Council approved development, not complying development, major projects (State significant development and state significant infrastructure), activities by public authorities under Part 5 of the EPA Act, or land clearing activities that require approval under the Local Land Services Act. Furthermore, the SEPP is not triggered for sites below 1 hectare which contributes to habitat fragmentation, particularly in urban and semi rural areas.

Biodiversity Offsets Scheme

The Biodiversity Offset Scheme is a framework for the offsetting of impacts on biodiversity from development and vegetation clearance where it applies based on the activation of three defined triggers comprised of:

- Clearance of native vegetation on land covered by the Biodiversity Values Map.
- Exceedance of the native vegetation clearance area thresholds
- Impact is identified as being significant based on the application of the Test of Significance.

The application of the Scheme which has a target outcome of No Net Loss of Biodiversity in NSW is to ensure that funding is provided to offset impacts in perpetuity. Council staff are of the view that such offsetting, if not regulated and controlled effectively, can result in adverse biodiversity outcomes at a local level.

Offset funds based on the value of the cleared vegetation or habitat can also be contributed to the Biodiversity Conservation Fund to be invested elsewhere and variation rules can apply where like-for-like offsetting cannot be achieved. Application of this scheme can therefore result in a net loss of biodiversity in the local government area.



2.6. Wilton Growth Area Planning Documents

Wilton 2040

Wilton 2040 was prepared by the State Government in 2018 to guide greenfield land release and identify required infrastructure for Wilton, a new town of around 15,000 homes to be built over the next 20-30 years.

The goals in the plan that relate to tree canopy include:

- Walkable neighbourhoods,
- Strong pedestrian and cycling links to connect with Wilton Town Centre, public transport hubs and open space,
- Tree lined streets and green links,
- Innovative water solutions to keep water in the landscape,
- Conservation of natural areas and habitat in the river gorges.

The Plan also aims to respond to the community's desire for environmental preservation and fauna habitat protection.

The plan will be delivered and funded through:

1. Wilton Special Infrastructure Contribution fund
2. Rezoning using the new 'urban development zone'
3. Strategic bio-certification through Cumberland Plan Conservation Plan and
4. Wilton Development Control Plan

Wilton 2040 will set an effective framework for the strategic integration of urban canopy on public and private land to gain the most value from urban canopy in relation to environmental, social and economic benefits. The framework includes the Wilton Green Plan and Development Control Plan.

Wilton Green Plan

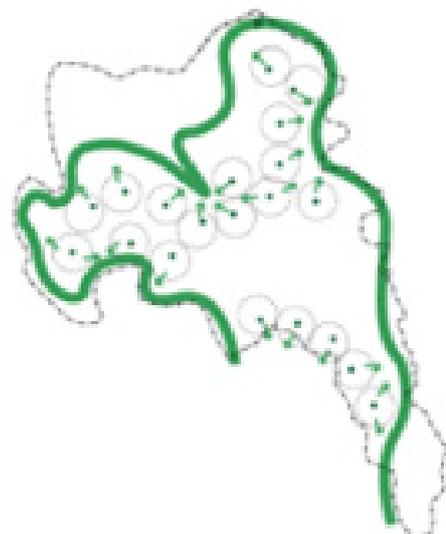
The State Government is currently working with Wollondilly Shire Council to develop a Green Plan for Wilton to guide the planning and design of open space and tree canopy in the Wilton Growth Area and explore opportunities for an integrated network of waterways, bushland, urban tree canopy and green spaces.

The Plan will identify key initiatives and delivery priorities that aligns with the growing community and will include:

- A vision statement and guiding design principles for Wilton,
- Options for possible future open space, better connectivity and opportunities for embellishment of existing open space,
- Identify a new Tree Canopy Strategy for Wilton focusing on public land.

It is acknowledged by the State Government that the built form of housing typologies will need to work with the existing natural landscape character and allow for the outcomes of the Green Plan to be achieved.

Relevant Wilton Green Plan Principles Diagrams (Source: Draft Wilton Growth Areas DCP Appendix H, 2019)



Connecting the community

Draft Wilton Growth Area DCP 2019

The draft Wilton Growth Area DCP was released by the State Government in 2019 and applies to Precincts, or parts of Precincts, where precinct planning has been completed in South East Wilton and North Wilton. The main purpose of the DCP is to communicate the planning, design and environmental objectives and controls against which the Consent Authority will assess Development Applications (DAs).

The DCP contains a number of initiatives that will benefit urban canopy.

Although these initiatives currently only apply to the Wilton Growth Area, the document provides strong precedents that can be considered for adoption into future revisions of the Wollondilly DCP 2016 in appropriate areas, for wider effect across Wollondilly. With the Wilton DCP already in use for new development applications within the Wilton Growth area, Council are in a unique position to observe and learn from the implementation of the DCP and make adjustments to it for adoption into the Wollondilly DCP.

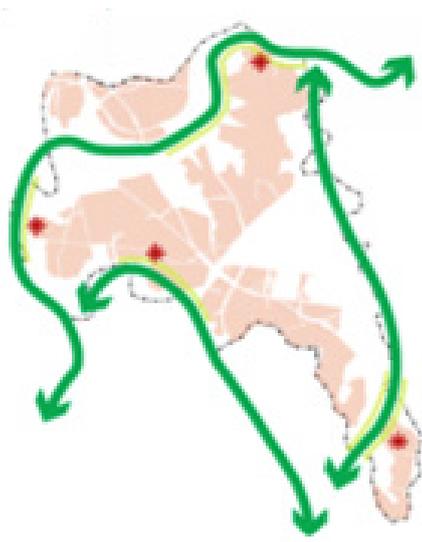
Important initiatives that would benefit canopy and should be considered for adoption as principles and/or actions in the revision of the Wollondilly DCP include:

Canopy target:

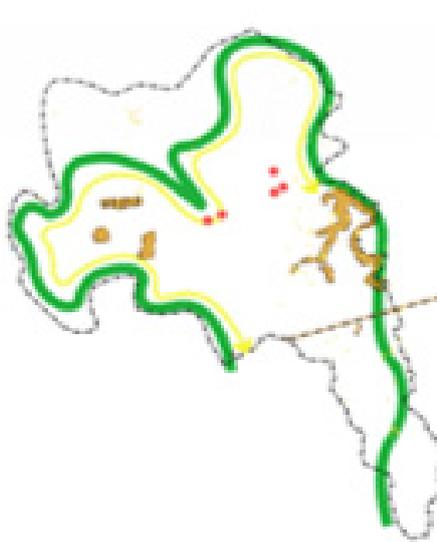
- Provide at least 40% mature canopy coverage of a neighbourhood (and entire street block) from the completion of development and demonstrate the potential to attain a 50% canopy coverage over landscaped areas within 15 years from the completion of development

Protect existing trees:

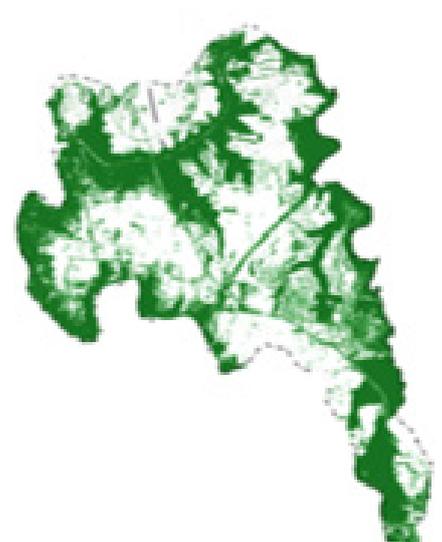
- Retention of native trees and vegetation in accordance with requirements identified in the relevant neighbourhood plan to ensure that native vegetation contributes to the character and amenity of the Wilton Growth Area,
- Conserve and rehabilitate the remaining native vegetation on urban capable land within the Wilton Growth Area,
- Retain and restore native vegetation within riparian areas,
- Mature trees should be incorporated into the subdivision and public domain design and retained to contribute to the mature tree canopy cover in the neighbourhood,
- Site clearing after subdivision should be avoided.



Koala sensitive urban design



Heritage and Character



Cooling Wilton

Environmentally Sensitive Areas:

- Consider how areas of existing vegetation can add to the character of the new urban area, provide open space and amenity, contribute to the Greater Sydney Green Grid, support riparian protection and water sensitive urban design, provide urban cooling, and support biodiversity and water sensitive urban design in the relevant structure plans and neighbourhood plan,
- Retain vegetation inside corridors in open space networks,
- Decision-making should not contribute to habitat fragmentation and where possible, should increase landscape connectivity,
- Clearing and habitat disturbance in areas zoned Environmental Conservation E2 adjacent to urban development areas will be mostly avoided,
- Sufficient corridors to support koala communities, with a minimum preferred width of 425m for primary corridors,
- Restrict land uses within secondary wildlife corridors to support wildlife movement,
- Residual threats to koalas and other species will be mitigated through conservation development controls that aim to reduce the impacts of vehicle strike, dog attacks and other key threats as well as appropriate development controls. Management measures can be translated into development controls.

Plant new trees / tree selection:

- To contribute to the creation of an interesting and attractive streetscape and to implement green links in accordance with the Wilton Green Plan Principles,
- Appropriate plant species are to be selected for the site conditions with consideration given to trees providing shade in summer and allowing sunlight in winter, or to provide habitat,
- At least 1 tree (that will have a mature height of at least 8m) is to be planted in each rear yard on the site,
- At least 1 tree (that will have a mature height of at least 5m) is to be planted in the front yard of the primary road and secondary road (for corner lots),
- The selection of trees and other landscaping plants is to consider the prescribed trees in Appendix F of the DCP,
- Use of locally indigenous species where available,
- Use of plant species in landscaping that are not harmful to children or the environment and resilient to climate change. Avoid the use of noxious and environmental weeds (as listed on Council's website),
- Use tree species in road reservations, footpaths and other public domain areas that will not interfere with the effectiveness of street lighting and passive surveillance,
- Footpath design should allow for the planting of street trees in accordance with the Council's Tree Strategy,
- Low water demand drought resistant vegetation is to be used for the majority of landscaping, including native salt tolerant trees.



Resilience to climate change and urban heat:

- Ensure that the management of retained and protected environmentally sensitive areas minimises any adverse impacts of climate change on biodiversity,
- Improve the ability of flora and fauna populations to adapt and respond to climate change,
- Mitigate indirect and ongoing impacts of development that may exacerbate the impacts of climate change on biodiversity,
- Ensure that new and existing streets provide street trees and canopy cover to reduce the urban heat island effect (refer to Section 2.7 of this DCP).

Neighbourhood Plans:

Neighbourhood plans are master plans that illustrate the structure of a future neighbourhood including residential densities, movement networks, the open space network and blue/green grid opportunities, special interface treatments, and special treatments of environmentally sensitive land, bushfire risk and asset protection zones and precinct bushfire evacuation routes.

- A neighbourhood plan provides further guidance on the development of land through the controls in the Wilton DCP and where appropriate the creation of neighbourhood specific controls to achieve precinct outcomes,
- Each Precinct has a schedule that provides additional objectives and controls which are precinct specific. These will contain mapping layers that relate to the relevant structure plans in Wilton 2040 and will form the basis (in part) for Neighbourhood Plans,
- Where an inconsistency exists, the provisions of an approved neighbourhood plan prevail over the main body of the DCP,
- Development applications need to be prepared in accordance with neighbourhood plans.

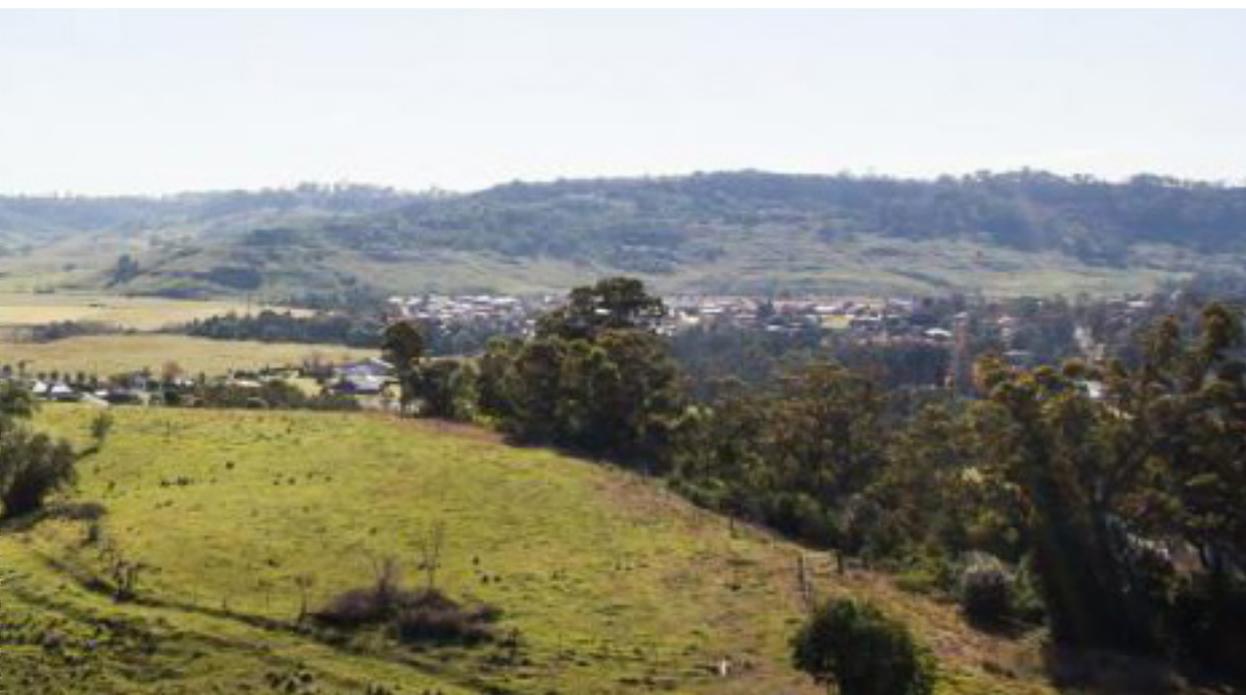


Image Source: visitwollondilly.com.au/destination/wollondilly/

Wilton Health and Wellbeing Strategy (2019)

The Wilton Health and Wellbeing Strategy indicates Council's commitment and the actions it will take to support the health and wellbeing of the new community in Wilton through planning and design. Health is defined not just by the absence of disease or illness. It is considered "a complete state of physical, mental and social wellbeing" that is based on social and environmental factors.

Green Infrastructure is one of the four pillars in the vision for a healthy Wilton and increasing urban canopy is a focus area for action.

The Strategy also recognises that urban canopy as part of green infrastructure will help create a network of green spaces that connect people and provide physical connections for wildlife, enhancing biodiversity. Urban canopy will also contribute to:

- creating interest and improving visual amenity,
- encouraging social connection,
- building environmental resilience,
- encouraging physical activity and reducing obesity,
- reducing noise and air pollution.

Council's green infrastructure priorities for Wilton include to 'extend the tree canopy' by working with the NSW Government to achieve 40% urban tree canopy coverage in Wilton through:

- tree planting in and around public parks, plazas and sporting fields,
- developing tree-lined streetscapes and shared pedestrian and cycleways,
- providing incentives for tree planting in private gardens,
- use tree planting to support links to high-quality open spaces and develop a network of green spaces that are

connected to each other and the urban environment.

Key actions for Council to achieve this include:

- partner with the NSW Government to promote, offer incentives and provide community information and education for tree planting and maintenance on private and Council property,
- provide additional tree cover through planting and maintenance in public areas,
- facilitate the development of tree-lined streetscapes by incorporating requirements in the Wilton DCP and other Council policies, including Engineering Guidelines,
- protecting conservation areas including koala habitats is one of the objectives of the Wilton Green Plan that will protect some of the existing canopy.

Key actions for Council include:

- partner with the NSW Government, the community and developers to create and implement the Wilton Green Plan,
- provide green infrastructure in Wilton to support delivery of the Wilton Green Plan and the Cumberland Plain Conservation Plan.



2.7. Bushfire Legislation

Under the Environmental Planning and Assessment Act 1979, bushfire hazard must be considered at the strategic planning phase. Local Environmental Plans should aim to protect life, property and environment from bushfire by discouraging incompatible land uses in bushfire prone areas and encouraging sound management of those areas.

The NSW Rural Fire Service Planning for Bushfire Protection 2019 provides specific vegetation coverage for Asset Protection Zones that can result in loss of canopy, and influence where Council can promote urban canopy:

- Inner Protection Area < 15% canopy cover at maturity
- Outer Protection Area < 30% canopy cover

Bushfire prone areas are widespread across Wollondilly Shire. Maintaining asset protection zones is an ongoing legal obligation for land owners and Council should not encourage further plantings that exceed canopy cover limits on public or privately owned land.

Planning for urban canopy cannot adequately respond to considerations of bushfire unless undertaken at a precinct or more refined level. Furthermore, consultation with the NSW Rural Fires Service and emergency management professionals should occur in the planning process for urban canopy embellishment in the Shire.

2.8. Planning Framework Summary

Wollondilly Shire has a complex range of planning instruments to navigate at the Commonwealth, State and local level in order to implement controls to protect and enhance urban canopy.

The need to protect the Shires significant biodiversity and heritage adds to this complexity with more layers of legislation for consideration including a Koala Plan of Management, currently in preparation. Furthermore, the widespread bushfire prone areas trigger the need for careful consideration as to where urban canopy embellishment is appropriate.

While State Government planning instruments protect the environment and people from impacts due to development or hazards, others are designed to streamline the planning process and assist with housing affordability and provision, which in some cases can contribute to the loss of urban canopy. Council's challenge is to negotiate around these pieces of legislation to achieve its canopy targets.

Implementation of a precinct-based approach to planning for canopy in the Shire will be the best way to achieve desired urban design and canopy outcomes that are responsive to the environment, community desires, the planning framework and statutory requirements.

Image: Bargo State Conservation Area

Source: Wollondilly Historical Page (Facebook.com)



Bargo State
Conservation Area



3.0 REGIONAL ANALYSIS

The following sections describe key existing characteristics of the study area that influence the thinking behind the Wollondilly Urban Canopy Plan and Landscape Strategy, noting regional opportunities and challenges that relate to urban canopy revealed by these maps and an understanding of important features of the Wollondilly physical and cultural context.

3.1. Existing Urban Areas and Heritage

Scattered throughout the urban and peri-urban areas of Wollondilly are a number of relatively small towns, many of which are rich in historic character and listed heritage items, buildings and areas. These towns are a significant part of Wollondilly's character and identity and are valued as important opportunities for tourism as well as important symbols of the lifestyle that Wollondilly offers its current and future residents.

The map on the right shows the distribution of existing urban areas and their relationship heritage listed items and general cultural areas identified in the LEP as well as major mobility infrastructure. The mapping shows the significant overlap of heritage and general cultural areas with existing urban areas. It also shows that the majority of Wollondilly's larger existing towns, both historic and new (already built communities within the Wilton Growth Area) are concentrated in the southern half of the LGA in closer proximity to major infrastructure corridors such as the Hume Hwy and the railway line.

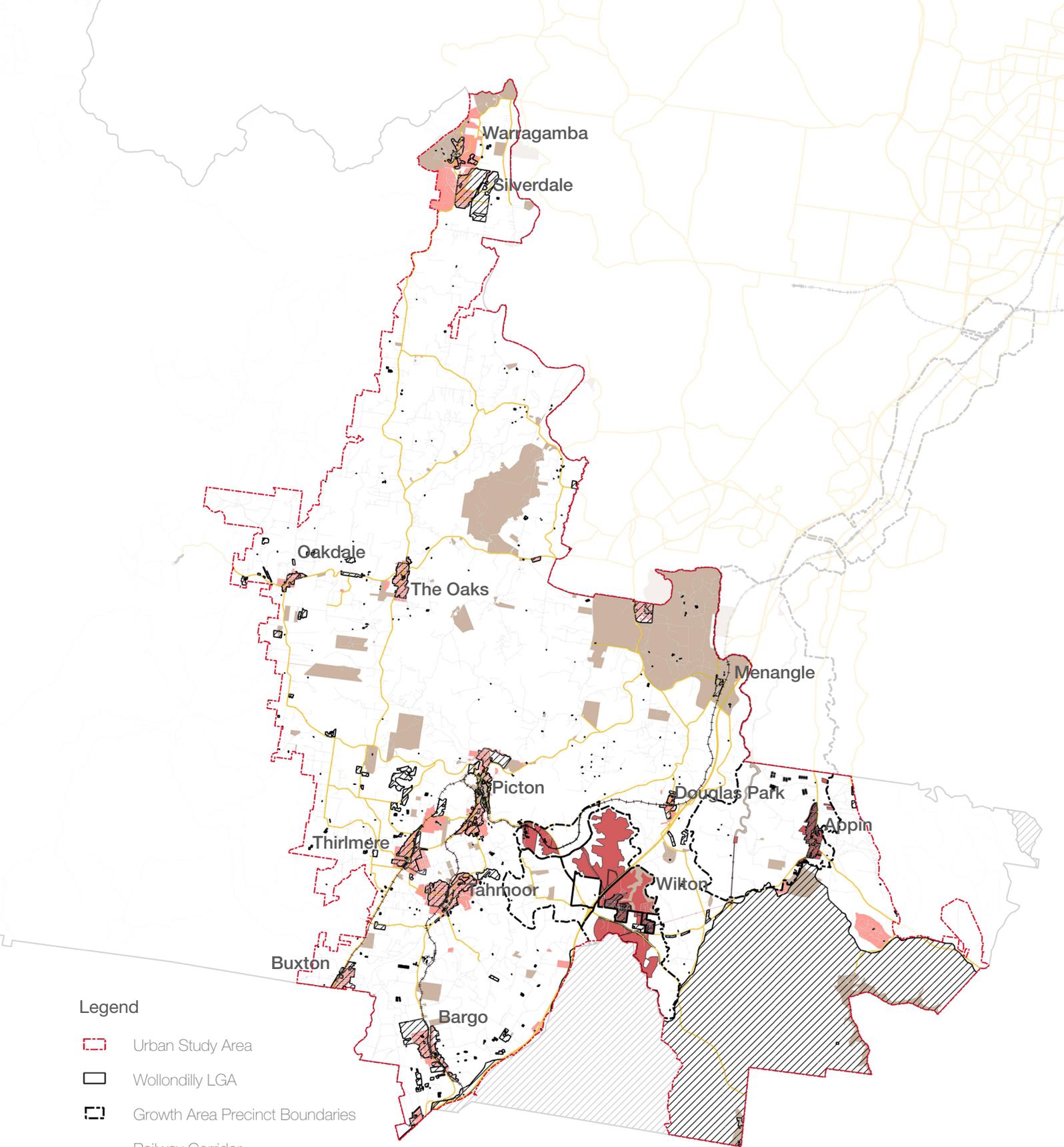
Challenges:

- Maintaining historic character of existing towns into the future,
- Maintaining canopy in old town areas as mature trees reach end of life.

Opportunities:

- Enhancing canopy of existing towns with species alike to those that are present today and represent the historic town character,
- Using tree species to denote and enhance character of historic areas.





Legend

- Urban Study Area
- Wollondilly LGA
- Growth Area Precinct Boundaries
- Railway Corridor
- Main Roads
- Secondary Roads
- EPI Heritage (NSW Department of Planning, Industry and Environment)
- General Cultural Area (former NSW Dept Finance Culture and Innovation)
- Urban Zoning: Wollondilly LEP 2011
- Urban Zoning: Growth Centers SEPP



3.2. New Development Areas

Wollondilly will experience significant housing growth in the following decades. Much of this growth will occur within the NSW State Government Growth Areas of Wilton and Greater MacArthur. Wollondilly Council are also focussing on delivery of new housing in the vicinity of Picton, Tahmoor and Thirlmere as well as housing, business center and restaurant precinct in the vicinity of Menangle.

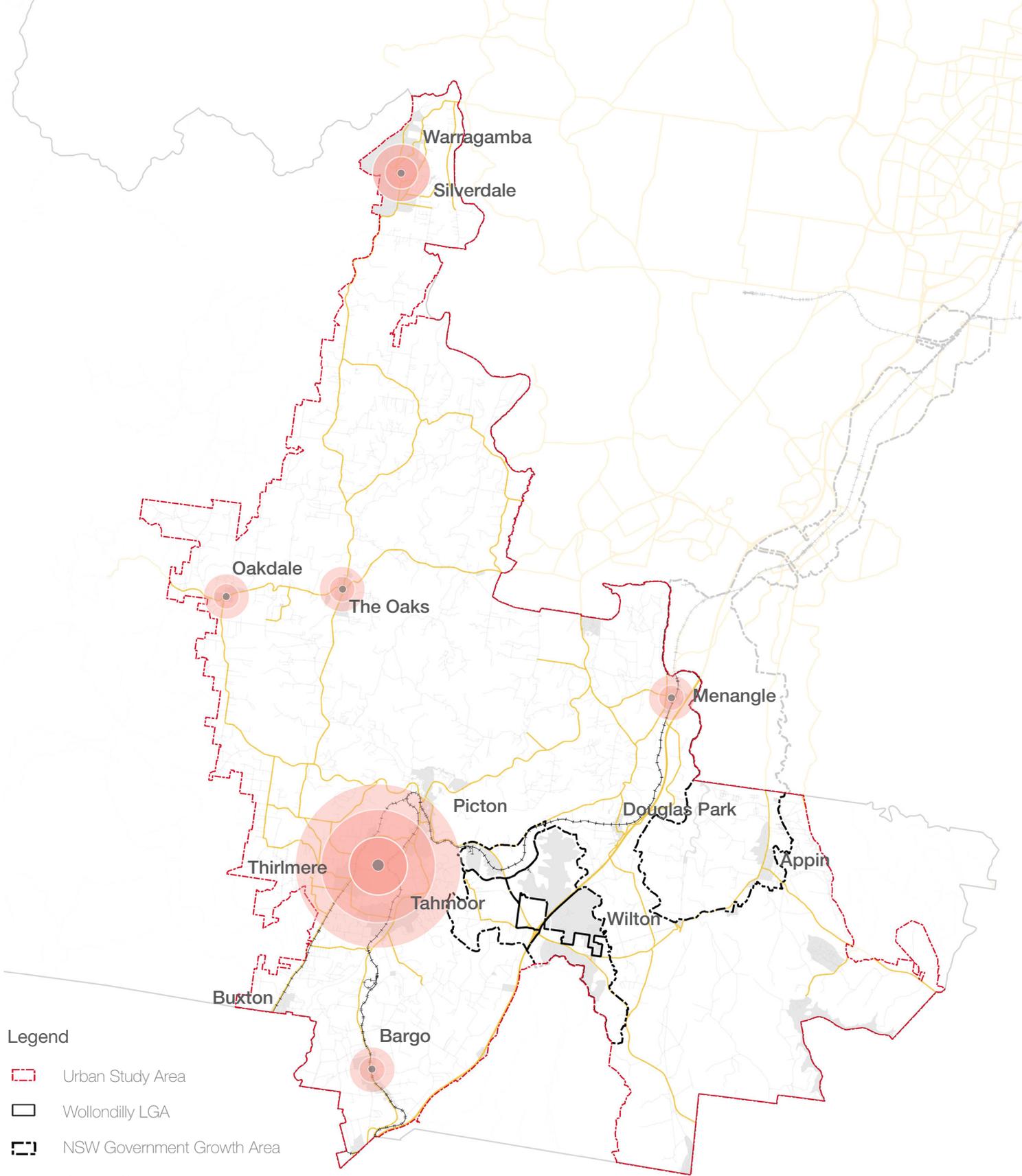
The majority of these proposed developments occur in the southern portion of the LGA where the larger existing settlements are concentrated. These planning proposals will infill the land between Picton, Thirlmere, and Tahmoor and connect them. Noting the significance of character and identity around these existing towns and Menangle, it is important to consider how to preserve uniqueness of the town characters as they begin to merge together. Furthermore, as these towns connect due to housing expansion around their fringes, it is important to consider the impact on the remaining biodiversity corridors that exist in these areas of Wollondilly. These ecological considerations are discussed on the following pages.

Challenges:

- Maintaining unique character of historic towns as infill development connects them,
- Protecting existing trees and other vegetation as new urban development occurs,
- Retaining the peri-urban/rural lifestyle and character of Wollondilly with significant areas of new development.

Opportunities:

- Using tree species to denote character of renewal vs. historic areas,
- Protecting existing mature trees in new development areas to limit urban heat vulnerability in the period before new planting canopy can develop,
- Increasing Wollondilly canopy cover (as much of the undeveloped land areas are currently grasslands).



Legend

-  Urban Study Area
-  Wollondilly LGA
-  NSW Government Growth Area
-  Railway Corridor
-  Main Roads
-  Secondary Roads
-  Concentration of future urban growth (under LEP)



3.3. Sydney Green Grid Opportunities

The map on the right shows the relationship of the Government Architects Office South West regional green grid project opportunities to existing and proposed urban development in the study area.

A number of the project opportunities pass through and/or converge around the larger towns of Wollondilly including Tahmoor, Picton and Thirlmere and the new Wilton developments.

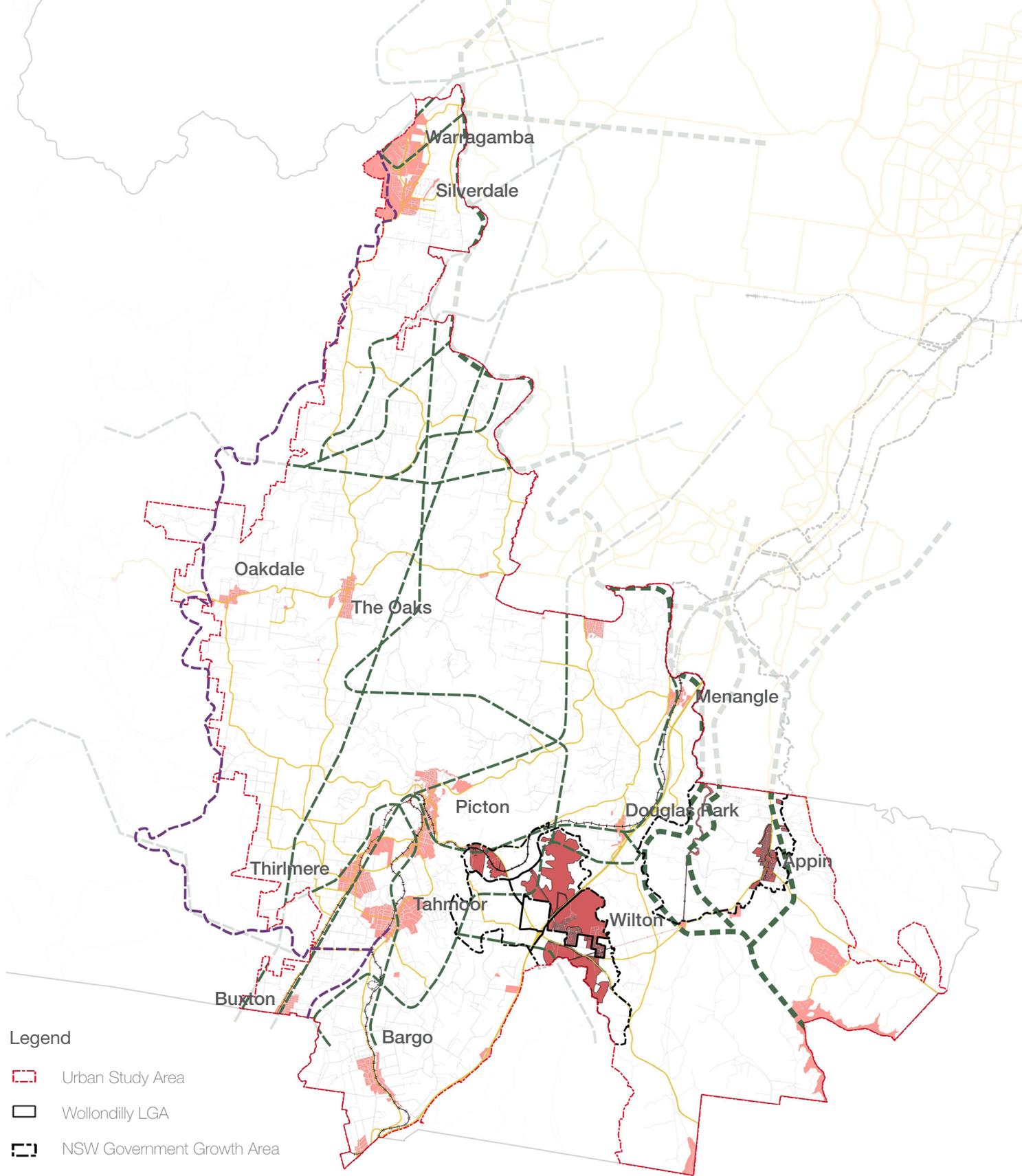
While these green grid opportunities are very high level they represent strategic opportunities to create urban canopy linkages within towns via green streets that link to greater regional green grid networks and to enhance connectivity of biodiversity corridors (e.g. north south BioMap corridor that overlaps with a secondary green grid project opportunity) using the regional green grid project opportunity as an economic lever.

Challenges:

- Government Architects green grid opportunities are very high level and require significant local consideration to realise them.

Opportunities :

- Green, canopy rich street connections from existing and new developments to regional green grid,
- Using regional green grid opportunities to strengthen ecological corridors and habitat connectivity,
- Government funding and collaboration to implement.
- Protection of biodiversity on a localised scale and integration of biodiversity within open space and liveability values.



Legend

- Urban Study Area
- Wollondilly LGA
- NSW Government Growth Area
- Railway Corridor
- Main Roads
- Secondary Roads
- Wollondilly Trail
- Sydney Green Grid: Major
- Sydney Green Grid: Secondary
- Urban Zoning: Wollondilly LEP 2011
- Urban Zoning: Growth Centers SEPP



3.4. Bushland Areas

Although Wollondilly is renowned for its high proportion of, and high quality remnant native bushland, significant sections of the study area have been cleared for agriculture and this continues to be a primary factor in the loss of trees in Wollondilly (primarily on agricultural land).

There are three critically endangered ecological communities (CEEC) in the study area: Shale/Sandstone Transition Forest, Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. Despite being fairly fragmented by agricultural lands, remnant bushland forms distinct corridors across the study area from north to south, and east to west across the southern portion of the study area.

These areas are picked up as regional corridors by the Cumberland Plain Biodiversity Investment Opportunities Map and Koala Corridor mapping undertaken by Council in partnership with the Energy, Environment and Science Division of DPIE. These corridors offer opportunities for land owners to receive funding to protect bushland on private property. The location of existing bushland areas falls predominantly along the ridges, steep embankments and river valley corridors throughout the study area where agricultural potential is less.

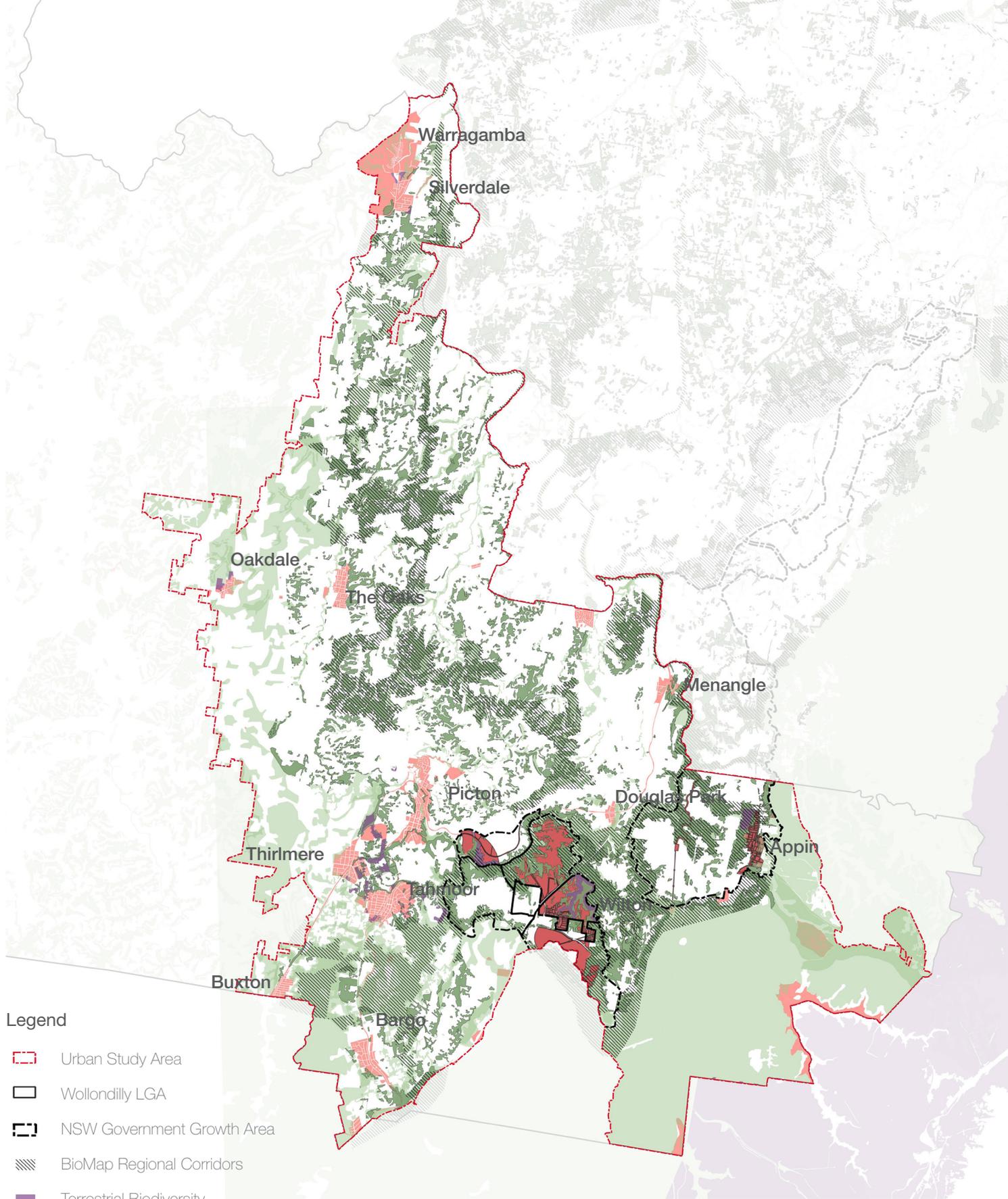
When these areas of bushland are reviewed with existing urban areas and planning proposal areas overlaid, there are significant overlaps between areas flagged for new developments and important areas of terrestrial biodiversity, CEEC and BioMap areas, particularly in the southern portion of the study area in the vicinity of Thirlmere, Picton and Tahmoor and within the Growth Areas of Wilton and Greater MacArthur. This correlation poses a risk to further fragmentation of important habitat areas and reduction in biodiversity and canopy cover, but may also provide opportunities to increase community connection and appreciation for nature.

Challenges:

- Existing and proposed urban development in high ecological/biodiversity value areas,
- Further fragmentation of ecological corridors,
- Limiting the opportunity to enhance already fragmented ecological corridors.
- Retention of canopy and biodiversity on a localised scale within constraints presented by the Biodiversity Offset Scheme, which has a focus at the state and regional scale

Opportunities:

- Creation of environmentally sensitive lands on steeper slopes,
- Community, developer incentives and education programs to protect and enhance existing canopy,
- Connect communities to the natural environment e.g. green streets that link to bushland areas throughout and fringing new developments,
- Planning controls to protect and enhance existing canopy.
- Protection of areas of "strategic biodiversity value" as identified by Council in their Biodiversity Strategy (under development at time of writing).



Legend

- Urban Study Area
- Wollondilly LGA
- NSW Government Growth Area
- BioMap Regional Corridors
- Terrestrial Biodiversity
- VISmap
- CEEC NSW
- Urban Zoning: Wollondilly LEP 2011
- Urban Zoning: Growth Centers SEPP



3.5. Koala Habitat Areas

There is an exceptional colony of Koalas in the Macarthur Region that crosses Wollondilly and includes sections of the adjoining Campbelltown and Wingecarribee Local Government Areas. While populations of koalas are generally decreasing around NSW, this colony may be the only colony listed in NSW as likely to be growing (Alpine, 2015). All areas mapped as vegetation across the study area are protected under the SEPP Koala Habitat Protection 2019. Further habitat protections apply to bushland areas including

- Koala Corridors (representing recent mapping (2019) undertaken by Council and the EES)
- Koala Development Application Map and
- Site Investigation Areas for Koala Plans of Management Map, to initially identify koala habitat before more detailed mapping occurs by Council.

However, there is significant overlap of planning proposals with mapped koala habitat areas. Of particular significance are areas within the Wilton and Greater Macarthur Growth Areas to which the SEPP does not apply, but where there are significant known populations of Koalas. There are significant implications to the future of existing Koala communities in this region without the adoption of a comprehensive Koala Plan of Management to guide development.

Urban development is one of the greatest threats to koalas, however there are also opportunities to demonstrate a new model of urban planning and design that is unique in character, and sensitive to the sustainability of Koala populations, and to connect residents to the spirit of nature stewardship.

‘Koalas are listed as a vulnerable threatened species under the Biodiversity Conservation Act 2016, which means there is a high risk of extinction in the medium-term.’

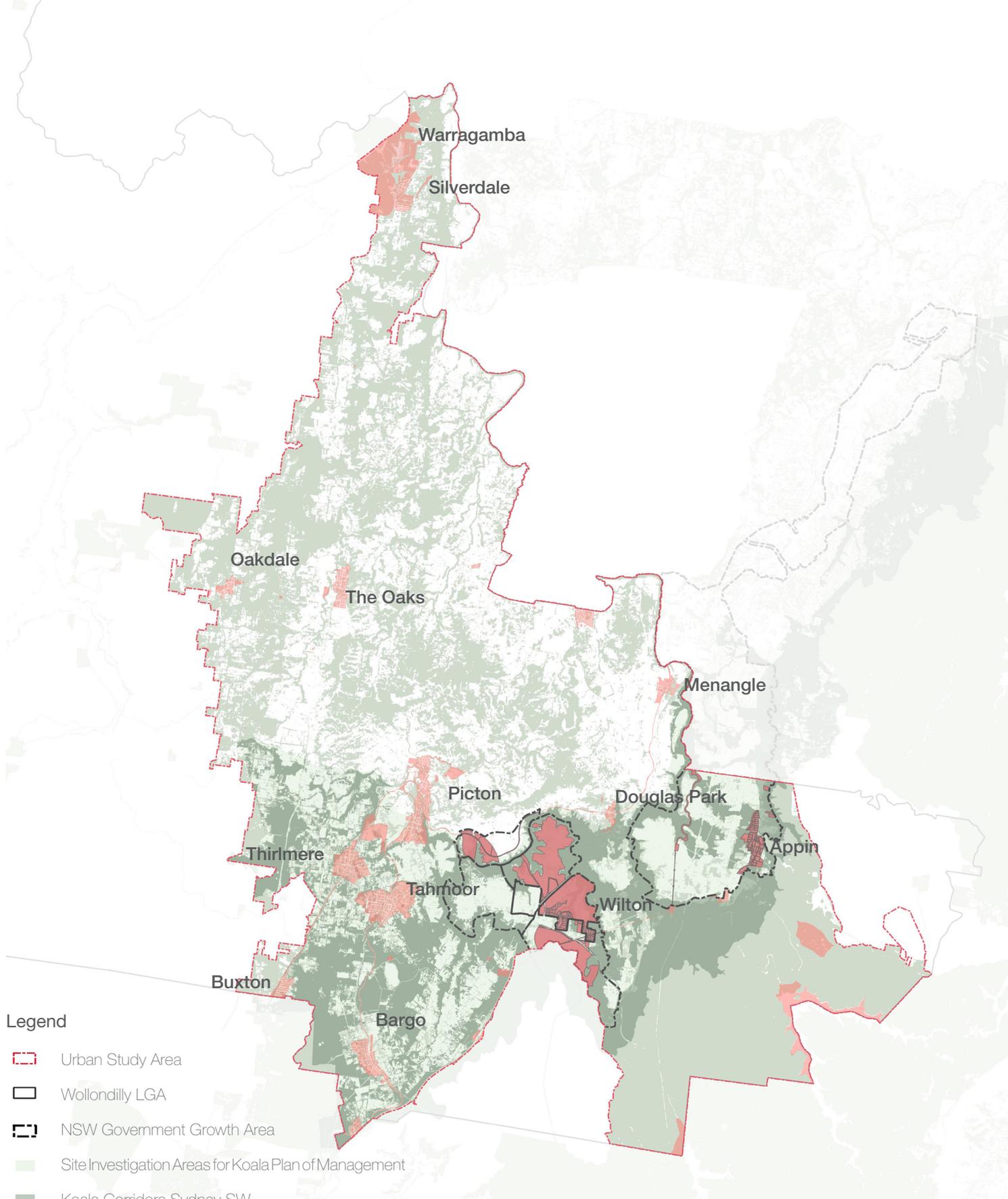
EDO 2020

Challenges:

- Planning proposals for urban development are concentrated in and around koala corridors threatening habitat and safety,
- Land clearing for urban development, roads and domestic animals (dogs) are amongst the greatest threats to Koalas.
- Protection of koala habitats and necessary koala habitat corridor widths within the constraints presented by the Biodiversity Offset Scheme which is focused on protecting biodiversity at the regional scale.
- Protection of koala habitat on development sites within the constraints presented by the Koala SEPP 2019 where the Biodiversity Offset Scheme is triggered.
- Achieving adequate protection of koala habitats and necessary habitat corridor widths within Growth Areas that for which DPIE are the approval authority and state planning framework applies

Opportunities:

- Connecting communities to the spirit of nature stewardship,
- Connecting community to natural bushland areas through preservation and enhancement of canopy in important koala corridors through and around urban development,
- Pilot development of koala sensitive urban design and management creating unique character.
- Protection of koala populations and their associated habitat through the implementation of Wollondilly strategies on biodiversity, greener places and landscape.
- Development and adoption of a comprehensive Koala Plan of management
- Protection of Koala Habitat through determining zoning boundaries that have a strong ecological basis
- LEP/DCP maps to identify koala habitat, as well as zoning and planning provisions to protect and enhance that habitat.



Legend

- Urban Study Area
- Wollondilly LGA
- NSW Government Growth Area
- Site Investigation Areas for Koala Plan of Management
- Koala Corridors Sydney SW
- SEPP Koala Habitat Protection 2019
- Urban Zoning: Wollondilly LEP 2011
- Urban Zoning: Growth Centers SEPP



3.6. Bushfire Prone Land

A significant portion of Wollondilly is classified as Bushfire Prone Land as shown in the map on the right. Bushfire prone land correlates with areas of vegetation mapping, with:

- Category 1 areas containing the most hazardous vegetation categories (generally where good quality native bushland exists in areas > 1 hectare.
- Category 2 areas being less risk than Category 1 but higher than Category 3. These areas generally correlate with vegetated, discrete urban reserves, areas where the topography inhibits upslope fire runs to urban development, there is suitable access and infrastructure for fire suppression, or a higher likelihood of fire detection from surrounding urban areas.
- Buffer areas of 100 & 30m directly adjoin bushland. These are areas in which development and people are most likely to be affected by a bushfire. The buffer areas extend for a distance of 100meters from Category 1 areas and 30m from Vegetation Category 2 or 3 areas.

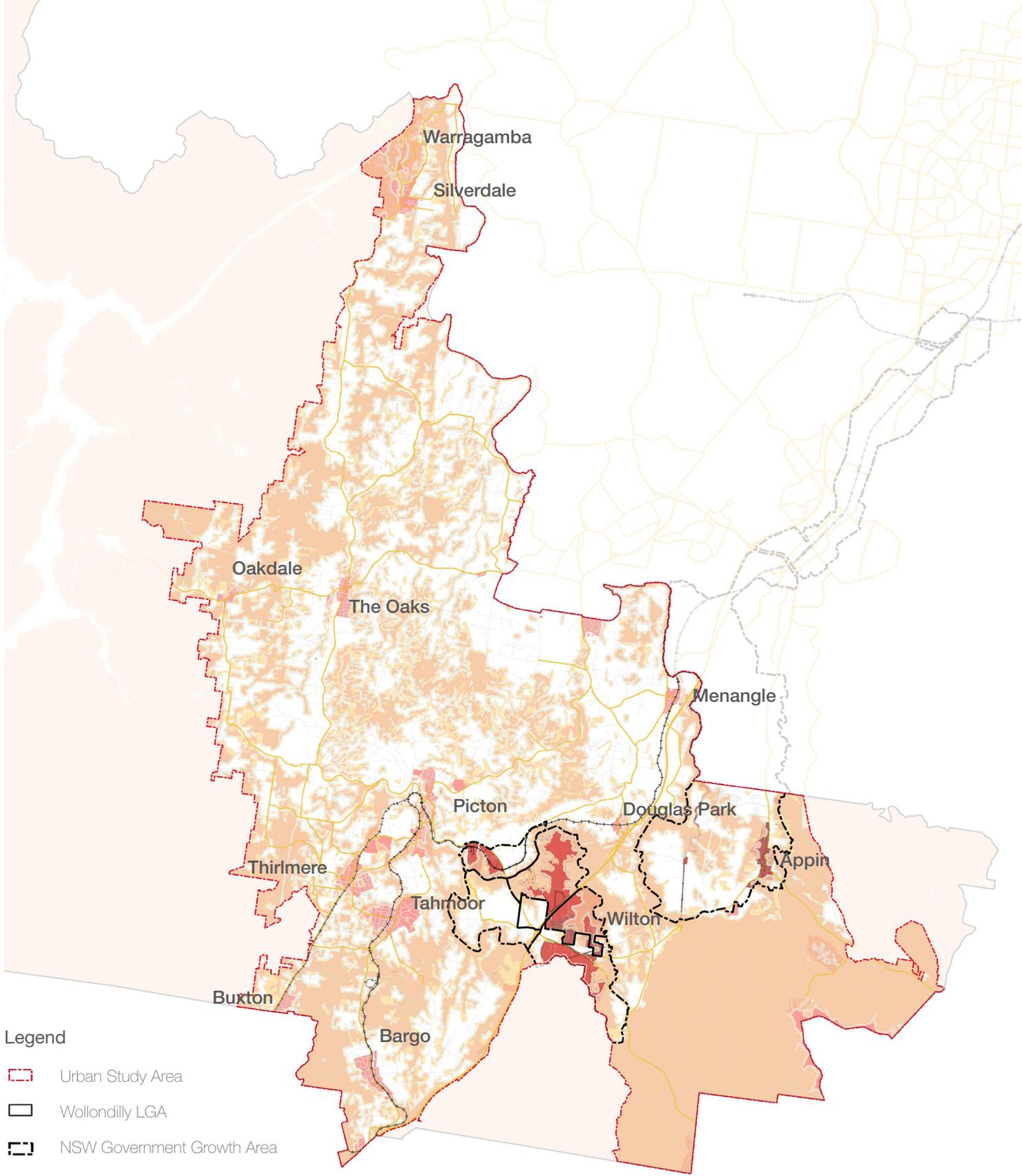
Bushfire prone land including buffers typically fringe existing and proposed urban development areas (where past agriculture or urban development has meant the clearing of bushland) but in many cases also transect urban areas along creeklines or remnant bushland pockets.

Challenges:

- Restrictions to tree planting and canopy targets within bushfire prone areas,
- Restrictions to enhancing bushland connectivity.

Opportunities:

- Encourage interesting diversity of vegetation and planting layout that are lower bushfire risk,
- Using mesic species have the potential to define place and town character,
- Precinct planning in collaboration with the community, ecologists, fire and emergency experts to improve resilience.



Legend

- Urban Study Area
- Wollondilly LGA
- NSW Government Growth Area
- Railway Corridor
- Main Roads
- Secondary Roads
- Vegetation Buffer
- Vegetation Category 2
- Vegetation Category 1
- Urban Zoning: Wollondilly LEP 2011
- Urban Zoning: Growth Centers SEPP



3.7. Urban Heat Island Vulnerability

Despite the general perception that Wollondilly is an LGA with significant tree cover, analysis of the urban heat vulnerability index mapping layer from the NSW OEH (2016) reveals that vulnerability is in fact moderate to very high in urban areas.

The Heat Vulnerability Index represents exposure, sensitivity or adaptive capacity to urban heat on a scale of 1 to 5 and is a function of land surface temperature, vegetation cover, and socio-economic data from the 2016 ABS Census.

Areas of Menangle and Tahmoor have an indexed score of 5 and the aerial view of these areas are shown to the right. In Menangle, the high vulnerability score is a function of a development with high impervious areas (concrete and roofs), no tree canopy cover that is a retirement village (vulnerability social group).

In Tahmoor, the high scoring area correlates to employment lands with very low canopy cover and large areas of concrete and asphalt roads and car parks.

Challenges:

- Funding for planting and ongoing maintenance of trees in the public domain,
- Planning controls that protect trees and mandate tree planting,
- Retaining sufficient areas and configurations of existing or new vegetation on new development sites
- Protecting the community's health and safety from impacts of urban heat island effect.

Opportunities:

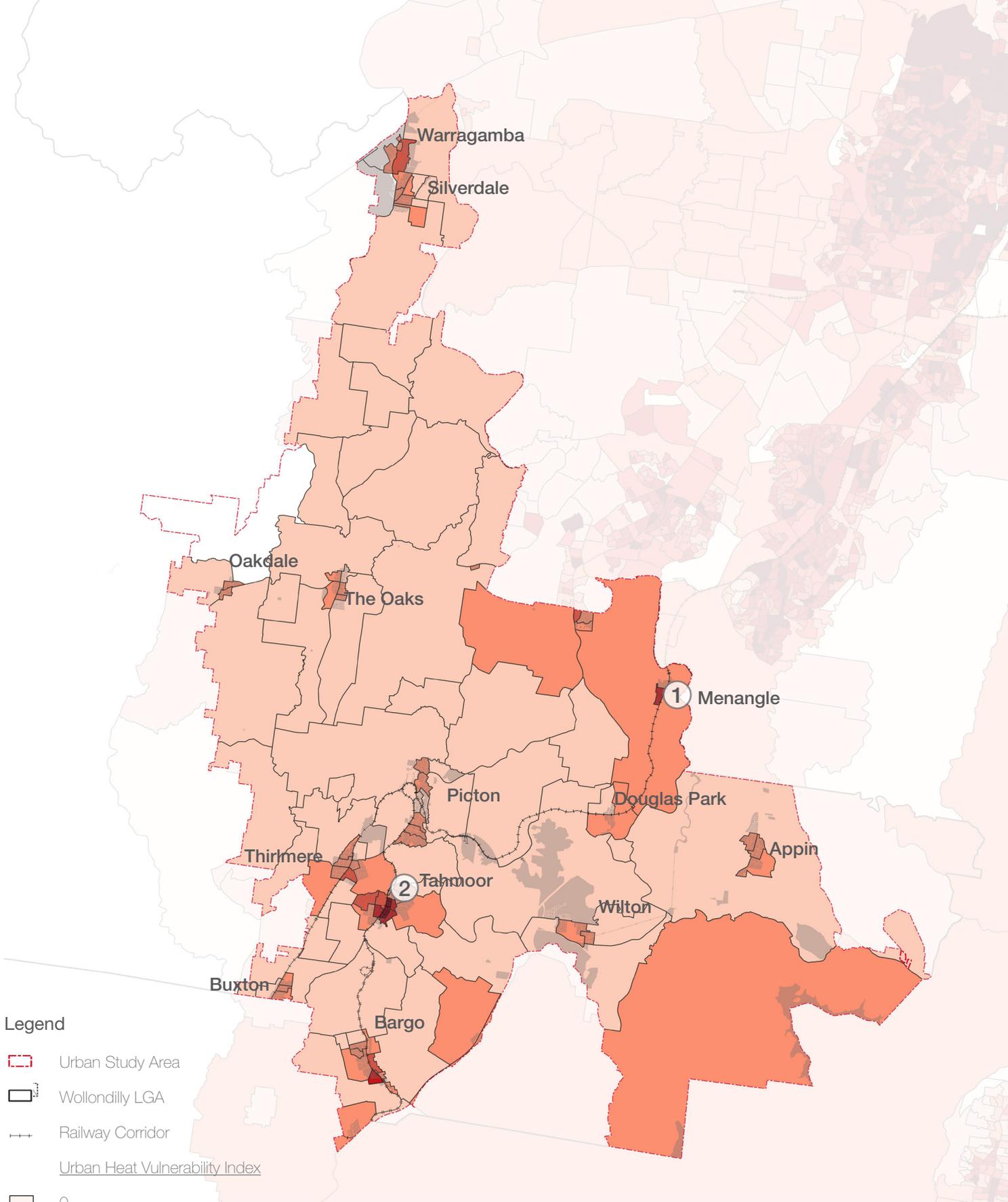
- Address 'hot' areas and vulnerable areas with increased urban tree planting that prioritises fast growing trees and large canopies (and other vegetation),
- Harnessing funding opportunities
- Reduce urban heat island vulnerability in new development sites through implementation of Wollondilly strategies on biodiversity, greener places and landscape (under development)



①



②



Legend

Urban Study Area

Wollondilly LGA

Railway Corridor

Urban Heat Vulnerability Index

- 0
- 1
- 2
- 3
- 4
- 5



4.0 EXISTING CANOPY ANALYSIS

4.1. Canopy Cover by Land Use

Canopy Cover over Wollondilly was assessed by analysis of detailed point cloud LIDAR data across the whole study area from which canopy extent and heights were extracted. The methodology of this process is documented in Appendix B.

Canopy cover over the total study area is 40%, however because of the high proportion of rural, peri-urban and bushland in the study area, this figure does not give a fair representation of urban canopy cover. To understand the distribution of canopy cover across broad landuses, canopy coverage was assessed by the following land use typologies, defined by LEP zone boundaries:

- Urban Development: B1, B2, B4, B5, IN1, IN2, IN3, RE1, RE2, R2, R3, SP2, UD
- Periurban: R5, E4
- Bushland: E1, E2, E3
- Rural/other: RU1, RU2, RU4, SP1

This assessment showed that the dominant landuse across the study area is rural (64%) which accounts for over half of the total canopy (23%). Urban areas cover 9% of the study area and account for 3% of the total study area canopy.

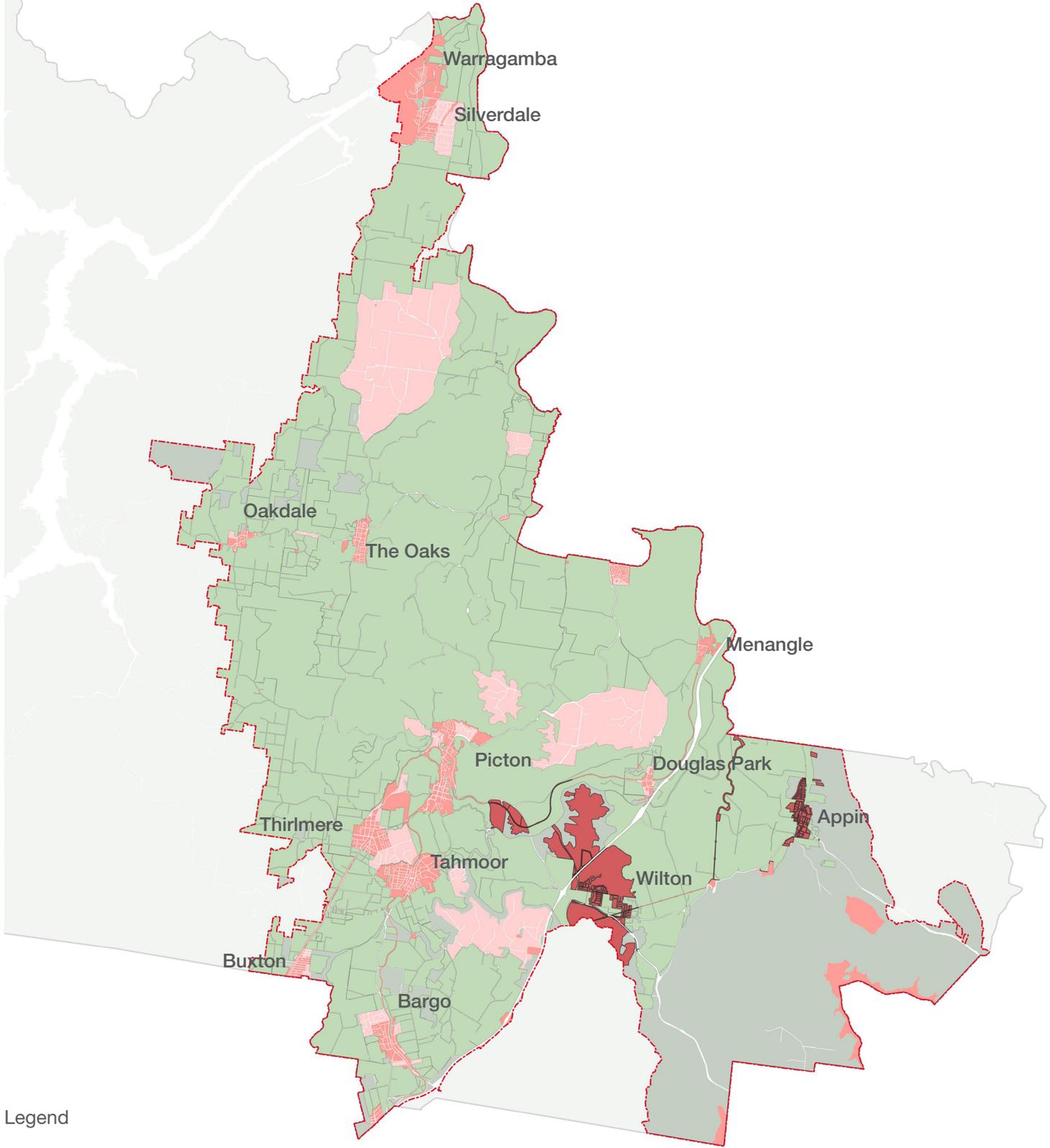
When urban areas are isolated in this way, the data shows that canopy coverage in urban areas is 32%.

Canopy cover by broad landuse is summarised in the table below.

**40% Canopy
Cover across
Study Area**

**32% Canopy
Cover across
Urban Landuses**

Landuses	Landuse Area		Canopy Coverage	
	Percentage of total study area	Percentage of total study area	Percentage by landuse	
Urban	9%	3%	32%	
Peri-urban	8%	3%	34%	
Bushland	19%	12%	63%	
Rural/Other	64%	23%	35%	
Total Study Area	100%	40%		



Legend

- Urban Study Area
- Wollondilly LGA
- Wollondilly LEP Peri-urban Zoning
- Wollondilly LEP Urban Zoning
- Growth Centers SEPP Urban Zoning
- Wollondilly LEP Rural/Other Zoning
- Wollondilly LEP Bushland Zoning



4.2. Canopy Cover by Land Zone

Assessment of the distribution of canopy cover across different urban land zones provides an understanding of land zones that are typically low in canopy and therefore more vulnerable to urban heat effect etc. and those that are higher in canopy and therefore represent land zones in which it may be easier to plant more trees.

Urban landuses make up 9% of the study area. Across this area only, urban canopy cover was assessed by the following urban land use typologies defined by LEP zoning:

- Commercial: B1, B2, B4, B5
- Industrial: IN1, IN2, IN3
- Residential: R2, R3, UD
- Open Space: RE1, RE2
- Streets/Roads: SP2 & Road Reserves*

Assessing canopy cover percentage by urban landuse shows that public open space hold the greatest opportunity for canopy coverage with 51% of open space being covered. Road reserves have 35% canopy coverage which is notable considering the generally wide road carriage ways in Wollondilly.

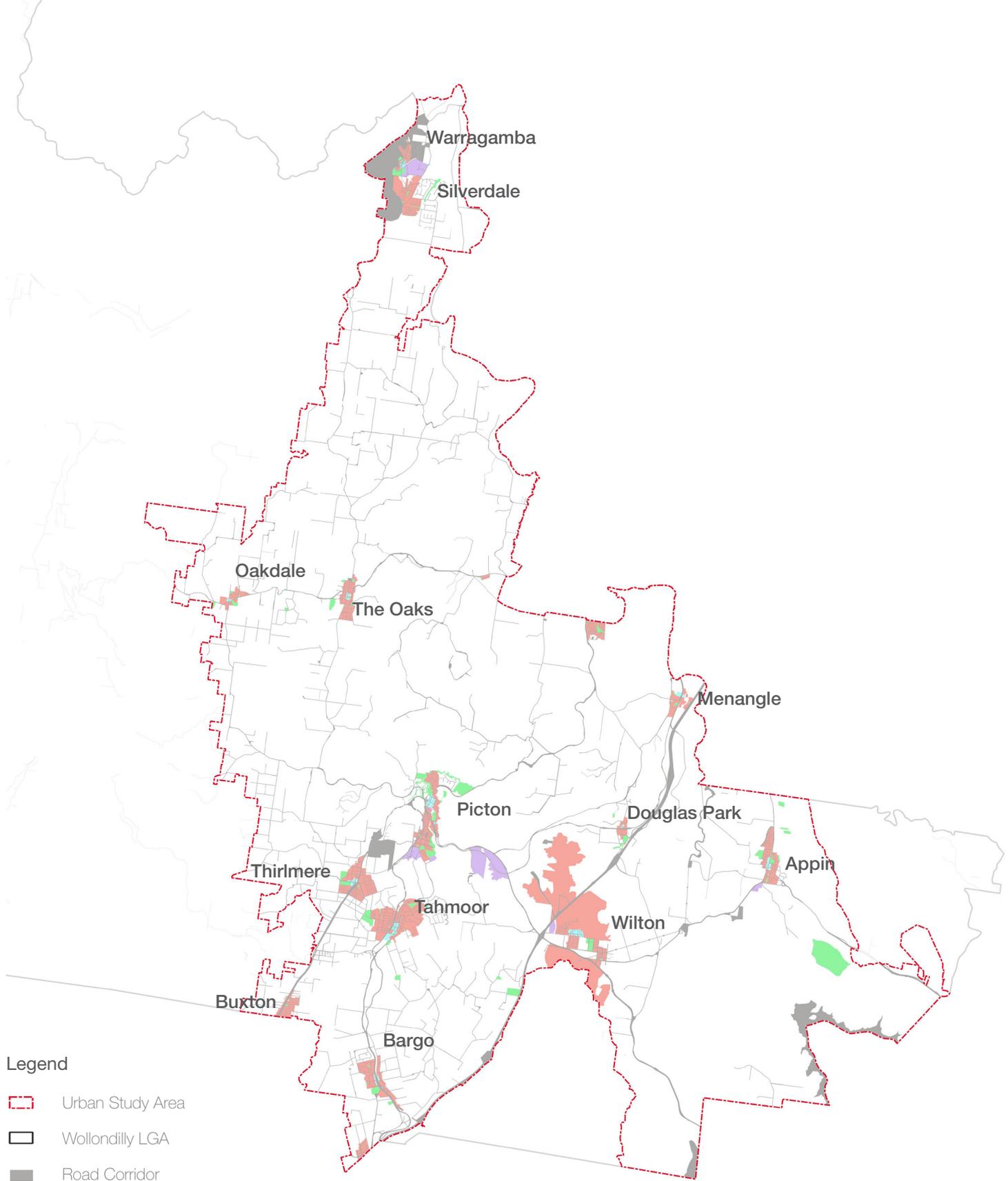
It should be noted that while much of the canopy cover recorded in road reserves may come from street trees, some coverage will also be contributed by trees in private lots adjoining road reserves. It is important to acknowledge the role that private trees can play in contributing to the walkability and thermal comfort of public streets. Canopy cover by broad landuse is summarised in the table below.

*Road Reserves were extracted from all other land zones to avoid double counting. This assessment showed that road reserves make up over half of all urban land and include both Council owned roads and other e.g. RMS owned roads

9% of the study area is zoned for 'urban' uses

51% canopy coverage of all open spaces

Landuse	Landuse Area	Canopy Coverage
	Percentage of total urban landzone areas	Percentage by landuse
Commercial	1%	22%
Industrial	4%	27%
Residential	33%	24%
Open Space	7%	51%
Streets / Roads	54%	35%



Legend

- Urban Study Area
- Wollondilly LGA
- Road Corridor
- Urban Land Uses
- Commercial
- Industrial
- Open Space
- Residential
- Roads & Infrastructure

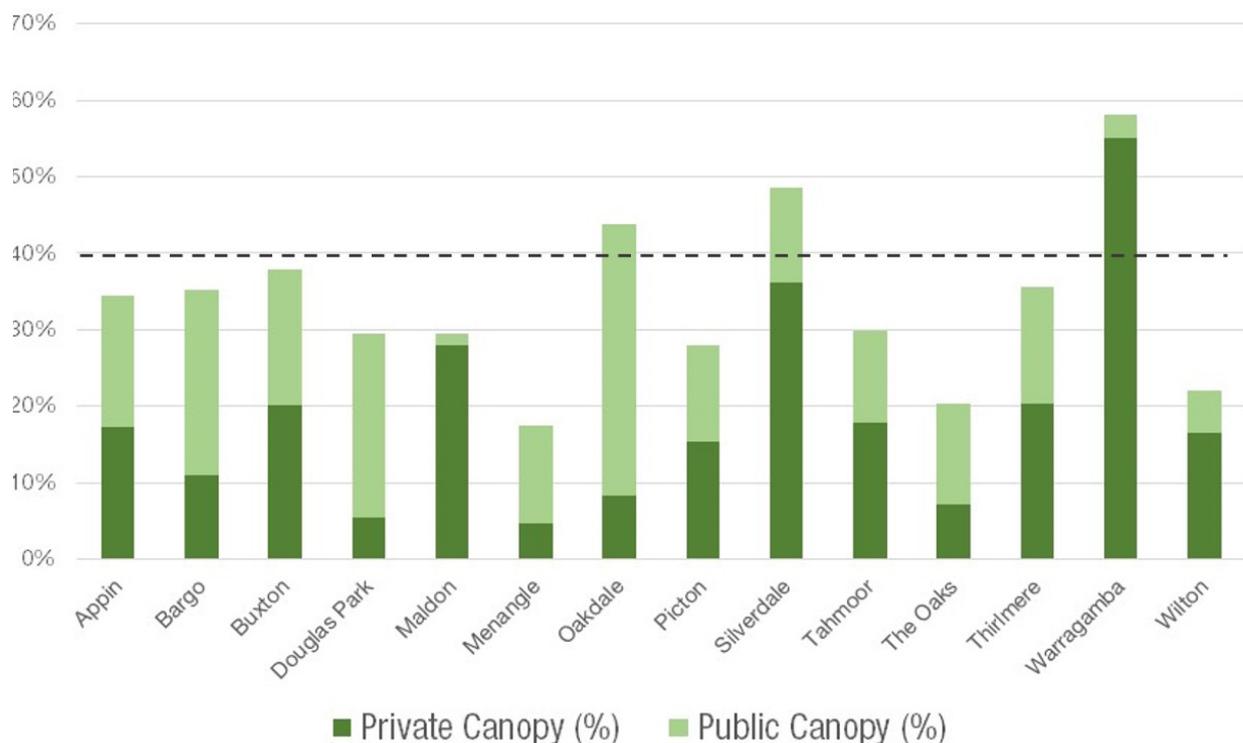


4.3. Canopy Cover by Town

Assessing Wollondilly's canopy by town begins to identify towns that are likely to require additional tree planting to reach the Government Architects recommended target of 40% canopy coverage.

This assessment shows that only three of Wollondilly's existing towns meet the 40% canopy target; Warragamba, Silverdale and Oakdale. Most of Wollondilly's existing towns have between 20-40% canopy cover and only Menangle having <20% canopy cover in its urban areas. While this data is a useful overview of the canopy performance of the existing towns and which should likely be prioritised for creation and enhancement of canopy cover, it is still necessary to zoom in further to each town to understand the trends and factors influencing the overall town canopy coverage data.

For example, Warragamba's high proportion of canopy coverage in private land relates to a large forested area zoned SP2 associated with the Warragamba Dam. Similarly, Menangle's low canopy coverage is highly skewed by the Durham Green retirement village development which has zero effective canopy cover, while the older residential areas north of the development have fairly typical coverage for Wollondilly. The summary of existing town canopy coverage is summarised in the graph below.

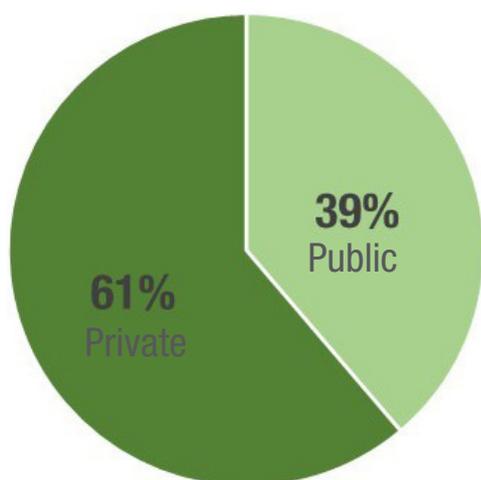


4.4. Private and Public Canopy Cover

The town by town assessment summarised in the graph below also shows the breakdown between trees on public and private land, indicating where there may be greater opportunity to increase canopy via community planting incentive programs (where private land canopy cover is low) or justification to increase Council planting in parks/reserves or streetscapes (where public land canopy cover is low).

The breakdown in the pie graph below, shows that across all towns, canopy is more prevalent on private property (61%) than public lands which account for road reserves and public open spaces (RE1), however town by town consistent trends are not apparent.

Council has greater opportunity to influence urban canopy on public lands in existing towns than on private land through Council tree planting programs and infrastructure or park renewal projects. While having less direct impact, Council can also incentivise increase in private canopy cover through programs such as financial incentives for tree planting, Council nursery plant give aways and community education.



4.5. Summary of Findings

- While the whole Wollondilly study area (non-national park areas) has a canopy cover of 40%, the majority of this canopy is accounted for in bushland and rural land use areas and does not represent urban canopy cover.
- Urban areas account for only 9% of the study area which holds only 3% of the study area's total canopy.
- Within urban areas, the highest canopy cover can be found in open spaces (51%) followed by road reserves (35%).
- Only 3 existing towns; Oakdale, Silverdale and Warragamba meet or exceed the state set 40% canopy cover target.
- Most towns have canopy cover of between 20-40%.
- 61% of canopy cover in all towns is on private land and 39% is on public lands (RE1 public open spaces and road reserves*).

*This calculation accounts for all road reserves and may include road reserves owned by different agencies such as RMS.





Image Source: <https://paigcrm.s3.amazonaws.com>

5.0 REFERENCES

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