



# TOOWOOMBA REGION **FUTURES**

## **Green Infrastructure Strategy Planning Scheme Integration (GRISPI)**

### **Why have we done the strategic project, and what did we want to achieve?**

GRISPI will assist Council in achieving the Green Infrastructure Strategy vision and position Council as leaders in the planning and delivery of Green Infrastructure (GI).

Integrating GI into the Planning Scheme will improve future development outcomes, in particular, resilience to natural disasters, protection of environmental values and improved liveability.

### **What are the key components?**

- Phase one involves a background research audit and mapping to identify the location of the Region's green infrastructure assets and networks.
- Phase two will involve policy development and consultation to test opportunities for the protection and enhancement of the Region's green infrastructure.

### **Who have we consulted with?**

As part of the background research audit, internal consultation was undertaken during the first half of 2021. Community feedback and professional advice received as part of previous studies was verified through this consultation.

### **What are the key findings we have learned?**

The background review of the Toowoomba Region's Green Infrastructure has identified a range of important Green Connectors, Spaces and Forms which require protection and enhancement to ensure they can continue to deliver important services to the local environment, community and economy.



#### **Disclaimer**

The following study has been prepared as part of the Toowoomba Region Futures program. It was endorsed by Toowoomba Regional Council at its Ordinary Council meeting on 19 April 2022 as information to aid decision-making. The content of this study does not reflect an adopted policy position of Council and Council's endorsement of it does not include adoption of any policy position, action or recommendation put forward by the study.



# Integrating Green Infrastructure into the new Planning Scheme

## Final Summary Report

23 March 2022

Rev B



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Imagery has been provided for use in this report by Latstudios. These images were taken during field work undertaken for the TRLUCS and TRSAS studies commissioned by Council as part of the Toowoomba Future's Program.

## ACKNOWLEDGMENT

We acknowledge the Traditional Custodians of the Toowoomba Region whose song lines traverse our lands and pay our respect to Elders past, present and emerging, for they hold the knowledge, rich traditions and bold ambitions of Australia's first peoples.





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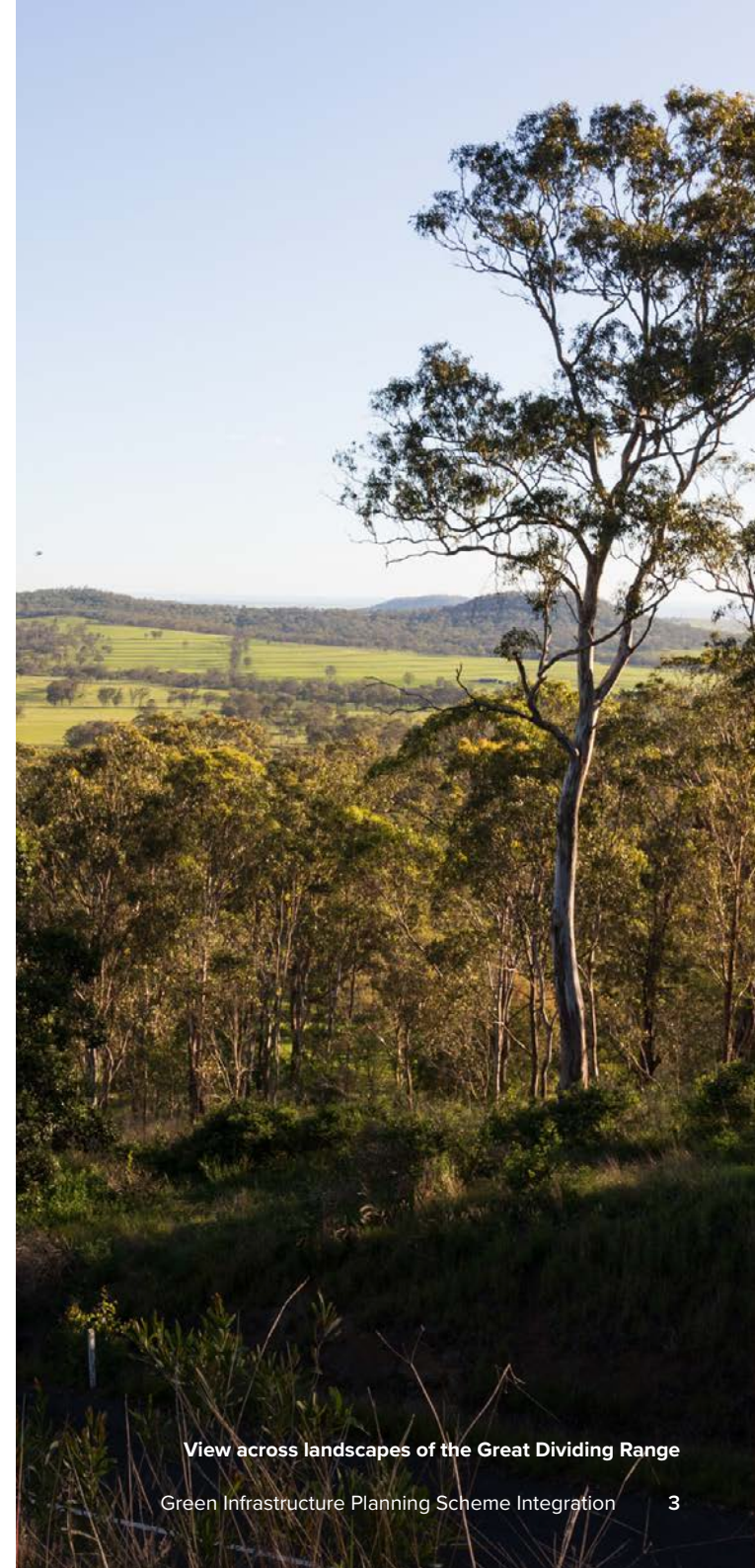
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View across landscapes of the Great Dividing Range



## 2. Introduction

### 2.1 Background

Green Infrastructure is integral to the identity, biodiversity and economy of the Toowoomba Region. Our Green Infrastructure Network links together living systems across both natural and built environments to deliver a range of benefits to our ecosystems and our communities.

Council has been working with our community since 2017 to define and identify the values associated with Green Infrastructure across the region. This included a number of phases in the development of Council's *Green Infrastructure Strategy (Green.IS)* and the identification and mapping of Matters of Local Environmental Significance (MLES).

The Green Infrastructure Planning Scheme Integration (GRISPI) project was completed to draw together previous work to map the region's Green Infrastructure Network and identify opportunities for its protection and enhancement through the new Toowoomba Regional Planning Scheme (Planning Scheme) (Figure 1).

This report summarises the findings of the GRISPI project.



Figure 1: Timeline highlighting the important previous projects which have informed the GRISPI project



## 2.2 Planning and policy context

Legislation (*the Planning Act 2016*) requires Planning Schemes to be reviewed every ten years. Based on its 2020 review, Toowoomba Regional Council has decided to draft a new Planning Scheme.

Council is currently undertaking studies as part of the Toowoomba Region Futures Program to inform the development of a new regional Planning Scheme, Growth Plan and Infrastructure Plan. This new Planning Scheme will guide growth and development Toowoomba and will need to deliver the State's Interests as outlined in the State Planning Policy and Regional Plans (Shaping SEQ and Darling Downs Regional Plan) (Figure 2).

The integration of Green Infrastructure into Toowoomba's new Planning Scheme will be critical to ensure that the important values provided by this living network will be protected and enhanced into the future. This will also help to achieve many of the State Interest Statements including biodiversity, water quality and agriculture, whilst also contributing to the retention and improvement of landscape systems that contribute to the character, visual amenity and liveability of the Toowoomba Region.

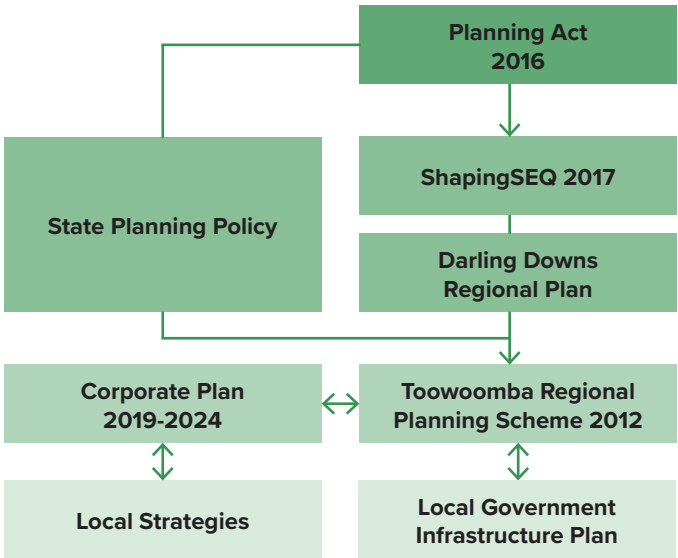


Figure 2: Planning and Assessment Framework overview



Scarred trees located on the Condamine River



### 2.3 What are we trying to achieve?

The future integration of Green Infrastructure into Council’s new Planning Scheme will assist Council in achieving the *Green Infrastructure Strategy (Green.IS)* vision and objectives, positioning Council as leaders in the planning and delivery of Green Infrastructure.

To inform how this should occur and the types and levels of regulation required, the GRISPI project has delivered the following Green.IS actions:

- Action 5 – Investigate and scope changes to the Toowoomba Regional Planning Scheme (Planning Scheme)
- Action 8 – Develop a Green Infrastructure Network Plan

In addition, the project has been undertaken to achieve the following objectives:

- Build recognition of the important services that Toowoomba’s Green Infrastructure provides, and where it occurs across the Region.
- Identify opportunities to protect and enhance Toowoomba’s Green Infrastructure into the future.
- Recommend opportunities for integration of the Green.IS, including MLES, into the future Toowoomba Regional Planning Scheme.



Figure 3: Green.IS vision and supporting objectives

### 2.4 How was it done?

The GRISPI project was undertaken in three key phases, beginning with the development of the Green Infrastructure Network as part of the mapping and policy review, followed by the development and testing of policy recommendations through consultation which informed the preparation of a summary of project outcomes and key recommendations (this report). A number of technical reports developed as part of the GRISPI project can be read in conjunction with this document to provide additional detail.

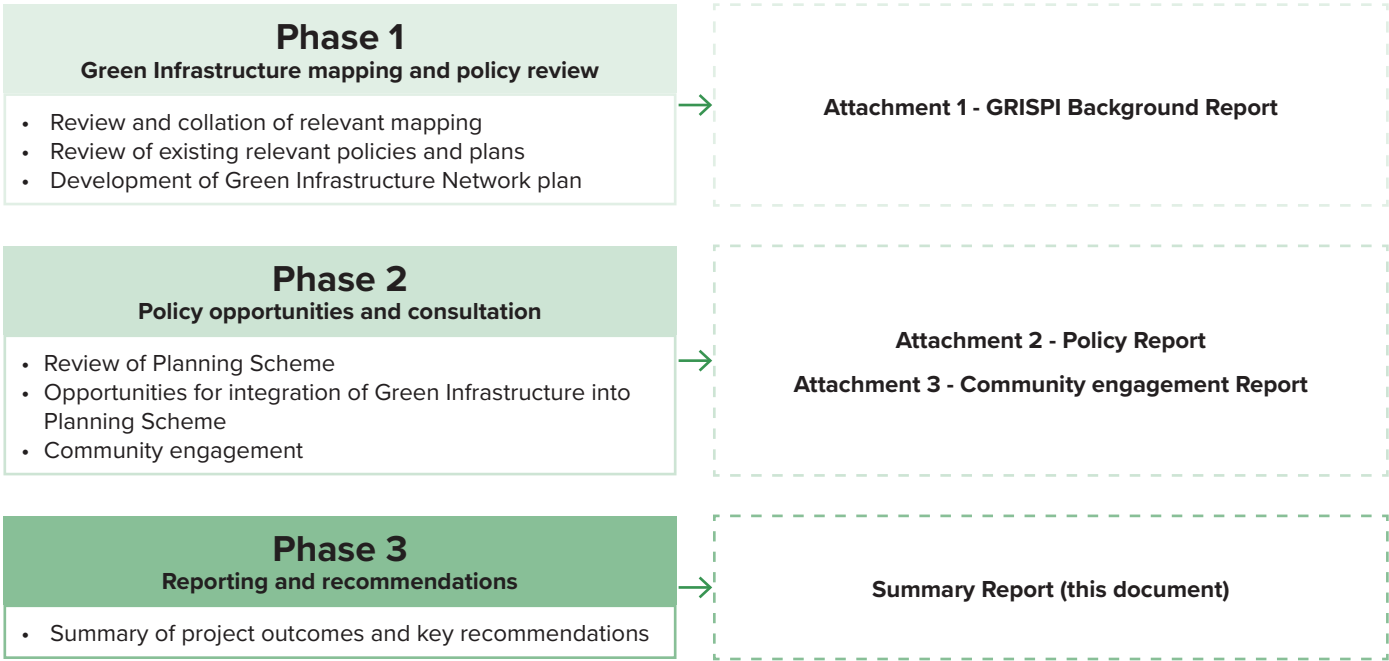


Figure 4: Key phases and tasks undertaken for the GRISPI project and key project deliverables





View towards Oakey Creek from Bowenville Reserve



# 3. Toowoomba's Green Infrastructure

## 3.1 What is Green Infrastructure?

Green Infrastructure in Toowoomba has been defined as:

**“A network of naturally occurring or built assets with a living component that deliver important benefits to people and places in both urban and rural environments.”**

This aligns with the Green Infrastructure definition in the Australian Standard for Climate Change (AS 5334—2013):

*The network of natural and built landscape assets, including green spaces and water systems within and between settlements.*

Green Infrastructure can be found at all scales, ranging from individual living assets such as private gardens, street trees, green roofs and walls, community gardens, Water Sensitive Urban Design (WSUD) elements, parks, farms and bushland, as well as living networks such as waterways and ecological corridors (Figure 5).

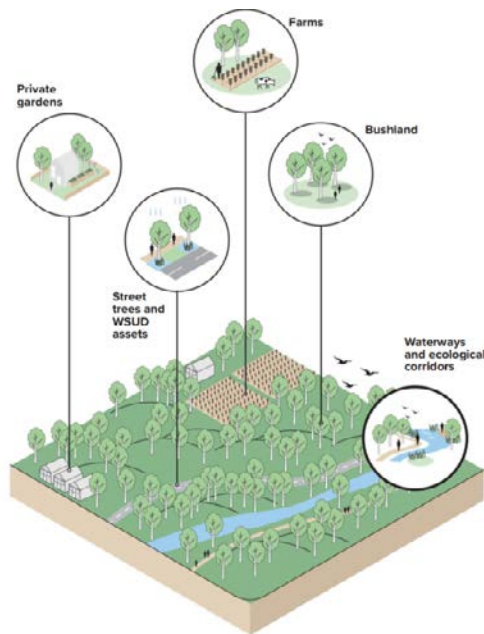












Figure 5: Diagram showing integration of Green Infrastructure assets as a connected landscape system

Each of these assets can provide multiple functions and benefits to the environment and community, including habitat, food, improving air and water quality, recreation, amenity and cooling (refer to Table 1).

These functions are amplified when individual assets are integrated within broader natural areas and connected corridors that allows Green Infrastructure to play an important landscape-scale role in biodiversity, ecological connectivity, water and soil management, scenic amenity and provision of food and other natural products.

Table 1: Summary of Green Infrastructure assets and the multiple ecosystem services they each provide (primary function in bold, other functions shaded).

Green Infrastructure Assets		Ecosystem Services Provided												
		Supporting			Regulating					Provisional			Cultural	
		Movement/ genetic diversity	Habitat	Soil formation	Clean water	Water conveyance	Cooling/shelter	Clean air	Carbon storage	Food	Timber	Water supply	Recreation	Amenity
	Biodiversity corridors	<div></div>	<div></div>	<div></div>	<div></div>		<div></div>	<div></div>	<div></div>					<div></div>
	Natural wetlands & waterways	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>			<div></div>	<div></div>	<div></div>	<div></div>
	Constructed waterways & water bodies	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>					<div></div>	<div></div>	<div></div>	<div></div>
	Natural biodiversity areas and urban bushland	<div></div>	<div></div>	<div></div>	<div></div>		<div></div>	<div></div>	<div></div>				<div></div>	<div></div>
	Open spaces, parks & backyards		<div></div>	<div></div>	<div></div>		<div></div>	<div></div>	<div></div>				<div></div>	<div></div>
	Agricultural land & timber reserves			<div></div>				<div></div>	<div></div>	<div></div>	<div></div>			<div></div>
	Trees - urban and rural		<div></div>	<div></div>	<div></div>		<div></div>	<div></div>						<div></div>
	Urban farms and gardens		<div></div>	<div></div>				<div></div>	<div></div>	<div></div>			<div></div>	<div></div>
	Stormwater management		<div></div>	<div></div>	<div></div>	<div></div>		<div></div>	<div></div>			<div></div>		<div></div>
	Green roofs and walls		<div></div>		<div></div>		<div></div>	<div></div>	<div></div>					<div></div>





Recent plantings within Picnic Point Parklands











## 3.2 A diverse and functional green landscape

Green Infrastructure underpins much of Toowoomba's character and identity, from its famous gardens in the city centre and iconic suburban street trees to the vast and fertile agricultural plains, bushland parks and intact forests along the escarpment and ridgelines. This rich green landscape is a gift from past land use and landscape design decisions and provides an important legacy for the region.

The following map (Figure 6) provides a breakdown of how Green Infrastructure contributes to the many different landscape typologies across the region.

Table 2: Summary of Green Infrastructure assets and the multiple ecosystem services they each provide (primary function in bold, other functions shaded).

	Description	Typical Green Infrastructure elements	Key Ecosystem Functions
 <b>Natural Areas</b>	Natural Areas are relatively undisturbed large areas of tree cover either as naturalistic remnant vegetation areas or managed forestry parcels.	<ul style="list-style-type: none"> <li>Natural areas</li> <li>Creek and ecological corridors</li> </ul>	<ul style="list-style-type: none"> <li>Habitat / biodiversity</li> <li>Carbon storage</li> <li>Clean water and air</li> </ul>
 <b>Urban Areas</b>	The Urban Core is a vibrant mixture of commercial businesses, some residential (of varying scales and densities), with some light industrial and recreation land uses.	<ul style="list-style-type: none"> <li>Street trees and gardens</li> <li>WSUD</li> <li>Creek and recreational corridors</li> <li>Green walls and roofs</li> </ul>	<ul style="list-style-type: none"> <li>Amenity, cooling and recreation</li> <li>Water treatment and conveyance</li> </ul>
 <b>Suburban Areas</b>	Suburban Areas are characterised by residential development and other recreation and community uses (e.g. parks and schools).	<ul style="list-style-type: none"> <li>Urban gardens</li> <li>Street trees</li> <li>Parks and other open spaces</li> <li>Creek and recreational corridors</li> <li>WSUD</li> </ul>	<ul style="list-style-type: none"> <li>Amenity, cooling and recreation</li> <li>Water treatment and conveyance</li> </ul>
 <b>Special Purpose</b>	Special Purpose Areas are large scale land use areas with vast paved surfaces such as shopping centres, light industry, airport etc	<ul style="list-style-type: none"> <li>Street trees</li> <li>Landscaped areas (e.g. carparks)</li> <li>WSUD</li> <li>Creek corridors</li> </ul>	<ul style="list-style-type: none"> <li>Amenity and cooling</li> <li>Water treatment and conveyance</li> </ul>
 <b>Rural Residential</b>	Rural Residential areas are characterised by low density residential development on acreages and hobby farms.	<ul style="list-style-type: none"> <li>Gardens</li> <li>Farmland</li> <li>Natural areas</li> <li>Creek corridors</li> </ul>	<ul style="list-style-type: none"> <li>Amenity, cooling and recreation</li> <li>Food production</li> <li>Soil and water management</li> </ul>
 <b>Agricultural Hills</b>	Agricultural Hills are areas of steeper topography and rolling hills where agriculture (grazing) is the dominant form of land use, although trees and remnant vegetation have a strong presence.	<ul style="list-style-type: none"> <li>Farmland</li> <li>Natural areas</li> <li>Creek corridors</li> <li>Water bodies</li> </ul>	<ul style="list-style-type: none"> <li>Food production</li> <li>Soil and water management</li> </ul>
 <b>Townships</b>	Rural Townships are distinct towns with a connection to the agricultural lands around them, and vary in size and scale.	<ul style="list-style-type: none"> <li>Parks</li> <li>Street trees and gardens</li> <li>Open spaces</li> <li>Farmland</li> <li>Creek corridors</li> </ul>	<ul style="list-style-type: none"> <li>Amenity, cooling and recreation</li> <li>Food production</li> <li>Soil and water management</li> </ul>
 <b>Agricultural Plains</b>	Agricultural Plains are highly fertile open and flat landscapes	<ul style="list-style-type: none"> <li>Farmland</li> <li>Rows and stands of trees</li> <li>Creek corridors</li> <li>Grasslands</li> <li>Wetlands and water bodies</li> </ul>	<ul style="list-style-type: none"> <li>Food production</li> <li>Soil and water management</li> </ul>

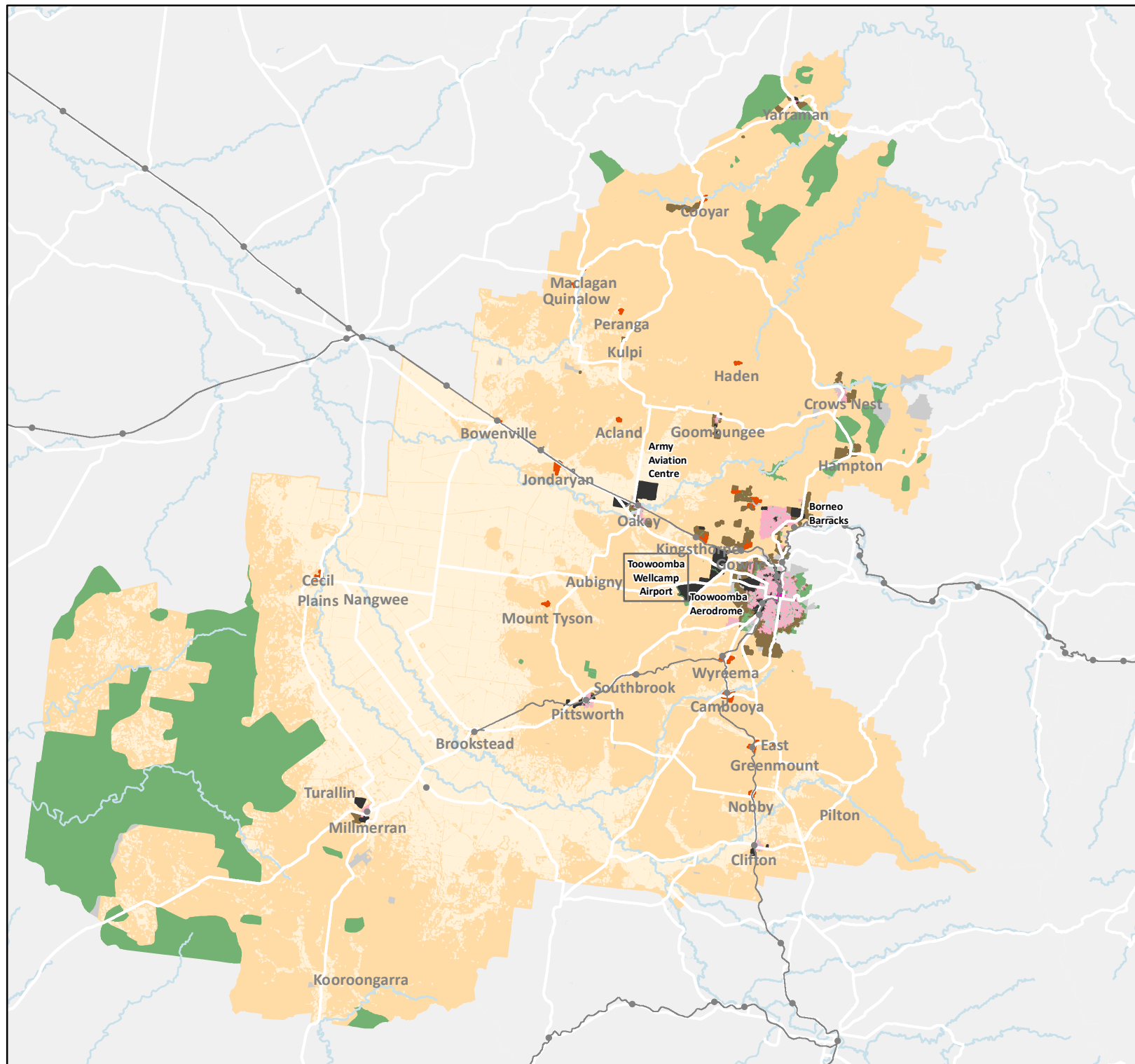


Figure 6: Regional profile plan showing and describing the different landscape typologies and typical Green Infrastructure elements across Toowoomba.

## Legend

- Operational Rail Network
- State Controlled Roads
- Major Watercourses
- Surrounding LGA's
- Toowoomba LGA
- Natural
- Urban
- Suburban
- Specialised Centre
- Rural Residential
- Agricultural Hills
- Townships
- Agricultural Plains

PSA Reference: 1175  
 Map Number: 5a Green.IS Landscape Profile Transect LGA  
 Date: 10/05/2021  
 Version: 2  
 Coordinate System: GDA 1994 MGA Zone 56





### 3.3 Understanding the Green Infrastructure Network

The Green Infrastructure across Toowoomba can be described as green corridors connecting green spaces and green forms, as described below and in Figure 7.

#### Green Connectors

These are the living connected networks such as waterways and ecological corridors. Consideration of the grey and blue corridors is also considered as they influence the location and quality of Green Connectors across the region.

#### Green Spaces

These are land uses and areas of vegetation that utilise or protect natural processes and functions. These include natural green spaces (such as National parks, conservation parks, state forests, bushlands) and managed green spaces (such as parks, farms and timber reserves.)

#### Green Forms

These are natural elements, built or planted in modified and managed environments to support the surrounding land use. This includes vegetated assets in public and private land in both urban and rural areas.

This network of Green Infrastructure creates a layered patchwork of natural assets across the Toowoomba region which are intertwined, proving a complex system of values and services for both the local Toowoomba region and the broader SEQ region (refer Figure 8).

Due to the interconnected and interdependent nature of the Green Infrastructure Network, the removal or degradation of any of these important green elements can contribute to the unravelling of the network, impacting on the range of services it can provide.

For example, the continual removal of stands of native trees not only removes important habitat in that area, but also removes important stepping stones for fauna to safely move through the region, disconnecting populations of native animals and impacting on the biodiversity of the area. The removal of vegetation and replacement of permeable landscapes with impervious surfaces such as roads and buildings also alters the natural hydrology of the area, reducing the amount of rainwater soaking into the ground and directing larger volumes of stormwater and pollutants to the local creeks instead. This contributes to hotter urban areas, less habitat connectivity, unstable and unhealthy local waterways and poor water quality in our dams, which increases the cost of drinking water treatment.

Therefore, both the protection of existing Green Infrastructure assets and the integration of new Green Infrastructure elements into the city, towns, suburbs and rural landscape is critical.

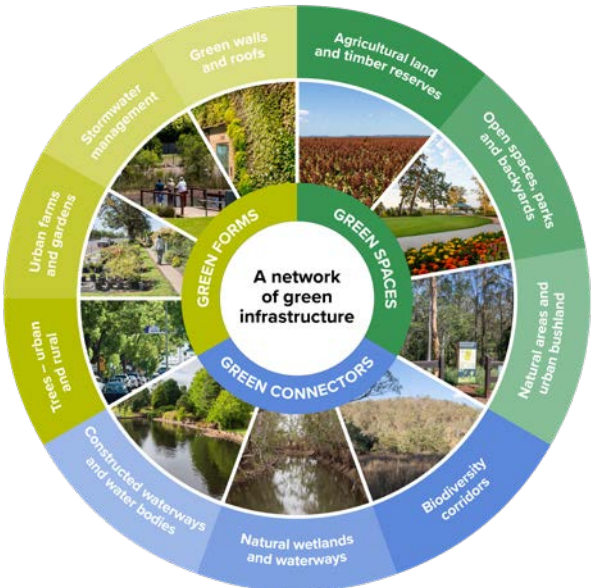


Figure 7: Description and summary of Toowoomba's green connectors, green spaces and green forms

#### What we've heard:

#### The community highly values green connectors and green spaces

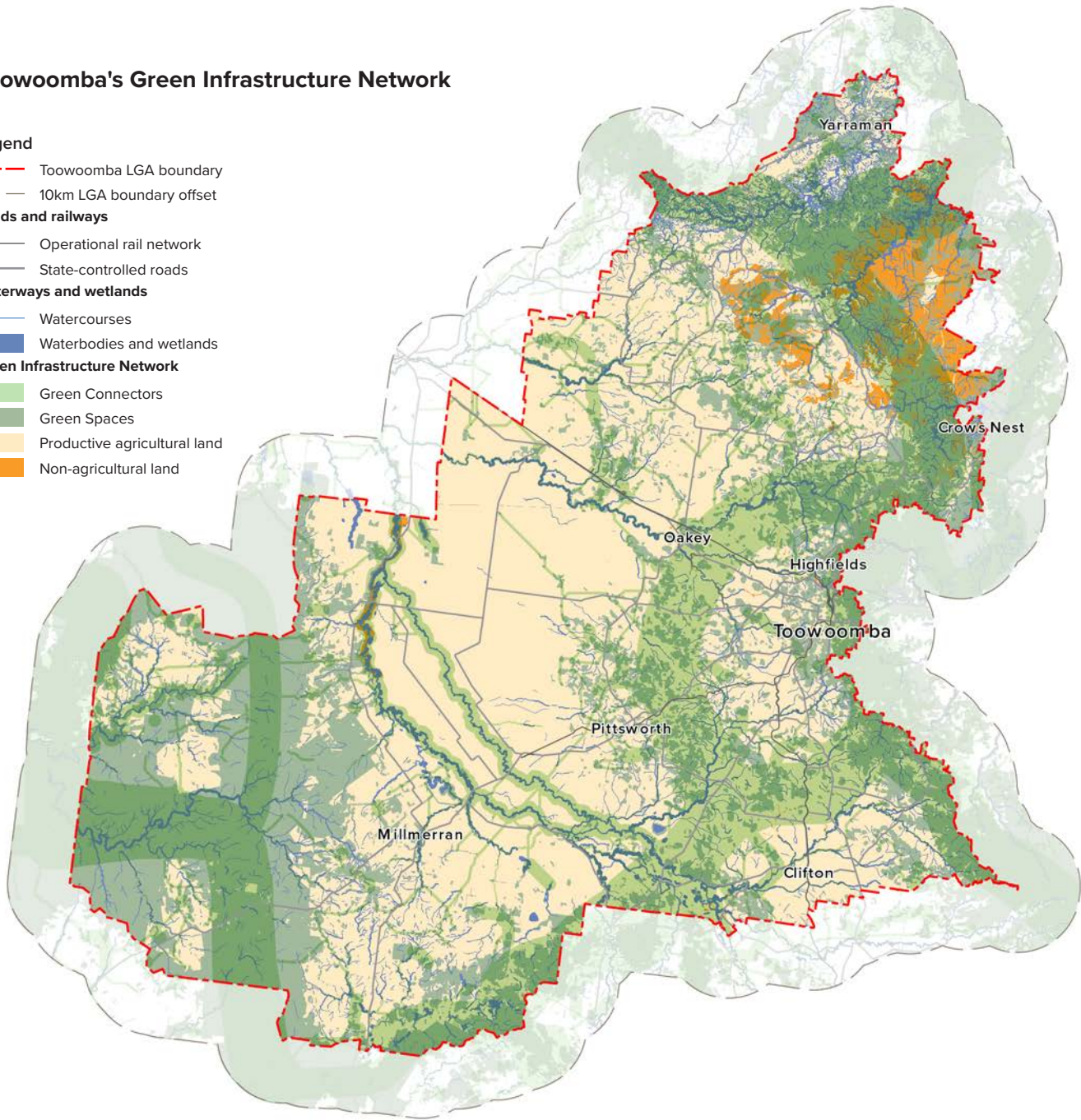
Community members who were engaged during this project rated green connectors and green spaces as very important to them. This included natural wetlands and waterways, biodiversity corridors, natural areas and bushlands and open spaces, parks and backyards.



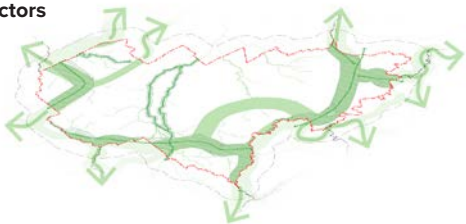
# Toowoomba's Green Infrastructure Network

## Legend

- Toowoomba LGA boundary
- 10km LGA boundary offset
- Roads and railways**
  - Operational rail network
  - State-controlled roads
- Waterways and wetlands**
  - Watercourses
  - Waterbodies and wetlands
- Green Infrastructure Network**
  - Green Connectors
  - Green Spaces
  - Productive agricultural land
  - Non-agricultural land



## Green connectors



Mapped state, regional and local corridors



Locally significant ecological corridors (MLES)



Locally significant wildlife corridors (MLES)

## Green spaces



National parks, forests, reserves, koala habitat and open space



Locally significant natural areas and habitats



Urban green space (urban bushland and trees)

Figure 8: Toowoomba's Green Infrastructure Network plan  
The supporting mapping information which forms the green connectors and spaces is also shown to highlight the local and regional significance of this Green Infrastructure Network



Toowoomba is unique as it is one of only a few warm temperate Local Government Areas in Queensland.

Green Infrastructure has a role to play in preparing for, and mitigating, the impacts of the changing rainfall and temperature conditions across Toowoomba by creating more resilient landscapes and providing urban cooling. Integrating Green Infrastructure into the Planning Scheme will also improve future development outcomes; particularly resilience to natural disasters, protecting environmental values and improving liveability. This will also help to support a variety of State Interests in the State Planning Policy, as shown below in Table 3.

Expected changes to the climatic conditions by 2030 would result in the climate of Toowoomba becoming more like the current climate of Kingaroy.  
(Pudmenzky, Kennedy, Brogden, Volz, & Pham, 2021.).

Table 3: Summary of how Green Infrastructure can help achieve the State interest statements in the State Planning Policy.

State Interest	State Interest Statement	Importance of the Green Infrastructure Network to achieve state interest
<b>Biodiversity</b>	Matters of environmental significance are valued and protected, and the health and resilience of biodiversity is maintained or enhanced to support ecological processes.	A network of green connectors and green spaces supports many environmentally significant values and more rigorously enhances ecological processes.
<b>Water quality</b>	The environmental values and quality of Queensland waters are protected and enhanced.	Waterways and wetlands are important components of green connectors and spaces. Retention of Green Infrastructure across the landscape – i.e. as a network – helps to protect the water quality of receiving waters.
<b>Agriculture</b>	The resources that agriculture depends on are protected to support the long-term viability and growth of the agricultural sector	Ecosystem services – soil improvement, air quality, water cleaning and species diversification – as part of a Green Infrastructure Network all support productive agricultural environments for long-term viability of the agricultural sector. Agricultural land is also an important component of green spaces.
<b>Liveable communities</b>	Liveable, well-designed and serviced communities are delivered to support wellbeing and enhance quality of life.	Green forms play an important role in well-designed, liveable urban environments
<b>Tourism</b>	Tourism planning and development opportunities that are appropriate and sustainable are supported, and the social, cultural and natural values underpinning tourism developments are protected.	Green Infrastructure plays an important role in protecting and enhancing the scenic amenity and natural identity of the Toowoomba region.
<b>Energy and water supply</b>	The timely, safe, affordable and reliable provision and operation of electricity and water supply infrastructure is supported and renewable energy development is enabled.	The retention of Green Infrastructure across water supply catchments improves water quality which contributes to improving the reliability and affordability of drinking water.
<b>Natural hazards, risk and resilience</b>	The risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards.	Green Infrastructure can help to mitigate and provide resilience to natural hazards including flooding and urban heat island impacts.







### 3.4 Threats in a growing region

As Australia's second largest inland city, Toowoomba will continue to experience growth pressure on both land use intensity and footprint. It is estimated that the population of the region may grow from around 170,000 to 225,000 by 2051. An additional 18,000 new dwellings will be required to service this growth, and will mostly be located within Toowoomba's urban areas (TRC, 2021). Many of these urban growth areas are located within areas containing important Green Infrastructure. For example, Highfields is a fast-growing urban area located to the north of the Toowoomba CBD, which is bounded at key growth fronts by important Green Spaces and Green Connectors (Figure 9). Typically, new urban development will impact on the Green Infrastructure Network through:

- Clearing of vegetation resulting in fragmentation of natural areas and reduction in corridor widths, impacting local and regional biodiversity values
- Construction of infrastructure creating a barrier for the safe movement of native terrestrial and aquatic fauna
- Invasion of pest flora/fauna impacting native species populations
- Erosion and poor water quality in local waterways due to increased stormwater volumes and stormwater pollution associated with traditional stormwater solutions
- Loss of urban canopy/green cover, due to loss of existing trees through removal and lack of space for provision of new trees
- Poorly designed stormwater treatment systems which impact on visual amenity
- Natural landscapes which are vulnerable to changing climates due to lack of vegetation diversity and provision of sustainable water supplies.

This will have a detrimental impact on the local habitat, soil and water quality, wetlands and waterways and create hotter urban landscapes and more vulnerable communities. This can also have significant impacts at a landscape scale on biodiversity, waterway health, connectivity, climate and ecosystem services, placing local flora and fauna species at increased risk of fragmentation, disease, predation and climate change impacts. Toowoomba's Green Infrastructure Network therefore requires a holistic approach to address the threats it faces from urban development and to ensure it is protected and enhanced for the enjoyment and use of future generations. Taking an approach to development which is sensitive to the environment it is within, and the values it provides can deliver outcomes which are beneficial to the community as well as the environment, providing places for people to recreate, relax and connect with nature.

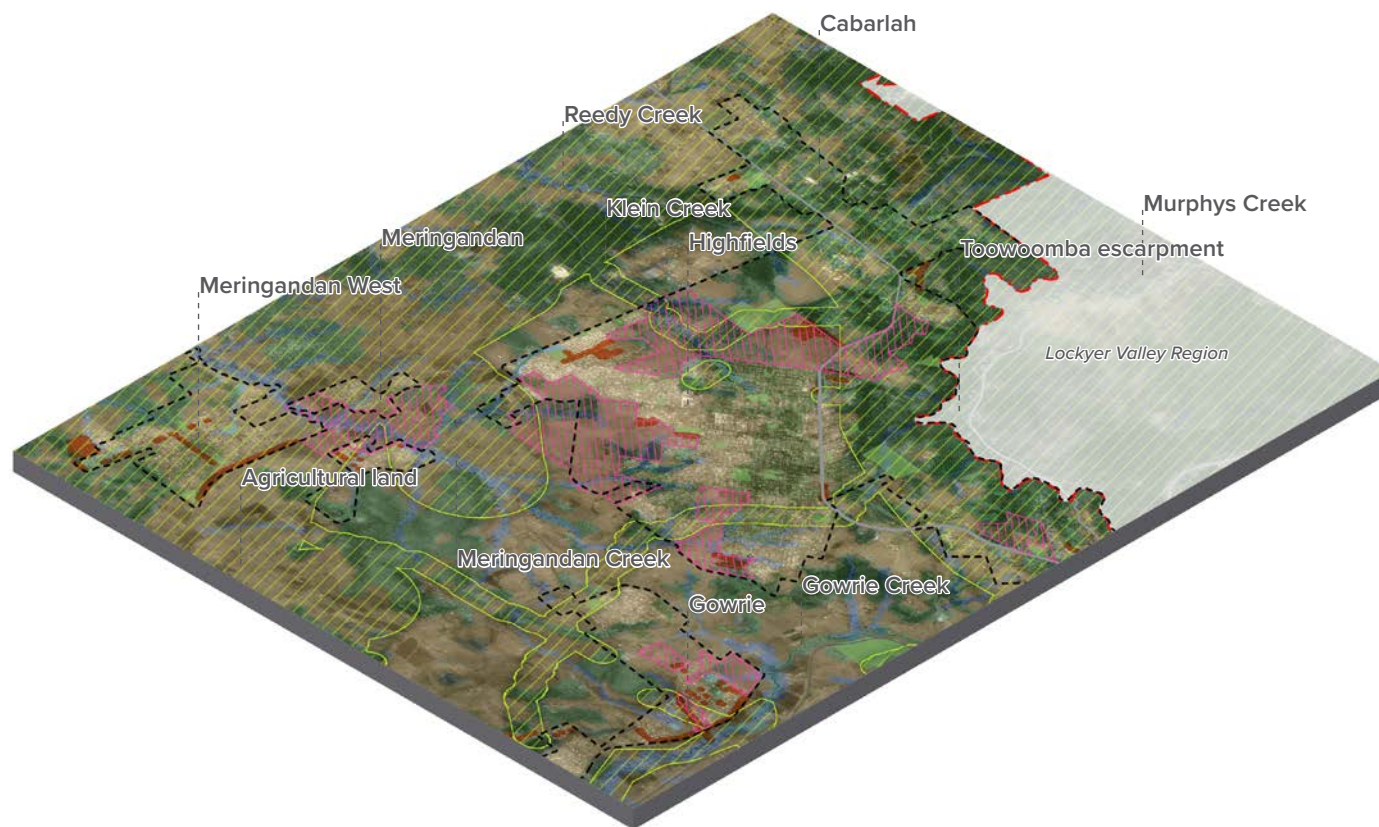


Figure 9: Location of the planned urban development for Highfields showing indicative overlay of the Green Infrastructure Network

#### Legend

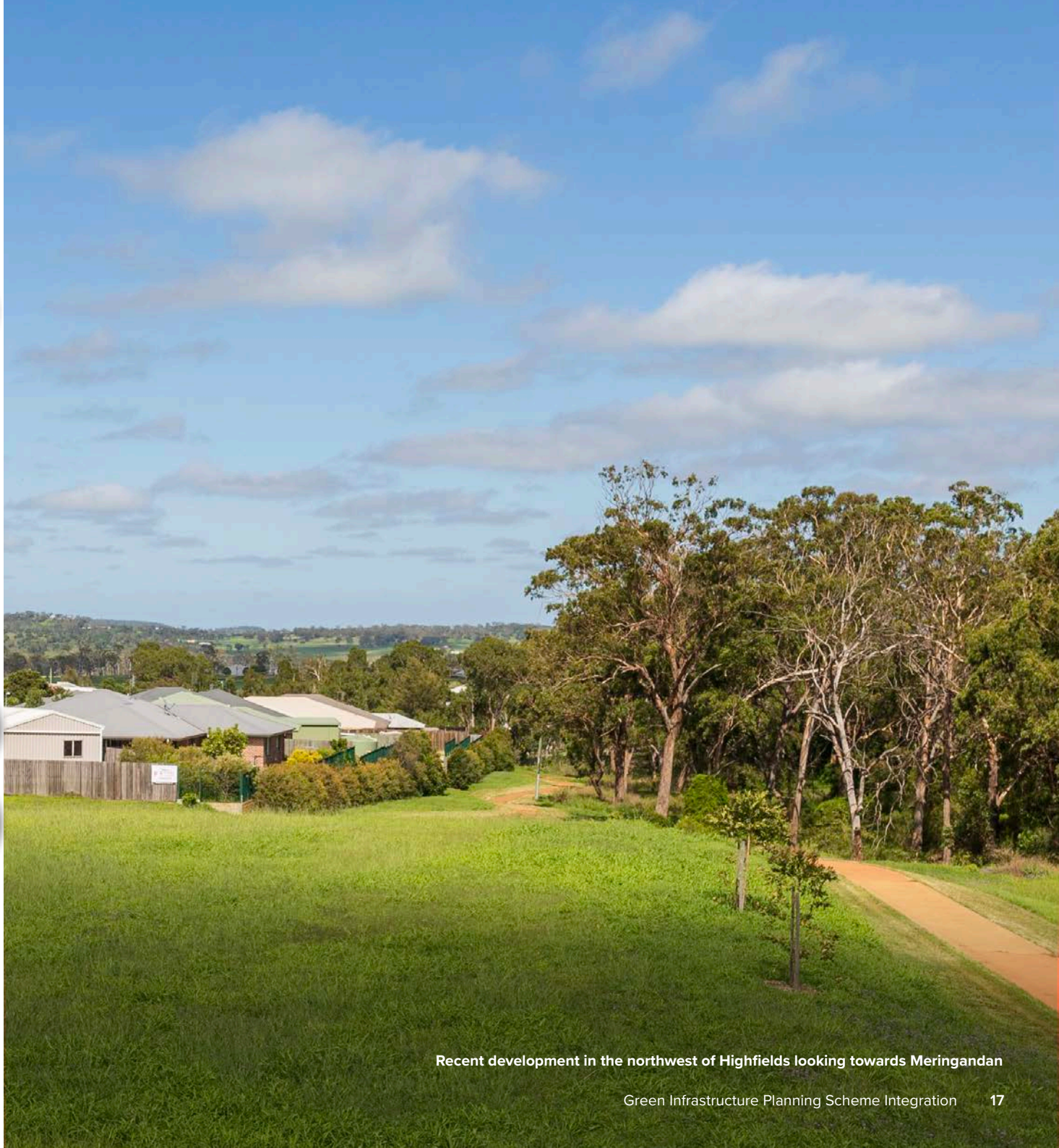
----- Urban extent boundary	Watercourses	Green Spaces	MLES urban bushland
— State-controlled road	Waterbodies and wetlands	TRC Open Space	TRC greenfield areas
— Operational railway	Green Connectors	TRC mapped trees	Google aerial imagery



### Positive benefits of Green Infrastructure, natural areas and urban bushland



### Negative impacts associated with limited Green Infrastructure in an urban environment



Recent development in the northwest of Highfields looking towards Meringandan



# 4. Opportunities for integration in the planning system

## 4.1 Incorporating Green Infrastructure into the Planning Scheme

Toowoomba's new Planning Scheme will regulate how Green Infrastructure is considered and integrated with new development across the region.

The interwoven network of Green Infrastructure will feature differently in terms of planning requirements across the region, ranging from restricting development to protect high value ecosystems, through to requiring new green forms such as trees in streets.

While these different outcomes may be delivered through different parts of the Planning Scheme, it is important that there is clear intent for Green Infrastructure outcomes through all relevant components, and that they effectively align with each other throughout the Planning Scheme, to best protect and enhance the Green Infrastructure Network.

Figure 10 presents how the Planning Scheme can incorporate the Green Infrastructure Network and its components including:

- **Strategic framework** – this sets the policy direction for the Planning Scheme and provides an opportunity to present the strategic intent for the Green Infrastructure Network as an integrated infrastructure system.
- **Overlays, zones, use codes, development codes** – these identify development outcomes and establish benchmarks for development to be assessed against and to support Green Infrastructure intents that Council and state interests are looking to achieve. These maps, zones and codes will tend to focus on individual elements of the Green Infrastructure Network.
- **Planning scheme policies** – these provide additional information and guidance on how development can address the Planning Scheme requirements. These could be developed as one Planning Scheme policy for all Green Infrastructure or as separate documents for different types of Green Infrastructure.

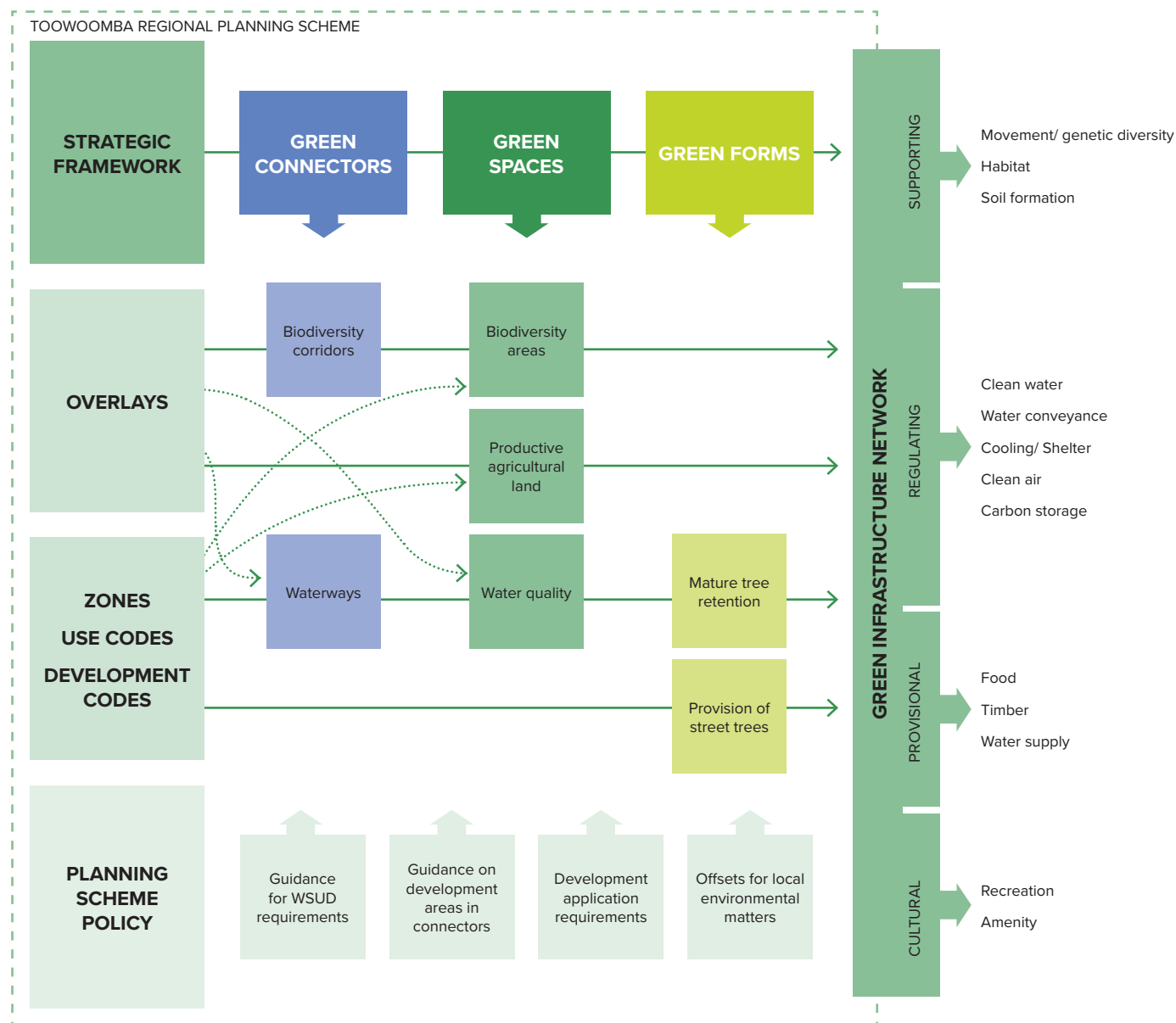


Figure 10: Summary of how Green Infrastructure can be incorporated across the Planning Scheme framework to enable the protection and enhancement of the ecosystem services it provides.



The current Planning Scheme does incorporate and provide regulation for many Green Infrastructure elements; however, a new Planning Scheme would benefit by addressing the following identified opportunities:

1. Identify and protect Matters of Local Environmental Significance
2. Protect existing high value natural areas from urban encroachment
3. Preserve and promote increased canopy cover across the region
4. Support greener urban development outcomes
5. Provide guidance on how to achieve Green Infrastructure values.

These opportunities are described in more detail in the following sections.

#### What we've heard:

**The local community are supportive of regulation for new development to better protect and integrate Green Infrastructure.**

*"We need to do all we can to enhance our Green Infrastructure. New developments in particular need to be made to support backyards, trees, proper soil, and good parks, instead of being a sea of rooftops."*

*"A good place to start would be tougher regulation on big developers that are producing these estates with small yards, clearing all the natural pre-existing trees and damaging flora and fauna."*



Small street tree species in new streetscapes in Wyreema



## 4.2 Opportunity 1: Protection of Matters of Local Environmental Significance

Protection of matters of environmental significance is facilitated through a combination of regulatory requirements by the federal, state and local levels of government. Matters of National Environmental Significance (MNES) are established through the Environmental Protection and Biodiversity Conservation Act (Cwth 1999) and State and local matters provide a complement to these highest order biodiversity protections.

At the state level, Matters of State Environmental Significance (MSES) are provided for through a suite of State policies and legislation. Biodiversity is a State Interest that requires careful consideration for the integration of Green Infrastructure into the new planning scheme. Table 4 presents an overview of the biodiversity State Interest and the supporting State Interest Policies to be included in the Planning Scheme to guide development outcomes.

Table 4: Biodiversity State Interest statement and policies

<b>State interest statement</b>	Matters of environmental significance are valued and protected, and the health and resilience of biodiversity is maintained or enhanced to support ecological processes.
<b>State interest policies</b>	<ul style="list-style-type: none"><li>• Development is located in areas to avoid significant impacts on matters of national environmental significance and considers the requirements of the Environment Protection and Biodiversity Conservation Act 1999.</li><li>• Matters of State Environmental Significance (MSES) are identified and development is located in areas that avoid adverse impacts; where adverse impacts cannot be reasonably avoided, they are minimised.</li><li>• Ecological processes and connectivity are maintained or enhanced by avoiding fragmentation of matters of environmental significance.</li><li>• Viable koala populations in South East Queensland are protected by conserving and enhancing koala habitat extent and condition.</li></ul>

Under the State Interests, Matters of Local Environment Significance (MLES) are required to be included in local Planning Schemes. These identified local natural values must be different to Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES). These federal and state areas of environmental significance are identified and protected in other legislation, while MLES are to be identified and protected in the local Planning Scheme.

MLES across Toowoomba has been identified and mapped using a robust assessment framework, following Queensland Government guidance and using four fundamental foundations: statutory, community values, current practice and technical data. Consultation across Council and other stakeholders, including an expert panel, was used to identify and define MLES categories, create a list of significant species and develop assessment criteria and methodology. MLES mapping was then undertaken using this methodology to reflect three broad categories: corridors, biodiversity areas and vegetation communities (Table 5). The expert panel also identified a number of special features for inclusion as MLES. Some of these have been incorporated across a number of mapping subcategories (e.g. local significant species habitat, areas of species richness and diversity, climate change adaptation and refugia areas). More detail on the MLES assessment can be found in “*Mapping Matters of Local Environmental Significance (MLES) for the Toowoomba Region - Technical Report*” (Redleaf, 2020).

The MLES mapping data has been used to inform the Green Infrastructure Network as green connectors and green spaces (refer to GRISPI Background Report). It is recommended that this MLES work be used to update the current Biodiversity Corridors and Areas of Ecological Significance overlays in the Planning Scheme where relevant to better reflect the regional and local biodiversity values, within both the corridor and natural areas mapping.



View across the Toowoomba Escarpment and Great Dividing Range

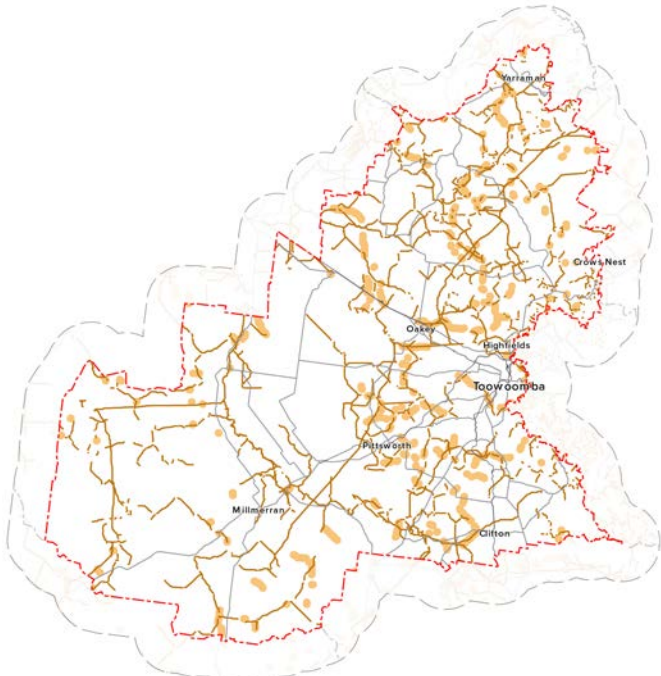
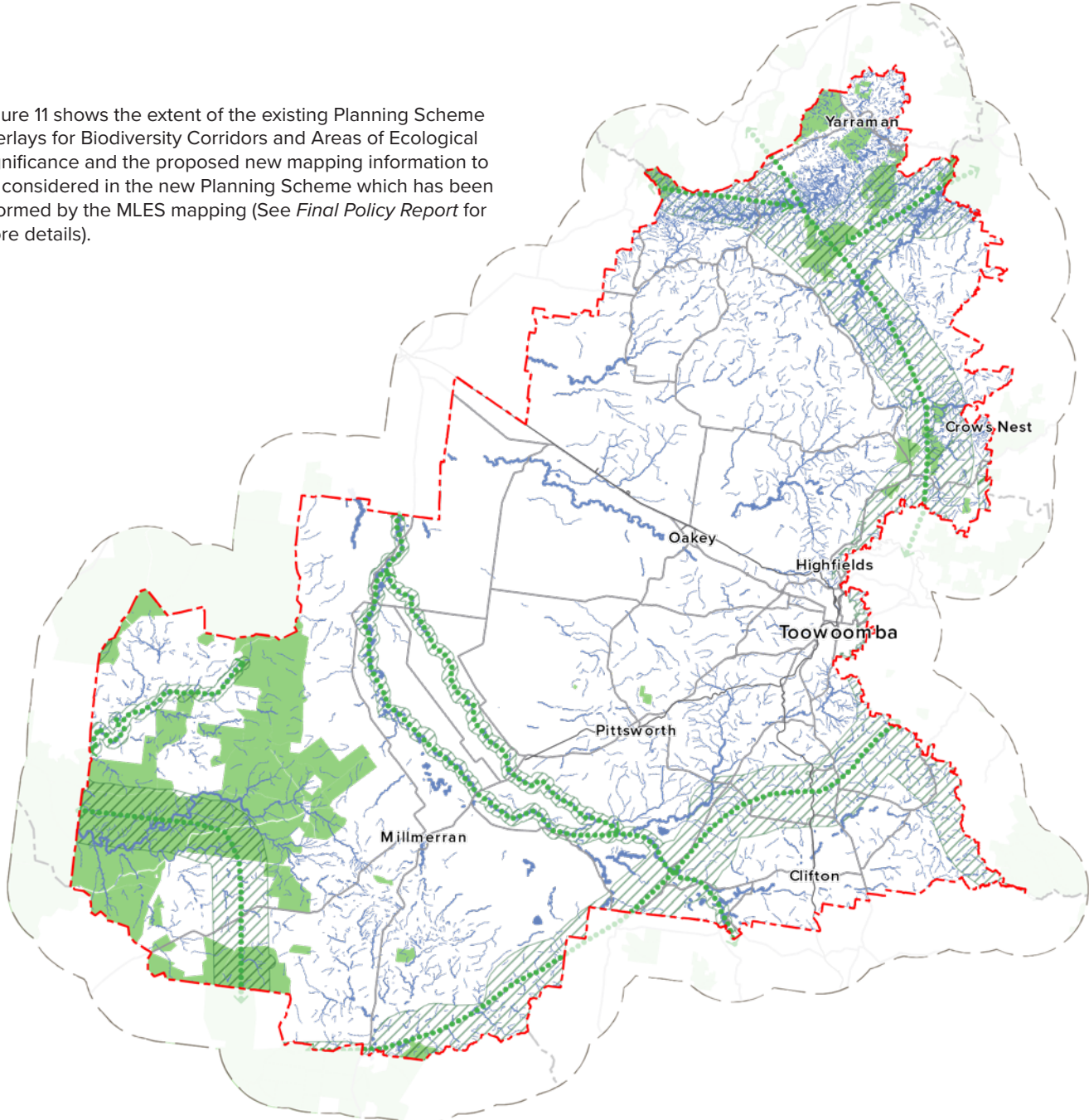


Table 5: MLES category and subcategory definitions

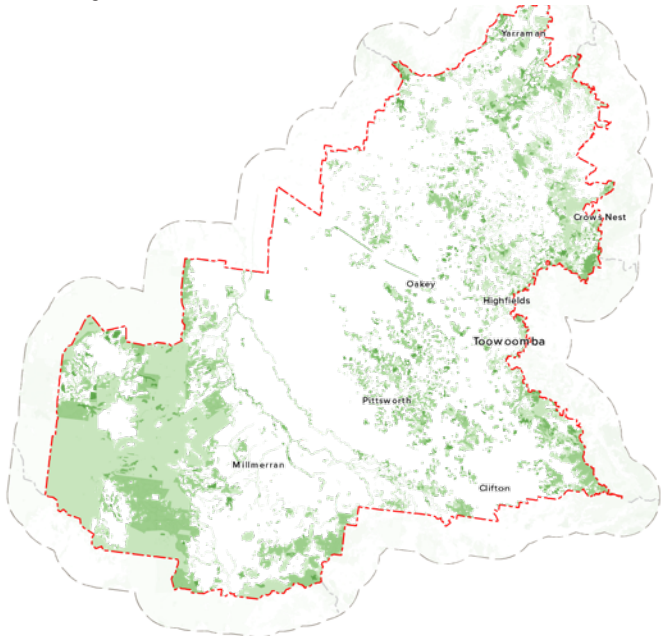
Mapping category	Sub-category	Short definition
<b>Corridors</b>	<b>1.1 Ecological Corridors</b>	Regional ecological corridors supporting landscape scale connectivity and ecosystem functions are essential for the movement and long-term survival of regional populations of flora and fauna by connecting large tracts of vegetation.
	<b>1.2 Wildlife Corridors</b>	Wildlife corridors supporting the local movement and dispersal of flora and fauna populations by connecting habitat patches.
	<b>1.3 Aquatic</b>	A network of aquatic ecosystems and their riparian buffers are important in providing ecological services such as maintaining healthy waterways and supporting wetland dependent flora and fauna.
	<b>1.4 Rehabilitation</b>	Prioritised rehabilitation areas across the Toowoomba region representing opportunities for potential restoration, revegetation, targeted offsets management or landscape improvements.
<b>Biodiversity areas</b>	<b>2.1 Large tracts of vegetation</b>	These vegetated tracts represent the largest intact landscape features in the region. They are the largest 5% of contiguous tracts of vegetation containing significant biodiversity areas and sustain local populations of flora and fauna.
	<b>2.2 Areas of species richness and diversity</b>	Areas known to support existing flora and fauna richness and diversity that is considered high when compared to other areas within the Toowoomba region.
	<b>2.3 Areas of ecosystem representation and/or uniqueness</b>	Areas of high ecosystem diversity containing a range of habitat features and unique assemblages of flora and fauna.
	<b>2.4 Climate change adaptation and refugia areas</b>	Areas of refugia which are considered important habitat, whether temporary or permanent, for mitigating the effects of climate change on the local flora and fauna of the Toowoomba Region.
<b>Vegetation communities</b>	<b>3.1 Least concern regional ecosystems</b>	Ecosystems not otherwise protected under state or federal law that are locally important, including both regrowth and remnant patches defined as 'least concern'.
	<b>3.2 Grassland regional ecosystems</b>	Areas containing the floristic diversity and composition of natural grassland communities on the alluvial plains of Darling Downs in the Toowoomba region.
	<b>3.3 Urban bushland</b>	Retained, restored, or enhanced urban bushland areas important in maintaining resilient populations of native flora and fauna. These areas may contribute to, or be a part of, urban green space.
	<b>3.4 Local significant species habitat</b>	Areas within the region that are a known habitat for locally significant species.
	<b>3.5 Stepping stone habitat</b>	Habitat within the Toowoomba region that supports transitional or resident populations of flora and fauna. Stepping stones are isolated (non-contiguous) from other habitat features or large tracts of vegetation.
<b>Special features</b>	<p>These features are high value conservation areas that demonstrate one or multiple MLES subcategory values and are as follows:</p> <ul style="list-style-type: none"> <li>MLES01 Redwood rainforest</li> <li>MLES02 Rifle Range rainforest</li> <li>MLES03 Broxburn-Pittsworth corridor</li> <li>MLES04 Basalt Hilltops SE Downs</li> <li>MLES05 Sandstone wildflower outlier</li> <li>MLES06 Cooby woodlands</li> <li>MLES07 Wet sclerophyll forests</li> <li>MLES08 River Red Gum Riparian Land Zone 3</li> <li>MLES09 Muntapa Tunnels</li> <li>MLES10 <i>Araucarian notophyll/microphyll</i> vine forests and semi-evergreen vine forests.</li> </ul>	



Figure 11 shows the extent of the existing Planning Scheme overlays for Biodiversity Corridors and Areas of Ecological Significance and the proposed new mapping information to be considered in the new Planning Scheme which has been informed by the MLES mapping (See *Final Policy Report* for more details).



MLES ecological and wildlife corridors



MLES significant vegetation and habitat areas

Figure 11: Existing Biodiversity Corridors (hatched) and Ecological Significance (green) Planning Scheme overlays (left) compared to the MLES ecological and wildlife corridors (top right) and MLES significant vegetation and habitat maps.





Semi-evergreen vine thicket within Redwood Park





### 4.3 Opportunity 2: Protecting natural areas from urban encroachment

There are a number of zone designations available to identify the intended uses of land parcels across the region including residential, centre, recreation, industry, rural and mixed use. Figure 12 presents the land use zoning in the current Planning Scheme. Toowoomba does not currently use environmental zones to designate uses across the Region, and currently a number of key natural areas / green spaces are zoned as open space. This lack of visibility and definition of environmental zones versus open space or other zones results in a lack of appreciation and understanding of the core values and function of these green spaces that new development should be aiming to protect and enhance. For example, creek corridors mapped as open space assumes that the key outcome to be achieved is flood avoidance, and may result in the waterway being delivered as a drainage channel rather than as a functioning and healthy natural waterway within a riparian zone that acts as a biodiversity corridor. It is therefore recommended that environmental zones (e.g. environmental management zones) are included in the new Planning Scheme to protect and enhance existing natural areas.

There are also a number of land use zones (rural residential, emerging communities) located on the boundary of existing urban areas, providing a transition to the surrounding landscape that supports a combination of rural and natural uses. These green inter-urban breaks are important as they support scenic amenity values, habitat areas, biodiversity corridors and cooling of the urban environment. There is constant pressure on these green spaces from development associated with emerging communities and the infill of rural residential properties. It is therefore recommended that inter-urban breaks are clearly defined in terms of their respective functions and are mapped for clear delineation to identify where development responses such as the avoidance or mitigation of impacts are required. It is suggested that local planning would be needed to address the specific functions of the different inter-urban breaks. Mapping of inter-urban breaks will need to be informed to be consistent with scenic amenity policy and growth planning policy adopted by Council.

#### Best Practice Example

##### Environmental Management Zones to protect significant natural values

Many SEQ councils have included environmental management and conservation zones which work to protect predominantly publicly-owned lands – in contrast Redland City Council applies the Environmental management zone to apply to privately owned lands that contain high value environments (often koala habitat or biodiversity corridors etc).

**Redland City Council Environmental Management Zones** protect privately owned land with significant natural values while providing for dwelling houses on privately owned lots. The zone maintains and enhances environmental values such as bushland, wetland, coastal or koala habitats, wildlife movement corridors and native vegetation. Development is generally limited to a single dwelling house on a large lot or small scale activities that facilitate the management or conservation of the environmental values on or near the land.

Accessed at: [https://www.redland.qld.gov.au/download/downloads/id/3031/fact\\_sheet\\_-\\_environmental\\_zones.pdf](https://www.redland.qld.gov.au/download/downloads/id/3031/fact_sheet_-_environmental_zones.pdf).

#### What we've heard:

##### Protection of green connectors and spaces

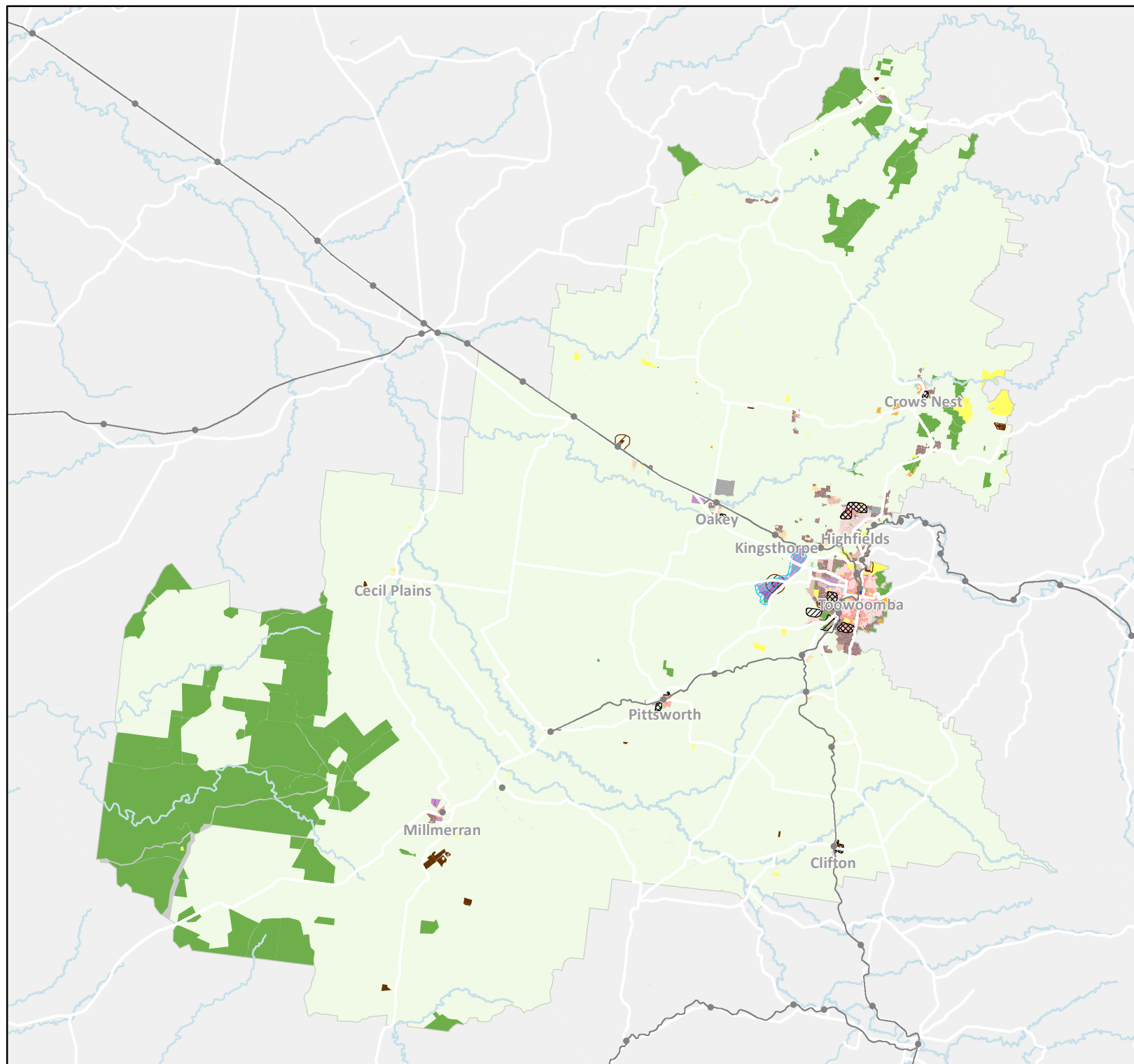
Local developers and community would like to see better identification of important natural areas and corridors based on strong science at the planning stage to better inform where and how development can occur. This information will ideally be provided as simple and streamlined overlays and requirements that are appropriate to protect the complex ecosystems in that area.

*“Council’s implementation of biodiversity corridors needs to be addressed earlier. Ideally implement provisions and allocate at the subdivision stage, at the zoning stage, at the planning stage. Timing is important, and it is no use trying to fix things after a development decision is made.”*

*“There should not be a ‘one size fits all’ or geographical approach – instead look at implementing an ecosystem zoning approach with different rules for different zones, to preserve the natural biodiversity.”*



Figure 12: Current Toowoomba Planning Scheme show land use zoning



## Legend

- Operational Rail Network
- State Controlled Roads
- Major Watercourses
- ▨ Future Urban Area
- ▤ New Urban Area
- ▧ Extractive Industry
- ▩ Charlton Wellcamp Enterprise Area
- Surrounding LGA's
- Toowoomba LGA

## Zoning

- Low Density Residential
- Low-Medium Density Residential
- Principal Centre
- Major Centre
- District Centre
- Local Centre
- Sport and Recreation
- Open Space
- Low Impact Industry
- Medium Impact Industry
- High Impact Industry
- Community Facilities
- Emerging Community
- Extractive Industry
- Limited Development (Constrained Land)
- Mixed Use
- Rural
- Rural Residential
- Specialised Centre
- Township



## 4.4 Opportunity 3: Preserving canopy cover

Trees are an important component of the Green Infrastructure Network and provide important ecosystem services as individual assets, as well as collectively within larger vegetation communities. They can occur across all landscape typologies including reserves, corridors, parks, private yards and road reserves.

The development of canopy cover targets has been a useful measure for many regions to assess current performance and understand the level of protection and enhancement required to achieve these targets. Typically it is recognised that to achieve canopy targets, trees are required on both private and government owned land. Toowoomba Regional Council does not currently have an agreed canopy target, but has undertaken some mapping to understand canopy cover within Toowoomba City (Figure 13).

Toowoomba currently has a *Street and Park Tree Policy* (2.68) and supporting *Street Tree Master Plan*. Requirements for development to provide street trees are also included in a number of development codes throughout the Planning Scheme. There is also regulation protecting the removal or damage of native trees under other legislation such as the *Queensland Vegetation Management Action*. State mapping is available to determine if there is assessable vegetation present and there are exemptions for requiring approval for clearing vegetation. There is currently no requirement beyond this in the local Planning Scheme for the protection of existing trees on private property or within road reserves.

To preserve canopy cover through the protection of existing trees and planting of new trees, the following recommendations are proposed:

- Significant local trees are defined for retention through development and works applications. This includes requirements for the protection of significant trees within road reserves through material change of use and operational works applications for urban development.
- A canopy target is developed for the region with an understanding of development requirements to achieve this, for example a 40% greenfield mature canopy cover requirement. This could be delivered through requirements for deep planting areas for trees on private lots in front and/or backyards, or minimum tree planting requirements that can reach a mature height and canopy in a reasonable time as development is completed.
- Additional supporting guidance should also be provided in the Planning Scheme Policy around the requirements for new trees in terms of appropriate soil or canopy provision.

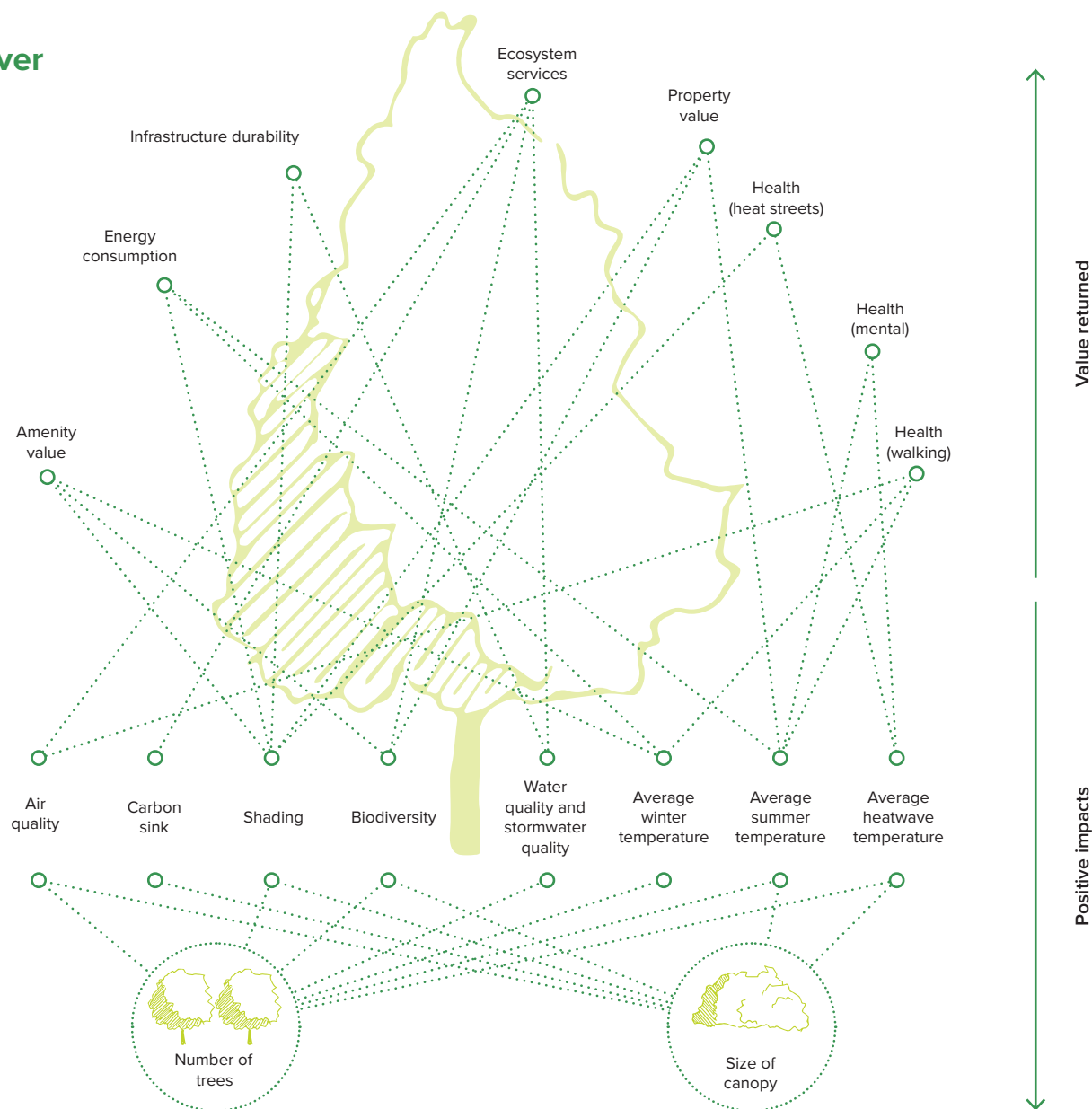


Figure 13: Multiple services provided by trees (Graphic adapted from AECOM, 2017)





#### What we've heard:

#### Trees are important to the community

Tree planting requirements for streets and allotments is a key outcome the community would like to see in the planning scheme.

*"Look at any desirable area. They all have large, wide canopy trees that actually provide shade and reduce heat load".*

The removal of large trees on existing residential lots was also raised as a concern, with education, incentives and regulation seen as opportunities to address this.

*"Too many large green beautiful and healthy trees on private property are cut down each year without being replaced with equally performing ones."*





### Best practice examples

#### Urban canopy targets and requirements

There are many local Councils across Australia which have set tree canopy targets to ensure urban trees and the functions they provide are better protected and planned for. Many of these areas have realised that achieving these will require trees in both government-owned and private land. The following are some examples from across Australia which provide requirements and guidance on the protection and provision of trees in new urban areas.

##### Tree canopy targets – City of Gold Coast

This study assessed and proposed locally relevant canopy targets (based on land tenure, land uses and zones etc) to be further considered by Council. A diverse range of tree canopy targets included:

- An ‘active travel route’ tree canopy target
- A ‘liveable street’ tree canopy target
- A ‘conservation corridor’ canopy and strata percentage target
- A ‘liveable neighbourhood’ canopy target.

##### Greenfield Housing Code – NSW

This new code provides requirements for setbacks and landscaping areas to protect existing trees as well as ensure new trees are planted in the front and back yards of new dwellings.

Accessed at: <https://legislation.nsw.gov.au/view/html/inforce/current/epi-2008-0572#pt.3C>.



Image source: <https://pp.planningportal.nsw.gov.au/greenfield-housing-code>

##### Better Apartments Design Standards – Melbourne

These standards provide detailed requirements to ensure new apartment developments provide appropriate space for canopy trees and landscaping. Requirements include canopy cover targets, deep soil area and volume, and tree type. Requirements are scaled based on the site area and are linked to IWM outcomes such as the use of alternative water sources for irrigation.

Accessed at: [https://www.planning.vic.gov.au/\\_\\_data/assets/pdf\\_file/0021/514164/Apartment-Design-Guidelines.pdf](https://www.planning.vic.gov.au/__data/assets/pdf_file/0021/514164/Apartment-Design-Guidelines.pdf).

Table D3: Soil requirements for trees

Tree type	Tree in deep soil	Tree in planter	
		Area of deep soil	Volume of planter soil
A	12 square metres (min. plan dimension 2.5 metres)	12 cubic metres (min. plan dimension of 2.5 metres)	0.8 metres
B	49 square metres (min. plan dimension 4.5 metres)	28 cubic metres (min. plan dimension of 4.5 metres)	1 metre
C	121 square metres (min. plan dimension 6.5 metres)	64 cubic metres (min. plan dimension of 6.5 metres)	1.5 metres

**Note:** Where multiple trees share the same section of soil, the total required amount of soil can be reduced by 5% for every additional tree, up to a maximum reduction of 25%.



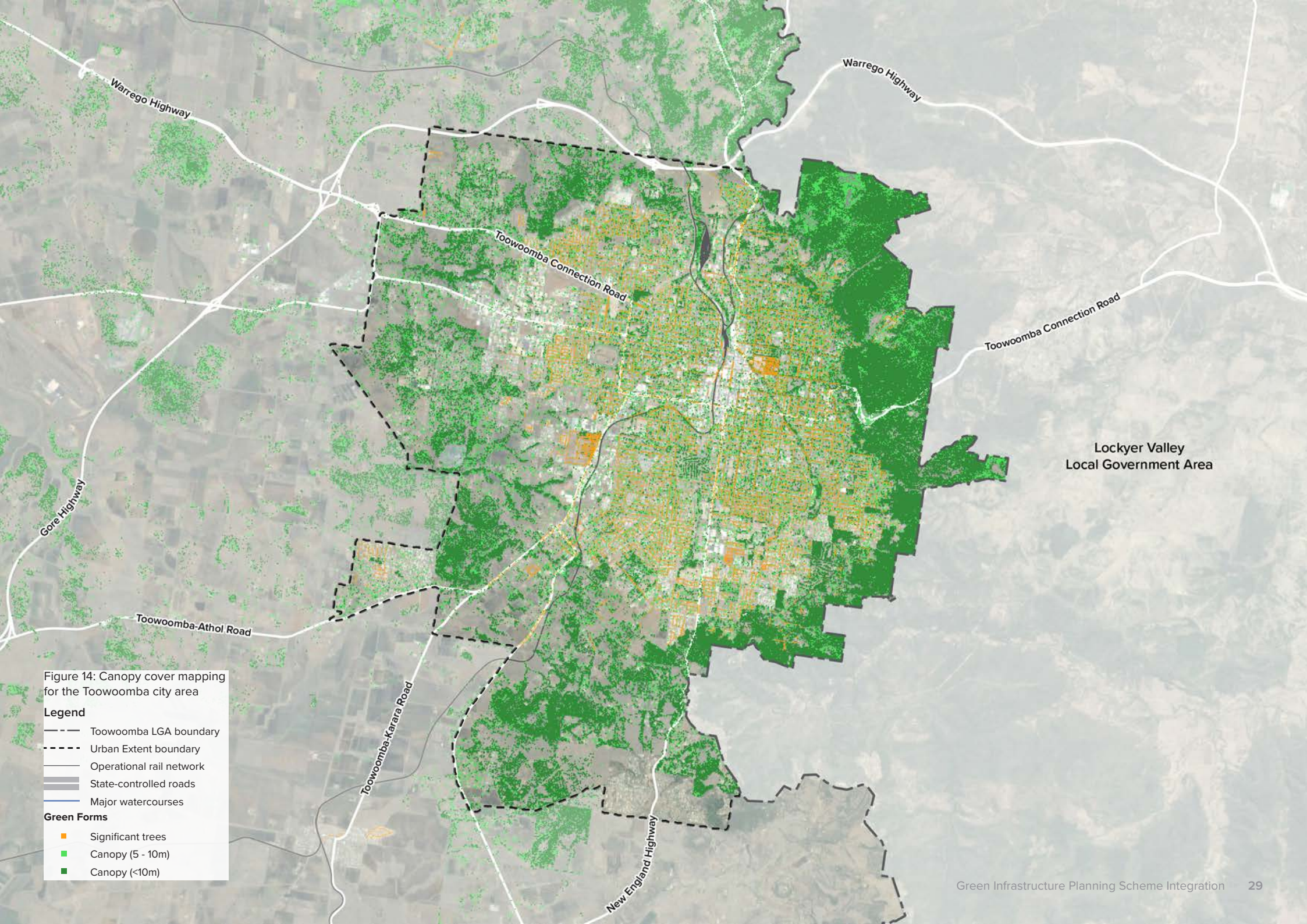


Figure 14: Canopy cover mapping for the Toowoomba city area

**Legend**

- Toowoomba LGA boundary
- ... Urban Extent boundary
- Operational rail network
- State-controlled roads
- Major watercourses

**Green Forms**

- Significant trees
- Canopy (5 - 10m)
- Canopy (<10m)



## 4.5 Opportunity 4: Creating greener urban development

New urban development typically requires the transformation of permeable natural grassed and vegetated surfaces into impervious hardstand surfaces associated with roads and buildings. This results in large changes to the ecosystem services provided in that area, including removal of habitat, soil impacts, water cycle changes and increased pollutant loads generated. Figure 15 highlights how the water cycle is altered when urban development occurs and Green Infrastructure is removed, with large volumes of wastewater and stormwater generated and limited infiltration into the soils and evapotranspiration occurring from vegetation.

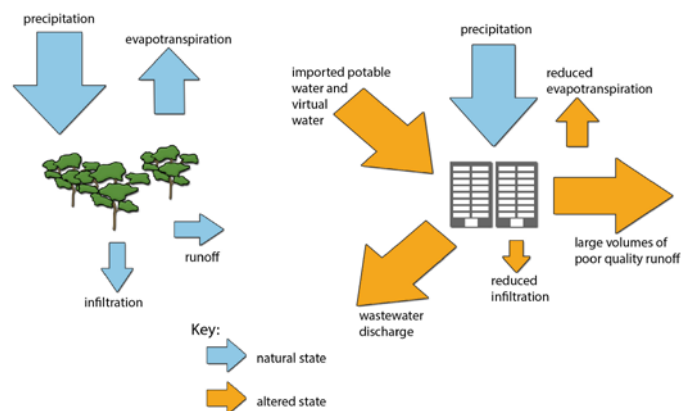


Figure 15: Water cycle changes associated with urban development and the removal of Green Infrastructure (Hoban and Wong, 2006)

The integration of green spaces and forms into urban development can help to preserve many of the ecosystem services in new urban development such as:

- Backyards that are vegetated with grass, gardens and / or trees allows water to infiltrate into soils following rain, improving soil moisture and reducing stormwater flows and nutrients entering waterways. These private green spaces also provide space for recreation, amenity, habitat, cooling and possibly local food production.
- WSUD / stormwater treatment assets are designed to manage urban stormwater flows to protect downstream waterways and water bodies. When designed well, these can function as high amenity landscapes which are passively watered, improving resilience to changing climates and water security.
- Green roofs and walls can also reduce the amount of stormwater flows and pollutants generated from urban areas by retaining water in the landscape. These green forms can also improve amenity and cooling in urban areas and even provide local habitat.

To ensure greener developments can be delivered across Toowoomba, it is recommended that the following is adopted into the new Planning Scheme:

- Permeable green spaces on sites are maximised to incorporate deep planting area (4m x 4m) and minimum requirements are provided for soft landscaping to the street front of development sites. Noting that reductions in maximum building footprints will be required to allow for this. This will ensure that local biodiversity, cooling and water management is provided on individual allotments.
- WSUD systems should be designed to achieve landscape design outcomes (amenity, access, recreation) as well as stormwater quality requirements to ensure they deliver multiple outcomes. This can include passively irrigated street trees, rain gardens, wetlands and swales.
- Protect natural waterway corridors from impacts and include requirements for artificial waterways to be designed as natural systems.

### Best practice examples

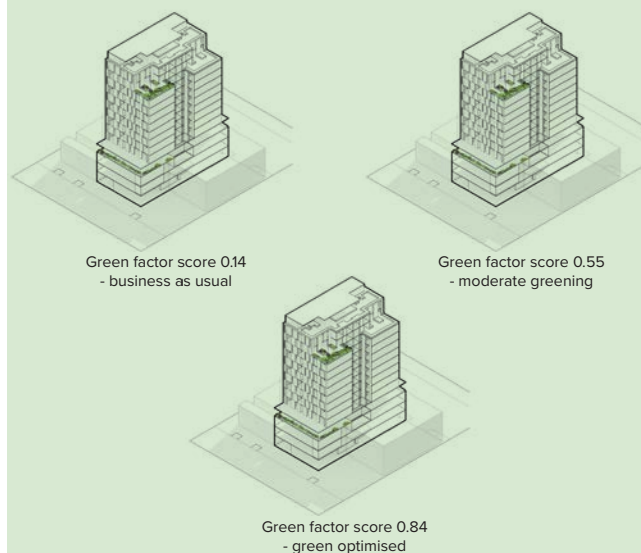
#### Urban greening requirements

Across Australia it is being recognised that new developments are not providing green and sustainable outcomes. This has led to a number of new requirements and guidelines being developed to support improved landscaping outcomes in new development as highlighted in the following examples.

#### Urban Green Cover Requirements and Assessment - Melbourne

The Melbourne Planning Scheme Amendment C376: Sustainable Building Design proposes to support sustainable and Green Infrastructure outcomes through a range of new mandatory and discretionary Sustainable Building Design Standards and requirements including a requirement to achieve equivalent of at least 40% green cover (trees, grass, shrubs, WSUD and lawn). The green factor tool is to be used to guide and assess the inclusion of Green Infrastructure in new developments.

Accessed at: <https://participate.melbourne.vic.gov.au/amendment-c376/amendment-overview>.







Site Data			
Site Area:	1420 m2 (2 lots)	Permeable Hard Surface:	0 m2
Number of Lots:	2	Non Permeable Hard Surface:	379 m2
Number of Dwellings:	4	Vegetated Surface:	304 m2
Density:	28 dwellings per hectare	Deep Root Zones:	2
Open Space:	770 m2	Canopy Trees	2
Site Coverage:	46%	Additional On-Site Water Storage:	None

Figure 16: Guidance on how infill development can occur while maintaining on-site allotment green pervious surfaces (London et al., 2020).

#### What we've heard:

The local community would like to see greener development outcomes which provide space for backyards and trees.

*“Developers should be encouraged to maintain existing trees of significance and block sizes should be of an acceptable size to allow trees and vegetation to be planted. This will facilitate better airflow around buildings and contribute to reducing heat.”*



Westbrook showing trees retained within a public park



## 4.6 Opportunity 5: Guiding Green Infrastructure outcomes

Planning scheme codes do not always give a full explanation of how assessment benchmarks are determined or how to respond to performance outcomes in a way that delivers the desirable outcomes on the ground. For example, references to “rehabilitation” or “enhance” in Green Infrastructure overall outcomes are ambiguous, and could be variously interpreted through development proposals. There are a number of ways to provide design guidance for ecological outcomes, including additional drawings and requirements in codes, Planning Scheme Policies and external extrinsic materials such as guidelines and standard drawings.

Planning Scheme Policies provide a good opportunity for additional guidance to be provided on how development is to achieve the Green Infrastructure requirements. Having a clear understanding of how to plan for, and design Green Infrastructure to deliver the multiple ecosystems services it provides can be difficult to achieve, especially as it sits within a broader integrated network. Bridging the gap between statements such as ‘rehabilitation’, ‘protection’, ‘multi-functional’ and ‘enhance’ to the delivery of on-ground solutions which achieve these outcomes requires additional guidance such as planting densities, corridor widths, habitat requirements, and other desired standards of service. It is therefore recommended that a new Planning Scheme Policy is developed to provide additional supporting guidance on the delivery of Green Infrastructure outcomes. Matters that could be included in this Planning Scheme Policy include:

- Green Infrastructure Network Plan and explanatory notes
- Guidance for development in green corridors
- Guidance for the assessment of MLES and subsequent requirements for development to address areas of high value
- WSUD design guidance for development proposals
- Requirements for trees retention and definitions for significant trees
- Guidance on providing safe and effective multi-functional corridors
- Offsetting policy for MLES

A Planning Scheme Policy will also provide Council with an easily referenced resource for development assessment and approval.

### Best practice example

#### Green Infrastructure Planning Scheme Policies

Gold Coast City Plan incorporates several planning scheme policies to support development applications to address its City Plan provisions. These include:

- **Ecological site assessments** – to assist developers to assess matters of ecological significance and to make recommendations for how a proposal will avoid or mitigate impacts
- **Environmental management plans** – to assist developers in the preparation of Vegetation management plans (VMP); Fauna management plans (FMP); Rehabilitation management plans (RMP); and Covenant management plans (CMP)
- **Environmental offsets** –relating to environmental offsets for matters of Local Environmental Significance
- **Bushfire management plans** – to assist developers in the preparation of Bushfire management plans that provide appropriate protection of people and property and also provides guidance for mitigation treatments to avoid significant negative impact on the biodiversity and health of the City's ecosystems.

## 4.7 Summary of recommendations

The following table presents a summary of the key Planning Scheme integration recommendations to address current gaps and enhance the protection of Toowoomba’s Green Infrastructure.

Table 6: Summary of GRISPI Planning Scheme recommendations

Opportunity	Description
1. Identify and protect Matters of Local Environmental Significance.	Identification and protection of MLES can be integrated into the Planning Scheme through updating mapping in the Environmental Significance Overlay to include MLES  Include guidance on the assessment and protection of MLES through a Planning Scheme Policy
2. Protect existing high value natural areas from urban encroachment	High value natural areas will be integrated into the Planning Scheme through the definition of inter-urban breaks and development provisions in the codes (zones or overlays) for the satisfactory development within and on adjoining lands
3. Preserve canopy cover across the region	Setting a tree canopy target for the region will allow the tree canopy preservation to be integrated into codes (development requirements) within the Planning Scheme
4. Encourage greener development outcomes	Include specific design requirements for developments to incorporate permeable green spaces, appropriately designed WSUD and natural waterways into the landscape and water design solutions.
5. Provide guidance on how to achieve Green Infrastructure values	Guidance on the integrated matters of Green Infrastructure will be a valuable integration mechanism within the Planning Scheme to assist landowners, developers and assessment officers in facilitating Green Infrastructure.



## 5. Next steps

### 5.1 Planning Scheme amendments

Toowoomba's new Planning Scheme will be influenced by recommendations from the GRISPI project in addition to the following Toowoomba Region Futures Program projects:

- Toowoomba Regional Urban Form Framework (TRUFF)
- Growth Management Plan (GMP)
- Toowoomba Regional Landscape and Urban Character Study (TRLUCS)
- Toowoomba Region Infrastructure Plan (TRIP)
- Servicing Strategy
- Planning Structure Review
- Regional Scenic Amenity Study
- Landslide and Steep Land Study
- Bushfire Risk Assessment
- Temperate Climate Design Study
- Industry Review
- Indigenous Cultural Heritage Study
- Land Use of Major Infrastructure.

It is anticipated that the integration of Green Infrastructure will be a key recommendation for a number of these projects including TRUFF, Scenic Amenity, Bushfire Risk Assessment, Temperate Climate study and TRLUCS. It is likely that this integration will be transitional over time and will rely on extrinsic materials to lay the foundations for effective change in the region, supported by residents, developers and industry.

### 5.2 Other Green Infrastructure implementation opportunities

The new Planning Scheme is only one pathway for the delivery of improved Green Infrastructure outcomes across Toowoomba. Additional opportunities for the enhancement and protection of Green Infrastructure across the region includes:

- Programs – demonstration projects, corridor plans, offsets, integration of Green Infrastructure into Council projects
- Partnerships – private landholder vegetation projects, community environmental programs and projects, incentives, linking up Council initiatives with other relevant stakeholders / agencies to align funding efforts
- Knowledge – guidelines, research, education campaigns, Green.IS branding.

These additional supporting actions will require input from a range of individuals and groups including Council, State Government, landholders, developers, community members, businesses and research institutions. This broad range of activities will be important to build understanding, support and momentum for improved Green Infrastructure outcomes across the region, especially in areas which are not owned by Council or delivered through the Planning Scheme



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# Attachments

- GRISPI Background Report
- GRISPI Policy Report
- GRISPI Stakeholder Engagement Report







View towards Highfields from near Gowrie



