



WESTERN SYDNEY

STREET DESIGN GUIDELINES

SUPPLEMENTARY REPORT

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ASPECT Studios—in partnership with the Western Sydney Planning Partnership—acknowledges more than 60,000 years of continuous Aboriginal connection to the land that makes up NSW.

We acknowledge and pay our respects to the traditional custodians of Country within Western Sydney. As part of the world's oldest living culture, the traditional Aboriginal owners and custodians share a unique bond to the Country – a bond forged through thousands of years of travelling across lands and waterways for ceremony, religion, trading, and seasonal migration.

We acknowledge that Western Sydney is home to the highest number of Aboriginal people of any region in Australia and that the primary Aboriginal custodians with obligations for Country and connection to the place for many generations including the Dharug/Darug, Dharawal/Tharawal, Gundungurra/Gandangara, and Darkinjung people.

Western Sydney Planning Partnership partner organisations:

Blacktown City Council, Blue Mountains City Council, Camden Council, Campbelltown City Council, City Of Liverpool, Fairfield City Council, Hawkesbury City Council, Penrith City Council, Wollondilly Shire Council, NSW Department of Planning and Environment, Greater Cities Commission, Transport for New South Wales, and Sydney Water.

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Better streets for Western Sydney

The Western Sydney region is experiencing rapid growth, emerging as Australia's third-largest economy with a rapidly expanding population and employment base. Each year, tens of thousands of new residents, originating from over 170 countries, choose to call this region home. The development of the Nancy-Bird Walton International Airport at Badgerys Creek, alongside urban development and infrastructure projects, marks a significant milestone for Western Sydney.

Substantial investment is underway to accommodate the needs of both existing and incoming residents by providing jobs, housing, and essential infrastructure. This is being enabled through several re-zoning packages that will build new communities across Western Sydney. This development is occurring amidst a backdrop of social and environmental challenges including increasing congestion and a lack of sustainable transport options; environmental degradation and habitat loss; rising urban heat; and an epidemic of loneliness.

The design of Western Sydney's streets will play a pivotal role in addressing these challenges, including through improved health outcomes, enhanced accessibility, better amenity, and development viability.

The Western Sydney Street Design Guidelines and this Supplementary Report seek to contribute to the delivery of these outcomes for existing and future communities.

Aims



A 'Safe Active Street' in Perth (source: Department of Transport WA)



Main Street, Rouse Hill (source: Home789)

Improved health outcomes

- Creating safe street environments that work Towards Zero deaths and serious injuries
- Providing extensive urban tree canopy (targeting 70-80% canopy cover within the street) and reducing urban heat

Increased accessibility

- Delivering walkable neighbourhoods and 30-minute cities
- Improving access to people's daily needs by public transport, walking, cycling and other forms of micromobility
- Reducing car dependence and traffic congestion



Galloway Street, North Parramatta (source: Sydney Morning Herald)

Better amenity

- Delivering comfortable, high amenity, and beautiful neighbourhoods with space for all street users
- Lowering vehicle travel speeds and reducing the ill-effects of automobility such as noise and air pollution



Thornton Estate (source: Morton)

Continued development viability

- Developing approaches to street network planning and network design that retain development viability
- Coordinating the subdivision process with street design for coherent development and appealing lifestyles



Aerial view of Oran Park (credit: Nearmap)

Section 1

Introduction

Overview

Background

The Western Sydney City Deal (City Deal) is a joint initiative of the Commonwealth, State, and Local Government. A central theme in the development of the City Deal was a desire to explore the potential of the new Western Sydney Airport as a catalyst for investment and jobs that would sustain the evolution of Western Sydney as a region connected to the world.

One of the outcomes of the City Deal was the establishment of the Western Sydney Planning Partnership (WSPP), which comprises representatives of the eight City Deal Councils plus Blacktown City Council (BCC).

The WSPP delivered one of the key commitments of the Western Sydney City Deal—to develop uniform local government engineering design standards for the region. The Western Sydney Street Design Guidelines (Guidelines) were developed as part of this commitment as a co-design project with Transport for NSW (TfNSW) and the eight City Deal Councils plus BCC. A copy of the Guidelines is available at <https://theparks.nsw.gov.au/wspp/completed-projects/>.

Since the adoption of the Guidelines in 2020, there has been some incorporation of the guidelines in some local government development control frameworks, and in planning for delivery of the Aerotropolis Precinct. Application of the Guidelines has also been piloted by Landcom. There have been learnings gained over this period including the identification of several matters that need to be further reviewed and resolved.

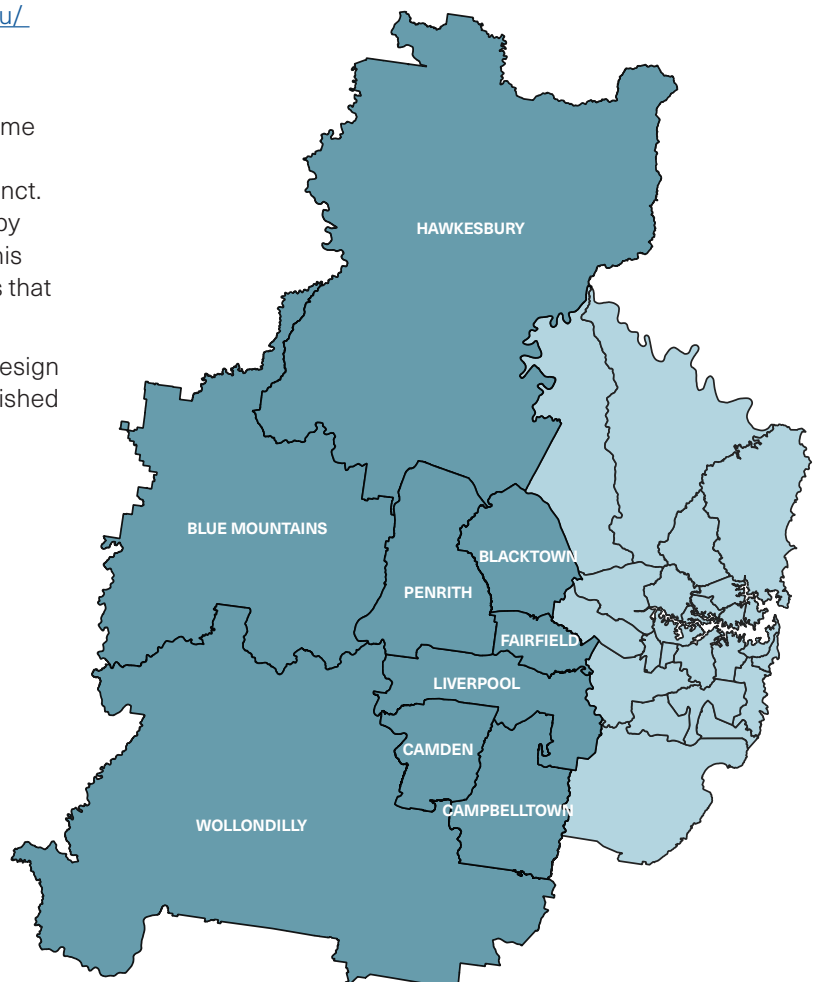
In addition, since the release of the Guidelines the design of Roads and Streets Guide (DORAS) has been published by TfNSW.

Purpose of this report

WSPP has carried out a post-implementation review of the Guidelines, including collation of feedback from key stakeholders on learnings related to their implementation. This process identified focus areas for potential updates to the Guidelines, providing the starting point for the development of this supplementary report.

ASPECT Studios was subsequently engaged to prepare that supplementary report. This report presents alternate technical solutions that seek to address stakeholder feedback and further the adoption and implementation of the Guidelines in Western Sydney.

The street types presented within this report are intended to supplement those presented in Part B of the Guidelines. They should be interpreted and understood in the context of the Guidelines.



The eight City Deal Councils plus Blacktown City Council.

Project objectives

The objectives for the Project are to:

- Undertake a post-implementation review, including collation of feedback from key stakeholders on learnings related to implementation of the Guidelines.
- Undertake analysis of the implementation of the Guidelines and identify key barriers to implementation that have been experienced that will need to be addressed to have impact at the regional scale.
- Address unresolved technical matters (Review Focus Areas) in the Guidelines that have been identified post-implementation.
- Undertake case study assessments of any development proposals utilising the Guidelines and identify examples where application of the Guidelines has resulted in improved community outcomes.
- Test the potential application of the Guidelines in a number of different contexts (primarily desktop consideration of how they would impact recent subdivision/DAs) with local council development assessment/engineering stakeholders and identify learnings to be included in the review.
- Better align the Guidelines with the principles in the TfNSW 'Design of Roads and Streets Guide' (2022) so that they are complementary when applied.

Review focus areas

The post-implementation review led to the development of focus areas to be addressed within a supplementary report. This has involved testing and options analysis for alternate solutions to address these review focus areas, which include:

- The design of shared and low-speed streets;
- Land use impacts on street design;
- The role and extent of on-street parking;
- Addressing bus access;
- Better incorporating street trees;
- Addressing green infrastructure provision and maintenance;
- A performance based framework for assessment non-complying or alternate street proposals; and
- Retrofitting existing streets.

The need for change

Resilient Sydney

Between 2015 and 2020, Infrastructure NSW (INSW) conducted research into the impacts of the urban heat island effect. They concluded that unless the prevailing patterns of urban development in Western Sydney were modified, there would be significant future impacts on health budgets in response to increases in air temperature.

As a consequence, INSW recommended that action be taken to modify the prevailing patterns of urban development in order to:

- Reduce building footprints and increase permeable surfaces;
- Integrate water cycle management into the urban planning process; and
- Increase tree canopy.

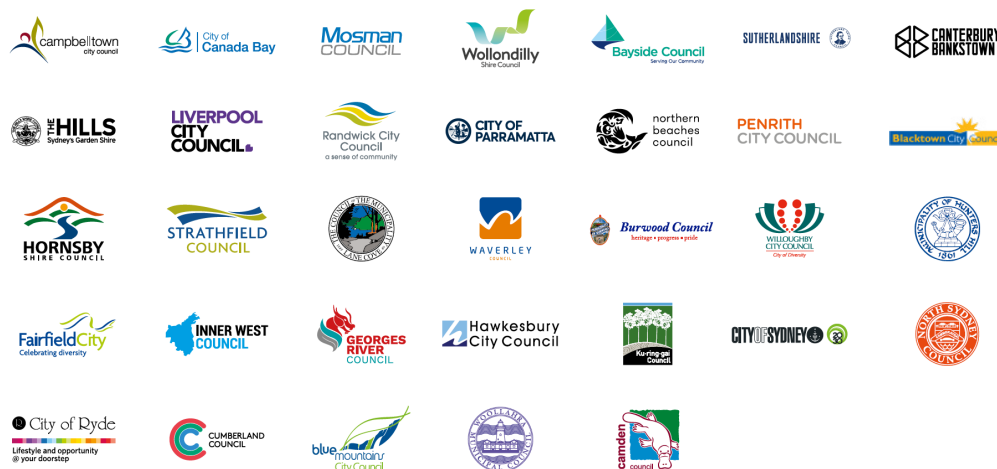
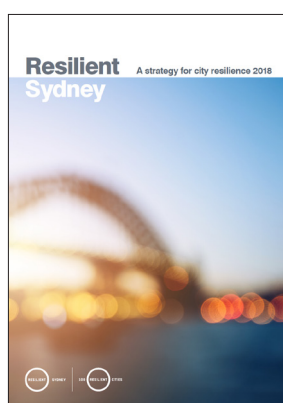
Resilient Sydney is part of a global movement known as the 100 Resilient Cities initiative, sponsored by the Rockefeller Foundation. The 100 Resilient Cities initiative was designed to help cities around the world become more resilient to the physical, social, and economic challenges that are a growing part of the 21st Century. Cities in the network were provided with resources to develop a roadmap to resilience.

The resulting strategy established a set of goals and objectives designed to strengthen metropolitan Sydney's ability to survive and adapt in the face of increasing global uncertainty and local shocks and stresses. The strategy was developed with the support of all of Sydney's metropolitan councils and contributors from the NSW Government, and business and community organisations. One of the five focus areas contained within the strategy related to "living with our climate".

Cool Suburbs is a flagship action under the Resilient Sydney Strategy and the urban planning tool kit is one of the Cool Suburbs action. The need for the Cool Suburbs Tool was identified under the Turn Down the Heat Strategy; a collaborative, multi-sector approach to tackling urban heat in Western Sydney. Launched in 2018, the Strategy lays out a five-year plan for a cooler, more liveable and resilient future.

The Urban Heat Planning Toolkit has been developed to help local councils strengthen local planning provisions to reduce the impacts of heat. It focuses on strategies that can be implemented in both new development and redevelopment contexts, to reduce urban heat and adapt to a changing climate.

CROSS REFERENCE



Resilient Sydney Strategy 2018
(above) and its contributors (right)



Better subdivision and street design

A key improvement to the planning and design process is the need to integrate precinct subdivision and street design to ensure they are coordinated and working together to deliver better outcomes.

Subdivision influences everything from net residential density and housing type to lot frontages, driveway frequency, and on-street parking, all of which are major determinants of street function and ultimately spatial design. Ensuring subdivision and street design are integrated and concurrent is critical to delivering improved street design outcomes.

For example, after street reserve width, the biggest influence on the design of a street and the experience of living on that street is the number and location of driveway crossings, determined by lot widths and property access. This impacts key street design outcomes such as on-street parking, the location of street trees and subsequent urban tree canopy, play safety, and the like.

The design of a street should also fit its movement and place context, and factor in the street/lot interface and how subtle changes to this impact the spatial arrangement of key street design elements presented within this report and within the Guidelines more generally.

Better street networks and mode shift

A car-centric street network leads to congestion, unattractive places, and poorer public and environmental health outcomes.

Without convenient and comfortable streets that support walking, cycling, and public transport, people will continue to drive out of both necessity and convenience. Too many parking spaces in well-connected areas can also lead to low walking, cycling, and public transport use.

A well-designed transport network across multiple scales—the district, neighborhood, and street—facilitates the efficient movement of people and goods while creating improved place outcomes. Increased walking, cycling, and public transport use not only alleviates congestion, but provides substantial health, environmental, and economic benefits, fostering resilient communities that are more equitable, inclusive, and liveable.

Reducing the space dedicated to on-street car parking also allows for the reallocation of space to footpaths, playgrounds, safe crossings, street trees, outdoor dining areas, bike lanes and much more.



Visualisation of the Western Sydney Aerotropolis Core (credit: WSPP)

Section 2

Street Types

Strategic alignment

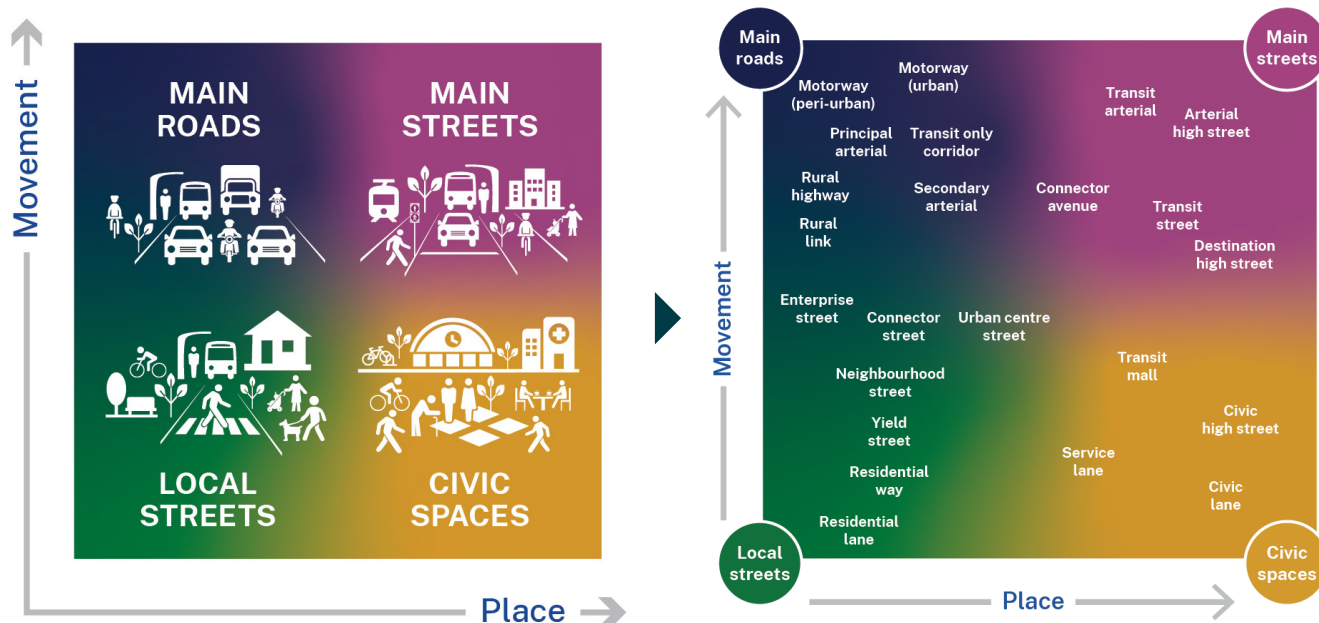
A key component of the Guidelines review is to bring any updates to the Guidelines street types into better alignment with the relevant Transport for NSW guidelines, in particular the Design of Roads and Streets Guide (DORAS). Other TfNSW guides referenced as part of this review include the Network Planning in Precincts Guide, Walking Space Guide, and Cycleway Design Toolbox.

To support the DORAS principle of “contextual design”, the planning and design of the street network and hierarchy should emphasise the close coordination required between the street type choice, its detailed design, and the subdivision of lots or cadastral “Place” determinants. That is, the place consideration is not just about the public domain ‘things’ within the street reserve like trees, but integrated design along the street/lot interface.

Street types as presented within the Guidelines have been renamed within this report. These street types are identified within the table adjacent and presented within the Movement and Place matrix below.

The street design presented herein are primarily intended to guide the design of new streets, however may be relevant for design updates to existing streets.

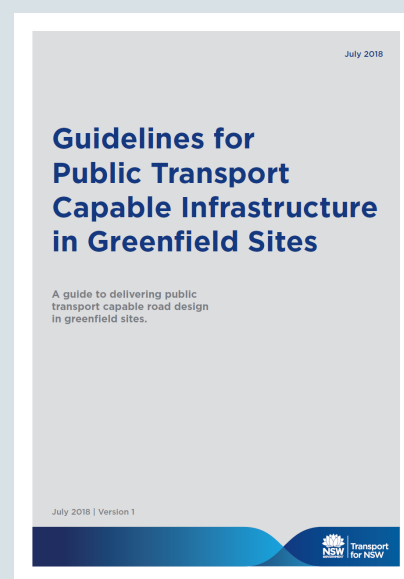
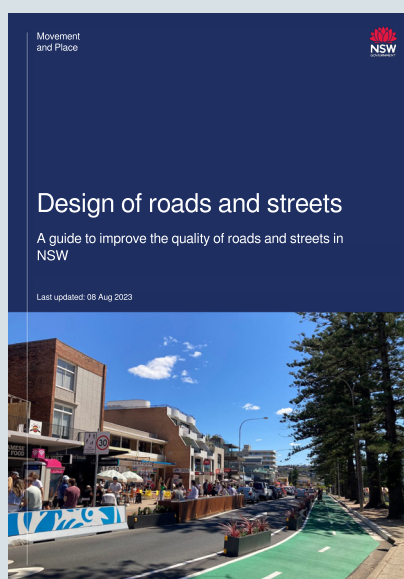
Existing Guidelines	DORAS (adopted herein)
Sub-Arterial Road	Secondary Arterial
Industrial Street	Enterprise Street
High Street	Destination High Street
Local Collector	Connector Street
Local Street – Type 4	Neighbourhood Street
Local Street – Type 3	Neighbourhood Street
Local Street – Type 2	Yield Street
Local Street – Type 1	Residential Way



Transport for NSW's Movement and Place matrix (left) with street types presented in the Design of Roads and Streets Guide (right)

CROSS REFERENCES

The below suite of documents should be referred to in the preparation of subdivision and street design -



Suite of Transport for NSW strategic guidelines

Secondary Arterial

Overview

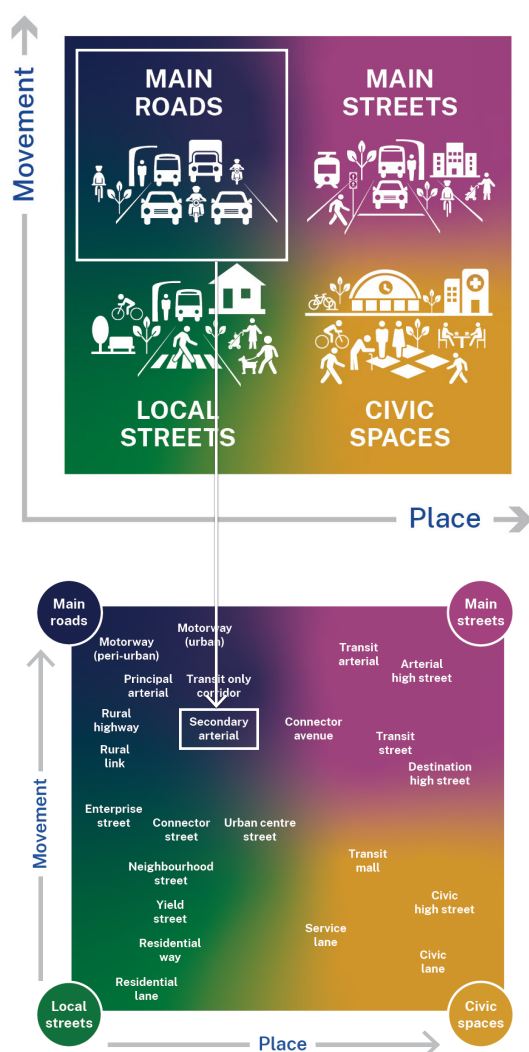
Secondary Arterials exist in a suburban, peri urban or rural context. They are designed as higher-order neighbourhood streets which typically facilitate the connection of the arterial road network to local street networks.

Secondary Arterials support vehicular and public transport activity alongside providing safe pedestrian and cycle movement.

Street priorities

- Footpaths on both sides of the street for continuous and universal accessibility
- Cycling facilities provide neighbourhood-wide access for people riding bikes
- Vehicle lanes allow for local bus routes
- 'In-lane' bus stops are provided on local routes to maintain bus priority, maximise space for bus stop amenities, and minimise impacts on continuity of verge arrangement
- Street tree planting provides a continuous tree canopy at maturity
- Low-flow runoff passively irrigates street trees and planting

Alignment with Movement and Place



PERFORMANCE BASED FRAMEWORK

Road reserve	≥26.5m
Typical AADT	≤20,000
Posted speed	60 - 70km/h
Design speed	70 - 80km/h
Bus capable	Yes
Vehicle travel lanes	3.5m
Parking provision	Nil
Parking arrangement	N/A
Walking	≥2m footpaths on both sides;
Cycling	≥1.5m one-way separated cycleway on both sides
Traffic calming	N/A
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	N/A

SUBURBAN CONTEXT



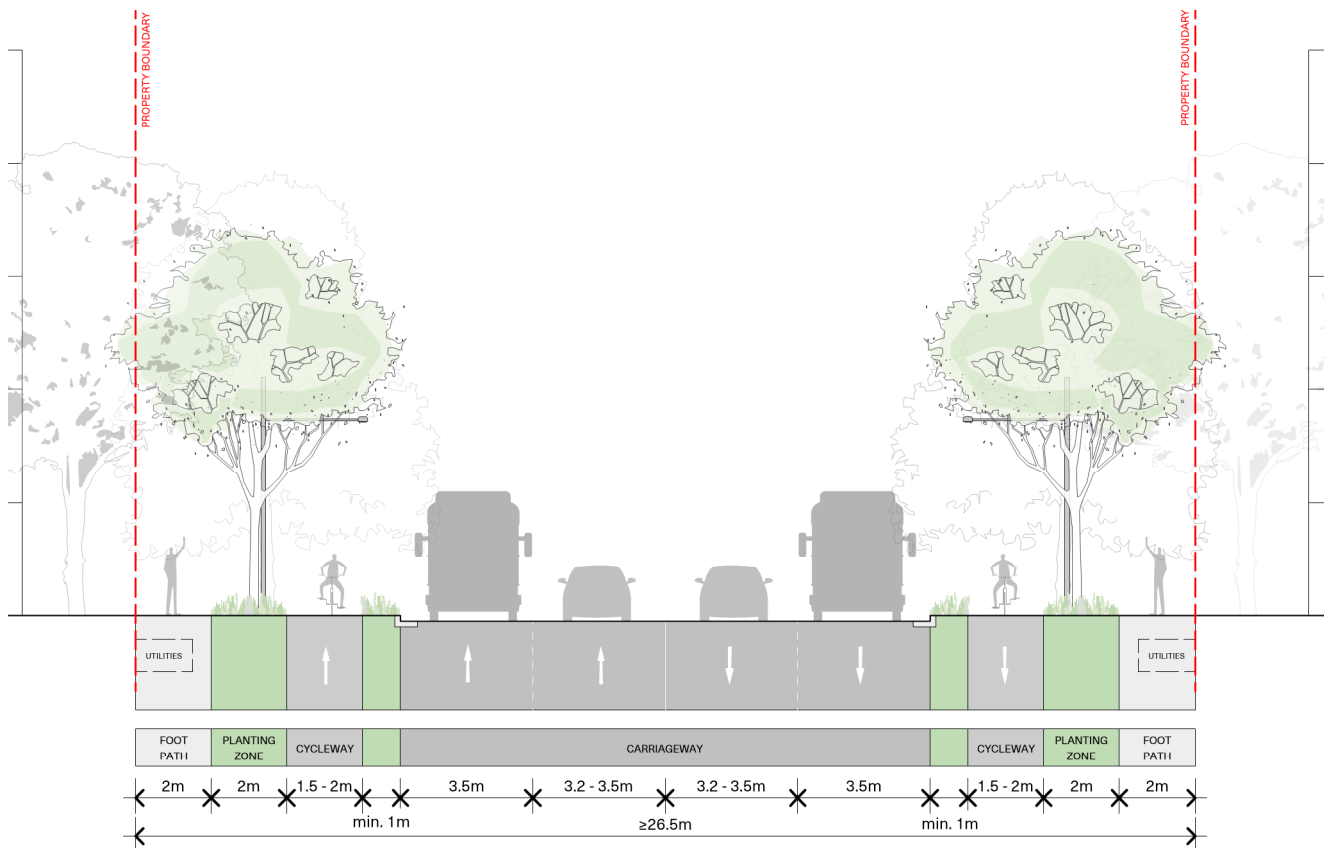
Precedent: Mulgoa Road, Regentsville (source: Google)

SUBURBAN CONTEXT

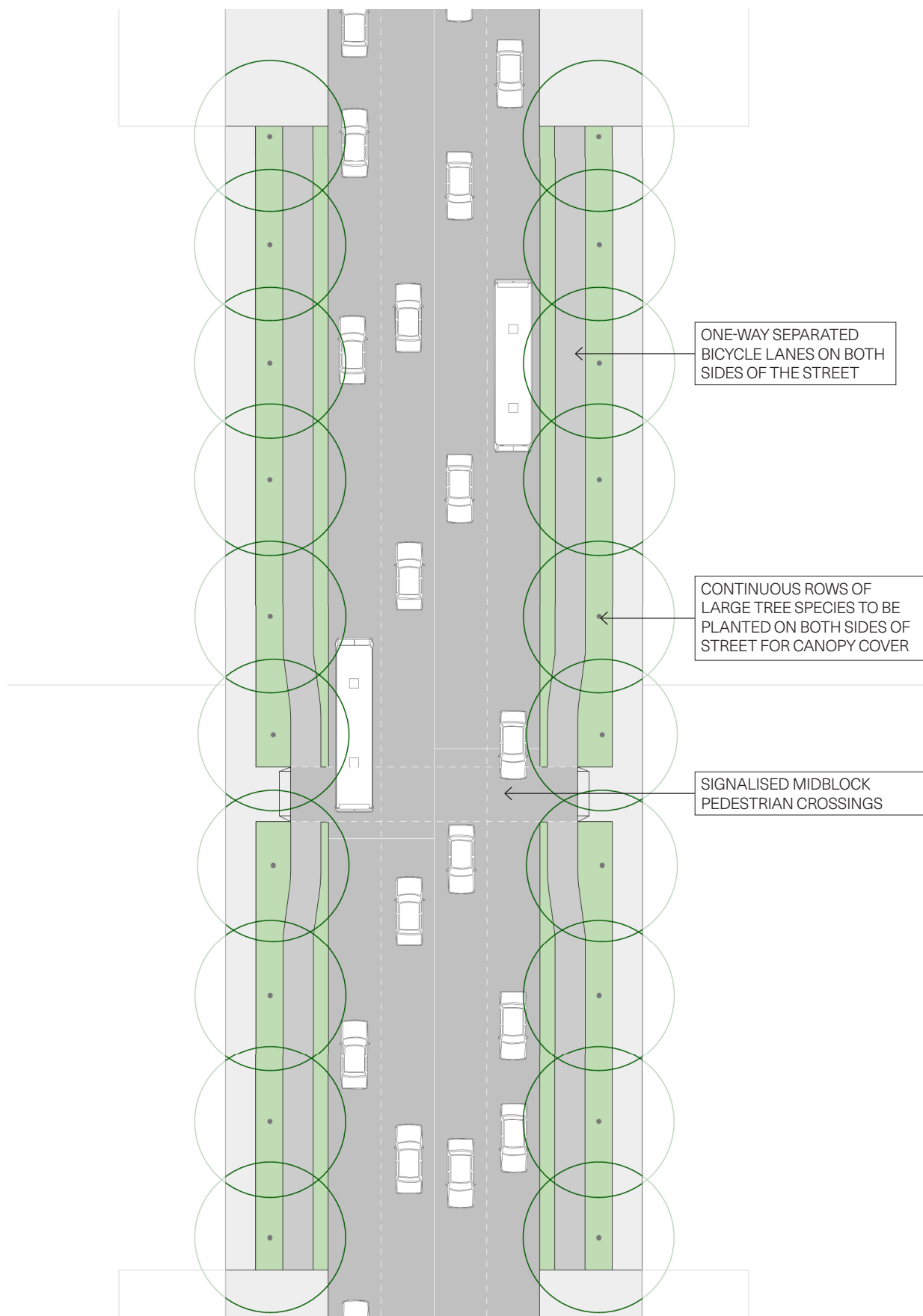


Precedent: Cowpasture Road, Cecil Hills (source: Google)

Cross section – Secondary Arterial



Concept plan – Secondary Arterial



Enterprise Street

Overview

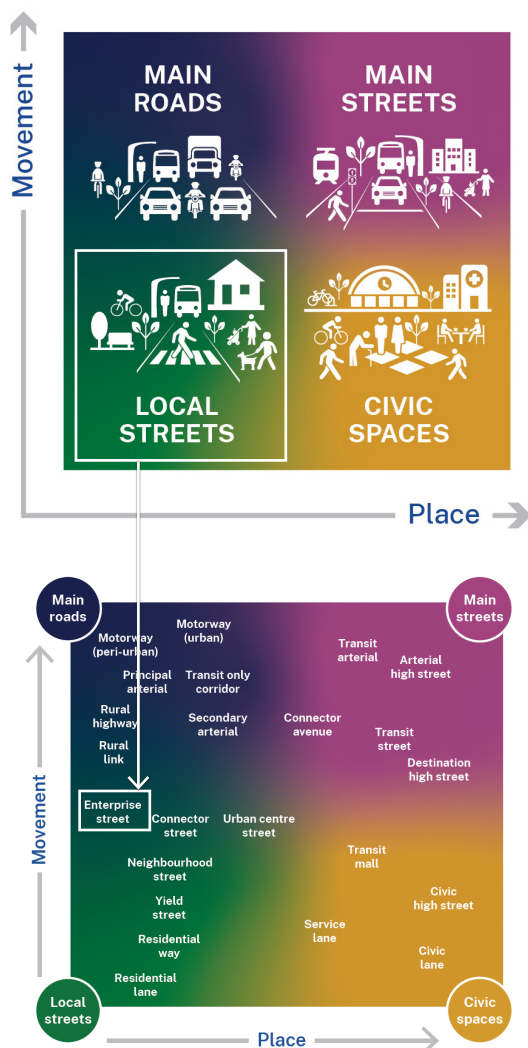
Enterprise Streets serve commercial and industrial areas, catering for both employees of these areas as well as people who deliver freight and servicing using light to heavy vehicles.

Areas within which Enterprise Streets are found are typically underserved by active and public transport, presenting an opportunity to affect sustainable mode shift by providing comfortable spaces for people to walk or ride.

Street priorities

- Paths are provided on both sides for continuous and universal accessibility
- A shared path provides a safe space for people riding bikes
- Street tree planting provides a continuous tree canopy at maturity
- Low-flow runoff passively irrigates street trees and planting
- WSUD elements are maximised to ensure neighbourhood-scale WSUD performance outcomes
- On-street vehicle parking is effectively integrated within the streetscape via indented parking bays
- Turning movements of heavy vehicles and heavy goods vehicles

Alignment with Movement and Place



PERFORMANCE BASED FRAMEWORK

Road reserve	≥ 21.5m
Typical AADT	1,000 - 4,000
Posted speed	40-50km/h
Design speed	Same as posted speed
Bus capable	Yes
Vehicle travel lanes	6.4m (+ 0.3m buffer for bus capability)
Parking provision	Varies
Parking arrangement	2.3m indented parking bays
Walking	1x ≥1.5m footpath + 1x ≥3.0m shared path
Cycling	1x ≥3.0m shared path
Traffic calming	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	≥35%

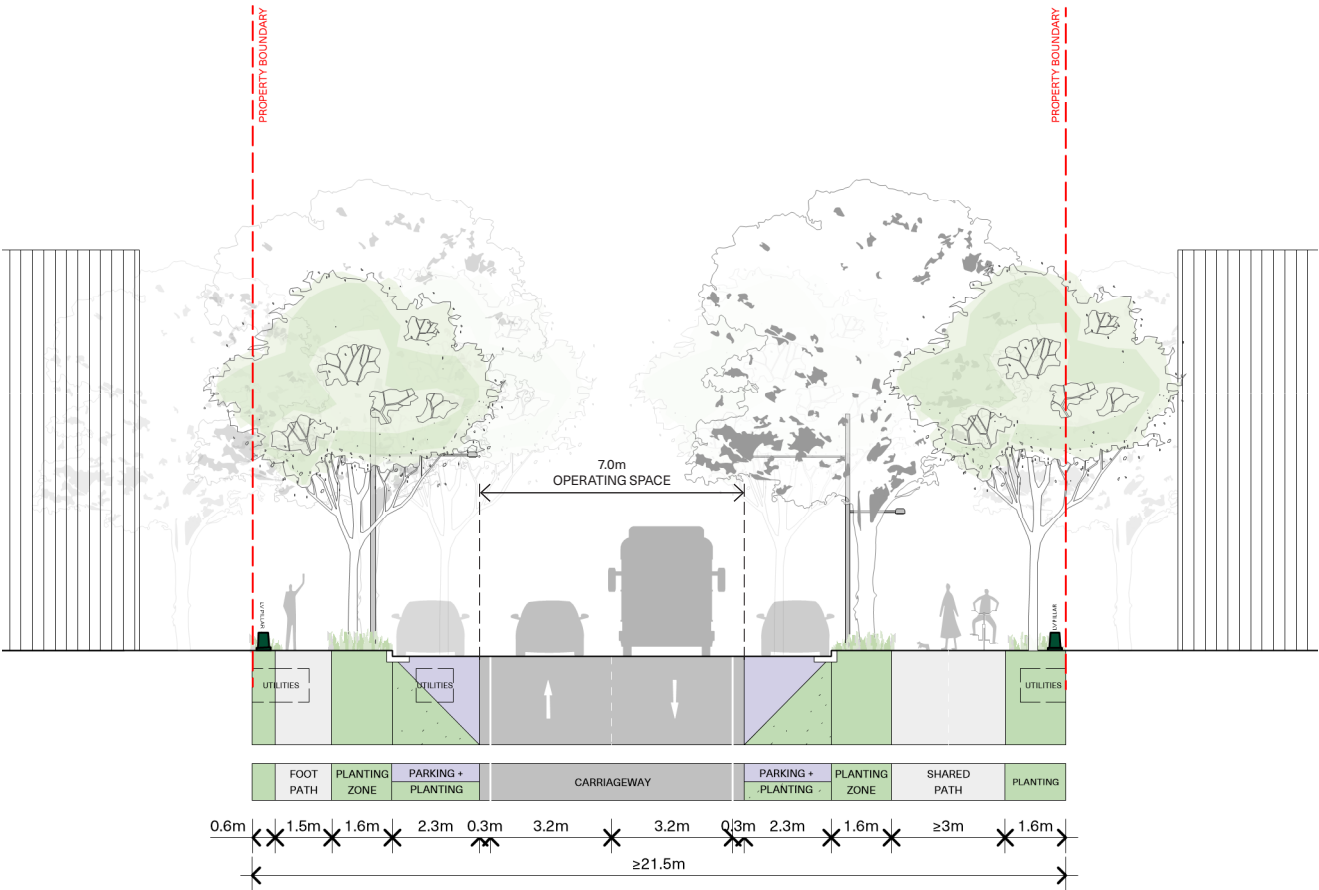


Precedent: Newton Road, Wetherill Park (source: Google)

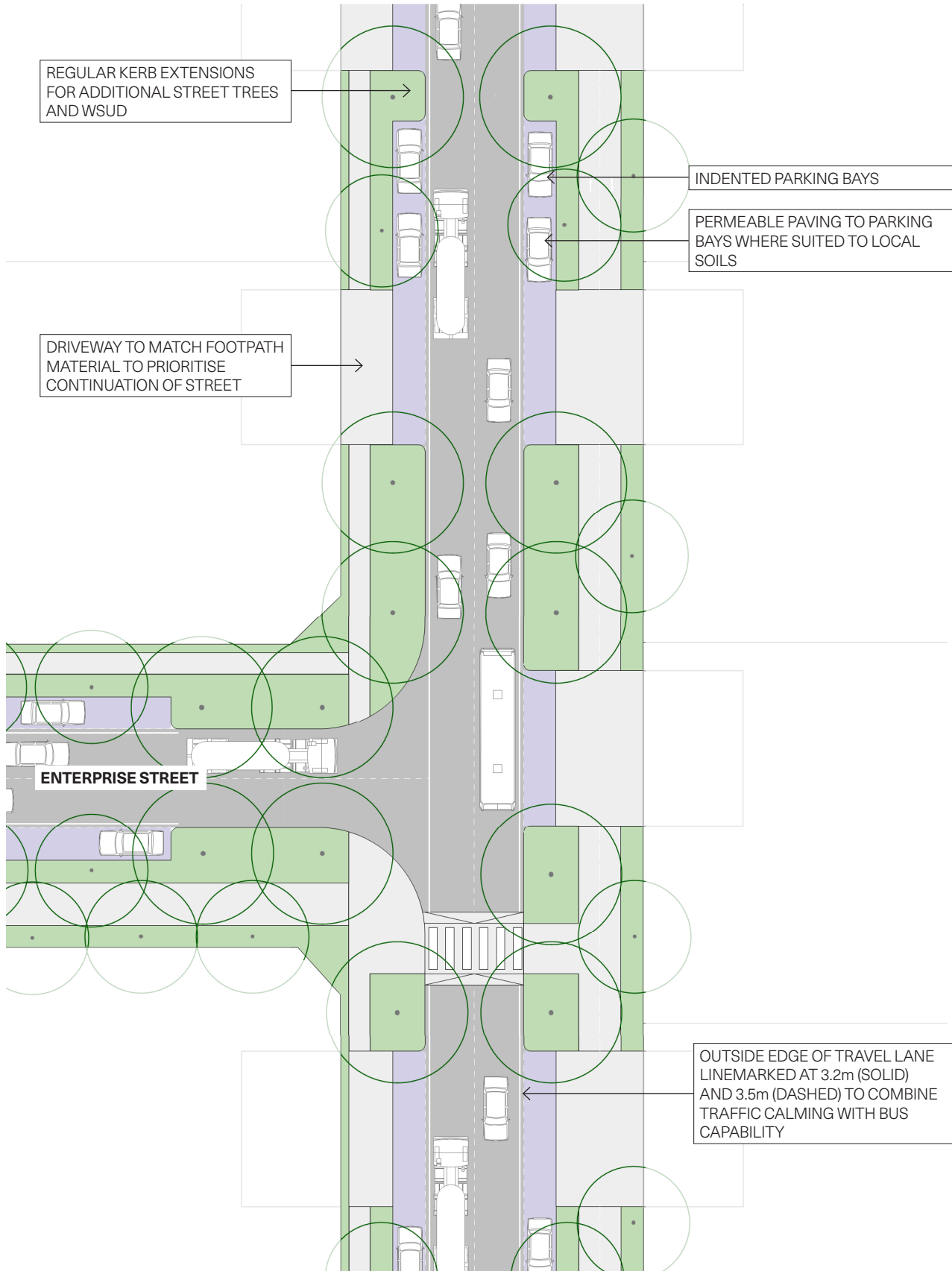


Precedent: Lockwood Road, Erskine Park (source: Google)

Cross section – Enterprise Street



Concept plan – Enterprise Street



Destination High Street

Overview

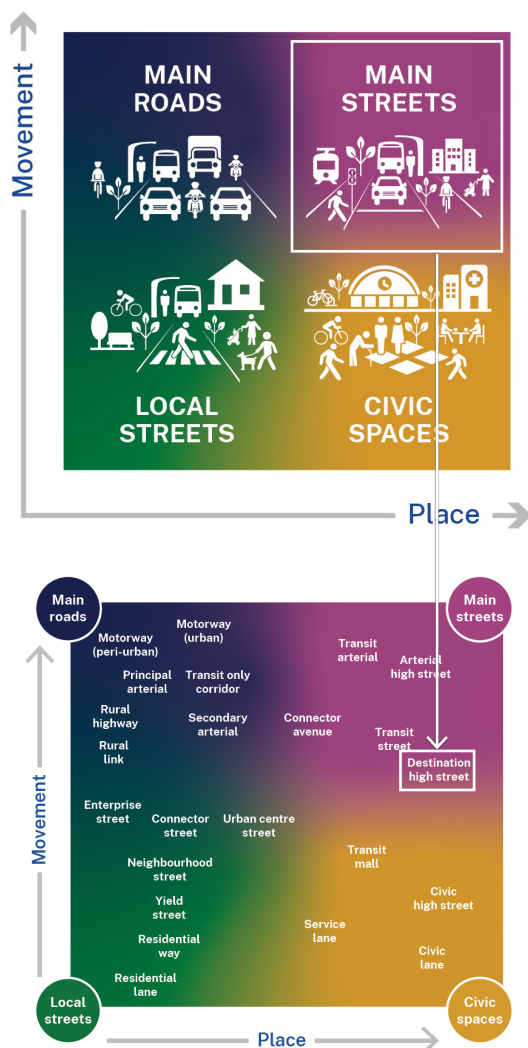
Destination High Streets are unique to commercial centres. High quality public amenity and generous verge space are crucial to the various environmental and community uses unique to Destination High Streets.

Destination High Streets are designed to foster street life and activity. Pedestrian amenity is prioritised and assembling in the street is encouraged. Footpaths are designed to accommodate high pedestrian traffic alongside other footpath uses such as seating and retail spill out. Dedicated cycling facilities provide safe and convenient access to destinations for people riding bikes.

Street priorities

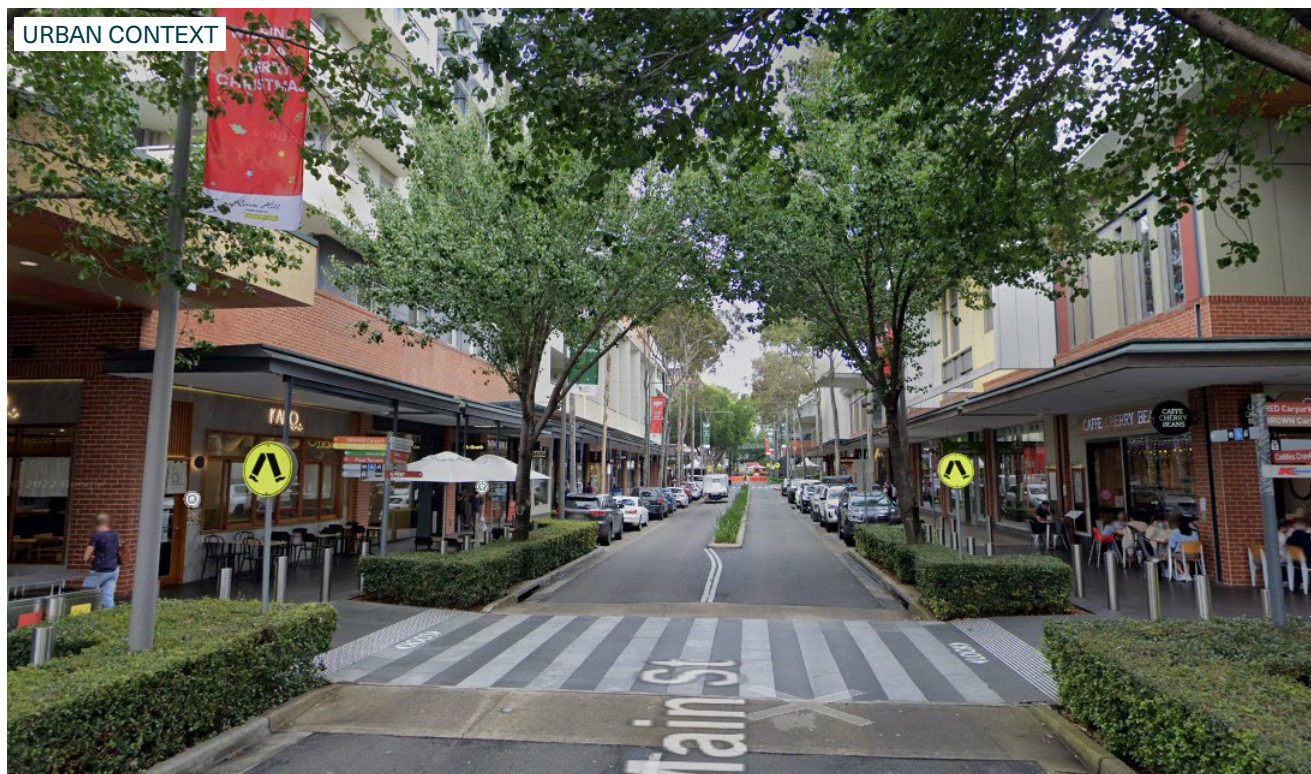
- Footpaths are generous and wide. Continuous footpath treatments are generally provided at intersections
- Separated cycleways are provided for convenient access to destinations for people riding bikes
- Street components like kerb extensions are incorporated mid-block and at intersections
- Vehicle lanes allow for local bus routes. 'In-line' bus stops are provided for local routes to maintain bus priority and continuity of verge arrangement
- Street tree planting provides a continuous tree canopy at maturity
- Low-flow runoff passively irrigates street trees and planting
- WSUD elements are maximised to ensure neighbourhood-scale WSUD performance outcomes
- On-street vehicle parking is effectively integrated within the streetscape via indented parking bays that adopt permeable paving where suited to local soils

Alignment with Movement and Place



PERFORMANCE BASED FRAMEWORK

Road reserve	≥20m
Typical AADT	≤10,000
Posted speed	30-40km/h
Design speed	Same as posted speed
Bus capable	Yes
Vehicle travel lanes	6.4m (+ 0.3m buffer for bus capability)
Parking provision	Varies
Parking arrangement	2.3m indented parking bays
Walking	≥3.0m footpaths on both sides
Cycling	≥2.0m one-way separated cycleway on both sides (unless alternate route provided)
Traffic calming	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	≥35%

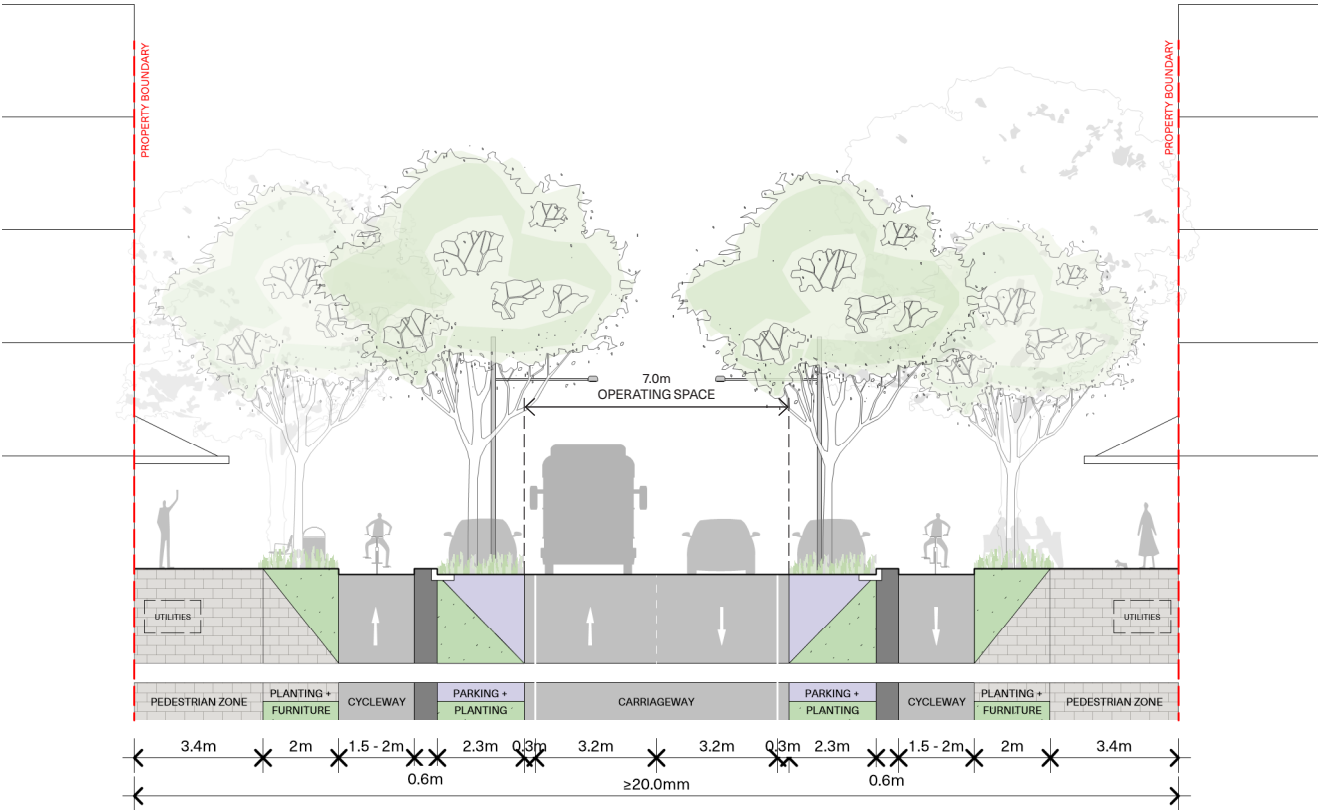


Precedent: Main Street, Rouse Hill (source: Google)

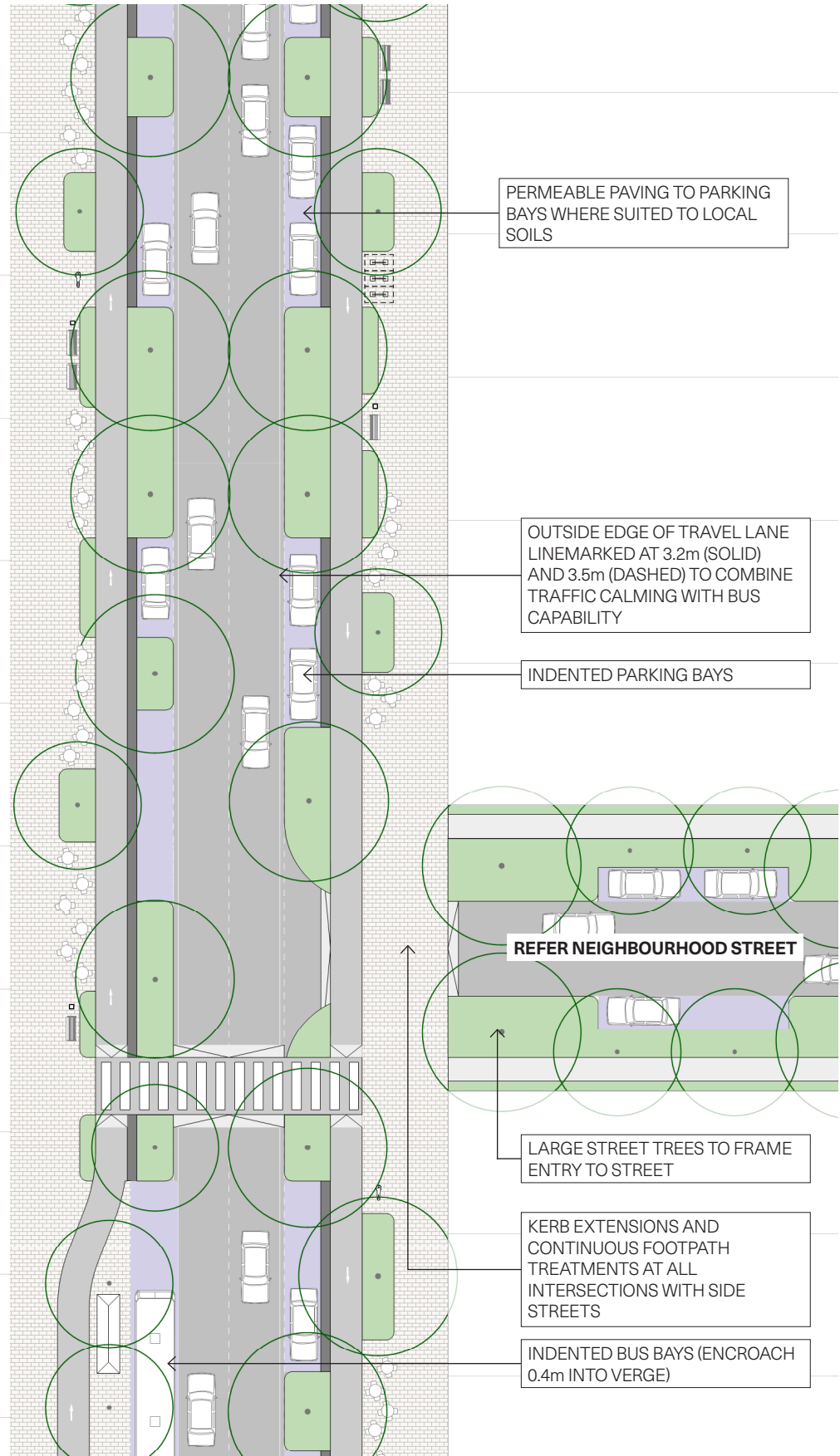


Precedent: High Street, Penrith (source: Google)

Cross section – Destination High Street



Concept plan – Destination High Street



Connector Street

Overview

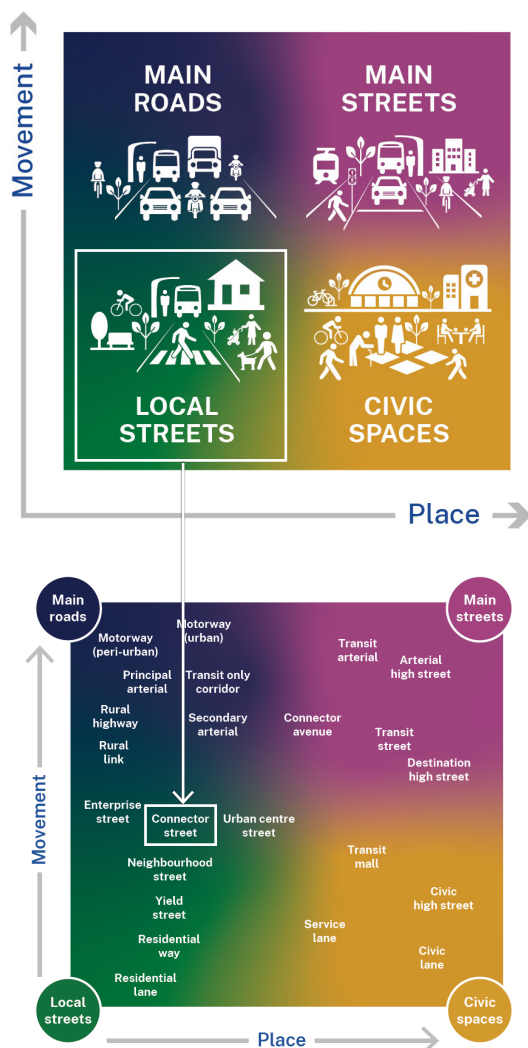
Connector Streets typically form the primary thoroughfare route into and through residential neighbourhoods. They provide important connections within and between neighbourhoods to key local destinations.

The character of Connector Streets is important to neighbourhood legibility and sense of place. Environment and local life predominate, and improved amenity is encouraged over the use of private vehicles. High quality walking, cycling and public transport facilities are all prioritised within these streets to promote sustainable travel options.

Street priorities

- Footpaths on both sides of the street for continuous and universal accessibility
- Cycling facilities provide neighbourhood-wide access for people riding bikes
- Vehicle lanes allow for local bus routes
- ‘In-lane’ bus stops are provided on local routes to maintain bus priority, maximise space for bus stop amenities, and minimise impacts on continuity of verge arrangement
- Pullover bus bays are provide on frequent routes for operational requirements
- Street tree planting provides a continuous tree canopy at maturity
- Low-flow runoff passively irrigates street trees and planting
- On-street vehicle parking is effectively integrated within the streetscape via indented parking bays that adopt permeable paving where suited to local soils

Alignment with Movement and Place



PERFORMANCE BASED FRAMEWORK

Road reserve	≥21.5m
Typical AADT	2,000 - 5,000
Posted speed	40-60km/h
Design speed	Same as posted speed
Bus capable	Yes
Vehicle travel lanes	3.2m (+ 0.3m buffer for bus capability)
Parking provision	Varies
Parking arrangement	2.3m indented parking bays
Walking	≥1.5m footpaths on both sides; or 1x ≥1.5m footpath + 1x ≥3.0m shared path
Cycling	≥2.5m separated cycleway; or 1x ≥3.0m shared path
Traffic calming	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	≥35%

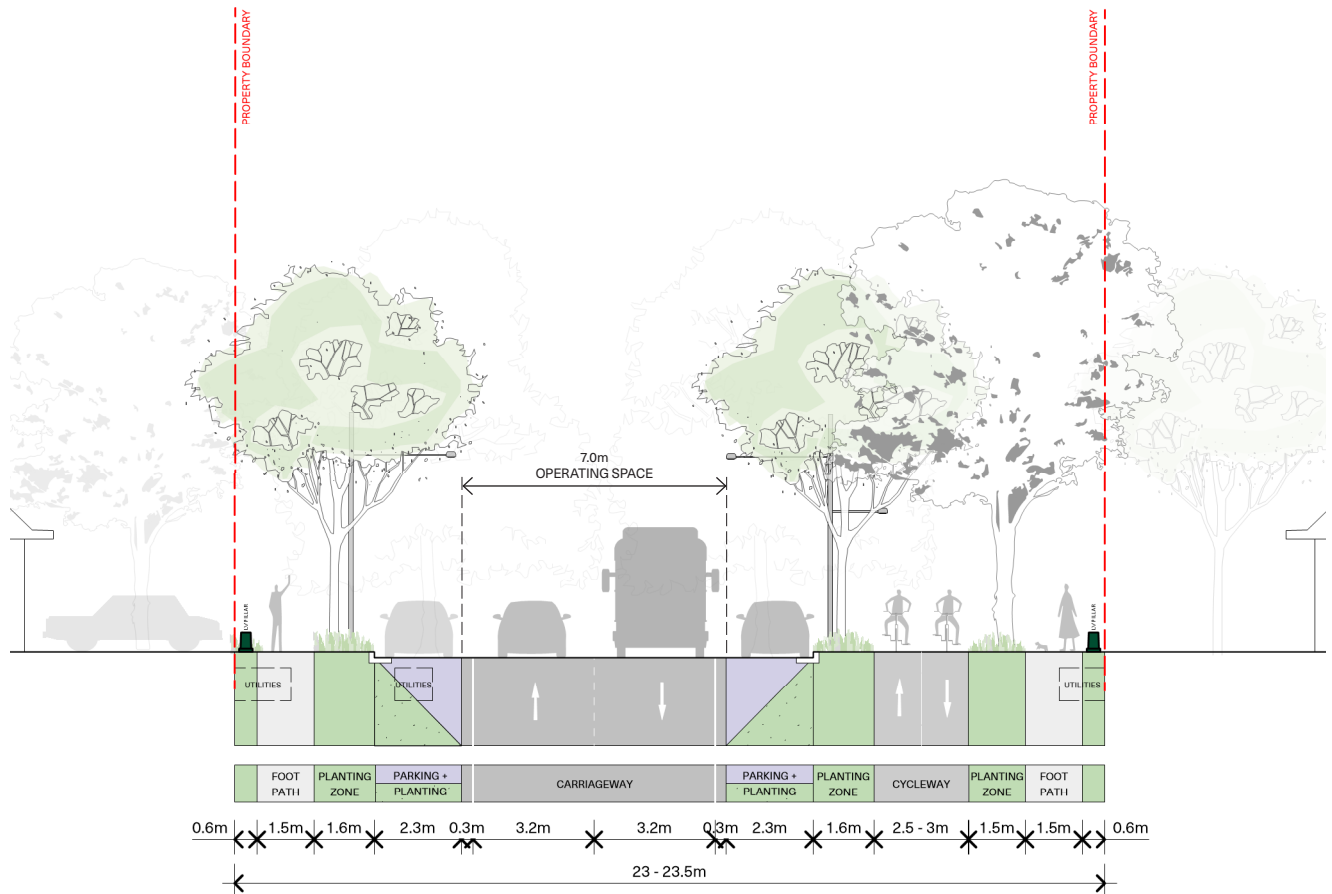


Precedent: Bigge Street, Liverpool (source: Google)

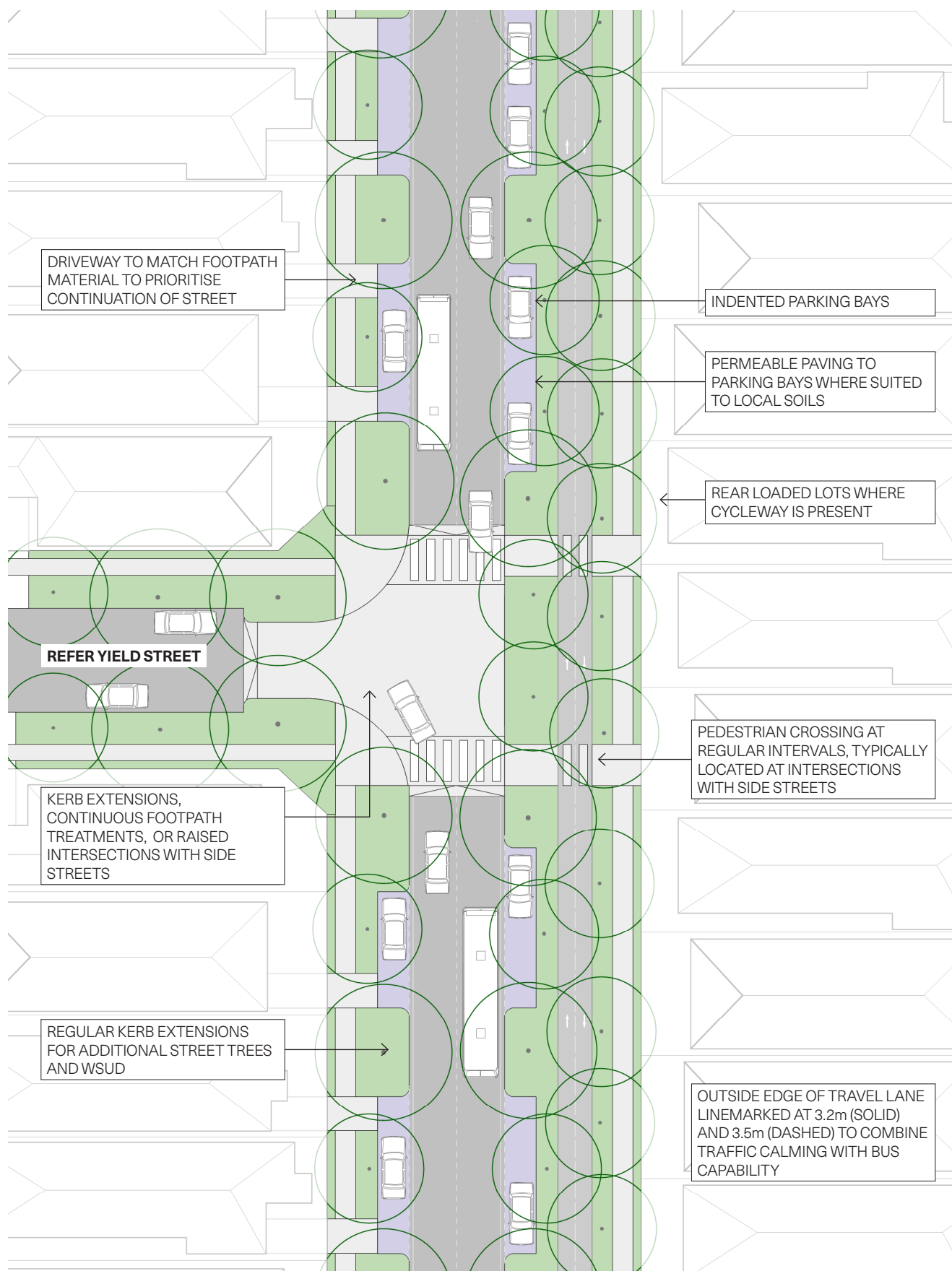


Precedent: Station Street, Penrith (source: Google)

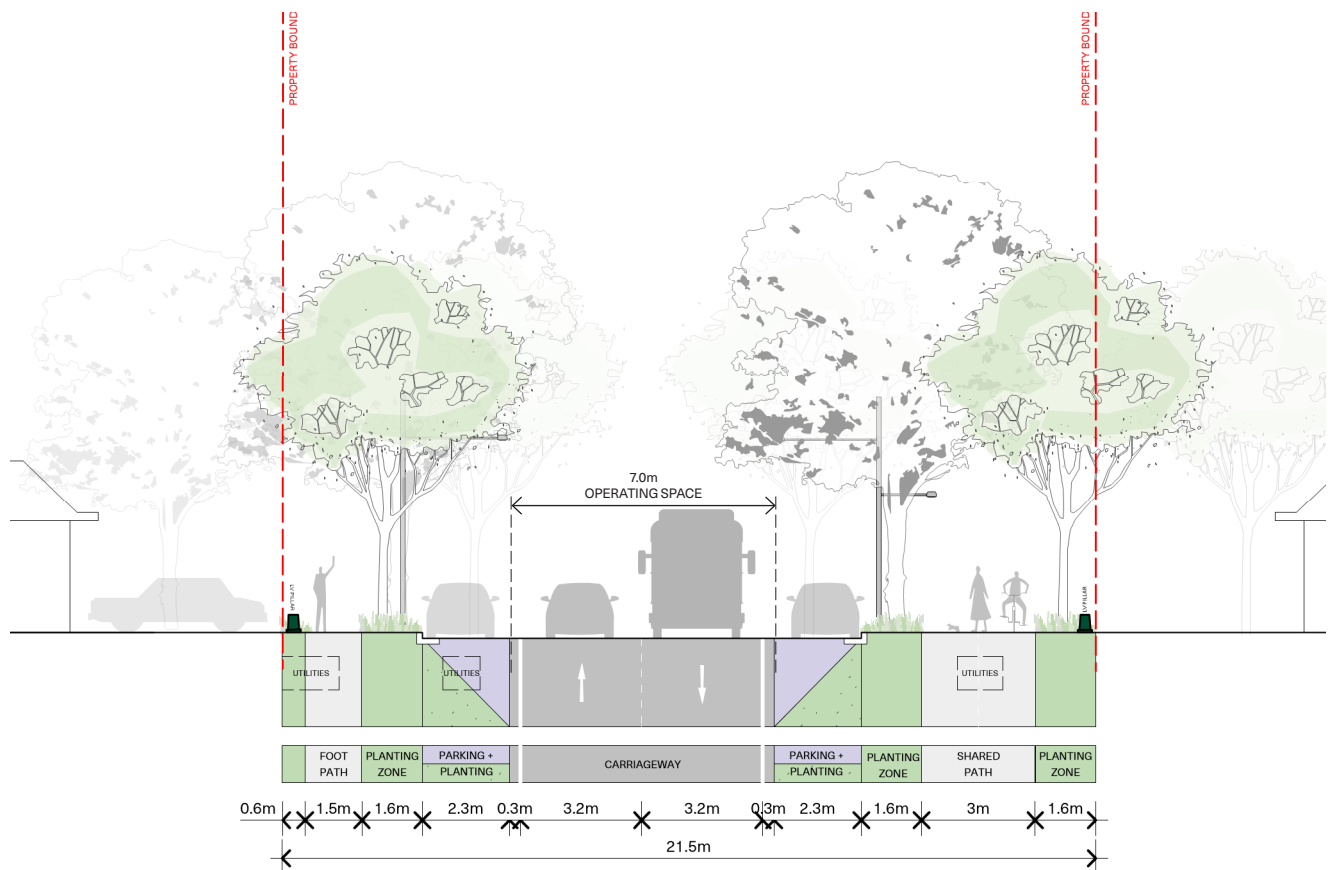
Cross section – Connector Street (Separated cycleway)



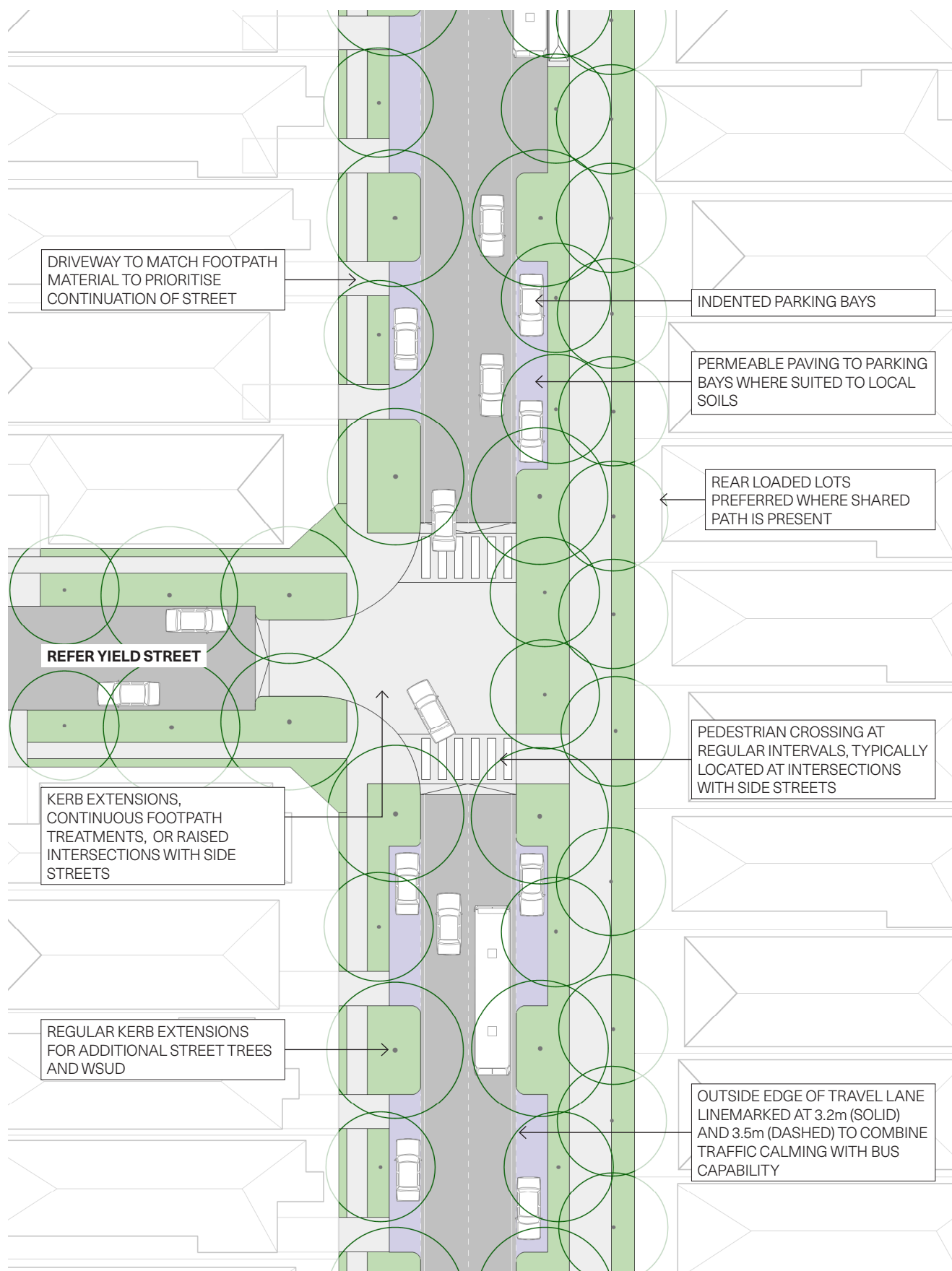
Concept plan – Connector Street (Separated cycleway)



Cross section – Connector Street (Shared path)



Concept plan – Connector Street (Shared path)



Neighbourhood Street

Overview

Neighbourhood Streets are quiet, predominantly residential streets that are designed to maximise place outcomes and encourage people to spend time in a low speed environment.

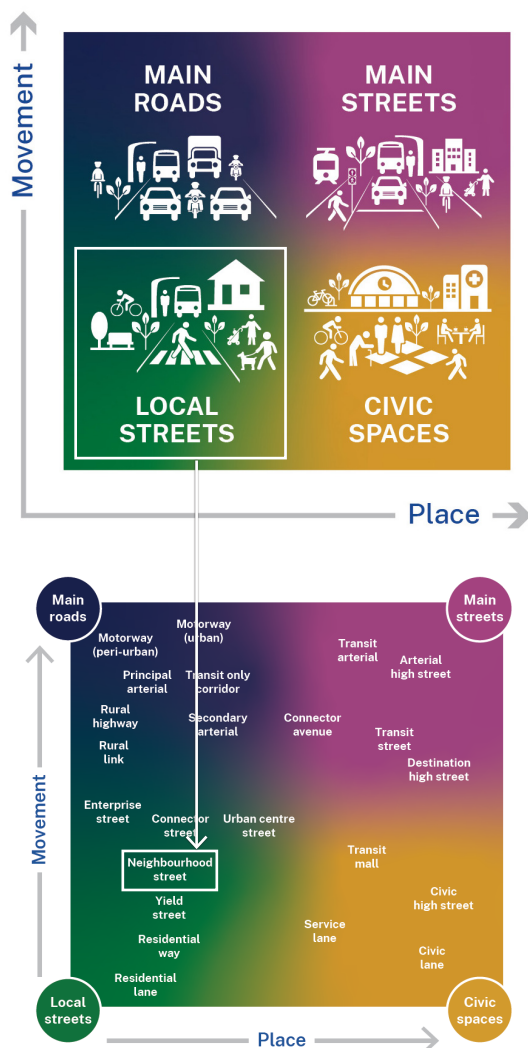
They are designed to accommodate low to medium levels of through-traffic around local destinations such as schools and open spaces.

Street trees and indented parking bays line both sides of a relatively narrow carriageway and verges give space to various environmental and community uses.

Street priorities

- Footpaths are provided on both sides for continuous and universal accessibility
- A slow street environment allows for cyclists of all ages to safely use the vehicle travel zone
- Street tree planting provides a continuous tree canopy at maturity
- Low-flow runoff passively irrigates street trees and planting
- WSUD elements are maximised to ensure neighbourhood-scale WSUD performance outcomes
- On-street vehicle parking is effectively integrated within the streetscape via indented parking bays that adopt permeable paving where suited to local soils

Alignment with Movement and Place



PERFORMANCE BASED FRAMEWORK

Road reserve	≥18m
Typical AADT	500 - 2,000
Posted speed	20 -30km/h
Design speed	Same as posted speed
Bus capable	No
Vehicle travel lanes	6.0m
Parking provision	≤0.75 per lot
Parking arrangement	2.1m indented parking bays
Walking	≥1.5m footpaths on both sides
Cycling	Quietway - refer TfNSW Cycleway Design Toolbox
Traffic calming	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	≥35%

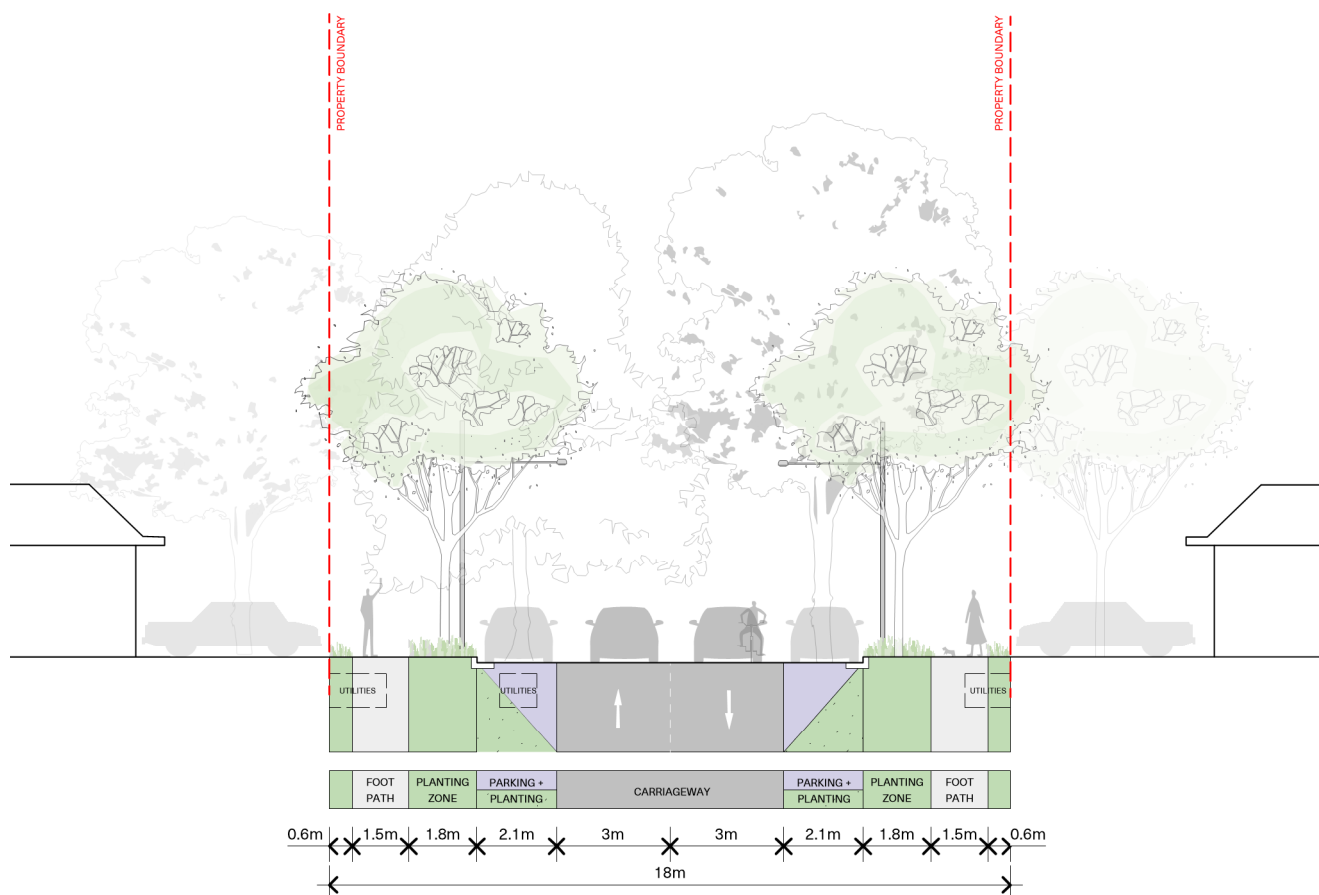


Precedent: Antwerp Street, Bankstown (source: Google)

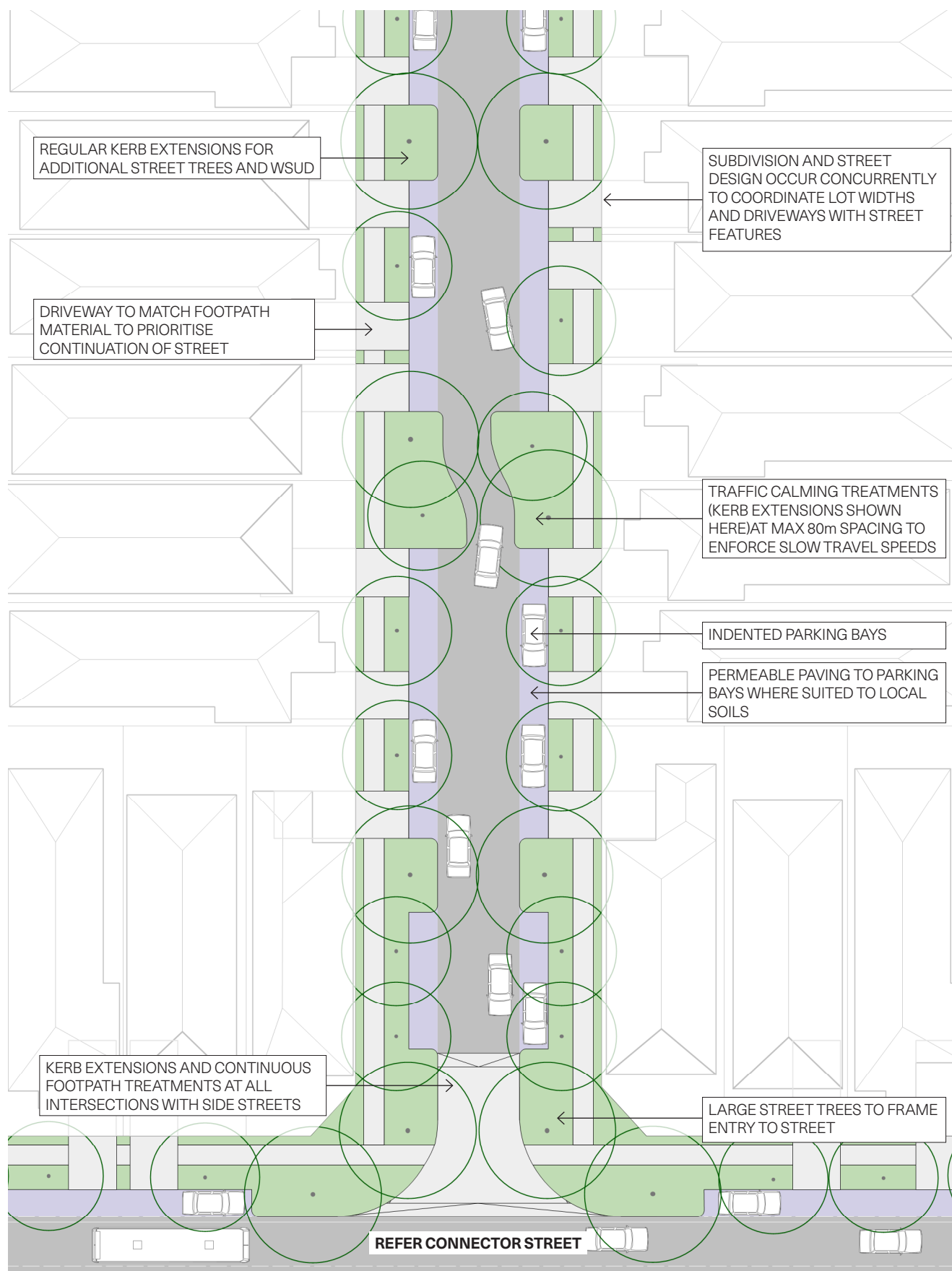


Precedent: Pennyroyal Boulevard, Denham Court (source: Google)

Cross section – Neighbourhood Street



Concept plan – Neighbourhood Street



Yield Street

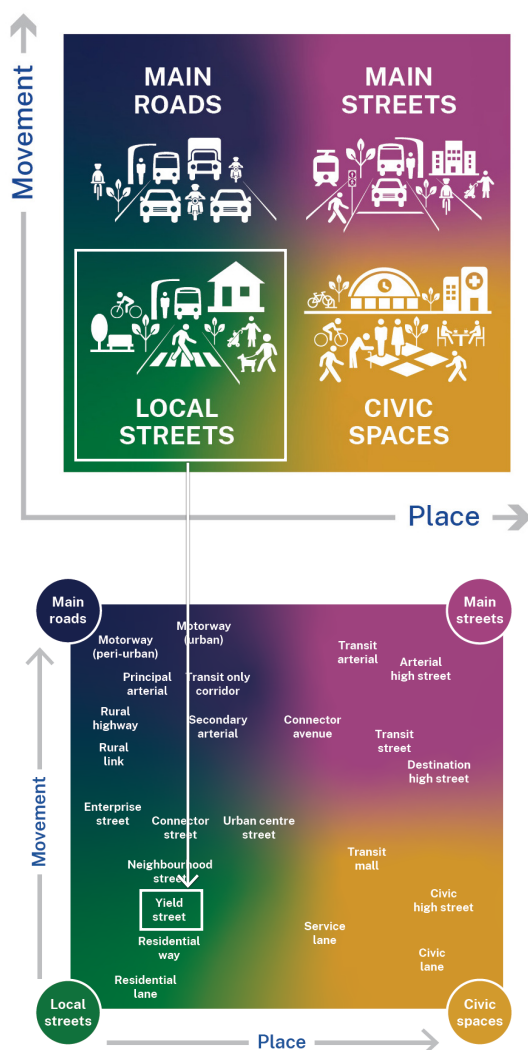
Overview

Yield Streets are quiet residential streets designed to be very slow speed environments. They are two-way, with a relatively low volume of traffic, providing an amenable living environment for residents and slow movement space for people travelling along the street.

Yield streets require slower, cooperative driving—people driving vehicles yield to one another where the available driving space is constrained by parked vehicles or other traffic calming measures.

Narrow carriageways also provide for larger verge dimensions, creating significant soil volumes for optimal street tree growth and canopy coverage of footpaths and the carriageway.

Alignment with Movement and Place



Street priorities

This type is not appropriate in situations where demand for on-street parking is projected to be high (e.g. areas with several narrow lots, near shops, near train stations, or without frequent driveways). Otherwise, this will ultimately result in the street only functionally having a single travel lane, and require costly interventions such as indented parking bays.

- Footpaths on both sides of the street for continuous and universal accessibility
- Very slow street environment allows for cyclists to safely use the vehicle travel zone
- Verges on both sides of the street provide adequate soil volume for optimal street tree growth and a continuous tree canopy at maturity
- All impervious surfaces graded to allow for passive irrigation of street planting
- WSUD systems are provided at key locations (e.g. intersections with other streets) to improve water quality
- Design as 'very slow streets' with minimised carriageways and increased vehicle calming measures

PERFORMANCE BASED FRAMEWORK

Road reserve	≥16m
Typical AADT	500 - 2,000
Posted speed	20-40km/h
Design speed	Same as posted speed
Bus capable	No
Vehicle travel lanes	=7.6m kerb-to-kerb two-way carriageway
Parking provision	≤0.75 per lot
Parking arrangement	Kerbside within carriageway to enforce yield for vehicles (no indented bays)
Walking	≥1.5m footpaths on both sides
Cycling	Quietway - refer TfNSW Cycleway Design Toolbox
Traffic calming	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	≥35%

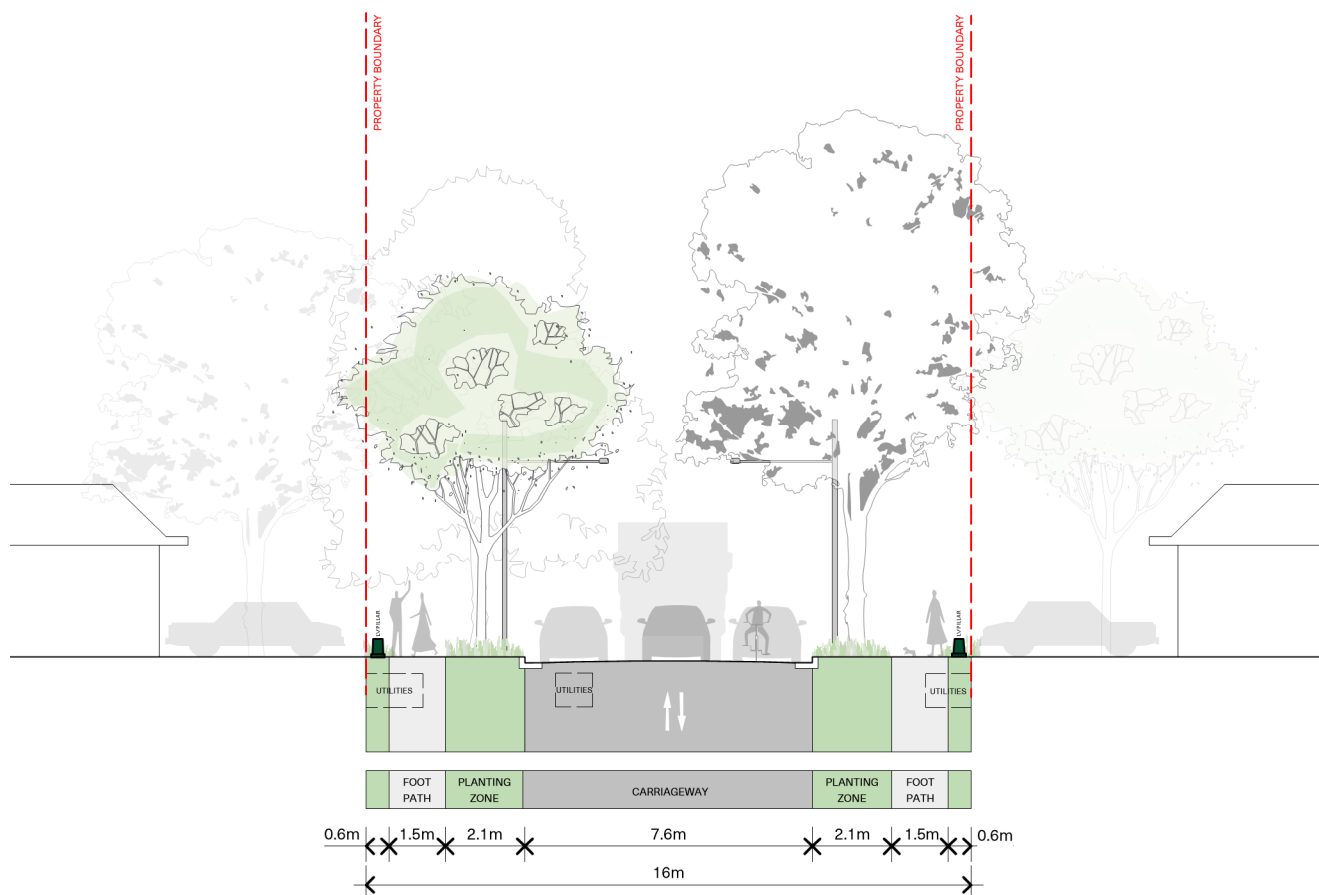


Precedent: Orth Street, Kingswood (source: Google)

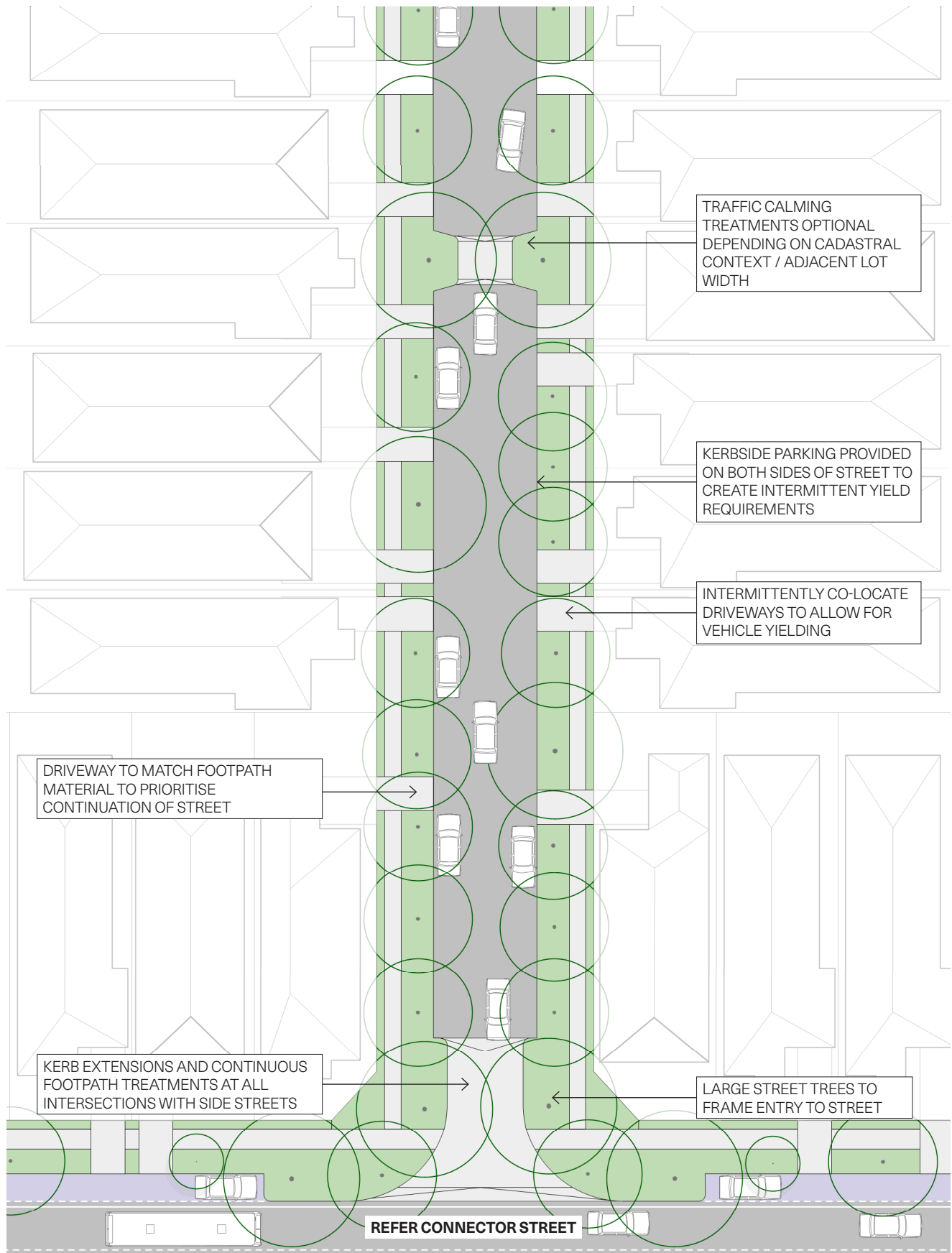


Precedent: Butler Crescent, South Penrith (source: Google)

Cross section – Yield Street



Concept plan – Yield Street



Residential Way

Overview

Residential Ways are very quiet residential streets that encourage a variety of place and movement uses, creating safe environments for all street users to spend time in.

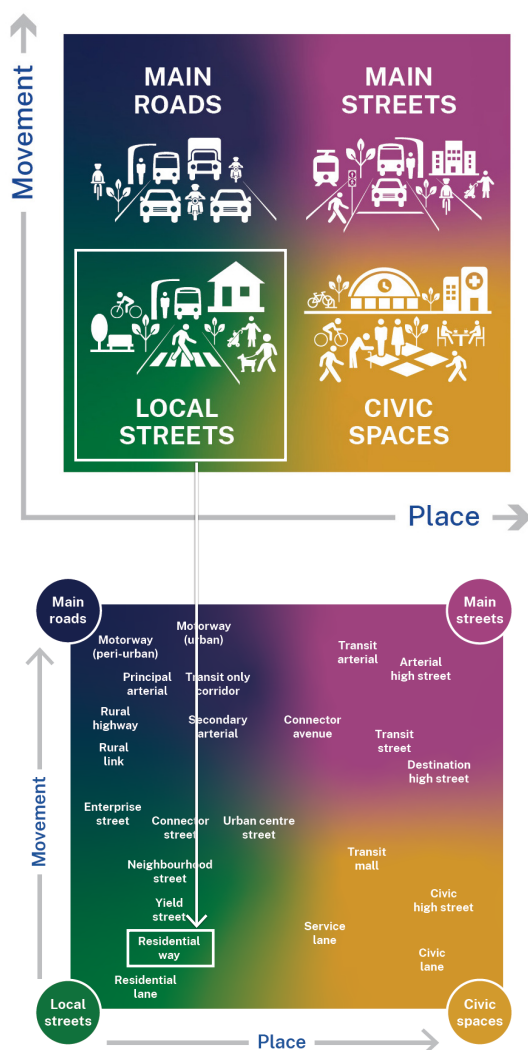
They provide a very low speed and volume of movement within a shared travel zone designed to prioritise pedestrian and environmental amenity. The use of traffic calming measures and an absence of footpaths encourages informal sharing of street space between all street users.

Residential Ways are designed to have a clearly identifiable shared zone character, with either unstructured car parking or car parking on one side.

Street priorities

- A very slow shared zone street environment is provided which allows for pedestrians, cyclists of all ages and vehicles to safely use the travel zone
- Active travel infrastructure facilitates connectivity to nearby public transport stops
- Verge swales are utilised to consolidate large areas of soil for optimal street tree growth and a continuous tree canopy at maturity
- All impervious surfaces are graded to allow for passive irrigation of street planting
- Permeability of parking bays is maximised with street trees and WSUD features integrated

Alignment with Movement and Place



PERFORMANCE BASED FRAMEWORK

Road reserve	≥14m
Typical lots served	≈10-15
Typical AADT	100 - 1,000
Posted speed	10-20km/h
Design speed	Same as posted speed
Bus capable	No
Vehicle travel lanes	5.6m two-way carriageway
Parking provision	≤0.5 per lot
Parking arrangement	≤2.4m indented parking bays (with 'parking in bays only' signage)
Walking	1.2m footpath and within shared zone
Cycling	Within shared zone
Traffic calming	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide
Permeability	≥35%

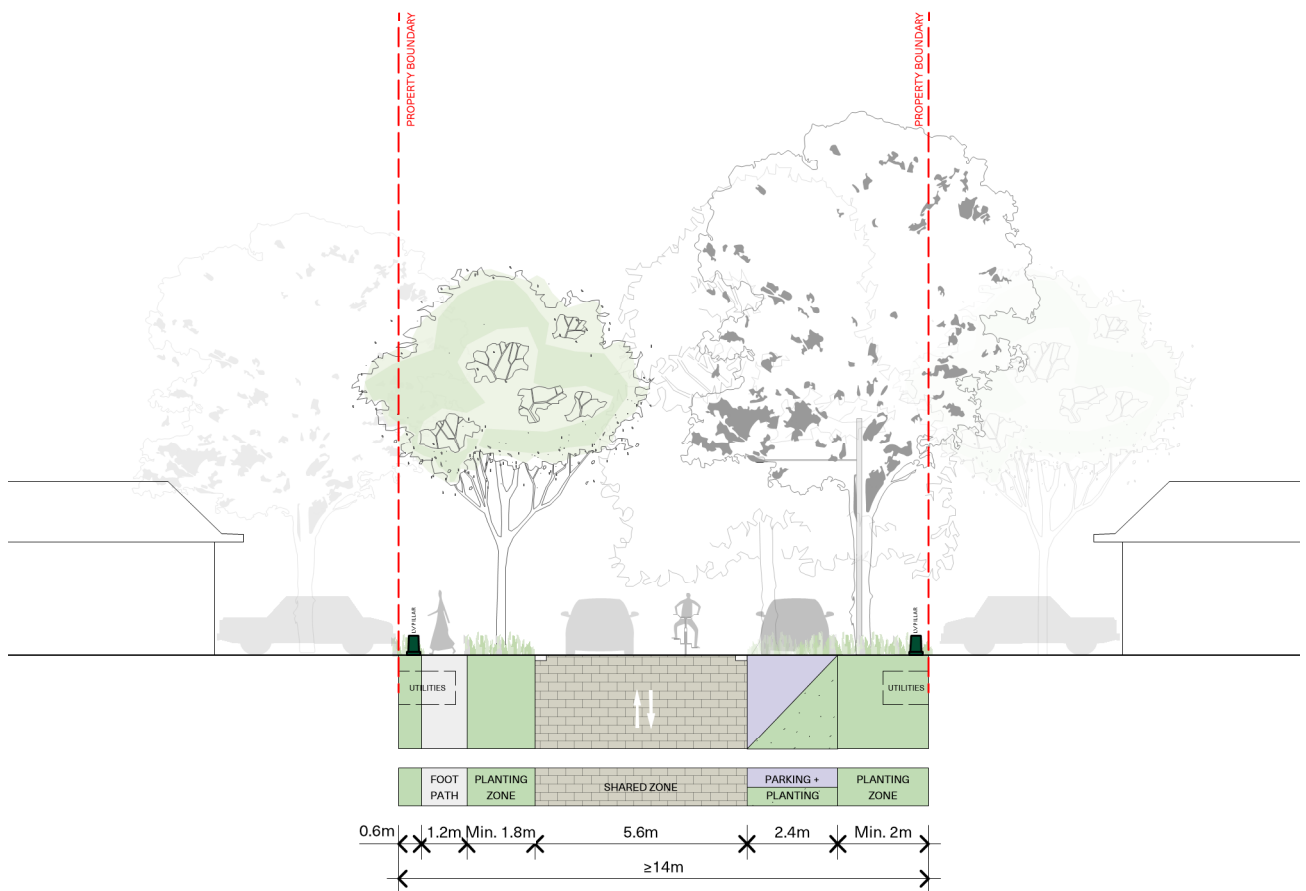


Precedent: Alliot Mews, Edmondson Park (source: Google)

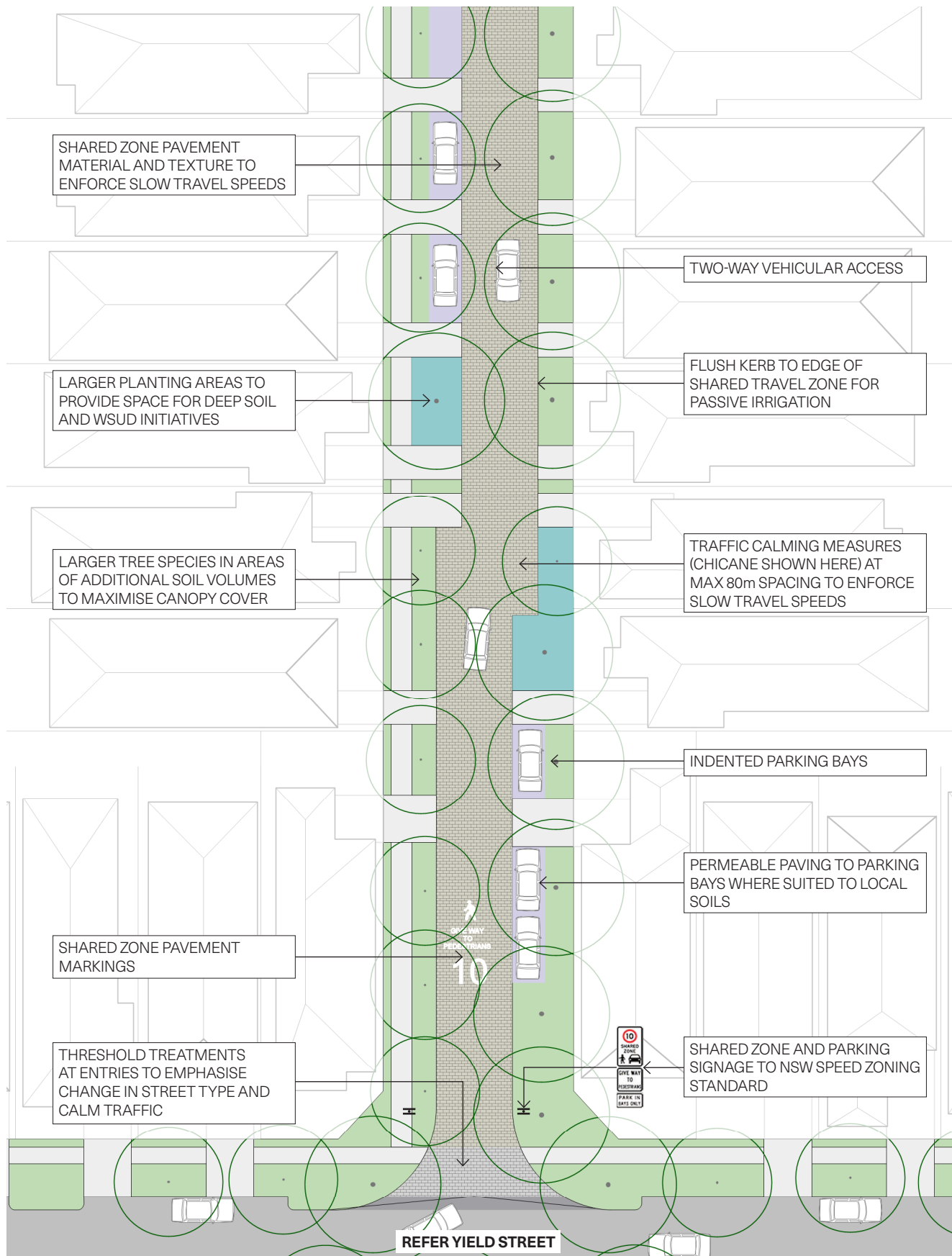


Precedent: John McLennan Circuit, Harrington Park (source: Google)

Cross section – Residential Way



Concept plan – Residential Way



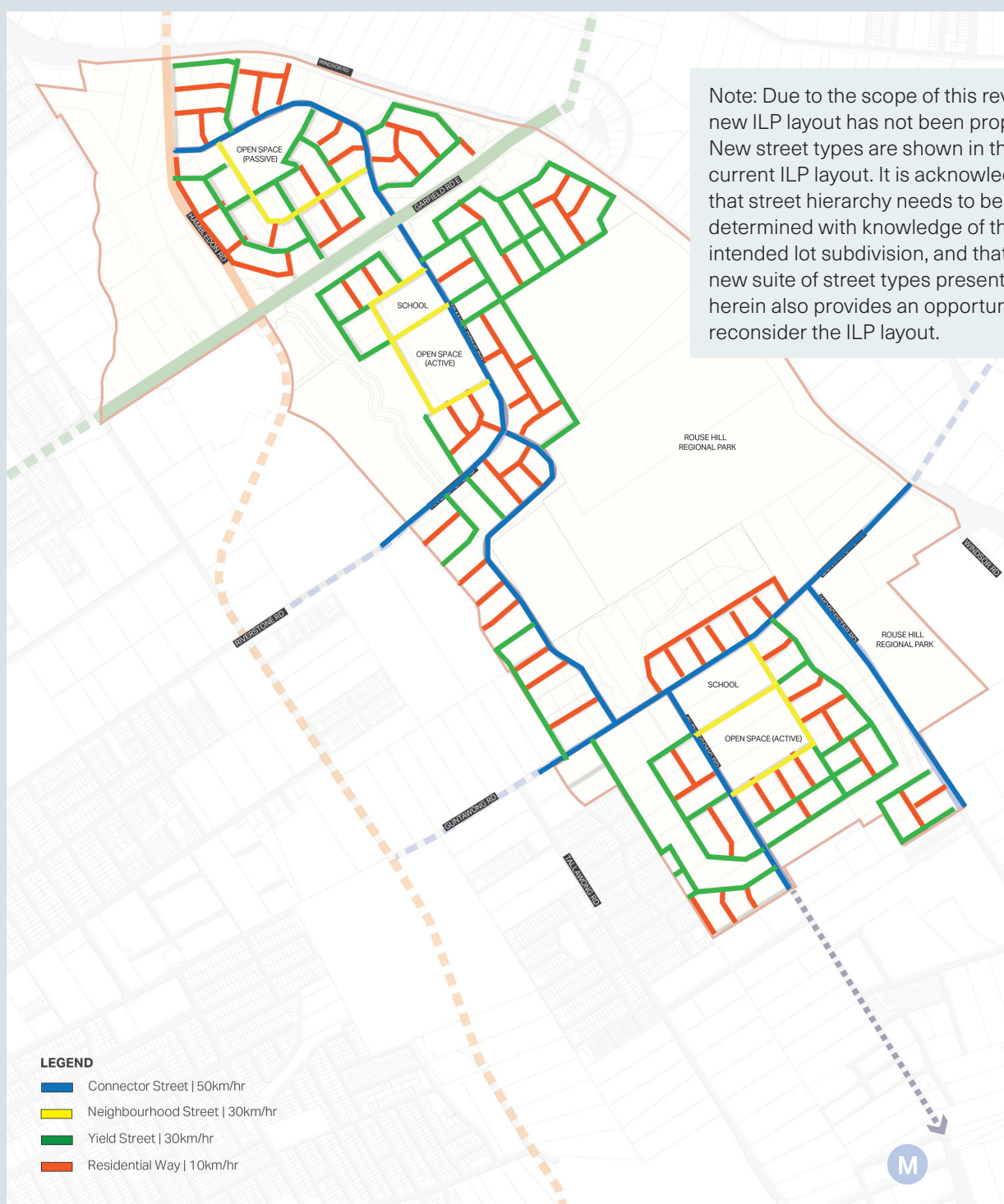
YIELD ANALYSIS

DRAFT ILP STREETS

Low Density	176,707m ²
Medium Density	453,981m ²
High Density	267,932m ²
Total Yield	898,620m²

PROPOSED NEW STREETS

Low Density	179,269m ²
Medium Density	457,878m ²
High Density	271,614m ²
Total Yield	908,761m²



Note: Due to the scope of this review, a new ILP layout has not been proposed. New street types are shown in the current ILP layout. It is acknowledged that street hierarchy needs to be determined with knowledge of the intended lot subdivision, and that the new suite of street types presented herein also provides an opportunity to reconsider the ILP layout.

Proposed updated street hierarchy adopting some of the street types presented herein.



Bourke Street cycleway (credit: Simon Woods, City of Sydney)

Section 3

Street Components



Street trees

Overview

There is overwhelming evidence that good tree canopy reduces ambient temperatures and mitigates the urban heat island effect through shade and evapotranspiration.

Western Sydney has a high number of significant heat days relative to the rest of Sydney and, in the context of a changing climate, the number of significant heat days is only set to increase.

Ambitious targets are being set across Western Sydney to increase tree canopy cover. These targets will help alleviate the urban heat island effect and create liveable streets and communities. However, many recently delivered local streets appear unlikely to achieve meaningful tree canopy coverage and a consequent reduction in ambient temperatures (refer case studies presented below and on the following page).

Street priorities

Priorities presented herein are intended to supplement, not replace, those presented in the Guidelines:

- Refer [Greener Neighbourhoods Guide](#) (NSW DPHI) for urban tree canopy targets
- Streets are to be designed to incorporate as many trees as possible in order to provide the extensive urban tree canopy required to reduce ambient temperatures.
- The number of street trees to be planted should not be tied to a development lot-related ratio (e.g. 1 tree per lot).
- The provision of on-street parking must be balanced with the need to plant street trees in the Flex Zone.
- Verge widths are to be maximised to provide adequate soil volume for optimal tree growth, with other design factors, such as the width of footpaths, balanced with the need for significant street tree growth.
- Spacings between street trees should be reduced as much as practicable.

CASE STUDY - LOCAL STREETS IN WESTERN SYDNEY

Local streets recently delivered across Western Sydney appear unlikely to reach urban canopy cover targets.



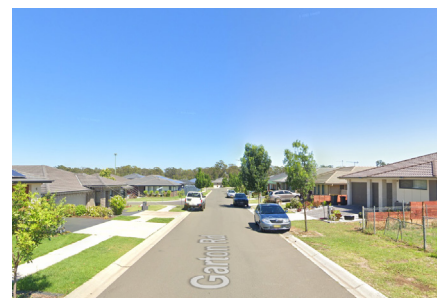
9.0m

Lotus Street, Marsden Park
Blacktown LGA
Road reserve: 16m



8.0m

Vandalay Road, Caddens
Penrith LGA
Road reserve: 16m



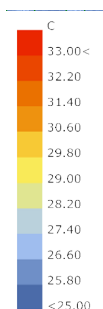
7.0m

Garton Road, Spring Farm
Camden LGA
Road reserve: 14.2m

CASE STUDY - STREET TREES AND URBAN HEAT

The Gurner Avenue Austral Master Plan, was prepared by e8urban and Scape Design for Landcom and the Office of Strategic Land. It undertook an analysis of ambient temperature that compared typical street typologies as defined by the Austral DCP against a variety of shared zones based on the Guidelines.

The analysis showed the Guidelines' shared zones provided a 6-degree reduction in ambient temperature during summer. Tree spacing was found to be a determining factor, with the Master Plan adopting tree spacing from 4m to 8m, whereas the typical Austral DCP street typologies in adjacent recently developed areas were found to be resulting in spacings between 12m and 15m.



Ambient temperatures – Austral DCP street types



Ambient temperatures – Guidelines street types

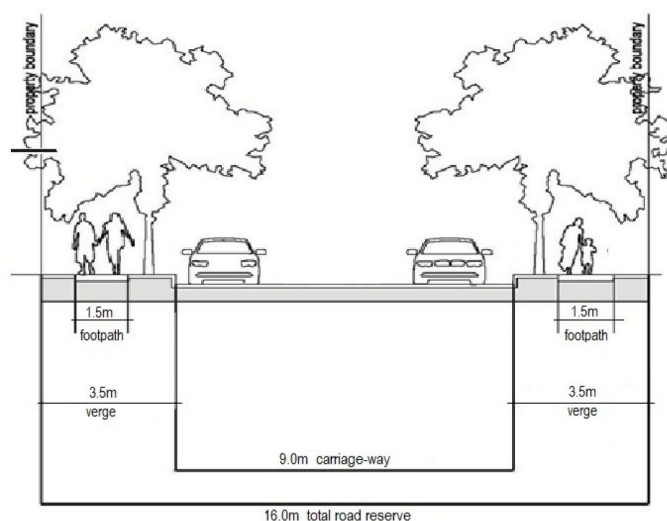


Significant street tree planting shown in the Gurner Avenue Austral Master Plan (source: e8urban + Scape Design For Landcom)

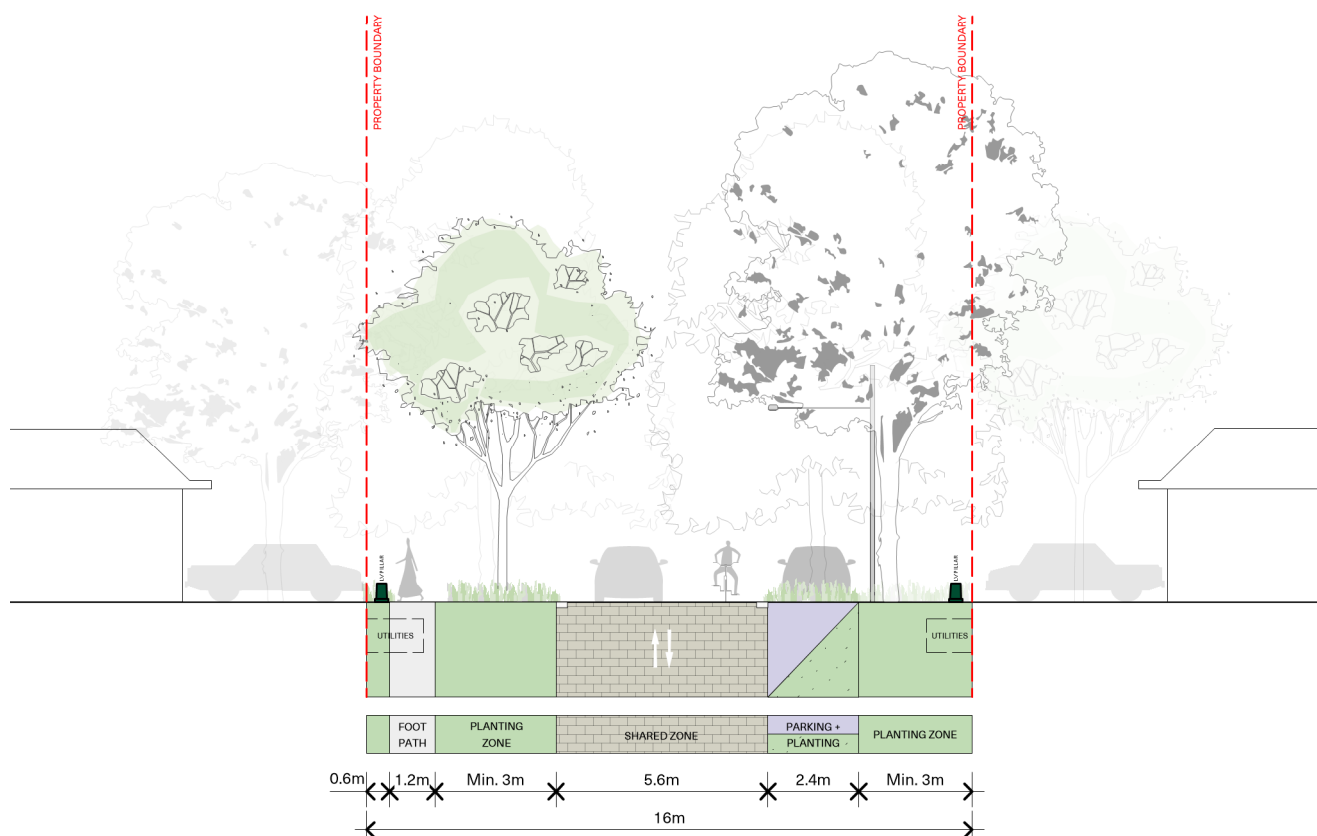
CASE STUDY - TREE CANOPY COVER

The following case study presents a comparison between the Local Street presented in Blacktown City Council's Growth Centre Precincts Development Control Plan 2010 and the Residential Way presented herein.

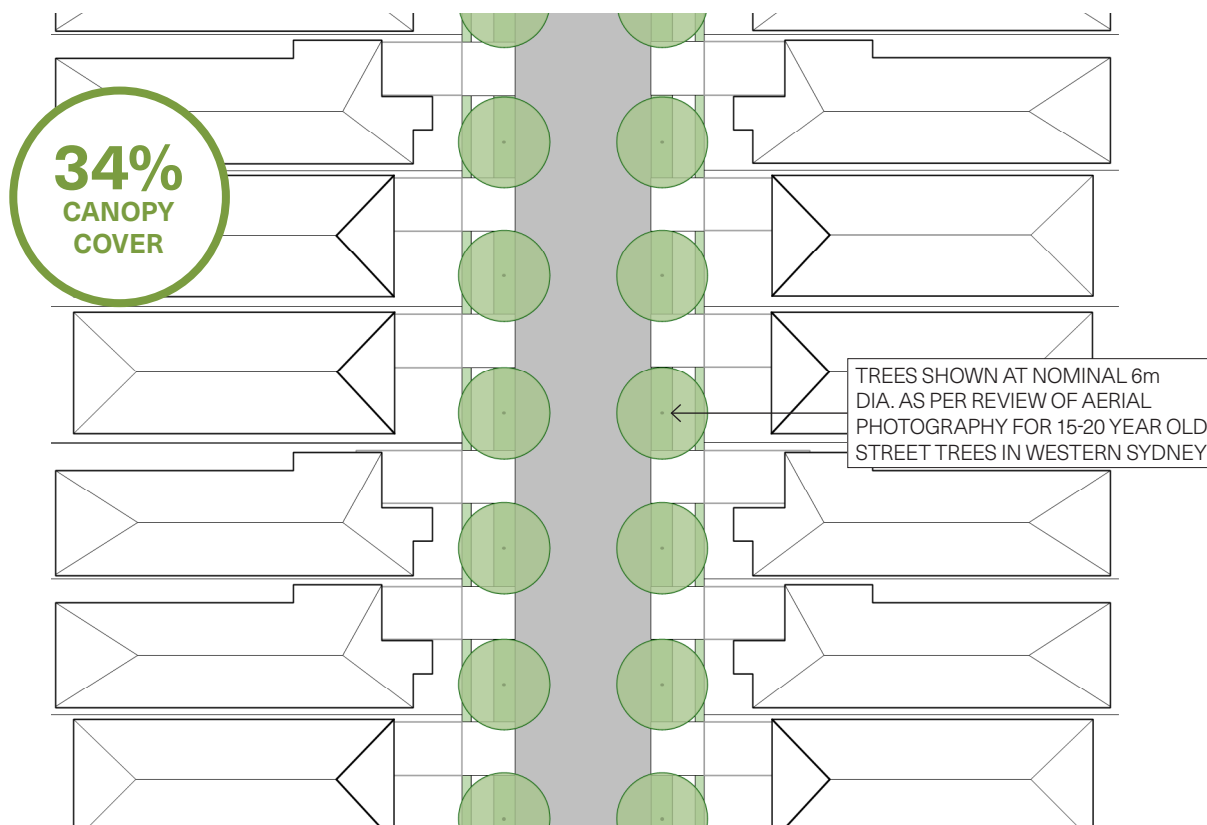
For the sake of comparison, the reserve width of the Residential Way has been adjusted to 16m to align with that of the Local Street.



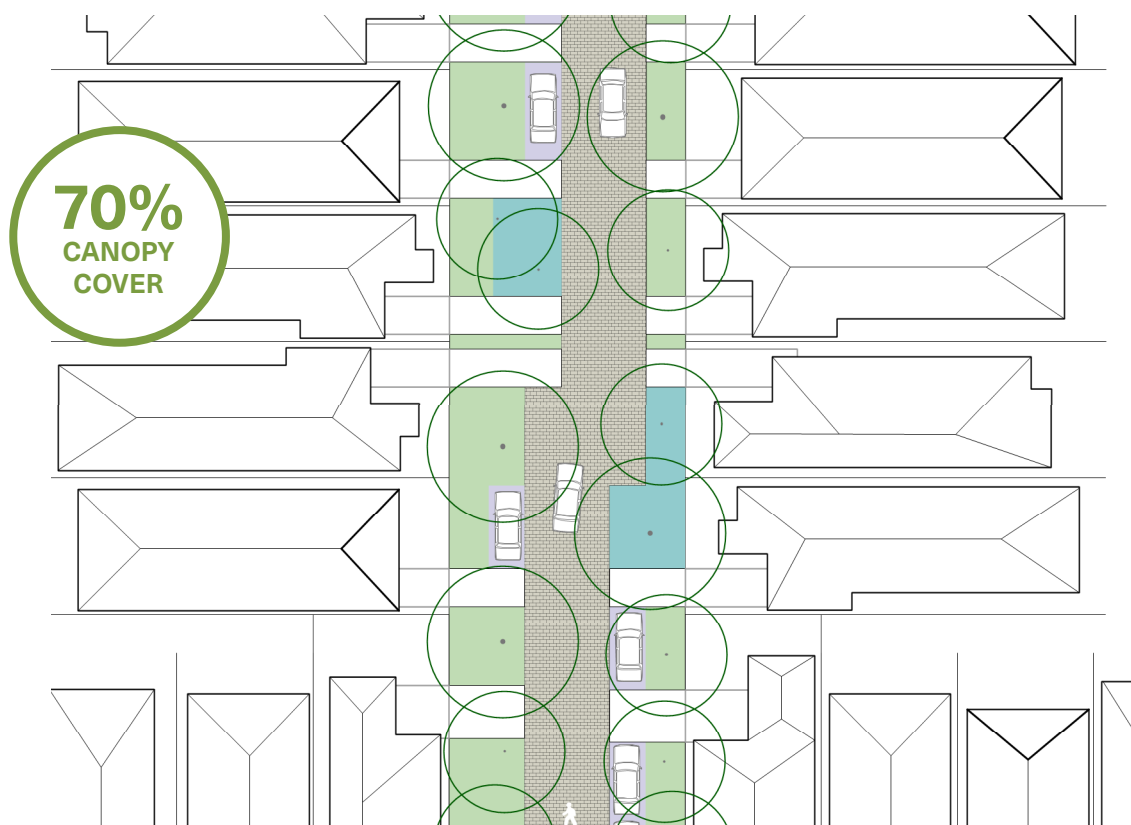
Typical cross section for Blacktown DCP Local Street



Typical cross section for Residential Way (16m variation)



Typical canopy cover shown for Blacktown DCP street



Typical canopy cover shown for Residential Way

Passive irrigation

Overview

Passively irrigated verges, or 'lo-fi WSUD', was once the norm in Australian suburban development. While the measures presented within Section C2.8 of the Guidelines remain relevant, this section seeks to encourage a 'lo-fi' approach to working with water in the street.

Passively irrigating verges needn't be complicated or involve complicated WSUD assets that are expensive to maintain. The examples presented below illustrate a variety of approaches to allowing water to passively irrigate verges and street trees without significantly adding to maintenance requirements.

Street priorities

- A permeable hardscape should be preferenced in low speed road environment, within parking bays and all non-vehicle hardscape zones.
- All pavement surfaces, including carriageways and parking bays, should be graded towards adjacent landscape features.
- Kerb, gutter, and inlet pit design is to be modified as required to direct low flows to adjacent landscape features and divert high flows to larger systems, while ensuring vehicle safety.



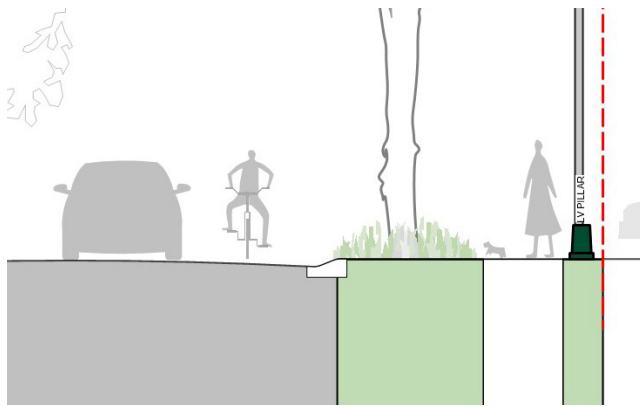
Kerbless areas for passive irrigation with inlet pits at Moorebank
(source: ASPECT Studios)



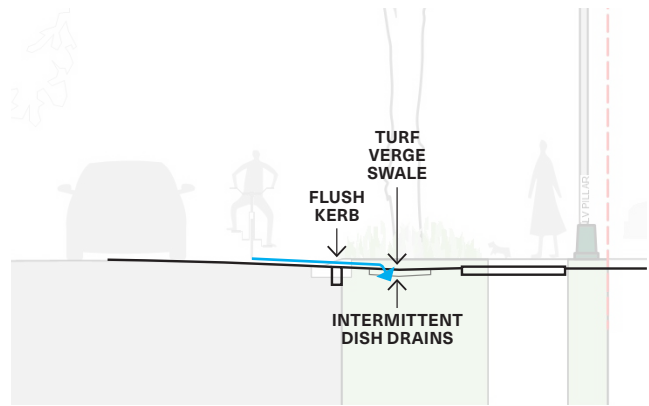
Slotted kerb for passive irrigation on Bourke Street, Surry Hills
(source: Simon Wood)



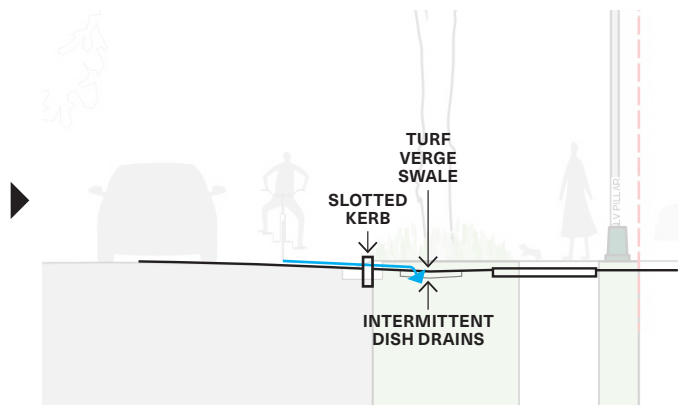
Passively irrigated turf verges, or 'lo-fi WSUD', was once the norm: Lane St, Laurieton (source: Google)



Standard mountable kerb



Flush kerb alternative



Slotted kerb alternative

Buses

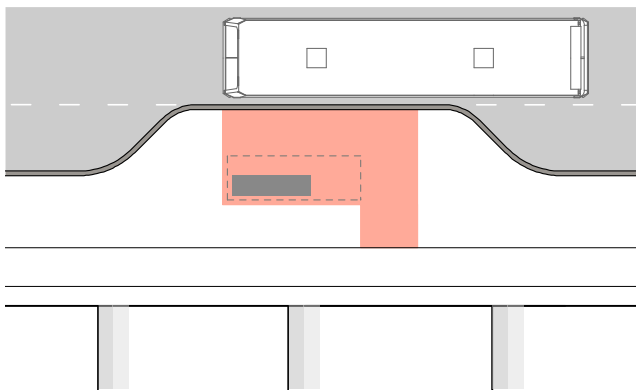
Overview

Consultation with Transport for NSW has resulted in the provision of further design requirements for streets in Western Sydney.

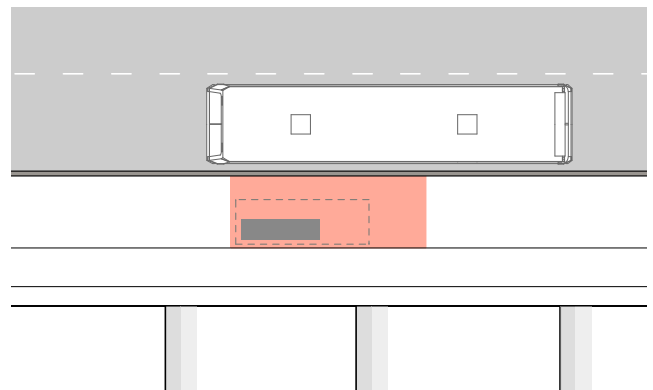
Different bus routes have different service frequencies, resulting in different street design requirements, particularly in relation to bus stop arrangement.

Street priorities

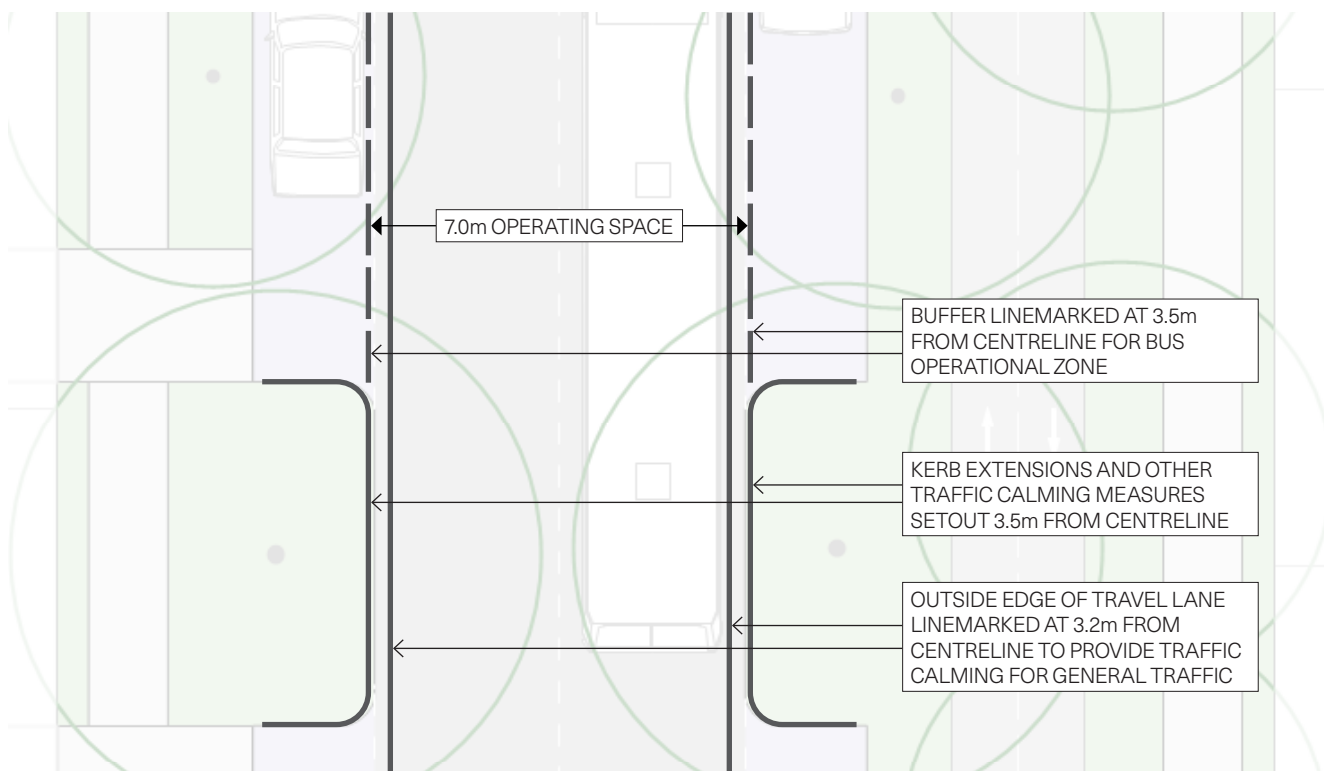
- Bus stop arrangement should be aligned with bus service frequencies, street environment and typical operating speed.
- An in-lane bus stop arrangement should be adopted on local service routes.
- A kerbside pullover bay arrangement should be adopted on frequent service routes.
- Comfortable places to wait with seating and a concentration of shade trees, and ideally a bus shelter



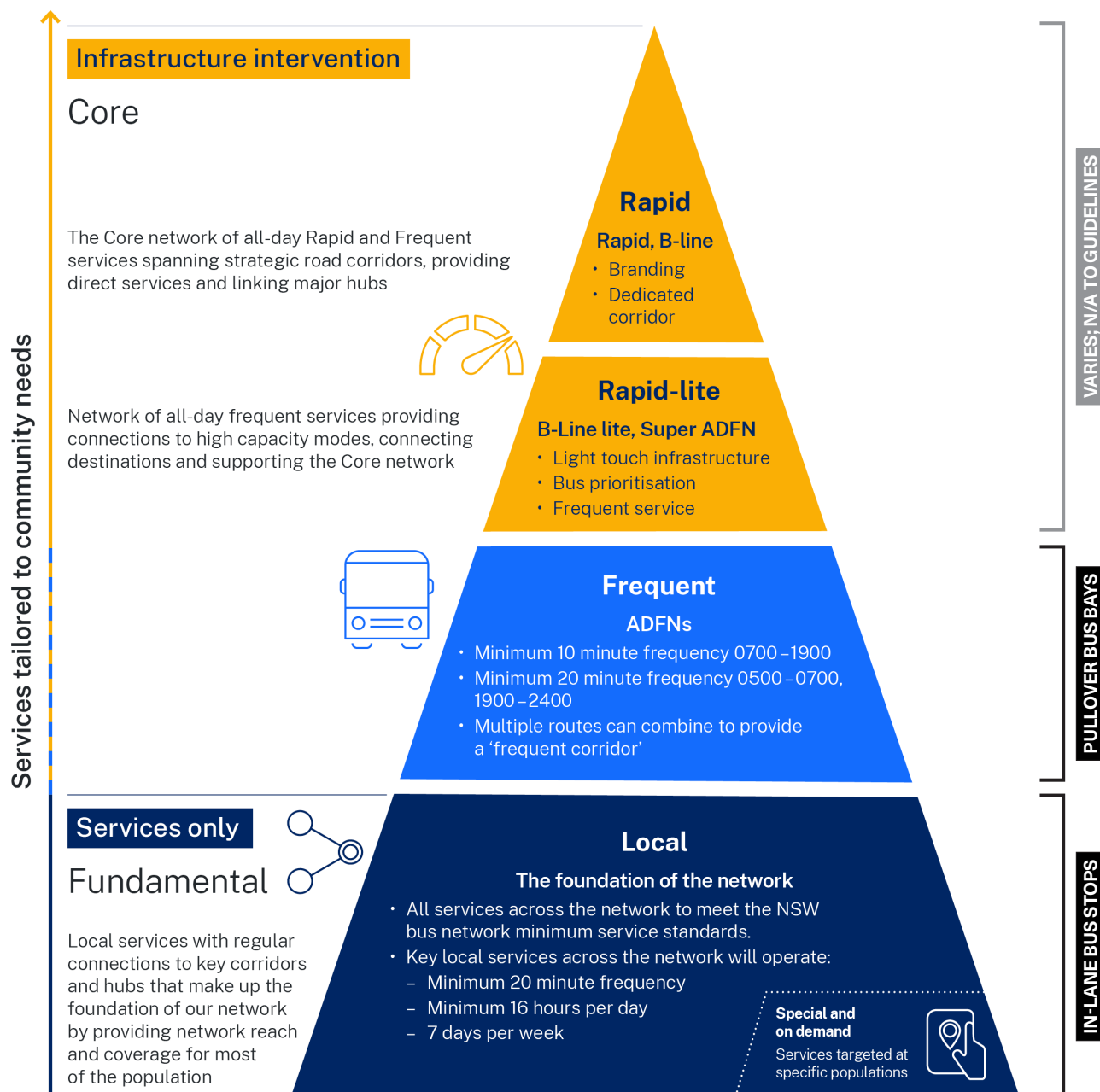
Typical in-lane bus stop configuration



Typical pullover bus bay configuration



Bus capable traffic calming line marking



Transport for NSW's current bus route classification shown in relation to bus stop arrangement
(credit: [NSW Bus Industry Taskforce Second Report](#), Oct 2023)



Aerial view of Marsden Park (credit: Nearmap)

An aerial photograph of a residential neighborhood, showing rows of houses with dark roofs and light-colored walls. The houses are arranged in a grid-like pattern, with streets running between them. The image is in a dark, monochromatic blue tone. The houses have varying rooflines, some with gables and others with flat roofs. There are some trees and green spaces interspersed among the houses. The streets are visible as dark lines between the house blocks.

Section 4

Retrofitting Streets

The need to retrofit

Overview

While much of the Guidelines and this supplementary report are primarily targeted at new streets within Western Sydney's growth areas, there is a pressing need to consider the region's existing streets.

This section presents strategies for retrofitting streets and includes case studies that illustrate the implementation of these strategies in Sydney and elsewhere. These strategies reflect a snapshot of potential retrofit initiatives based on the findings of WSPP's post-implementation review of the Guidelines, and are not intended to limit retrofit options available to Councils and practitioners.

Strategies include:

- Speed zoning
- Traffic calming
- Reallocating street space
- Greening

Speed zoning

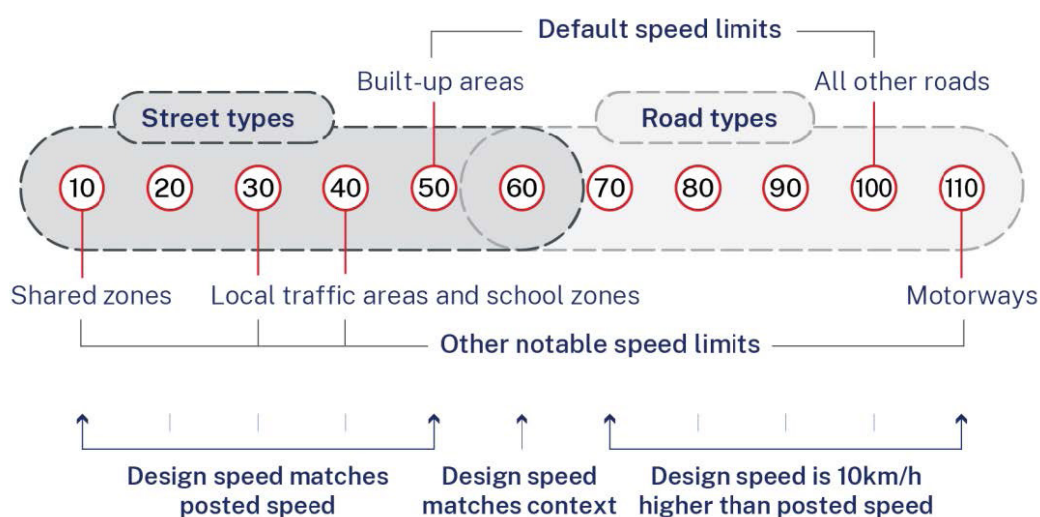
Speed is the biggest single factor involved in road deaths, contributing to around 40% of road fatalities each year in NSW. Speed limits are one of the simplest and most proven strategies for controlling and regulating driving speeds. (NSW Speed Zoning Standard, TfNSW, 2023)

Speed plays a pivotal role in ensuring road safety within a Safe System approach. Extensive research consistently underscores the direct correlation between vehicle speed and the frequency and severity of road crashes. Higher speeds increase the likelihood of crashes and exacerbate the risk of severe injuries or fatalities that result from crashes. The force of impact and subsequent trauma outcomes are directly influenced by vehicle speed.

Statistical models have demonstrated that even a minor increase in average speed, such as 1%, can lead to a substantial rise in the frequency of fatal crashes, up to 4%. Therefore, setting appropriate speed limits is crucial for managing crash risks and mitigating the impact forces experienced by road users.

Slower speeds also provide other environmental benefits as well as improvements in local amenity. Slower speeds reduce fuel consumption and subsequent carbon emissions. They also reduce noise pollution, improving the experience of the street for people using other modes such as walking and cycling, as well as reducing the negative health consequences of noise pollution for people living in adjacent properties.

Implementing a default speed limit of 30–40km/h for the whole network within a precinct is recommended, with additional low-speed zones near areas such as schools, hospitals, and other sensitive locations.



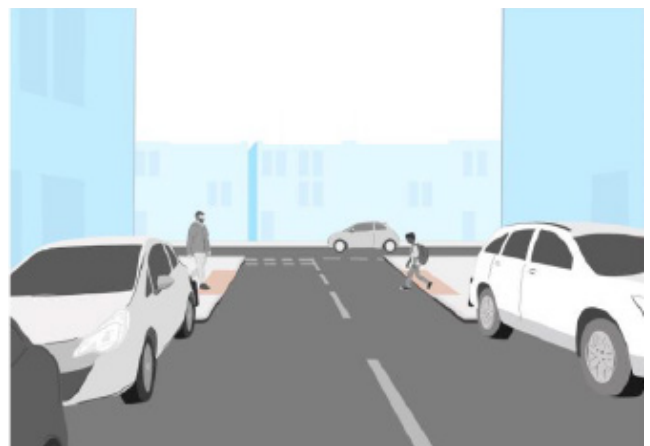
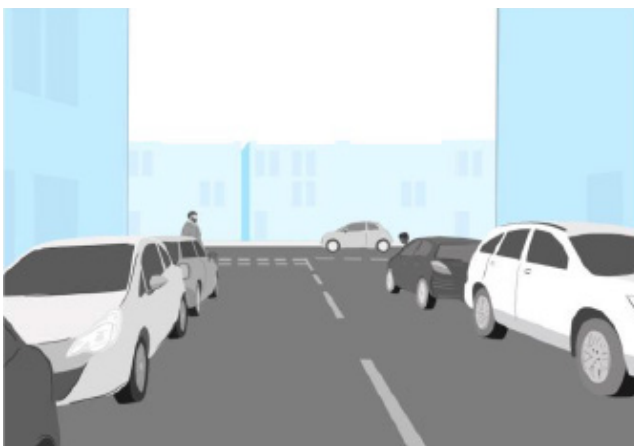
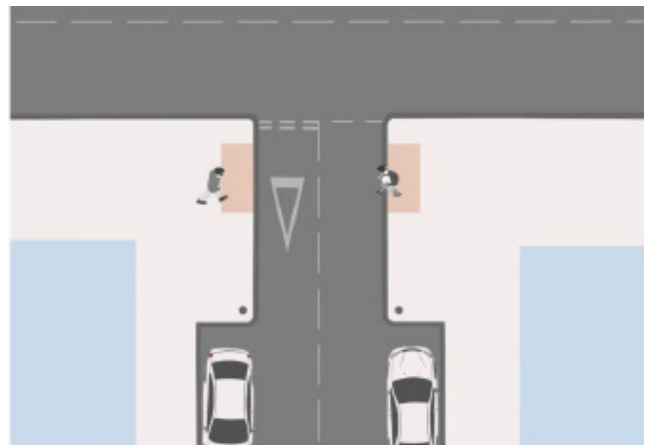
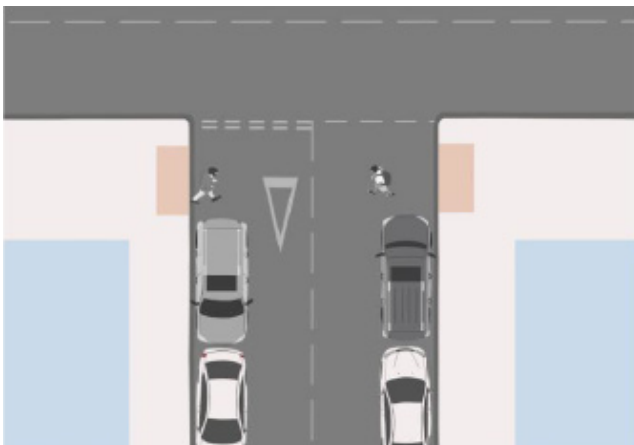
Context for self-explaining roads for the design of streets and roads
(NSW Speed Zoning Standard, TfNSW, 2023)

Traffic calming

Streets should be purposefully designed to reduce vehicle travel speeds, and traffic calming initiatives play an important role in achieving this.

Traffic calming refers to the use of physical design measures—such as raised thresholds and crossing points, alternate pavement selections, lane narrowing, kerb build outs, canopy coverage, and on-street parking—to create a balance between the movement and place functions of a street.

These initiatives are essential to providing street environments that are safer and more comfortable for all street users, particularly pedestrians and cyclists.



Effects of build outs at standard junctions
(credit: Inclusive Design at Continuous Footways, Living Streets, 2023)

Reallocating street space

Reallocating street space is one of the primary means through which the aims and objectives of the Guidelines can be implemented within existing streets.

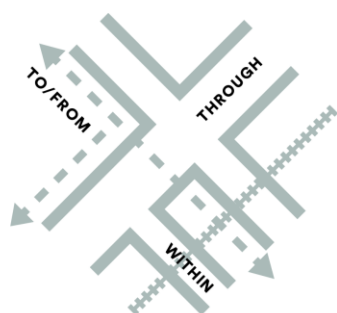
Transport for NSW's Road User Space Allocation Policy ensures that the allocation of street space is a deliberate exercise that considers the place, function, and movement requirements of a street.

Reallocating street space considers the limited amount of space available to accommodate competing user needs and considers users of the street as presented within the hierarchy diagram below.

Principles for street space allocation include:

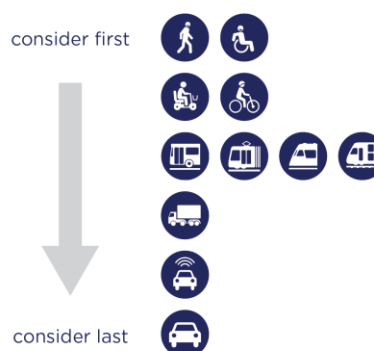
- Realise a balance between place and the movement of people and goods by first establishing a network vision and primary road functions based on strategies and plans
- When allocating road user space based on the network vision and road functions, consider all road users in order of: walking (including equitable access for people of all abilities); cycling (including larger legal micro-mobility devices); public transport; freight and deliveries; and point to point transport ahead of general traffic and on-street parking for private motorised vehicles
- Facilitate the movement of goods and servicing of property in a manner that responds to the local movement and place context
- Aim for the reduction of the mode share of private motor vehicle trips within built up areas
- Where it is not practicable to allocate physical space in line with these principles, dynamically allocate road user space
- Implement measures over time to achieve the strategic intent and outcomes identified as part of strategies or plans
- Track how these road space allocation principles are being implemented against the strategic intent and outcomes identified as part of strategies or plans
- Adhere to these principles ahead of any guidance that seeks to protect or maintain private vehicle level of service.

1 Establish Primary Road Function



Balance between place and the movement of people and goods based on strategies and plans

2 Order of Road User Space Considerations



Order of determination for allocating street user space
(credit: Road User Space Allocation Policy, Transport for NSW, 2023)

Greening and cooling

Streets are a major heat source in urban areas such as Western Sydney. The unshaded asphalt of streets absorbs heat during the day, increasing surface and ambient temperatures of the street and surrounding areas. At night, these surfaces release this absorbed heat and increase overnight temperatures.

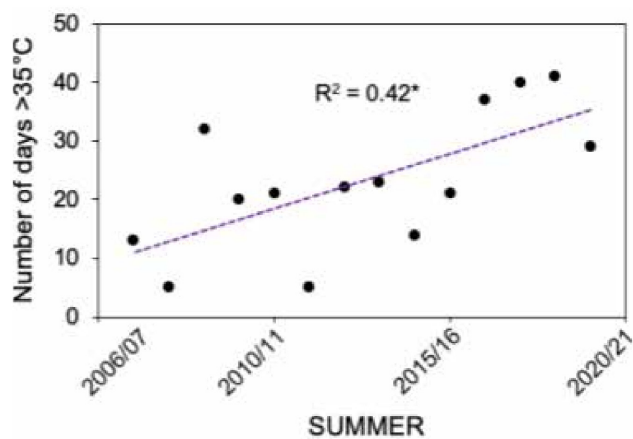
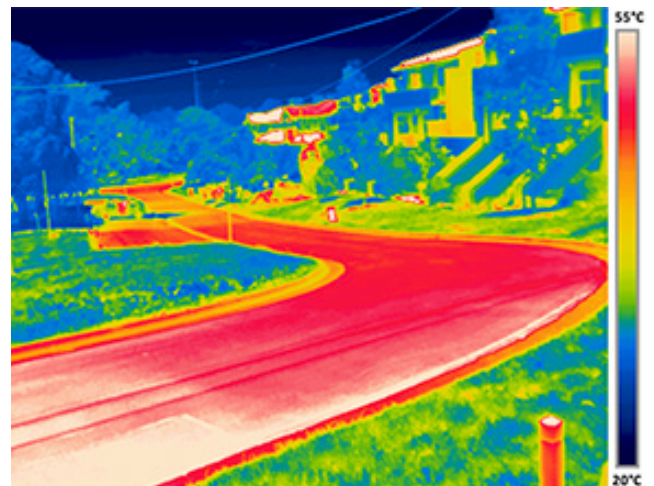
Greening streets can include comprehensive street tree planting or the replacement of paved surfaces with planted areas.

Cooling streets includes incorporating WSUD initiatives that keep water where it falls, or undertaking surface treatments (such as 'pavement painting') that lighten dark paved surfaces to reduce heat absorption.

Reference should also be made to the [Greener Neighbourhoods Guide](#) (NSW DPHI) for tree canopy targets.



Unshared streets generate significantly more heat
(credit: City of Parramatta)



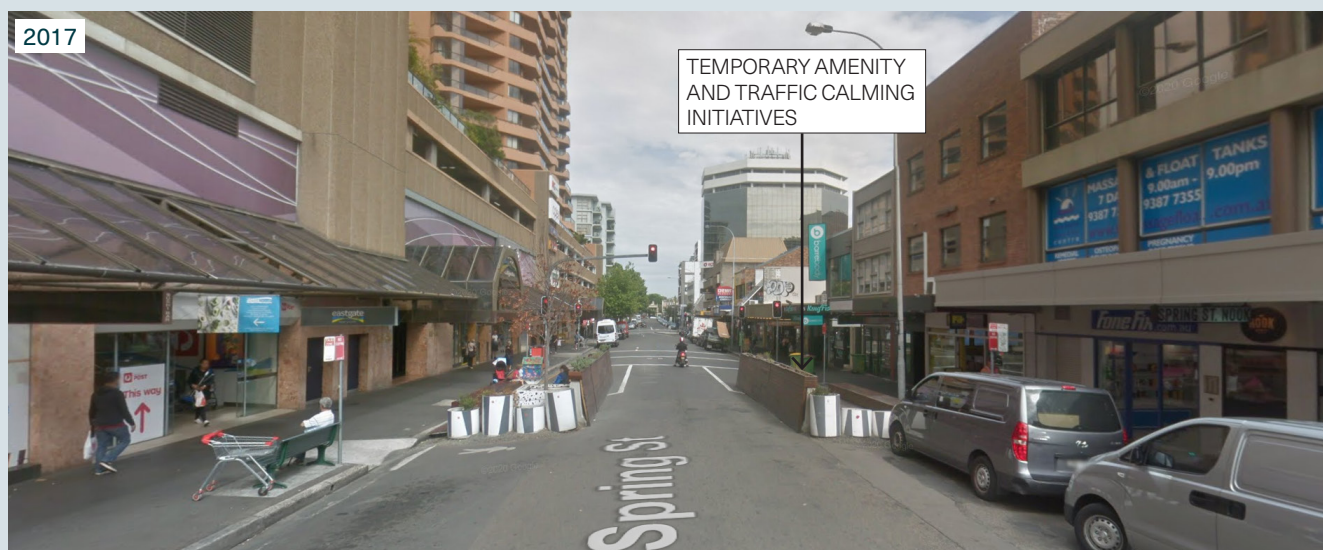
Total number of hot days as recorded at Richmond in Western Sydney
(credit: Wicked Urban Challenges in Western Sydney, WSU, 2022)

Case studies in retrofitting streets

This section presents case studies of existing streets that have been retrofitted with one or more strategies for retrofitting streets.

CASE STUDY - REALLOCATING STREET SPACE IN SPRING STREET, BONDI JUNCTION

The following case study presents a the progressive reallocation of street space at Spring Street, Bondi Junction to reduce vehicle travel lane width, increase tree planting, and provide a separated cycleway.



CASE STUDY - GREENING PRIMROSE AVENUE, ROSEBERY

Primrose Avenue was planted with new median street trees to improve safety by slowing traffic and provide new trees and shrubs for more shade.



CASE STUDY - CROWN STREET, SURRY HILLS

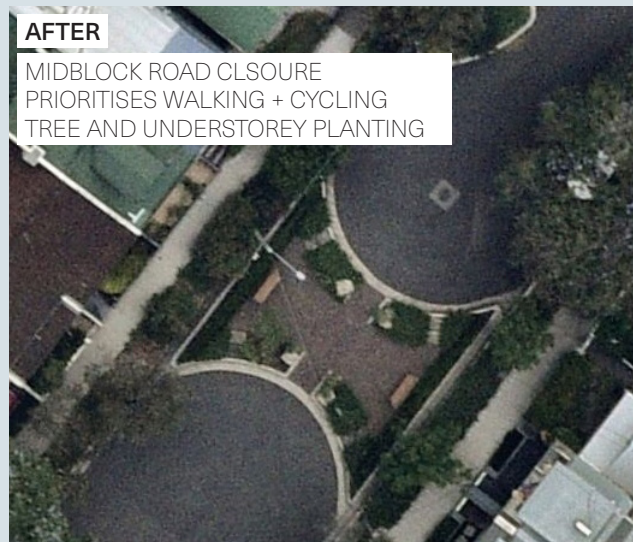
Crown Street was upgraded in 2015 with public domain improvements between Devonshire Street and Cleveland Street. Kerb extensions were introduced at Crown Street's intersection with Lansdowne Street to reduce crossing distances and improve amenity in conjunction with a new pedestrian crossing



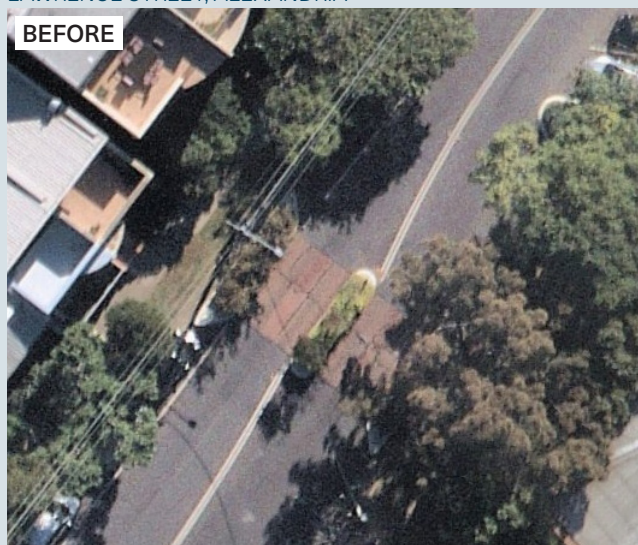
CASE STUDY - TRAFFIC CALMING IN ALEXANDRIA

The City of Sydney has progressively implemented traffic calming measures throughout the neighbourhood of Alexandria. While each individual installation is relatively small, they combine to provide traffic calming on a neighbourhood scale.

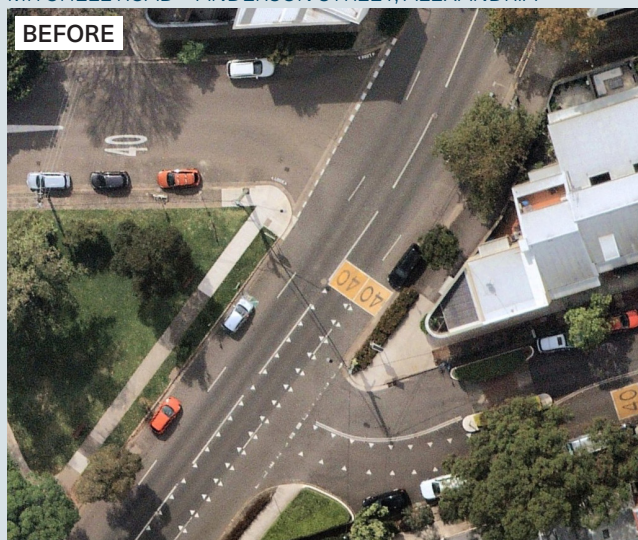
LAWRENCE STREET, ALEXANDRIA



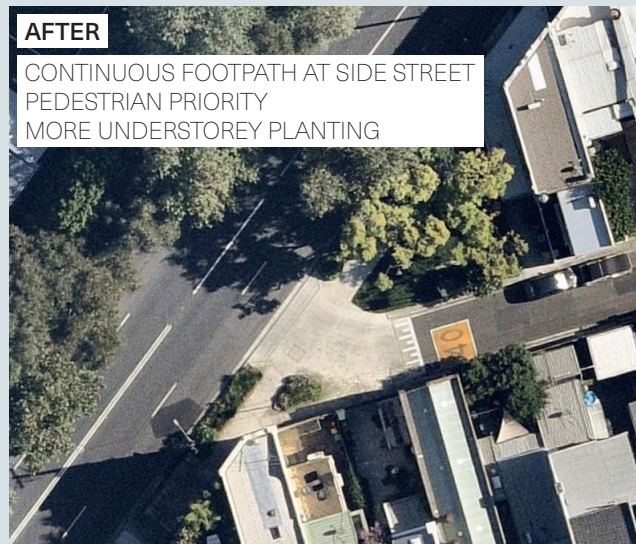
LAWRENCE STREET, ALEXANDRIA



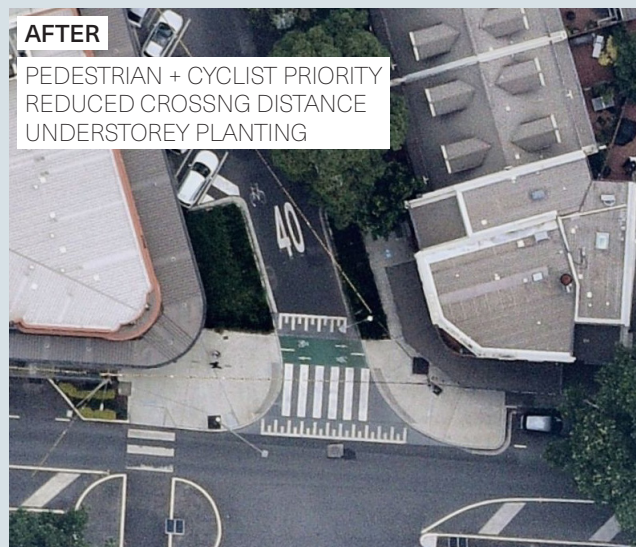
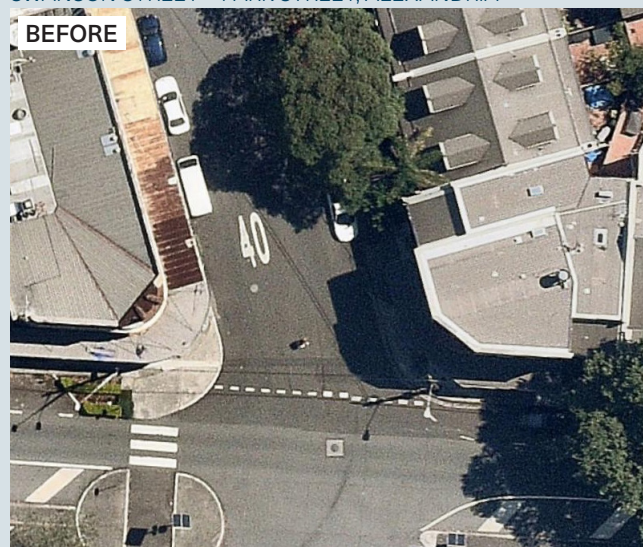
MITCHELL ROAD + ANDERSON STREET, ALEXANDRIA



MITCHELL ROAD + BUCKLAND LANE, ALEXANDRIA



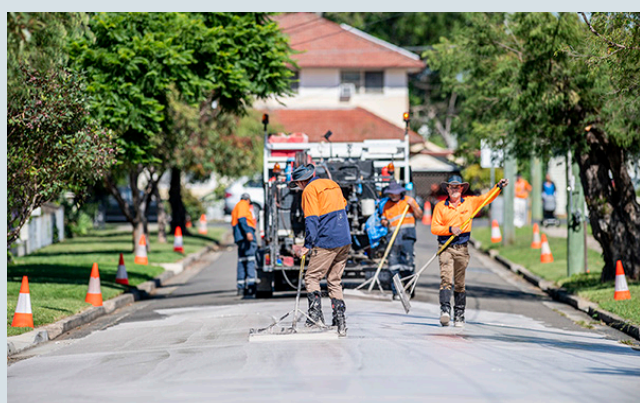
SWANSON STREET + PARK STREET, ALEXANDRIA



CASE STUDY - COOL ROADS TRIAL 2021

The surface treatment illustrated here (CoolSeal) reduced surface temperature of asphalt during the day by an average 6°C when compared with an untreated surface, however there was an increased 'feels like' temperature on treated asphalt due to the reflected solar radiation during the day.

ROSLYN AVENUE, NORTHMEAD



CoolSeal installation at Roslyn Avenue, Northmead
(credit left: George Gittany Photography, credit right: Google)

Attachment 1

Core DCP Standards

Core DCP Standards

	Secondary Arterial	Connector Street	Enterprise Street	Destination High Street
Road reserve	≥26.5m	≥21.5m	≥ 21.5m	≥26.5m
Typical lots served	N/A	N/A	N/A	N/A
Typical AADT	≤20,000	2,000 - 5,000	1,000 - 4,000	≤10,000
Posted speed	60 - 70km/h	40-60km/h	40-50km/h	30-40km/h
Design speed	70 - 80km/h	Same as posted speed	Same as posted speed	Same as posted speed
Bus capable	Yes	Yes	Yes	Yes
Vehicle travel lanes	3.5m	3.2m (+ 0.3m buffer for bus capability)	6.4m (+ 0.3m buffer for bus capability)	6.4m (+ 0.3m buffer for bus capability)
Parking provision	Nil	Varies	Varies	Varies
Parking arrangement	N/A	2.3m indented parking bays	2.3m indented parking bays	2.3m indented parking bays
Walking	≥2m footpaths on both sides;	≥1.5m footpaths on both sides; or 1x ≥1.5m footpath + 1x ≥3.0m shared path	1x ≥1.5m footpath + 1x ≥3.0m shared path	≥3.0m footpaths on both sides
Cycling	≥1.5m one-way separated cycleway on both sides	≥2.5m separated cycleway; or 1x ≥3.0m shared path	1x ≥3.0m shared path	≥2.0m one-way separated cycleway on both sides
Traffic calming	N/A	≤80m spacings Refer Guidelines Section C3.3	≤80m spacings Refer Guidelines Section C3.3	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)	Passive irrigation (low flow) Swale (high flow)	Passive irrigation (low flow) Swale (high flow)	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide	Refer Greener Neighbourhoods Guide	Refer Greener Neighbourhoods Guide	Refer Greener Neighbourhoods Guide
Permeability	N/A	≥35%	≥35%	≥35%

	Neighbourhood Street	Yield Street	Residential Way
Road reserve	≥18m	≥16m	≥14m
Typical lots served	N/A	N/A	≈10-15
Typical AADT	500 - 2,000	500 - 2,000	100 - 1,000
Posted speed	20-30km/h	20-40km/h	10-20km/h
Design speed	Same as posted speed	Same as posted speed	Same as posted speed
Bus capable	No	No	No
Vehicle travel lanes	6.0m	≈7.6m kerb-to-kerb two-way carriageway	5.6m two-way carriageway
Parking provision	≤0.75 per lot	≤0.75 per lot	≤0.5 per lot
Parking arrangement	2.1m indented parking bays	Kerbside within carriageway to enforce yield for vehicles (no indented bays)	≤2.4m indented parking bays (with 'parking in bays only' signage)
Walking	≥1.5m footpaths on both sides	≥1.5m footpaths on both sides	1.2m footpath and within shared zone
Cycling	Within vehicle travel lanes with traffic calming initiatives	Within vehicle travel lanes with traffic calming initiatives	Within shared zone
Traffic calming	≤80m spacings Refer Guidelines Section C3.3	≤80m spacings Refer Guidelines Section C3.3	≤80m spacings Refer Guidelines Section C3.3
WSUD	Passive irrigation (low flow) Swale (high flow)	Passive irrigation (low flow) Swale (high flow)	Passive irrigation (low flow) Swale (high flow)
Tree canopy cover	Refer Greener Neighbourhoods Guide	Refer Greener Neighbourhoods Guide	Refer Greener Neighbourhoods Guide
Permeability	≥35%	≥35%	≥35%

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