Tasmanian Walk, Wheel, Ride Guidance

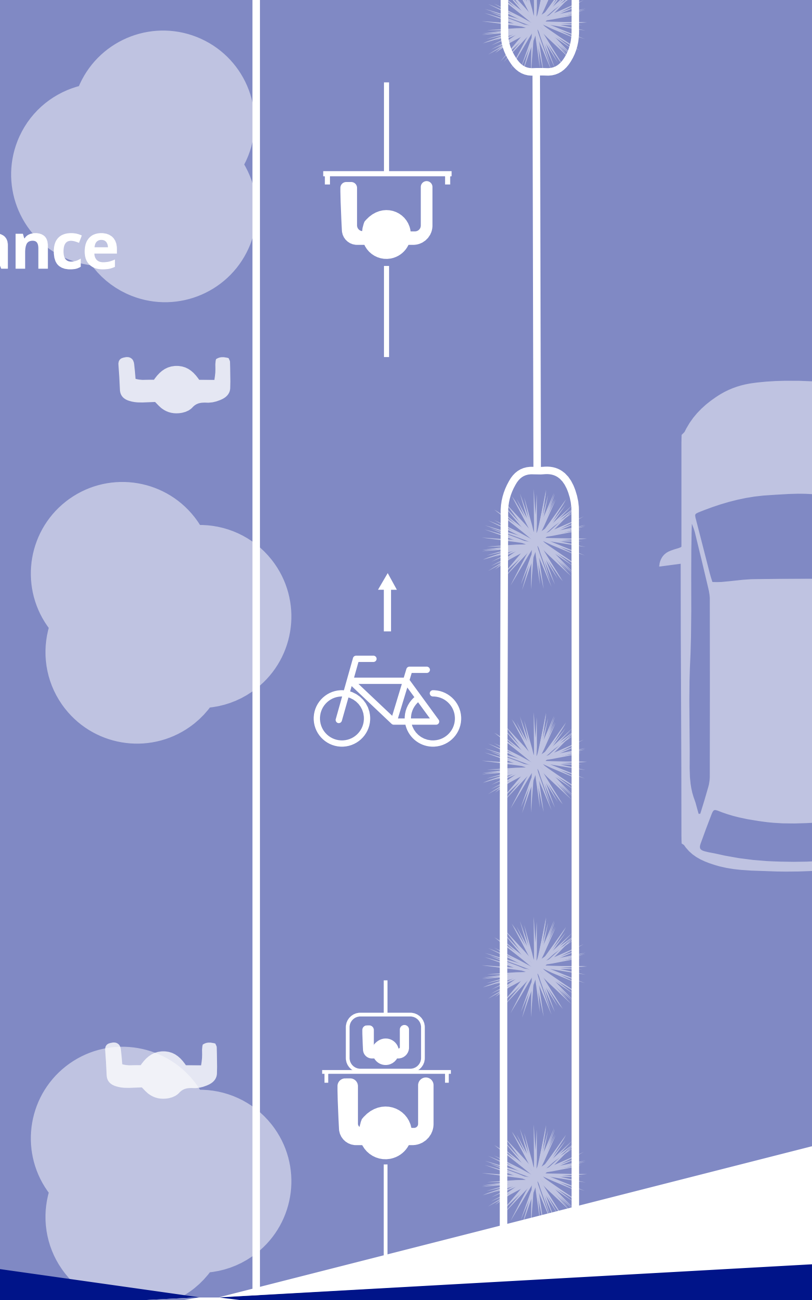
Cycling Infrastructure Design

PLANNING

DESIGN

DELIVERY

OPERATIONS



Tasmanian Government

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Acknowledgement of Country

In recognition of the deep history and culture of these islands, we acknowledge all Tasmanian Aboriginal people as the continuing Custodians of this Land and Sea, and pay our respect to Elders past and present, and to all Aboriginal people who live and work in Tasmania today.

1 Introduction

The Tasmanian Government is committed to getting more people riding. We know that safe and comfortable infrastructure is required for more people to choose to ride. This guide supports the delivery of new cycling infrastructure that provides for people of all ages and abilities.

This is the first Tasmanian Cycling Infrastructure Design Guide. This guide has been developed to support the design of infrastructure that enables more people to cycle. The guide draws on national and international best practice and some of the concepts introduced are new to Tasmania. The Department of State Growth is seeking to support practitioners and stakeholders with new designs to enable more Tasmanians to ride.

Design guidance evolves over time in response to the volume of riders, types of devices and other factors. It is expected the guidance will iterate over time as new projects and designs are delivered and evaluated. Ongoing feedback and dialogue about the guidance will support practitioners to work together to make riding a transport option for all Tasmanians.

1.1 Purpose of the guide

The purpose of this guide is to:

- identify bicycle design treatments and infrastructure elements that are suitable for people of all ages and abilities
- provide guidance to support design of the identified treatments and infrastructure
- improve the overall standard of cycling infrastructure in Tasmania with respect and careful consideration of the local context.

1.2 Application of this guide

This guidance has been developed to support practitioners to design new cycling infrastructure, or to upgrade existing routes. The guide seeks to complement existing guidance (such as Austroads) to achieve better design outcomes that respond to the local context.

The principles and treatments in this guide are applicable throughout Tasmania. In particular, the guide supports the design of on-road treatments.

Our aim is that all new cycling infrastructure is suitable for all ages and abilities (AAA).

1.3 What is 'riding'?

Cycling infrastructure needs provide for all types of riding. In this guide, the term 'riding' refers to all types of riding and some wheeling, including bicycles and other micromobility devices both powered and unpowered as illustrated in Figure 1.1. This includes the many different types of bicycles designed for all kinds of purposes: personal transport, the movement of goods, carrying passengers, and different sports like BMX, mountain biking and road cycling. People wheeling are also considered in this guide, including people using a wheelchair, pram, skateboard, roller blades or mobility aids.

Micromobility refers to a range of small, lightweight vehicles operating at speeds typically below 25km/h and operated by the rider directly. They can be human or electric powered. Common examples include e-scooters, e-skateboards, mobility scooters and e-unicycles.

When designing for micromobility, it is important to consider the differences between devices such as bicycles and e-scooters. For example, e-scooters have smaller wheels that handle bumps, grates and gradients differently than devices with larger wheels. Turning circles, acceleration and stopping distances will vary between different micromobility devices. This is considered throughout the guide.

Nonetheless, there are fundamental similarities for riders of micromobility devices and bicycles. These include speed, mass and vulnerability in a crash. Minimising interactions with pedestrians and motor vehicles is necessary to provide a suitable environment for both bicycles and micromobility.

1.4 Strategic context

The principle of a safe transport system underpins this guide, in line with Towards Zero – Tasmania's Road Safety Strategy. The objective of Towards Zero is that no one is seriously injured or killed on our roads. High-quality cycling infrastructure is fundamental to achieving this objective.

This guide has also been developed to align with a 'movement and place' approach recognising different streets have different movement priorities and that streets must serve community needs beyond only movement. This guide will support increased place functions to improve the social, economic and environmental performance of Tasmanian streets. The successful application of this guide will assist with the delivery of people-friendly, vibrant and safe places, which serve all ages and abilities.

Figure 1.1 A sample of the types of riders we are designing for (Credit:Transport for NSW)

1.5 Designing for all ages and abilities

Components that support people of all ages and abilities (AAA) to choose to ride are marked with the AAA symbol.

AAA design is inclusive by considering:

- **All people, regardless of age, gender and background**, including women, children, seniors, people living with disability, low-income households, various ethnicities, neurodiverse people and people who are less confident riding.
- **All types of bicycles and other small-wheeled devices**, including standard and e-bikes, cargo bikes, specialist bicycles for people living with a disability and micromobility devices like e-scooters.
- **All types of trip purposes**, including commuting, school run, shopping, and recreation.

To achieve a AAA rating, infrastructure must provide both safety from crash risks and a perception of safety, as described in Table 1.1. The treatments identified in this guide are given scores according to these thresholds.

	Crash safety	Perceived safety	Rider confidence
Preferred AAA	Eliminate exposure	All riders feel safe	Interested but concerned Strong and fearless Enthused and confident
Acceptable AAA	Reduce likelihood	Most riders feel safe	Enthused and confident Strong and fearless
Discretionary	Reduce severity	Some riders feel safe	Strong and fearless

Table 1.1 Design thresholds for AAA networks

Perceived safety and rider confidence

A rider's perception of safety and risk influences their level of confidence when riding, and therefore their willingness to ride for transport. More than half of Tasmanians currently ride a bike, or might consider it if we provide the right conditions. Nearly four out of ten are 'interested but concerned' meaning they would ride in locations that feel completely safe, even for inexperienced riders (CWANZ, 2023).

As shown in Figure 1.2, just 5% of Tasmanians identify with the 'strong and fearless' rider typology. These riders can manage stressful traffic environments, like sharing the lane with heavy traffic. This is the existing condition on most Tasmanian roads.

A further 13% are enthused and confident about riding in light traffic, but not in all circumstances.

Key factors that influence less confident riders include the traffic characteristics (e.g. vehicle speeds, traffic volumes, heavy vehicles and the presence of parked cars) and the level of separation from motor vehicles and people walking.

Actual safety is about reducing the likelihood and severity of crashes. Perceived safety is about addressing people's fears, which will be partially about actual safety, and partly about how a place feels – is it lit at night, separated from noisy traffic, and does it seem safe for my child to ride on easily?

Measures that improve road safety do not always improve perceived safety, and vice versa. A AAA network must deliver on both actual and perceived safety.

To get more people riding bikes and realise the benefits, it is often necessary to balance road safety and perceived safety.

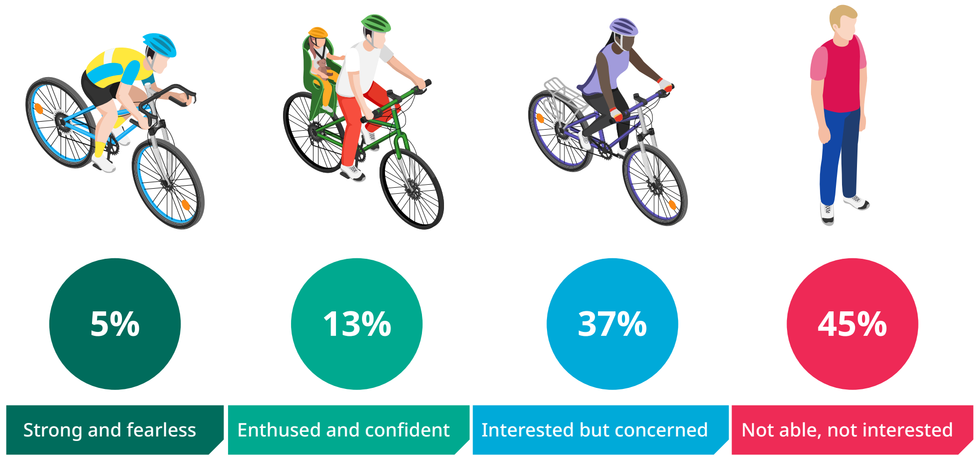


Figure 1.2 Rider typologies in Tasmania, as per CWANZ Walking and Cycling Participation Study 2023

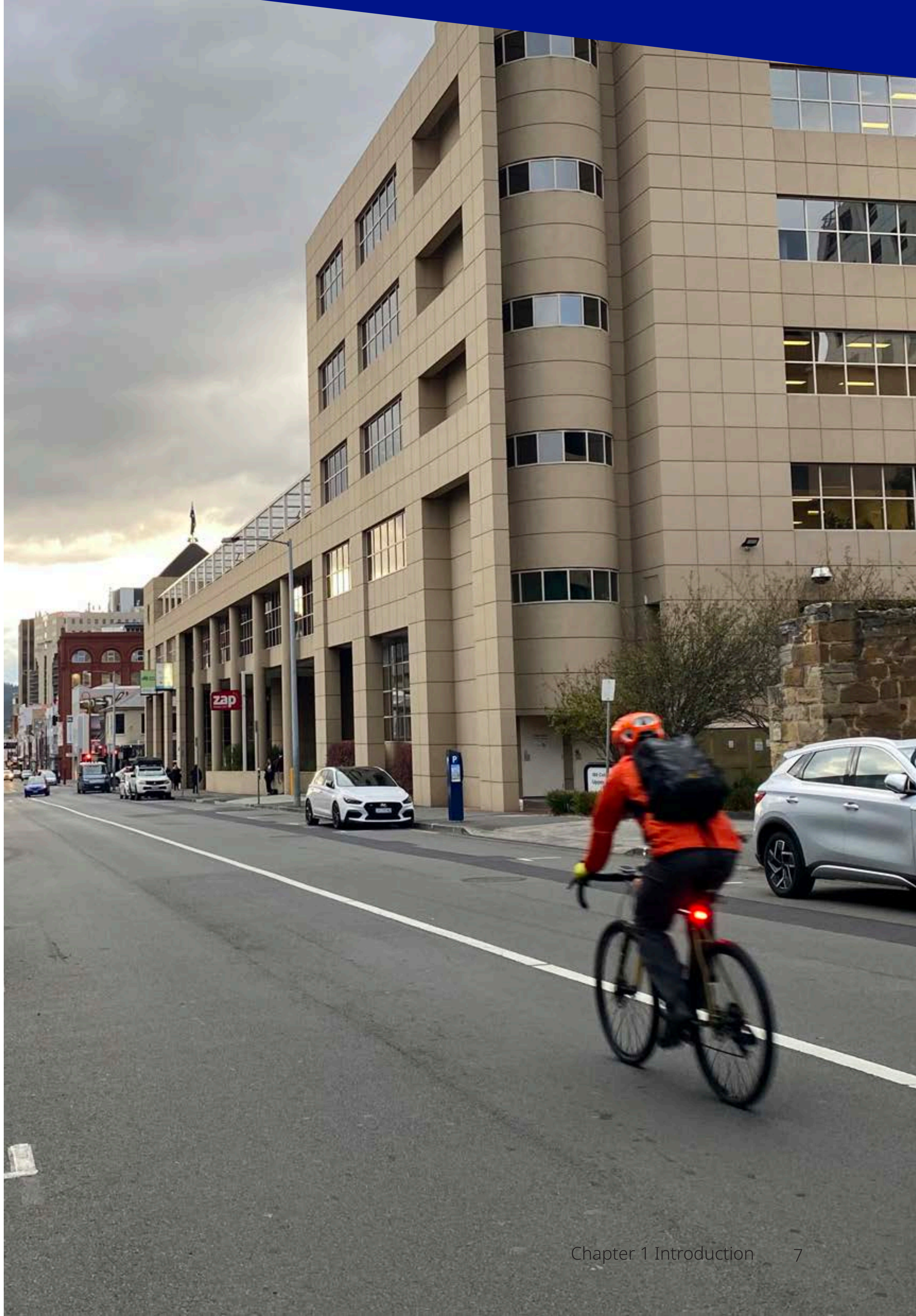
1.6 Benefits of riding

Walking, wheeling and riding are the most sustainable and equitable forms of transport.

They allow people to travel where they need to, when they want, and contribute to great places, cleaner local environments, healthier lifestyles and provide economic benefits.

Some of the benefits include:

- **improved physical and mental health for individuals, which saves costs for the health system**
- **supporting tourism and the visitor economy**
- **reduced traffic congestion and road maintenance costs**
- **improved social connections**
- **integration with other modes to reduce car dependence**
- **avoided environmental impacts of motor vehicles through noise, air pollution and emissions**



1.7 Making riding fun

Many people say they ride because it's fun and convenient. Good design can contribute to making riding more fun in a variety of ways. Some design considerations to make riding more fun are provided in Table 1.2. Applying these considerations to the bicycle network will make it more attractive for people to choose to ride.

What to consider

Fun	Design tips
Smiling to other people	Consider sight lines from footpath to bicycle lane, and across the street. Bi-directional lanes can be especially sociable. Provide bike boxes for riders to wait alongside one another at traffic lights.
Riding next to a friend	Provide adequate lane width for people to ride alongside each other or 'holding hands' (see Section 2.5).
Saving money	Provide a safe network and bike parking for commuter trips, as an alternative to driving.
Being outside	Bring people closer to nature with biodiverse, shady streets. Integrate trees, greening and play elements (see Section 6.4).
Feeling thought about	Small things can make a big difference when riding a bike. Going first through an intersection (see Section 5.4) or having somewhere comfortable to rest while waiting can make riders feel valued and appreciated.
Maintaining momentum	Coordinate traffic lights to change at bicycle speed (20-23km/h). Prioritise riders with dedicated bicycle lanes where traffic queuing occurs, such as signalised intersections (see Section 2.4.2).

Table 1.2 Considerations to make riding more fun

Local bicycle networks in Tasmania are generally in their infancy, and we recognise a connected network takes time to deliver. In some places, it may be difficult to create connections for new routes. Phased implementation and incremental improvements are often necessary but must steadily contribute towards the vision of a AAA network.

In contrast, some design decisions can make cycling unpleasant or frustrating. Some things to avoid are listed in Table 1.3.

What to avoid

Not fun	Design tips
Having to dismount	Do not require riders to dismount. This is a poor design outcome and compliance with dismount signage is very low. Chicane barriers are uncomfortable and should be avoided and can cause safety issues for people with limited walking mobility or with heavy cargo (such as carrying children).
Being passed by a truck	Where heavy vehicles operate, it becomes even more important to separate people riding bicycles from interaction with vehicles.
Riding too slow and losing balance	Do not require or expect people to ride at speeds lower than 12km/h as it becomes difficult to balance.
Getting lost	Consider route legibility and directional signage for riders (see Section 6.5).
'Bike lane ends'	Routes must be continuous and connected, and must provide a safe path. It is not acceptable to end a bike lane and put less confident riders into busy traffic. Where project delivery is staged over a long period, ensure people can safely access the footpath.

Table 1.3 Considerations to avoid making riding less fun

2 Fundamentals

2.1 Overview

Streets, roads and paths that are well designed for riding provide benefits for all users, particularly people walking.

This chapter introduces the fundamentals for good cycling infrastructure design in Tasmania. The guidance adopts and applies global best practice design principles. Key considerations to understand context are described, including the speed and volumes of traffic as well as the characteristics and needs of different types of riders. The guidance in this chapter identifies ways to respond to our local design challenges, such as hilly landscapes.

2.2 Design principles

The following principles guide design decisions throughout project development and are based on national and international best practice.

Safe

Infrastructure is designed for all ages and abilities, to feel safe during the day and night, and minimise interaction with vehicle traffic.

Direct

Priority will be given to the shortest routes between key locations, and using people's preferred pathway.

Comfortable

People of all ages and abilities can comfortably move around and pass each other, and are sheltered from noise, heat and rain where feasible.

Connected

Routes will be continuous and fully connected so people can find and reach their destinations easily.

Attractive

Streets and public spaces are a pleasure to ride along and provide public amenity. They have places to stop, public art and active frontages.

Adaptable

Designs are flexible and able to respond to changes in user needs and demands over time.

Top 10 design tips

1. Design for a 12-year-old to be able to ride without supervision.
2. Don't give up at the intersection. Interacting with vehicles at intersections feels the most dangerous, especially at roundabouts and turning right.
3. Consider the whole journey experience from door-to-door.
4. People riding generally travel faster than others who are walking and wheeling so separate where possible.
5. Riders rely on momentum, so minimise the need to stop.
6. Don't install chicanes and barriers that prevent cargo bikes, trailers and people with mobility issues from easy access.
7. Cycling facilities should contribute to a sense of place. Add trees, use attractive materials and widen footpaths where possible.
8. Always consider ongoing maintenance and upkeep of cycling facilities such as regular sweeping.
9. Keep costs low by removing through traffic and reducing speeds, which may negate the need to build protected bicycle lanes, and don't move kerbs and gutters.
10. Designers should ride so they understand common issues and the specific constraints of the facility they're designing.

2.3 Traffic speed and volume

2.3.1 Overview

Motor vehicle speed has a direct, causal relationship with the likelihood of harm. Figure 2.1 shows the likelihood of a pedestrian or rider fatality is 80% if struck by a vehicle at 50 km/h, reducing to 10% at 30 km/h (Transport for NSW, 2023).

The volume of traffic is also a major factor influencing a person's comfort and decision to ride. It is possible to provide for all ages and abilities without physical separation, but only with low speeds and low volumes of traffic. If the speed is less than 30km/h, you may not need to build a separated bicycle facility.

2.3.2 Design considerations

Given the relationship between traffic speed, volume and rider comfort, choosing the right infrastructure is closely related to the existing traffic conditions (see Section 4.2). Much of the focus of the infrastructure types discussed in Chapters 4 and 5 relates to providing separation between people and high-speed vehicles or a high-volume of vehicles.

Practitioners should consider whether reducing traffic speed and/or volumes could contribute to the development of safer, more attractive streets. Techniques to manage traffic speeds and volumes are discussed further in section 6.2.

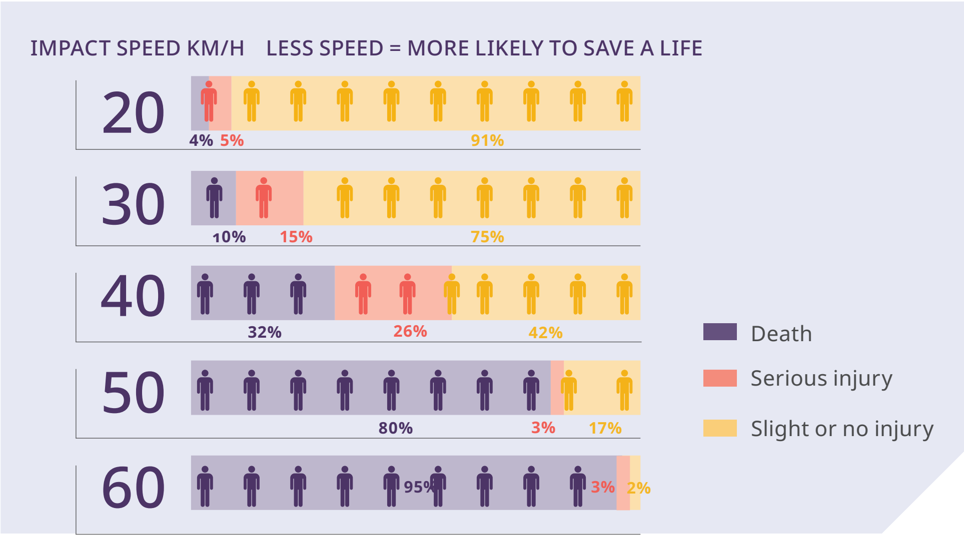


Figure 2.1 Likelihood of a fatality according to vehicle speed. Source: Towards Safe System Infrastructure: A Compendium of Current Knowledge (2018) Austroads.

2.4 Rider characteristics

2.4.1 Rider envelope

The 'rider envelope' for bicycles, cargo bikes and scooters is presented in Figure 2.2 below.

This envelope informs the height clearance needed along bicycle routes, considering structures, street furniture and overhead foliage as well as informing the effective width needed for riding. Designs must consider wheeled devices of different widths, such as cargo bikes, trikes and recumbent cycles.

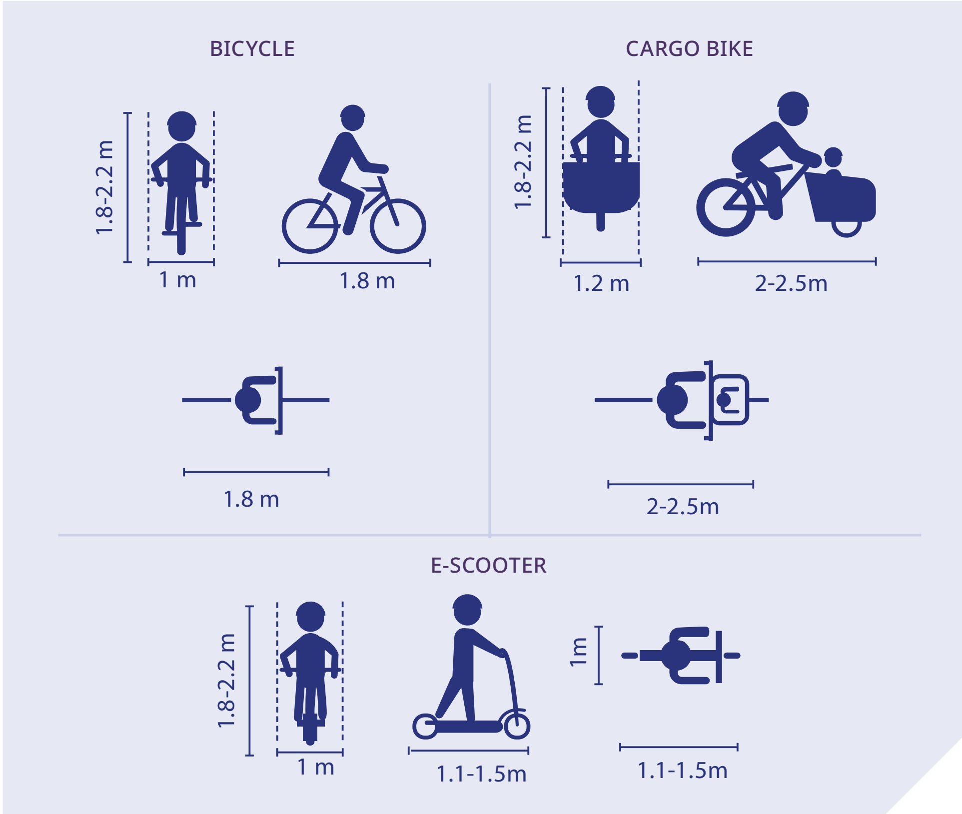


Figure 2.2 Rider envelope: typical dimensions of different types of riders

2.4.2 Rider speed

As illustrated in Figure 2.3, a rider's speed varies depending on factors including:

- a rider's level of confidence
- the type of bicycle or micromobility device
- trip purpose
- the context of the street.

In dedicated riding environments, enabling people to ride and maintain their desired speed is an important part of meeting the 'safe' and 'comfortable' design principles, both for slower and faster riders. Planning for safe passing manoeuvres is an important consideration, particularly when there is a greater diversity in the types of riders.

Fast riding speeds are appropriate only in suitable locations. For techniques to manage rider speeds, for example on shared paths and at potential conflict points with people walking, see Section 4.6.

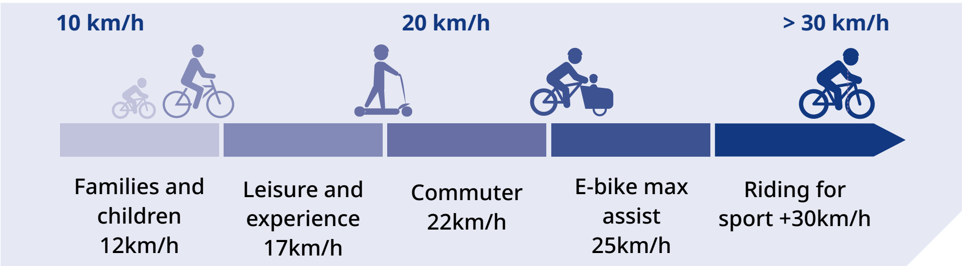


Figure 2.3 Typical speeds of different types of riders

Recommended bicycle lane and separation widths

Element	AAA preffered width	Minimum width
One-way path/lane	2.0m +	1.5m
Two-way path/lane	4.0m +	2.5m
Separation buffer	1.0m +	0.3m – alongside general traffic lane 0.6m alongside parked vehicles

Table 2.1 Recommended widths for lanes and separation from vehicles

2.5 Lane widths for riding

Designing and maintaining sufficient width for riding is important in order to:

- provide a comfortable riding experience for different types of bicycles and other devices such as e-scooters
- facilitate side-by-side riding, which makes journeys more enjoyable and safer when riding with others or with children
- allow opportunities to safely pass other riders.

One-way lane widths of 2m or more provide a comfortable environment, allowing riding side-by-side, diverse types of bicycles and safe passing. Passing of other riders is not possible at widths below 1.8m. Small street sweeper vehicles cannot operate in lanes less than 2.0m, as such narrow lanes may have higher maintenance costs to keep clean.

Austroads Guide to Road Design (AGRD) Part 6a refers to a minimum width for separated paths of 1.2m (one-way), however at this width with kerbs on both sides comfort is reduced for all riders. It is preferable to reduce the buffer width (0.3m minimum) to increase comfort and make it easier to ride larger cargo bikes.

These dimensions account for the fact that approximately 0.2m alongside a kerb face does not contribute to the useable width for riding. A semi-mountable kerb can increase the usable width for narrow lanes, and is more forgiving in the event of rider error.

2.5.1 Width guidance

Table 2.1 details the desired and minimum effective widths for bicycle infrastructure in Tasmania.

As streets have been designed for motor vehicles over many years, it will be challenging to reallocate the preferred width to bicycles in some contexts. A series of adjustments to the street design may be necessary to provide for new riders choosing to ride along new safe bicycle lanes over time.

Where preferred widths are not achievable due to constraints, the minimum widths shown in Table 2.1 can be applied to short sections of route. Widths below the minimum may not provide a safe and comfortable bicycle network. If the minimum widths cannot be achieved, consider the options below.

- Reallocate road space, for example space assigned to on-street parking or traffic lanes, to provide adequate space for riding.
- Provide a convenient alternative route such as a quieter parallel road.
- Provide a different infrastructure treatment. For example, an off-road path adhering to Austroads AGRD 6a (see Section 4.3.7).

2.6 Separation guidance

2.6.1 Separation between walking and riding

In shared walking and riding environments consideration should be given to how riders are separated from people walking. In most situations, paint or a surface contrast are adequate. It's better to minimise the width and height of any barriers to maximise space for people walking and riding and reduce the risk of a trip hazard.

Separation of people riding and walking may be needed in the following conditions.

- Locations with lots of people walking and riding, considered to be more than 150 combined movements per hour.
- Where the travel paths of people walking and riding are divergent and non-linear, such as near entrances to schools or busy crossings.
- During events, when a diversion for riders may be required.
- Where the design is likely to facilitate a high differential in speeds, typically where riders are moving at more than 15km/h such as downhill sections.

2.6.2 Separation from motor vehicles

Figure 2.4 shows a range of separator types that delineate where the bicycle lane is separated from other vehicle traffic. Separators that provide a high level of comfort are raised medians, planters and grade separation. Lightweight flexible posts and paint (chevrons or lines) provide a lower level of comfort.

Where a kerb separator is used, the kerb profile should be angled on the rider's side to avoid pedals striking the kerb and maximise the effective lane width. Separator design should consider application of treatments to ensure visibility, such as flexible bollards, reflectors, line marking and retro reflective pavement markers (RRPMs).

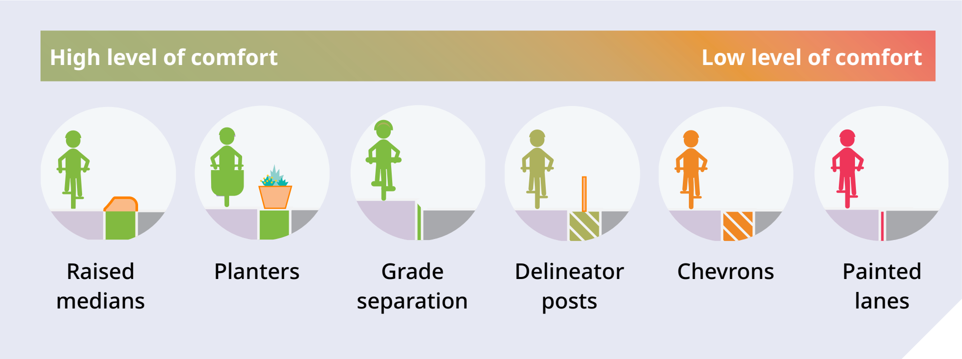


Figure 2.4 Overview of different types of separators, and associated level of comfort

Separation design needs to carefully consider existing and future kerb access needs. This includes waste collection, where separators and parkinng buffers may impact regular operational procedures. For example, in some places delineator posts have frequently been damaged by rubbish truck mechanical arms. Engagement with operators and residents through the design process is key to resolving these issues.

2.7 Designing for hills

Parts of Tasmania are very hilly, which presents a barrier to riding for most people. The increasing availability of e-bikes and micromobility devices mean that hills are becoming less of a barrier to riding and instead, a lot more fun. As e-bike ownership continues to grow, bicycle routes which include moderate hills will become accessible to more people.

Currently in some parts of Tasmania, bike lanes are provided on uphill street sections but not downhill. While the difference in speed between cars and bikes will be greater uphill, a bicycle lane should also be provided in the downhill direction unless the traffic speed and volume is low enough for the rider to comfortably share the lane with traffic (see Section 4.2).

2.8 Riding surface guidance

The finish of any cycling infrastructure should be smooth, continuous and well-maintained. To ensure comfort for riders with smaller wheels, the finish and maintenance should be to a higher quality than surfaces for motor vehicles. This includes maintaining the facility with regular sweeping to ensure the route is free of debris. For on-road routes, asphalt is the preferred material.

3 Great streets for riding

3.1 Overview

An enjoyable riding experience requires all design components to contribute to the quality and function of the street. This section visualises the design guidance and components provided in Chapters 4, 5 and 6. Together, the components can deliver a AAA outcome.

Local streets typically have lower traffic volumes, larger suburban streets often serve bus routes and main streets are busy places with deliveries, outdoor dining and more traffic. Each context has unique design challenges.

The four street types illustrated are:

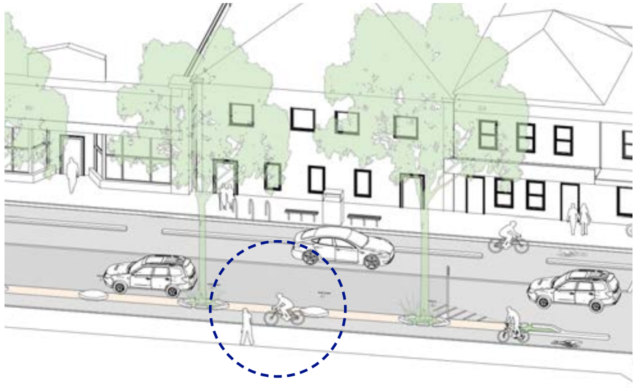
- two-way main street
- one-way main street
- suburban connector street with bus route
- local neighbourhood street.

These street types demonstrate how successful designs require the integration of a range of different treatments and design interventions. The annotations identify links to further guidance detailed in the later chapters in this guide.

3.2 How to use this guide and integrate components

This chapter illustrates what AAA designs could look like in a Tasmanian context. The concepts show how each component contributes to the overall function of the design.

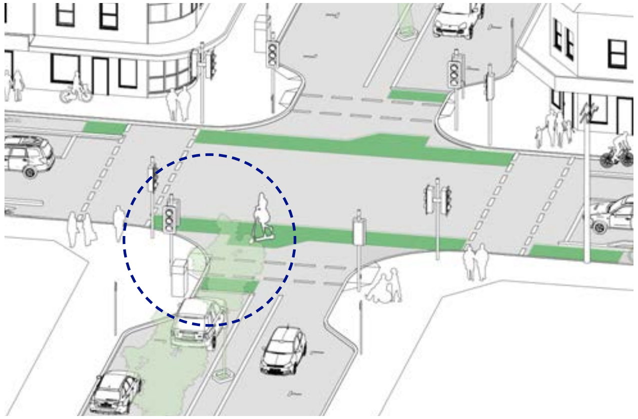
For a bicycle corridor design project, the first task is to identify the most suitable type of treatment option. Selecting an appropriate cycle facility is informed by the context of each project. The next step is to ensure that all intersections and crossings are appropriately designed to ensure they provide a continuous, safe experience. And thirdly, consider the additional street features that will improve the place outcomes overall.



Step 1: choose the facility type

Chapter 4 - Mid-block and off-road

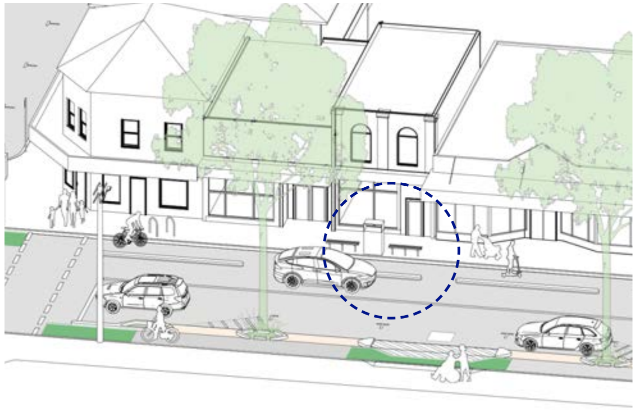
Chapter 4 outlines how to select a preferred mid-block facility, and further details the benefits and considerations of each facility type.



Step 2: design safe, comfortable intersection treatments

Chapter 5 - Intersections and crossings

Chapter 5 provides guidance on how to select and design suitable facilities at different types of intersections, and how to introduce crossings.



Step 3: consider additional features that make the street an enjoyable and welcoming place to be

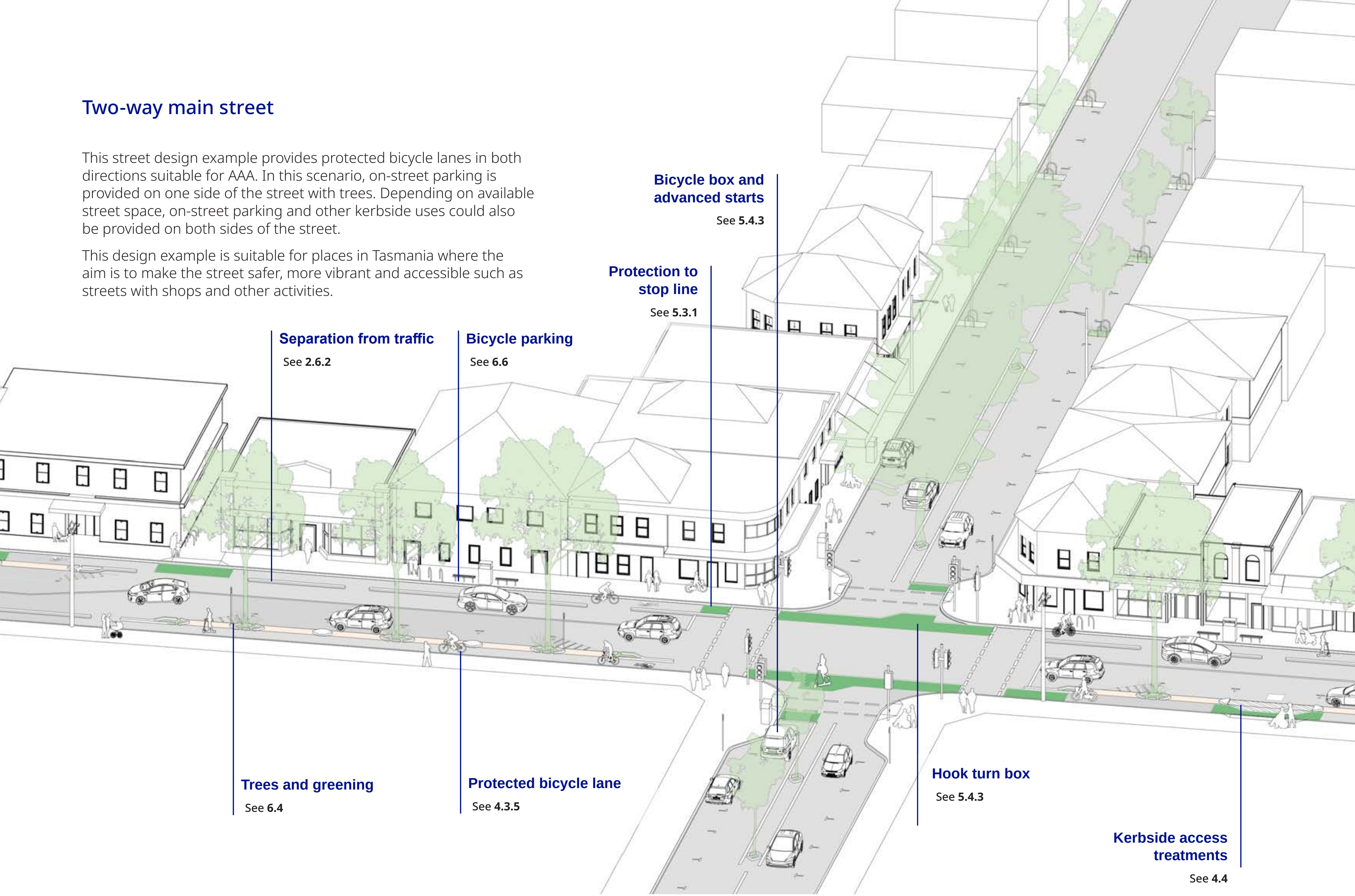
Chapter 6 - Additional features

Chapter 6 identifies a range of additional features that make the street an enjoyable and welcoming place to be, such as trees and seating.

Two-way main street

This street design example provides protected bicycle lanes in both directions suitable for AAA. In this scenario, on-street parking is provided on one side of the street with trees. Depending on available street space, on-street parking and other kerbside uses could also be provided on both sides of the street.

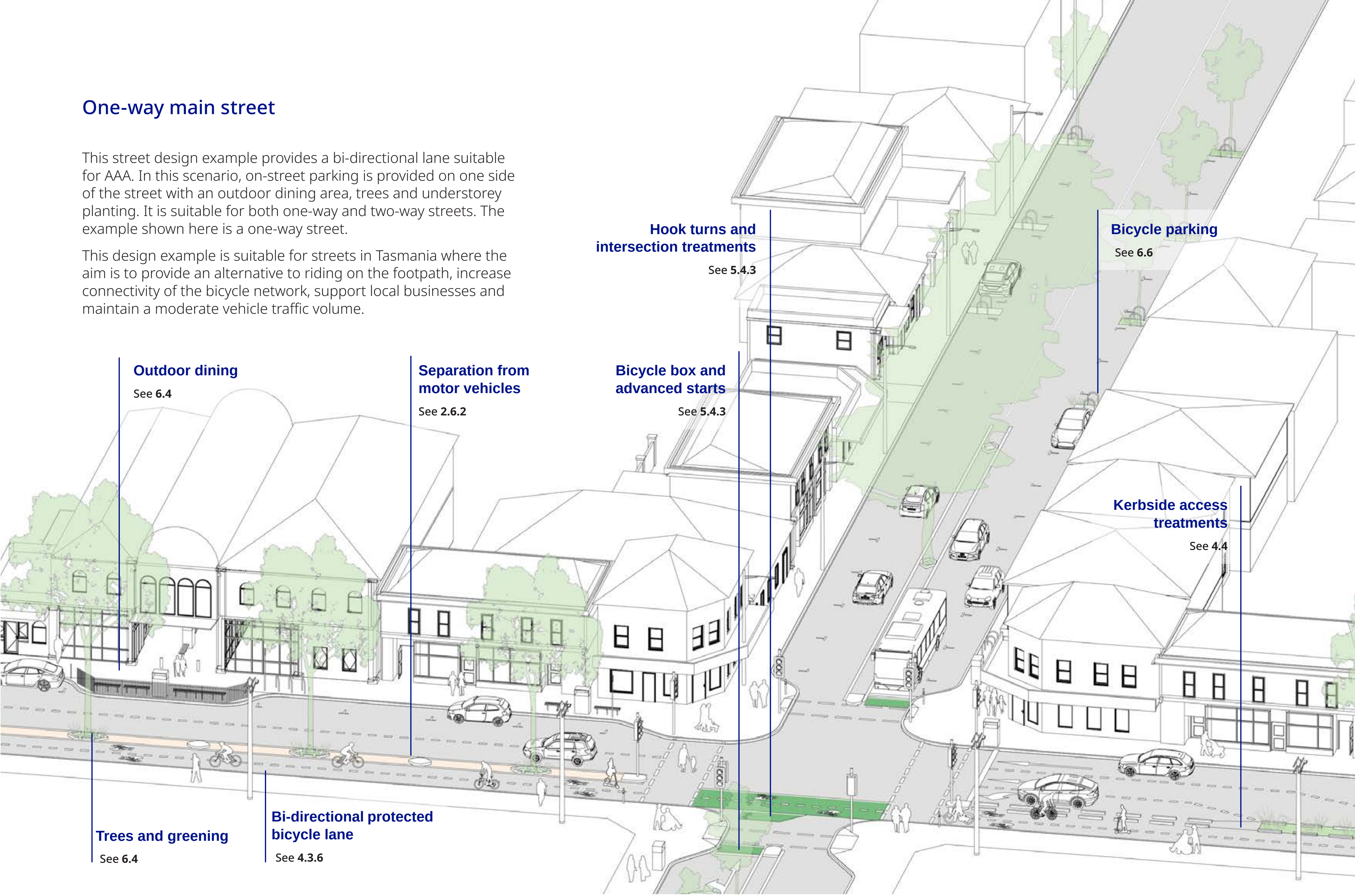
This design example is suitable for places in Tasmania where the aim is to make the street safer, more vibrant and accessible such as streets with shops and other activities.



One-way main street

This street design example provides a bi-directional lane suitable for AAA. In this scenario, on-street parking is provided on one side of the street with an outdoor dining area, trees and understorey planting. It is suitable for both one-way and two-way streets. The example shown here is a one-way street.

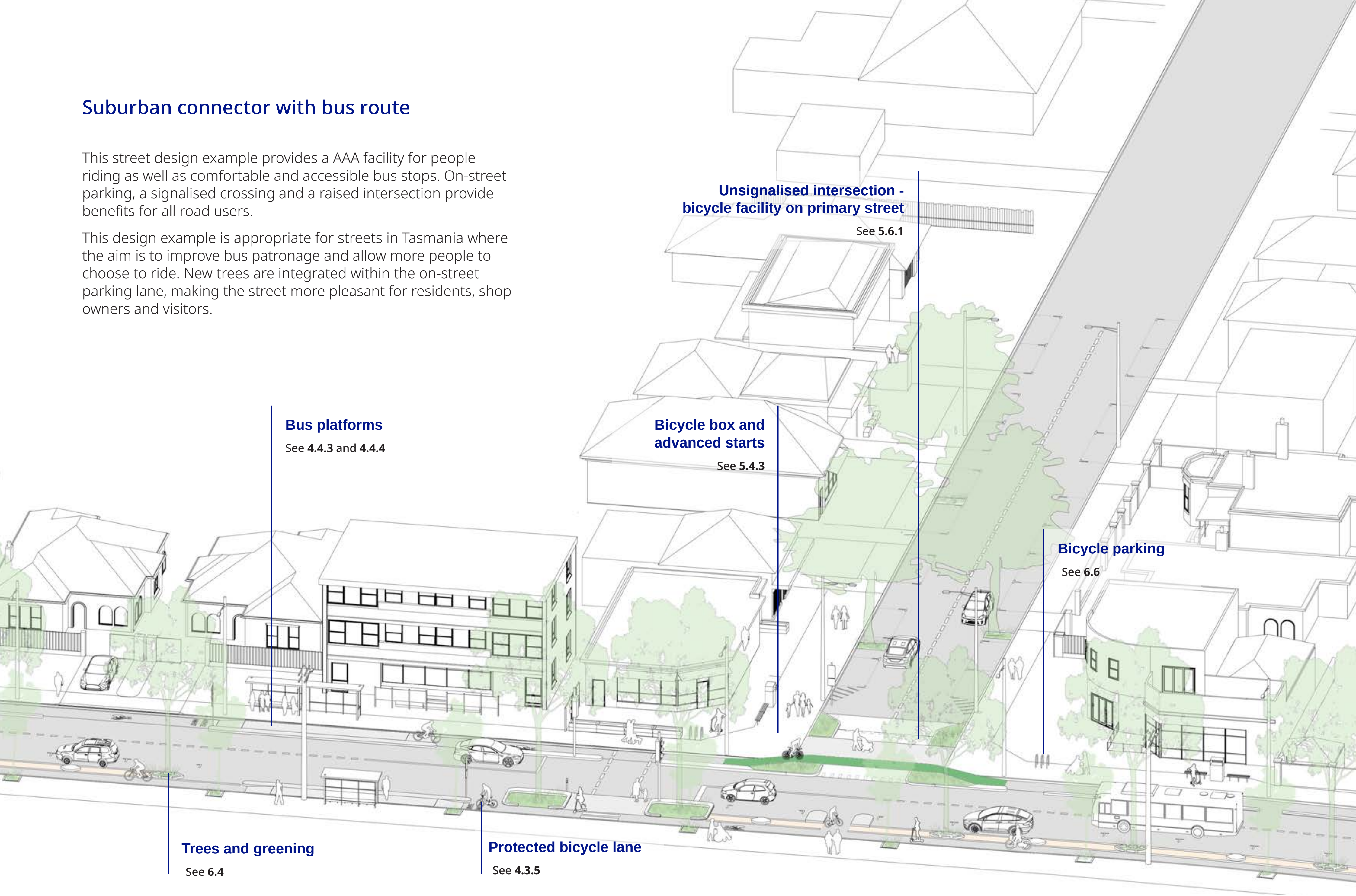
This design example is suitable for streets in Tasmania where the aim is to provide an alternative to riding on the footpath, increase connectivity of the bicycle network, support local businesses and maintain a moderate vehicle traffic volume.



Suburban connector with bus route

This street design example provides a AAA facility for people riding as well as comfortable and accessible bus stops. On-street parking, a signalised crossing and a raised intersection provide benefits for all road users.

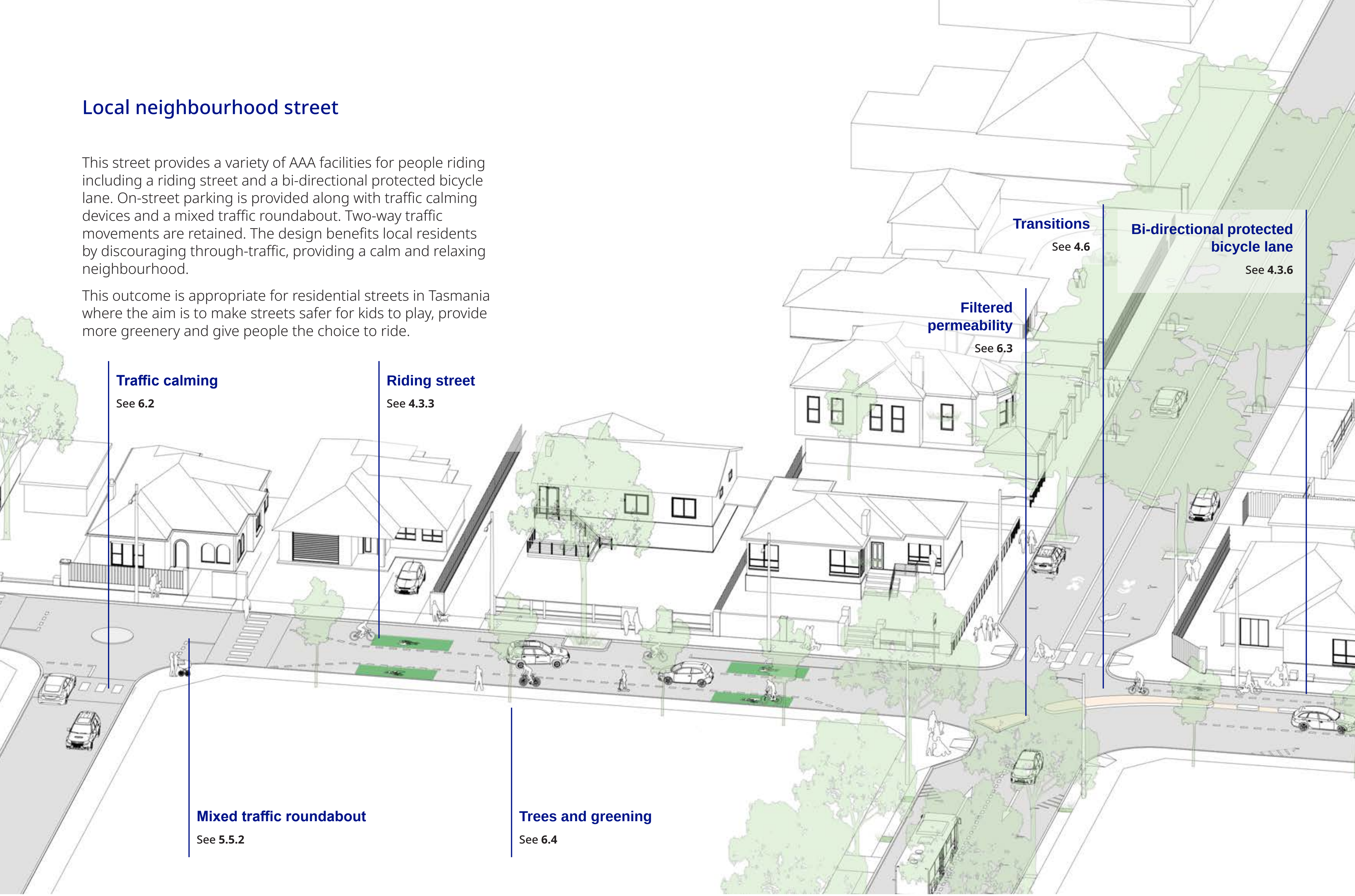
This design example is appropriate for streets in Tasmania where the aim is to improve bus patronage and allow more people to choose to ride. New trees are integrated within the on-street parking lane, making the street more pleasant for residents, shop owners and visitors.



Local neighbourhood street

This street provides a variety of AAA facilities for people riding including a riding street and a bi-directional protected bicycle lane. On-street parking is provided along with traffic calming devices and a mixed traffic roundabout. Two-way traffic movements are retained. The design benefits local residents by discouraging through-traffic, providing a calm and relaxing neighbourhood.

This outcome is appropriate for residential streets in Tasmania where the aim is to make streets safer for kids to play, provide more greenery and give people the choice to ride.



4 Mid-block and off-road treatments

This chapter outlines design guidance for development of on and off-road bicycle paths and lanes.

4.1 Overview

The type of facility provided will influence the range of people who will consider using it. Figure 4.1 provides an overview of different cycling facility types and the relative level of comfort they provide. Design guidance and further information around each facility is provided in Section 4.3.

This guide recommends a range of design options to provide a comfortable facility for AAA suitable for different contexts:

- local street bikeways (see 4.3.3 and 4.3.4)
- protected bicycle lanes (see 4.3.5 and 4.3.6)
- off-road paths (see 4.3.7 and 4.3.8).

Other facility types, including painted lanes, will generally not provide a AAA network. Guidance for these facilities is included in this guide (see 4.3.1 and 4.3.2), however these treatments should only be considered where there is a clear justification for not providing AAA infrastructure.

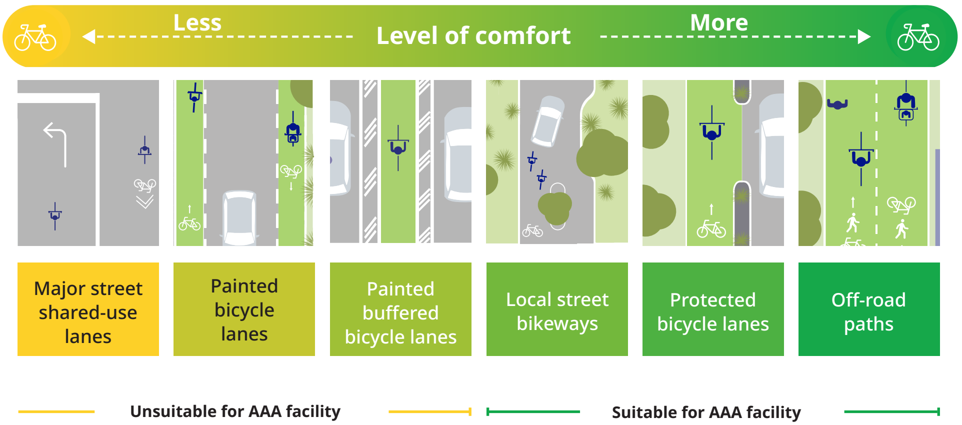


Figure 4.1 Level of comfort of different infrastructure types, and overview of AAA suitable facilities

4.2 Treatment selection criteria

Figure 4.2 guides selection of the preferred facility in an on-road context, with consideration of the traffic environment. See Section 2.3 for more details on how traffic speed and volume influence rider safety and level of comfort.

The key principles highlighted in Figure 4.2 include:

- riders should only share space with vehicles with low speeds (30km/h or lower) and low volumes (400 vehicles per hour or less)
- riders should be physically separated from high speed (>30km/h) and high volume (>400 per hour) vehicles
- riders should be off-road when traffic speeds are 60km/h or greater
- for off-road paths, people walking should be separated from speedy riders with a separate footpath or by providing a painted on-road bicycle lane for confident riders

See Section 6.2 for approaches to reduce vehicle speeds and volumes.

Additional factors to consider in selecting the most appropriate facility include:

- presence of heavy vehicles, which increase the need for physical separation
- kerbside activity – parking and loading
- interaction with public transport, including bus stops and other infrastructure
- street context – considering the general location of the site and adjacent land uses

Treatment selection tool

Design speed*	Two-way traffic volume** (busiest hour)	Painted buffered bicycle lane	Riding street	Calm street	Protected bicycle lane	Off-road paths
< 20 km/h	<400			AAA		
	≥ 400	AAA				
< 30 km/h	<400		AAA			
	≥ 400				AAA	
< 40 km/h	<400				AAA	
	≥ 400				AAA	
< 50 km/h	<400				AAA	
	≥ 400				AAA	
< 60 km/h	Any				AAA	
≥ 60 km/h	Any					AAA

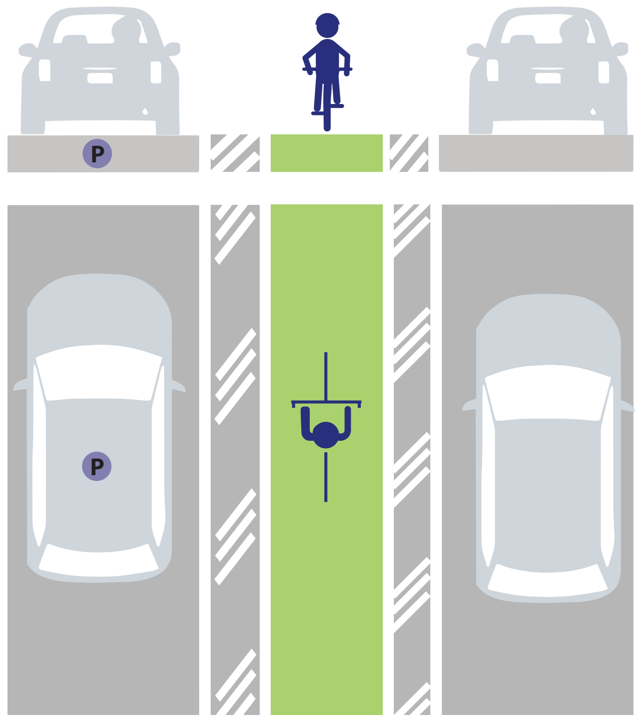
AAA	Likely the preferred AAA facility
	Provision should be suitable for most users
	Provision may not be suitable for all and may exclude some potential users
	Provision not recommended as it's unlikely to be suitable for a range of users
	Provision not considered suitable
	Provision may not be needed, consider local costs and benefits

Figure 4.2 Mid-block treatment selection matrix.
Adapted for Tasmania from the Ireland Cycle Design Manual (2023)

* motor vehicle design speed
**two-way volumes should be observed on the street where the bicycle facility is to be provided.
For traffic lane configurations of more or less than two lanes, assume a threshold of 200 cars per lane

4.3 Mid-block and off-road treatment types

4.3.1 Painted bicycle lane



Description

- an on-road bicycle lane without physical separation from motor vehicles
- in medium to high speed environments this treatment may not attract new riders (not AAA)

Benefits

- this treatment may support an incremental step towards a future AAA facility
- painted bicycle lanes with painted buffers reduce risk of 'dooring' incidents but may not increase comfort for less confident riders
- no impacts to drainage or vehicle access
- lower delivery cost and complexity

Applications

- residential streets where the likelihood of car dooring is lower
- medium- to high- volume and speed traffic environments, where vehicle design speeds are below 50 km/h (see Section 4.2)
- typically has been used where parking is retained against the kerb, although this is not recommended for new treatments
- can be applied as a low-cost traffic calming treatment to reduce traffic lane widths
- in low speed and volume traffic with moderate to steep inclines, a painted lane may be provided only in the uphill direction as this reduces the road space requirement – this treatment should only be considered in traffic environments where riding in mixed traffic would be safe if not for the gradient of the road (as per Figure 4.2)

Key features

- painted bicycle lane of preferred width 2m+ (minimum 1.5m)
- painted buffer alongside parking with a preferred width 1m (minimum 0.6m)
- suitable treatment where route coincides with kerbside activity and bus stops (see Section 4.4)
- slip resistant coloured surface markings at unprotected conflict points with vehicles, for example at unsignalised intersections and high volume crossovers

Additional recommendations

- a buffer between the bicycle and traffic lane with widths of 0.4m to 1.0m+
- for further guidance on dimensions for painted lanes, refer to City of Melbourne Bike Lane Design Guidelines

Crash safety
Perceived safety

4.3.2 Contraflow bicycle lane

Description

- on-road painted bicycle lane permitting riding in the opposite direction to the traffic flow on a one-way street
- bicycle lane can be protected, painted, or in low-traffic environments contraflow movements are allowed without a delineated lane

Benefits

- provides for more direct and convenient journeys for people riding
- improves connectivity of the bicycle network, and can make bicycle routes more competitive with vehicles for short trips
- safety and comfort benefits for people walking and wheeling by reducing riding on the footpath and visually narrowing the street to reduce traffic speeds
- low cost measure providing high benefit for people riding

Applications

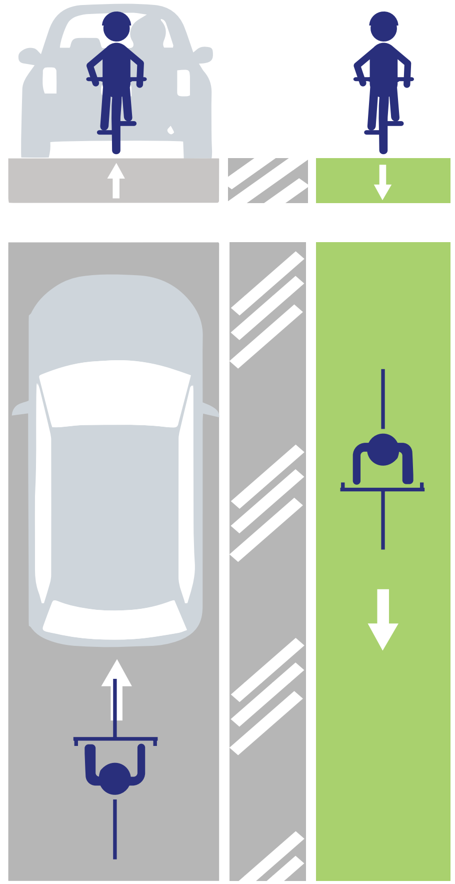
- streets with one-way vehicle traffic

Key features

- clear signage and road markings to ensure drivers are aware that contraflow riding is permitted and a 'bicycles excepted' sign is attached to any 'no entry' signs
- narrow traffic lane widths to reduce traffic speeds
- for low speed (<40km/h), low volume (<200 veh/hour one way) streets with few buses or heavy vehicles, contraflow riding can be permitted without a delineated lane
- in medium- to high- volume and speed traffic environments, where vehicle speeds are between 40km/h and 60km/h, a painted or physically separated contraflow lane is required – see Table 2.1 for recommended lane and separator widths
- suitable transitions to support access to and from contraflow lane – see Section 4.6

Additional recomendations

- regular breaks in any physical separation to allow drainage, maintenance access, and facilitating access to driveways
- where no physical contraflow lane is provided, sharrow bicycle markings can be used to highlight presence of riders – this is only suitable in very low and very slow speed environments and will not provide a level of comfort for all riders
- advisory contraflow lane marking or bicycle symbols, at larger and/or two-way side streets – to encourage drivers entering/exiting the one-way street to look for and give way to riders travelling in the contraflow direction



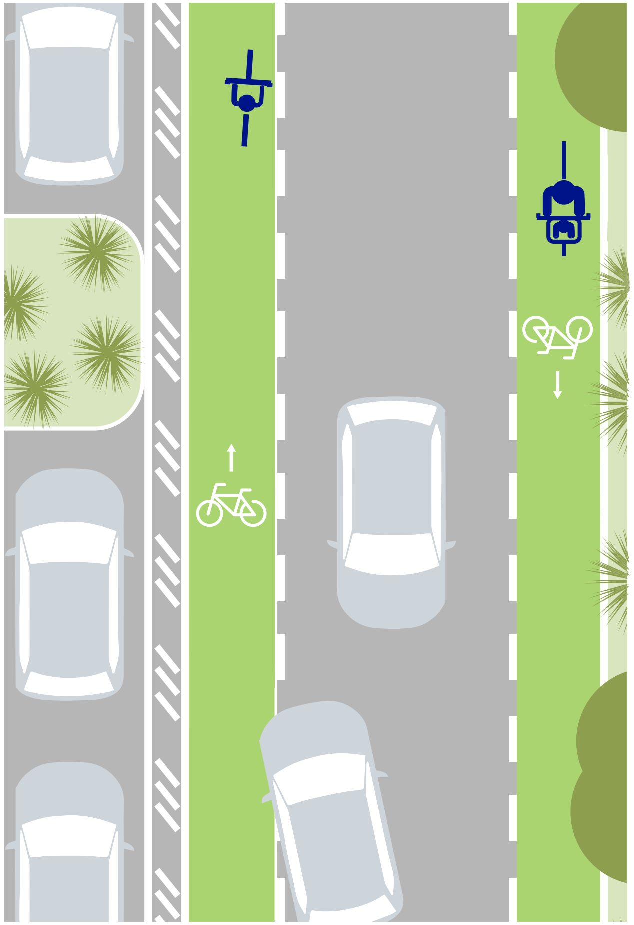
Crash safety

Perceived safety

4.3.3 Riding street

AAA

Description	• riders are prioritised along the street • drivers must give way to riders and vehicles driving in the opposite direction, and are allowed to enter the bike lane when it is safe to do so
Benefits	• if there are suitable existing traffic conditions (speed/volume), minimal infrastructure is required • effective for traffic calming, creating the perception of a narrowed carriageway • less road space reallocation is required than protected lanes as on-street parking can be retained • supports healthier, more attractive streets with increased greenery and lower vehicle speeds
Applications	• low-speed and low volume traffic environments with maximum one traffic lane in each direction • recommended for streets with traffic speeds of less than 30 km/h, however applications with a traffic speed of less than 40 km/h may be acceptable • usually a residential context where through traffic is discouraged
Key features	• low-volume of traffic with a design speed of 30km/h or less (see **Figure 4.2**) • the minimum clear carriageway width is 5.5m including 1.5m (minimum) bicycle lanes • the central vehicle lane is the width of a car (2.5m preffered) and serves two directions so a road centre line is not provided • if vehicles need to pass one another, both temporarily move into the bicycle lane when safe • bicycle lanes are marked with dashed lane lines and bicycle symbols, with an additional 0.5m buffer positioning riders away from where car doors open • slip resistant green surface treatment is provided at conflict points
Additional recommendations	• signage guiding road user behaviour on streets with these treatments may need to be provided until the facility type is more commonplace • planted buildouts can be provided along the parking lane to prevent driving in the parking area • alternate parking sides to reinforce slower speeds



Crash safety

Perceived safety

4.3.4 Calm street

AAA

Description

- riders use the same road space as people driving
- low-speed (30km/h or less) and low volume traffic environment, where people riding feel comfortable in the centre of the lane

Benefits

- if there are suitable existing traffic conditions (speed/volume), minimal infrastructure is required
- less road space reallocation is required than protected lanes as existing on-street parking can be retained
- can support healthier, more attractive streets for all with increased greenery and lower vehicle speeds

Applications

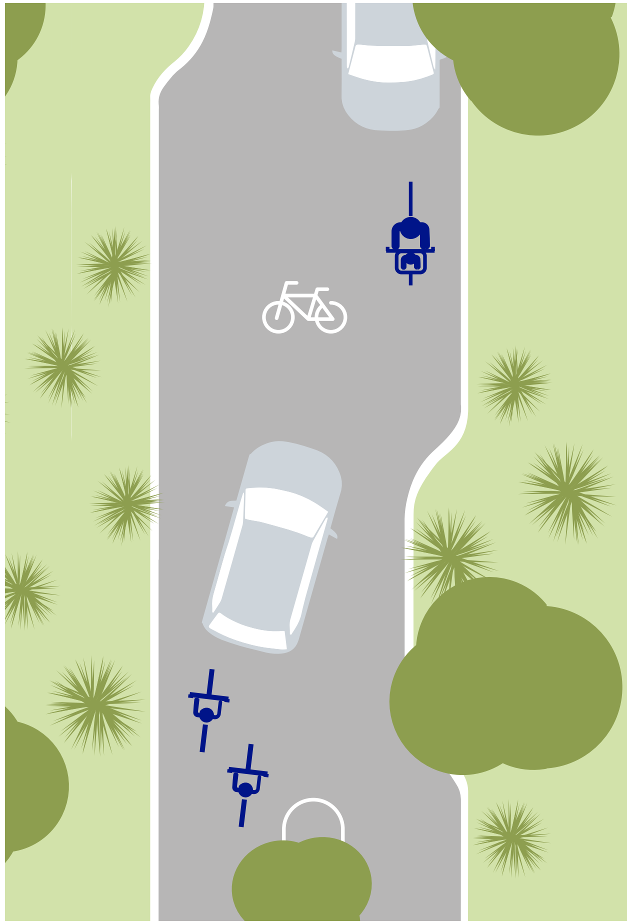
- low-speed and low volume traffic environments with maximum one traffic lane in each direction
- usually a residential context where through traffic is discouraged

Key features

- low-speed and low volume traffic environments meeting the following four criteria:
  1. design speed is 30km/h or lower
  2. low volume traffic, with fewer than 400 vehicles in the busiest hour (two-way volumes)
  3. heavy vehicles comprise less than 5% of the total vehicle volume (preferably nil)
  4. self-enforcing environment, that is, a roadway layout and associated traffic calming features that make it clear to drivers to drive slowly and carefully
- see **Section 6.2** for traffic calming treatments to reduce traffic speed and volume
- a traffic centre line is not appropriate as this may increase vehicle speeds

Additional recommendations

- signage and road markings to alert all road users to the presence of bicycles on the road and support riders to confidently ride in the centre of the lane
- 'sharrow' road markings to indicate a shared environment for bicycles and motor vehicles
- integrate new landscaping and street trees in the design to calm driver behaviour and create a more pleasant street environment (see **Section 6.4**)



Crash safety

Perceived safety

4.3.5 Protected bicycle lane

AAA

Description

- an on-road bicycle lane with physical separation from motor vehicles, provided in a single direction and typically at the kerbside

Benefits

- improves road safety for all road users
- physical separation from traffic provides high level of comfort for less confident riders
- reduces risk of 'dooring' incidents by providing a buffer to parked vehicles
- improves safety for people walking by reducing the distance to cross the street, and reducing speeds
- supports healthier, more attractive streets with opportunities for greenery and lower vehicle speeds
- typically lower cost with fewer changes to traffic signals and kerb lines than a bi-directional protected bicycle lane
- safer than a bi-directional bicycle lane (see Section 4.3.6) where there are multiple crossovers and unsignalised intersections

Applications

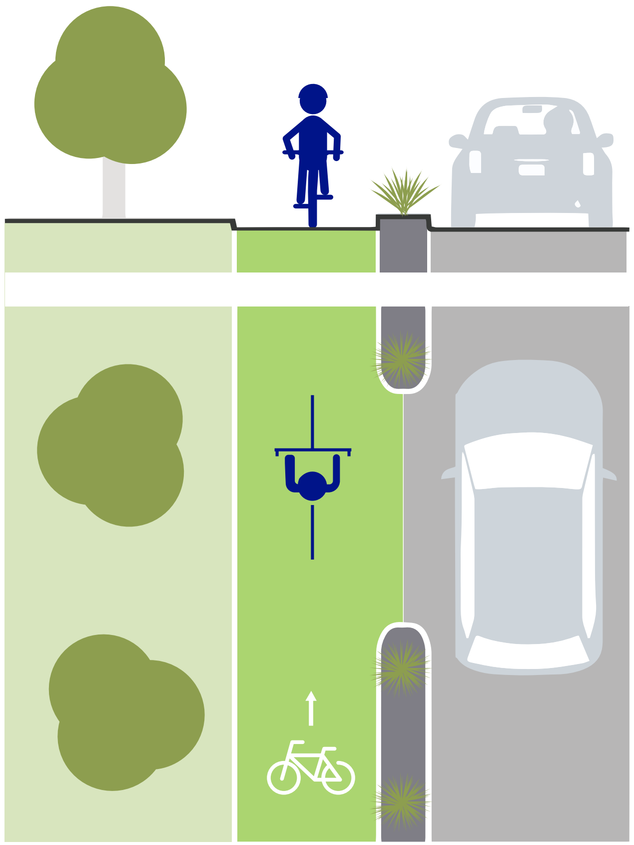
- medium- to high-volume and speed traffic environments, where vehicle speeds are between 30km/h and 60km/h (see Section 4.2)
- note that where there are traffic speeds of 60km/h and above, an off-road treatment should be provided (see Sections 4.3.7 and 4.3.8)

Key features

- see Table 2.1 for preferred lane and separation widths
- regular breaks in separators to allow drainage and make it easy to cross the street
- use of slip resistant coloured surface markings at conflict points with vehicles, such as unsignalised intersections and major crossovers
- smooth surfaces – people riding are more sensitive to uneven surfaces, cambers and drainage grates than motor vehicles
- suitable treatments at intersections and crossovers (see Chapter 5)
- suitable treatment where route coincides with kerbside activity and bus stops (see Section 4.4)
- suitable transitions between treatments, where applicable (see Section 4.6)

Other considerations

- typically requires a greater reallocation of road space than a bi-directional protected bicycle lane (see Section 4.3.6)



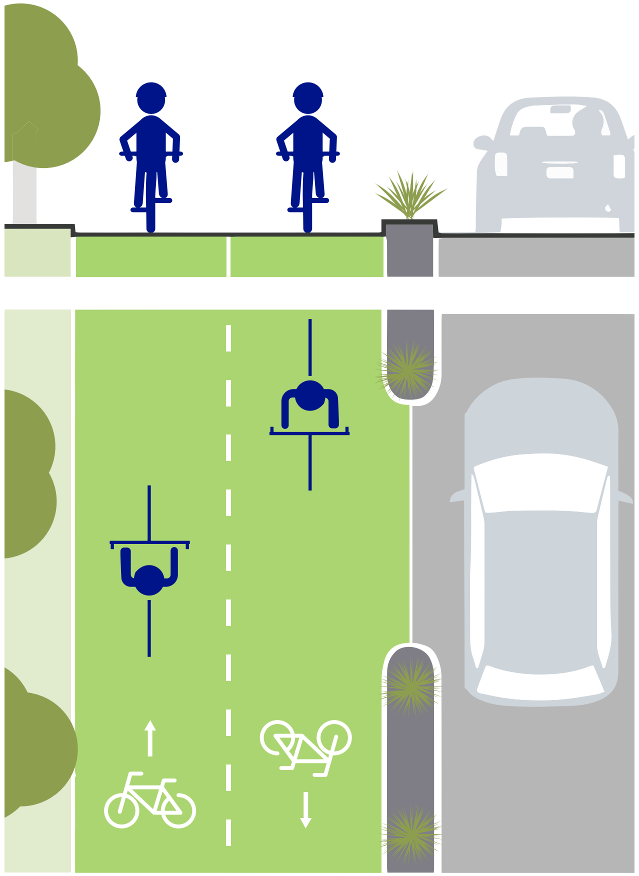
Crash safety
Perceived safety

4.3.6 Bi-directional protected bicycle lane

AAA

Description

- an on-road bicycle lane with physical separation from motor vehicles



Benefits

- improves road safety for all road users
- physical separation from traffic provides high level of comfort for less confident riders
- reduces risk of 'dooring' incidents by providing a buffer to parked vehicles
- improves safety for people walking by reducing crossing distances across traffic lanes
- supports healthier, more attractive streets with increased greenery and lower vehicle speeds
- enables contraflow bicycle movements on one-way streets (see Section 4.3.7) and can create a more sociable riding environment and require less road space than a uni-directional lane

Applications

- medium- to high- volume and speed traffic environments, where vehicle speeds are between 30km/h and 60km/h (see Section 4.2)
- note that where there are traffic speeds of 60km/h and above, an off- road bicycle route should be provided (see Sections 4.3.7 and 4.3.8)

Key features

- see Table 2.1 for preferred lane and separation widths
- regular breaks in separator kerbs to allow drainage and ease for people crossing the street
- use of slip resistant coloured surface markings at conflict points with vehicles
- smooth surfaces – people riding are more sensitive to uneven surfaces, cambers and drainage grates than motor vehicles
- suitable treatments at intersections and crossovers (see Chapter 5)
- suitable treatment where route coincides with kerbside activity and bus stops (see Section 4.4)
- suitable transitions treatments where required (see Section 4.6)

Other considerations

- well suited for long segments with few crossovers
- there may be increased risk of conflict where vehicles are required to turn across lane, as drivers may not look both ways
- significant signal changes are typically required at signalised intersections
- transitions to other facilities such as a uni-directional bicycle lane can be complex

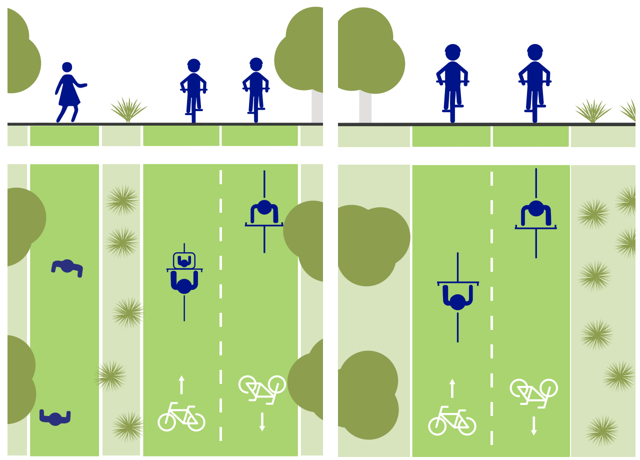
Crash safety

Perceived safety

4.3.7 Off-road path – bicycle only

AAA

Description	• bicycle-only facility providing separation from people walking, wheeling and driving motor vehicles • may have a separate footpath alongside, which can be separated by a buffer
Benefits	• dedicated space for riding without conflicts lowers both the actual and perceived crash risk • allows riders to maintain desired speed with minimal need to stop
Applications	• locations alongside high-speed roads (>60km/h) • recreational and scenic routes • locations with high volumes of people walking and riding
Key features	• preferred width: 4m+ (two-way), 2m+ (one way) • minimum width: 2.5 (two-way), 1.5m (one-way) • suitable crossing treatments where off-road path crosses a road (see **section 5.6**) • smooth surfacing
Additional recommendations	• centre line to separate direction of travel, and bicycle directional arrows/markings • suitable lighting, especially where path is frequented at night
Other considerations	• a parallel on-road painted bike lane can be provided for more confident and faster riders • for further guidance, refer to Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling



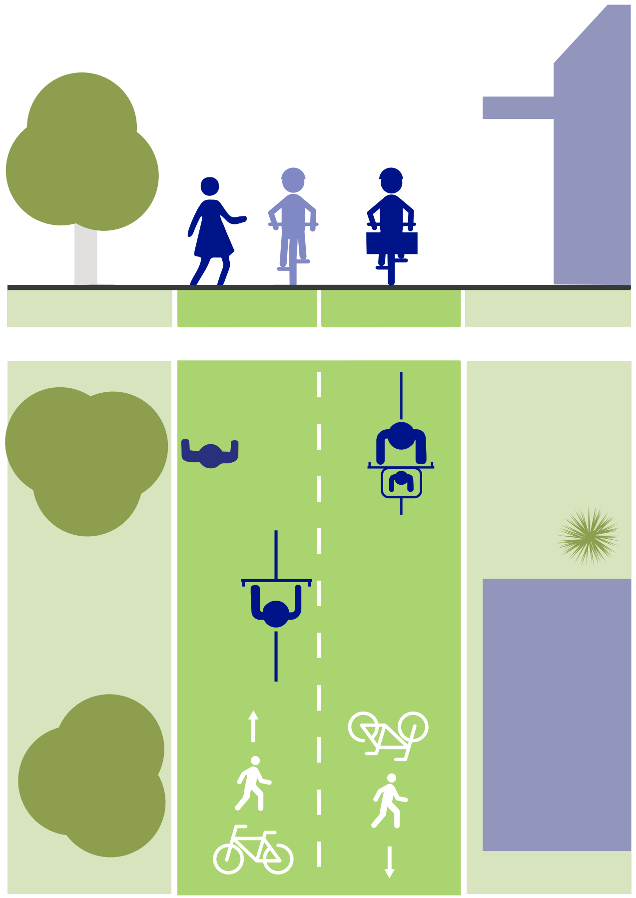
Crash safety

Perceived safety

4.3.8 Off road path - shared path

AAA

Description	• a path separated from vehicles, with people walking, wheeling and riding using the same path
Benefits	• dedicated space for riding separated from the roadway, lowers actual and perceived crash risk • allows riders to maintain desired speed with minimal need to stop, although riders need to be alert for people walking especially with toddlers or dogs, for example
Applications	• locations alongside high-speed road (>60km/h) • recreational and scenic routes • locations where the volume of people walking and riding does not warrant separation of modes (see **Section 2.6**)
Key Features	• preferred width: 4m+ (two-way) • minimum width: 2.5m (two-way, for short sections only) • suitable crossing treatments where off-road path crosses road (see treatments in **Section 5.5**) • smooth surfacing
Additional recommendations	• centre line to separate direction of travel, and shared path directional arrows • suitable lighting, especially where path is frequented at night
Other considerations	• not suitable for high volumes of people both walking and riding (see **Section 2.6**) • hilly sections, where bicycle riders pick up speed downhill, may need a wider path or separation from people walking and wheeling • a parallel on-road painted bike lane can be provided for more confident and faster riders • for further guidance, refer to Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling



Crash safety

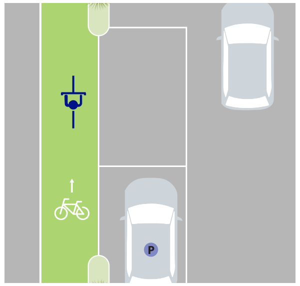
Perceived safety

4.4 Kerbside access treatments

In locations where people walking frequently cross a bicycle lane from the kerb, additional design considerations are required to manage potential conflict. Car parking, loading, bus stops and other kerbside activities will impact the safety of people riding, walking and manouvering in the space, if not designed carefully. Four such examples are illustrated, with additional considerations provided.

- Where a cycling facility is not physically separated from vehicles, parking and loading tends to occur across, or next to, the bicycle lane. This means riders may need to move into the adjacent traffic lane to pass the obstruction, creating an unsafe and uncomfortable experience for most people.
- Vehicle doors opening into painted bicycle lanes (car dooring) is one of the most frequent causes of crashes.
- Due to associated reversing manoeuvres, angled parking alongside cycling facilities is typically not suitable for provision on bicycle routes.
- Kerbside bus stop treatments should be considered where an on-road treatment coincides with a high frequency bus route. Where road space is available the floating bus stop treatment (**4.4.3**) is preffered to manage conflict between pedestrians, passengers and riders at a single conflict point. The design of bus stops must also align with Department of State Growth bus stop guidelines and standard drawings.

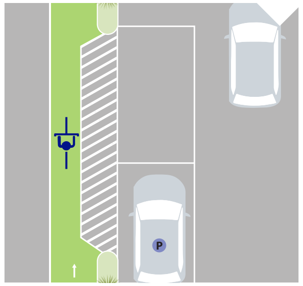
4.4.1 On-street parking



Design features

- as per **Table 2.1**, the width of separation between people riding and stationary vehicles (e.g. parking and loading lanes) is preferably 1m and a minimum of 0.6m
- separation should be physical for rider comfort (see separator options in **Section 2.6**)
- a 3m gap between parked cars and any driveway, laneway or side street crossing to maintain sightlines and increase visibility is recommended
- regular breaks in separation should be provided to allow ease of entry and exit from a parked car while also preventing vehicles from entering the bicycle lane
- position separators to minimise conflict with door opening positions

4.4.2 Loading / DDA bays

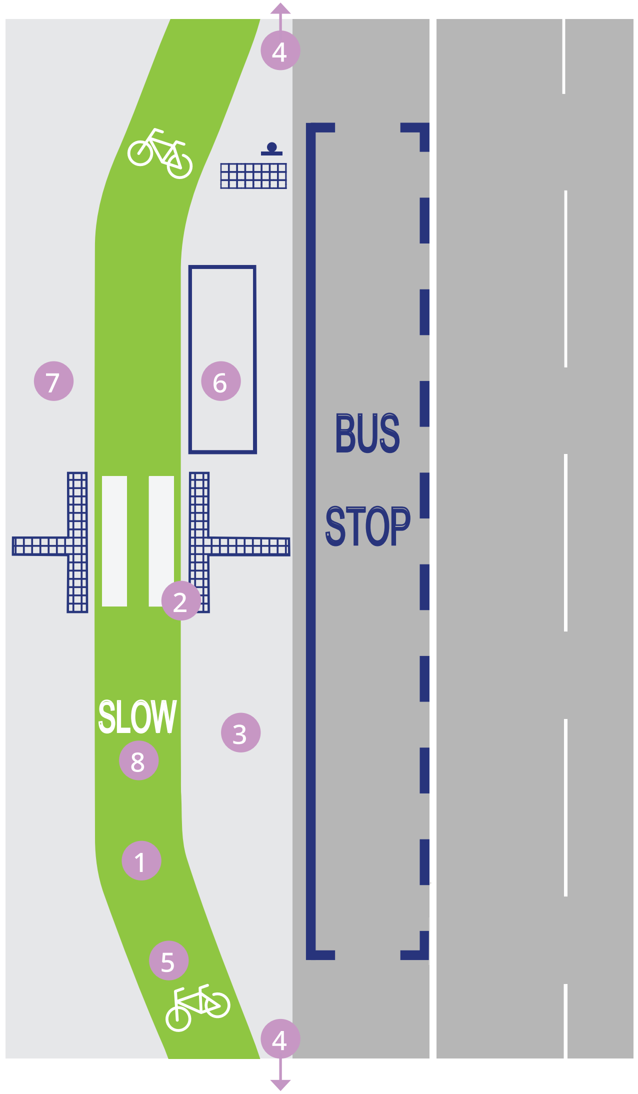


Design features

- where a loading or accessible bay is provided, an extended painted buffer area can be provided in the bicycle lane to make loading of vehicles easier
- the painted buffer creates a visual narrowing, signaling to riders to watch out for kerbside activity while minimum widths are maintained, ensuring access for all kinds of bicycles
- recommended for loading zones, hotel pick up/drop off and accessible bays
- for parking bays compliant with the Disability Discrimination Act, ensure that access to the footpath is provided including a kerb ramp if needed

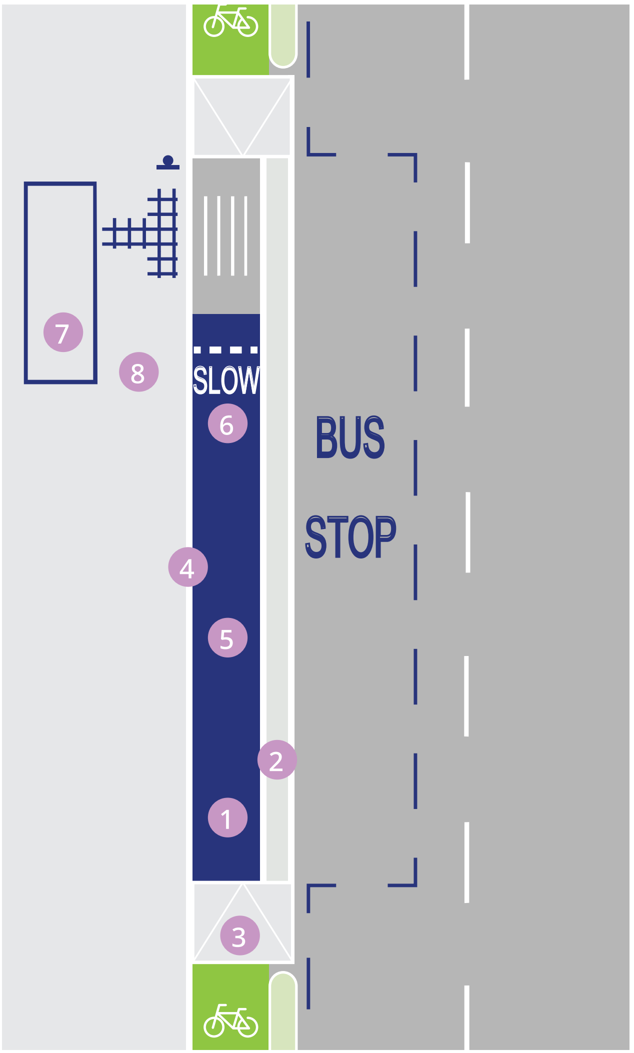
4.4.3 Floating bus stop

Key features	1) 1.2-1.5m wide bicycle path (for uni-directional riding) to encourage slow, single-file riding through bypass 2) mini zebra crossing with tactile paving 3) 2.5m minimum width 'island' waiting area, or larger for high patronage bus stops 4) suitable transition between on-road bicycle facility and the bypass bicycle path 5) footway, bicycle path and island to be delineated through material, surfacing or line marking 6) maintain good sightlines and carefully locate visual obstructions such as a bus shelter 7) maintain adequate footpath width adjacent to the bicycle path (recommended minimum 1.5m) 8) signage and line marking to ensure riders are alert for, and give way to, passengers
Additional recommendations	• grade separation between the bicycle path and pedestrian areas, with a raised table to reduce rider speeds and provide a flush crossing point for passengers • use of clear panels on bus shelter to help maintain sightlines • measures to manage pedestrian conflict points (see **Section 4.6**)
Other considerations	• riders can bypass the stop, preventing interaction between people riding and passengers loading • separates bus passengers from people using the footpath • suitable where bicycle path is bi-directional or unidirectional • requires more road space than a platform bus stop, or can impact footpath width • bus passengers must cross the bicycle path to reach the bus stop, which can be more difficult for people with limited vision • provides a limited sized waiting area for bus passengers • substantial civil and drainage works often required to achieve suitable grades



4.4.4 Platform bus stop

Key features	1) 1.2-1.5m wide bicycle path (for uni-directional riding) to encourage slow, single-file riding through platform 2) platform to include 0.5m-1m buffer area from the face of kerb to the bicycle path for passenger safety and comfort 3) suitable ramped transition between on-road cycling facility and the platform 4) footpath, bicycle path and buffer to be flush 5) bicycle path is clearly delineated to ensure pedestrians keep the bicycle path clear 6) signage and line marking to inform riders to give way to passengers boarding or alighting 7) good sightlines between users and carefully locate visual obstructions such as a bus shelter 8) maintain adequate footpath width adjacent for both waiting passengers and people walking along the street (recommended minimum 1.5m)
Additional recommendations	• measures to manage conflict points with people walking (see **Section 4.6**) • bus can be located in the vehicle lane, slowing and calming vehicular traffic while prioritising public transport services
Other considerations	• compact design with less road space required can be easier to retrofit • bus passengers have priority: riders are required to stop and give way to passengers while boarding and alighting – at major stops this may cause some delay to riders • bus passengers may block the bicycle path while waiting for a bus • less suitable where bicycle path is bi-directional



4.5 Transitions

Transitions between different types of bicycle paths and lanes are an important part of delivering a safe, connected network. The design objective for quality transitions is to provide a seamless experience for people riding where different routes meet, or where different bicycle path and lane types are used on a single bicycle route. Adequate space should be provided for riders to comfortably complete turning movements.

Three examples of common transition types, and key design features of each, are discussed further in this section.

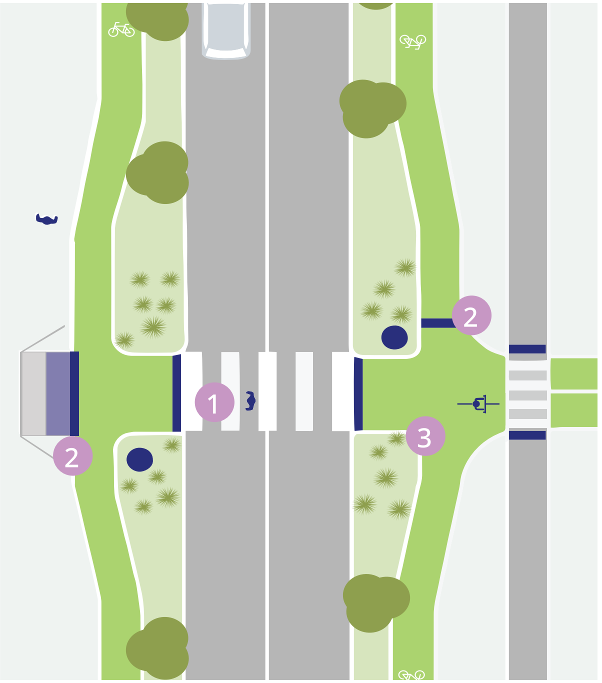
4.5.1 Off-road path to protected bicycle lanes

Design features

1) a shared use crossing (a suitable crossing type should be provided in line with traffic conditions), with measures to reduce motor vehicle speed

2) signage to indicate to riders that they are entering a shared area with people walking and wheeling

3) clear signage and pavement markings to highlight conflict points with other users, and consider approaches to manage rider speed on approach to the transition (see Section 4.6)



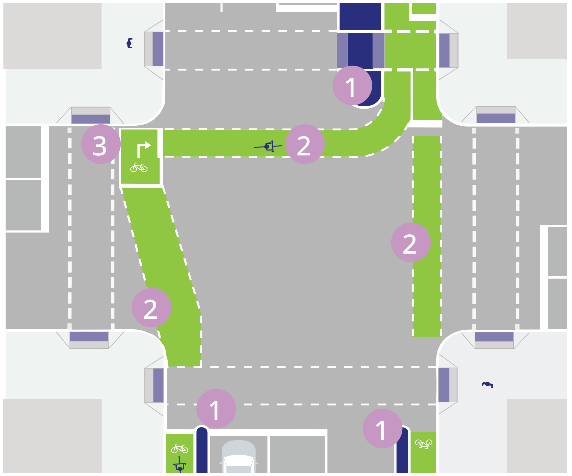
4.5.2 Protected bicycle lanes to bi-directional protected bicycle lane

Design features

1) continuation of separator islands to start/end of bicycle lane

2) clear signage and carriageway markings to highlight conflict points and alert road users to bicycle movements

3) protected crossing opportunity to reach start of bi-directional bicycle lane – in the example shown, this is provided through a hook turn bike box, but this could also be provided through a mid-block signalised crossing, or a dedicated bicycle phase at a signalised intersection that allows for a diagonal crossing movement



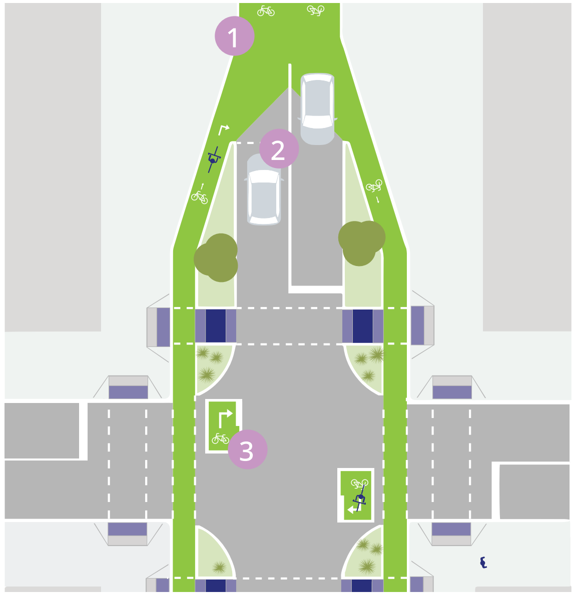
4.5.3 Protected bicycle lanes to local street bikeways

Design features

1) signage and carriageway markings to highlight conflict points and alert road users to bicycle movements

2) 'Give way to bicycles' signage and markings at start of mixed traffic area

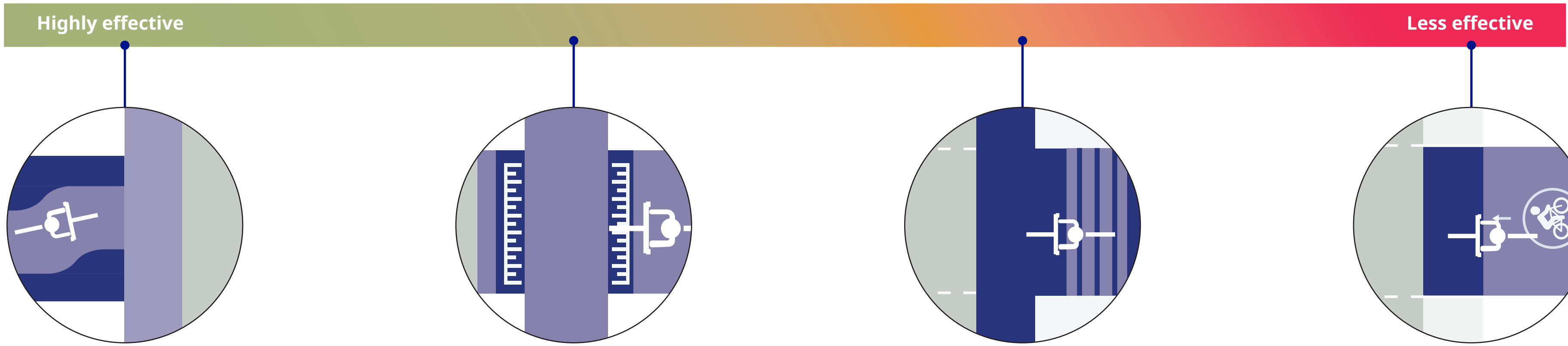
3) hook turn boxes can be provided to support riders to safely turn to/from perpendicular street



4.6 Managing pedestrian conflict points

Providing a suitable environment for different riders to cycle at their desired speed is an important part of providing a comfortable network. However, in some places it is important to manage rider speeds, particularly at conflict points with people walking.

Different approaches to speed management are shown in Figure 4.18.



Horizontal shift

Horizontal deflections are considered the most effective at reducing rider speed. However, they can take up more space than other options.

Any horizontal shift must be designed to ensure riders of cargo and recumbent bicycles can comfortably move through. These are best provided through altering the course of the path, and not gated chicanes. Riders with a disability, or with a heavy load such as children, may not be able to dismount, manouvre or walk their bicycles if staggered bars are used.

Try to provide additional width at the conflict point and maintain clear sight lines.

Raised table

A raised table, where pedestrians continue on their footpath at grade, while riders slightly change grade, indicates that people walking have priority over riders.

Vertical deflections such as raised tables can be effective to manage speeds. However, changes in grade will generally impact stormwater flows and this often introduces costly drainage requirements.

Surface material

Differences in surface material and pavement markings signal to riders to slow or be alert.

Material changes include different surface colour or texture through use of pavers, provided they are not too course to reduce accessibility. The use of 'rumble strips' is not recommended as they are hazardous for small wheels such as e-scooters and divert the rider's attention towards the ground when they need to be focused on the approaching conflict point.

Pavement markings to alert people walking and riding can include painted artworks, colourful dots or chequeboard patterns at conflict points.

Signage and linemarking

Signage and linemarking have limited effectiveness for reducing rider speeds.

Signage can be easily missed, especially when above head height. Linemarking, such as zebra crossings, provide visual cues to priority but don't necessarily reduce rider speed on the approach unless warning is given. Relying on linemarking to delineate bicycle and pedestrian space in busy areas can increase hostility between people walking and riding.

5 Intersections and crossing treatments

Intersections and crossings are critical points on the network for people who ride. These junctions are important to provide connections between routes, and are often the most challenging part of a network to design due to their complexity. Small improvements at intersections can provide substantial benefits and the guidance in this chapter identifies a range of cost-effective approaches for different contexts.

5.1 Overview

A lack of suitable provision for riding at intersections and crossings are gaps in safe bicycle networks. It is vital that protected facilities extend to and, where suitable, through intersections to achieve safe and comfortable conditions.

The following sections present typical treatments at the following types of intersections and crossings:

- Signalised intersection treatments – Section 5.3
- Traffic signal management – Section 5.4
- Roundabouts - Section 5.5
- On-road routes at unsignalised intersections – Section 5.6
- Off-road path crossing treatments – Section 5.7

5.2 Managing conflict with turning vehicles

Crashes between riders and drivers turning at intersections can lead to serious injuries and fatalities for riders. Table 5.1 describes approaches to manage these conflicts. Intersection treatments incorporating these features are further described throughout this chapter.

Intersection Type	Signalised	Roundabouts	Unsignalised
Preferred AAA	Conflicting movements between bicycles and turning vehicles are time separated or eliminated, such as with turn bans.	People walking and riding are provided priority with crossings and vehicles are physically slowed. Alternatively, an off-road path or grade separation bypasses the roundabout.	Conflicting movements between riders and turning vehicles are eliminated, or traffic volume on side road is substantially reduced by introducing modal filters.
Acceptable AAA	Movements are partially time separated with the use of advanced starts for riders or holding turns for vehicles.	Vehicle speeds and volumes are managed to allow riders to comfortably share the lane with vehicles.	The speed of turning vehicles is reduced. People walking and riding have priority over vehicle turning movements.
Discretionary	Both rider and driver are given a green signal at the same time.	Riders share the lane with drivers, making it uncomfortable for many riders and less safe.	Pavement markings, refuges and signage assist riders but provide limited protection.

Table 5.1 Approaches to managing conflicts at intersections

5.3 Signalised intersection treatments

Intersection treatments need to respond to the traffic speed and volume to provide a connected and comfortable facility. Figure 5.1has been developed to support design decisions in different Tasmanian contexts. The intersection treatment will often be supported by other treatments, such as bicycle boxes and advanced starts, based on the context of the bicycle route (see Section 5.4 and Table 5.2).

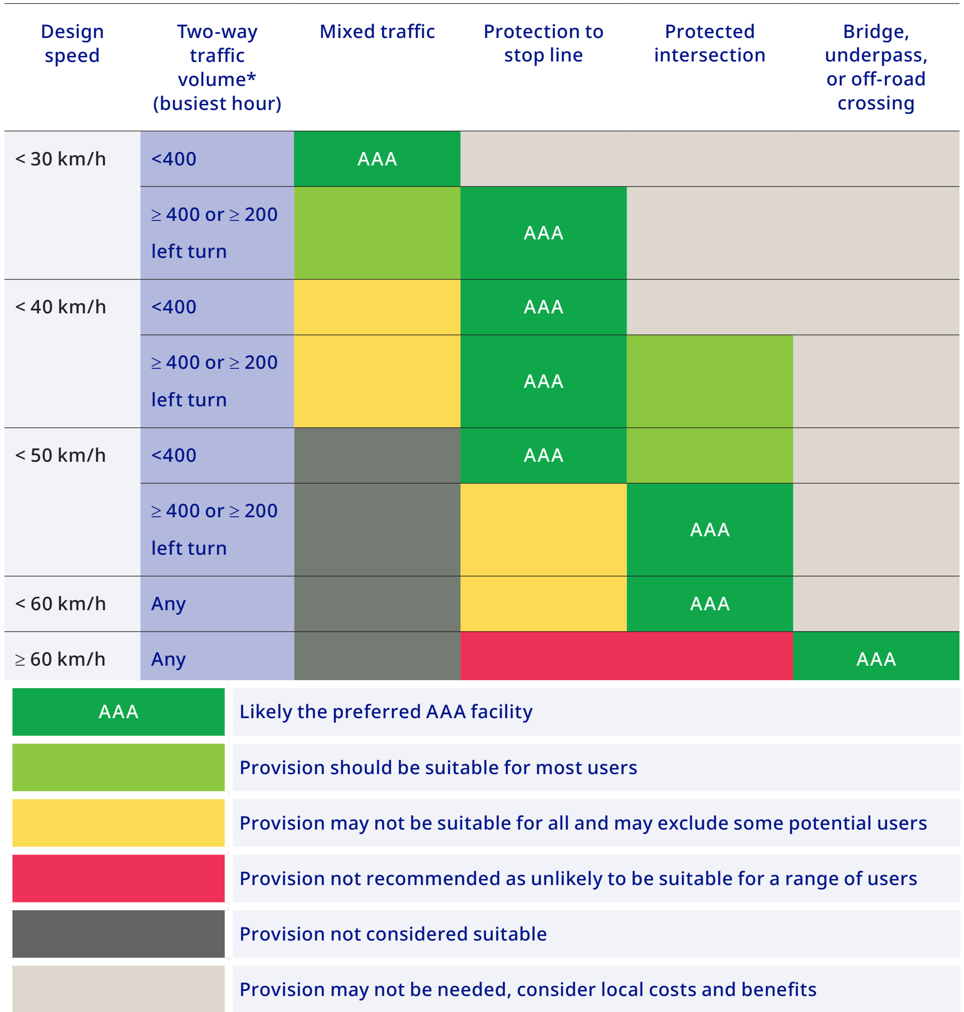
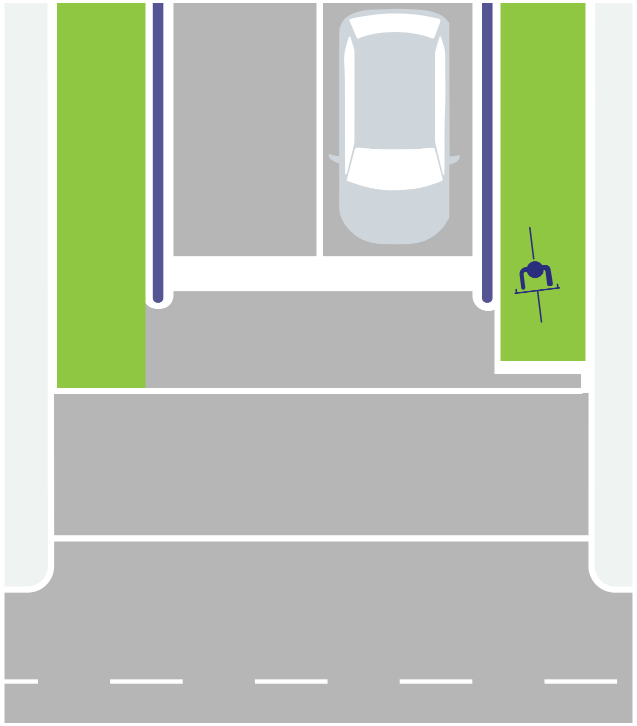


Figure 5.1 Intersection treatment selection matrix
Adapted for Tasmania from the United Kingdom LTN 1/20 and Irish Cycle Design Manual (2023)
*two-way volumes should be observed on the street where the bicycle facility is to be provided.
For traffic lane configurations of more than two lanes, assume a threshold of 200 cars per lane

5.3.1 Protection to stop line

AAA

Description	• physical separation between riders and vehicles is provided as far as possible to safely reach the intersection • to achieve a AAA facility, this treatment should be combined with traffic signal management to partially time separate movements to manage conflicts (see Section 5.4)
Benefits	• reduces speed of turning vehicles, and provides a visual cue for drivers and riders to slow and be aware at the intersection • increases perceived safety and comfort for riders • improved safety for people walking
Applications	• moderate volume and speed traffic environments (refer Figure 5.1) • typically provided with on-road protected lanes (see Section 4.5.3) • signalised intersections where a protected intersection (Section 5.3.2) is not feasible due to road space or other constraints • introducing this treatment will often require a traffic approach lane to be reallocated to provide physical protection to the intersection stop line
Key features	• physical separation provided as far as possible up to stop line, while ensuring that crossing movements and vehicle turning movements can be safely completed • bicycle lane and separation widths to be provided as per Table 2.1
Additional recommendations	• set back of vehicle stop line at least 2m behind the stop line for riders, to improve sight lines and allow riders to move into the intersection in advance of vehicles • traffic signal supporting features to manage interactions between riders and turning vehicles (see Section 5.4) e.g. rider gets a head start • a wider island on approach to improve sight lines and reduce vehicle turning speeds • other measures to reduce the speed of turning vehicles, such as raised tables or tight turning movements • green surface treatment through the intersection to highlight presence of riders to other road users, and improve route legibility



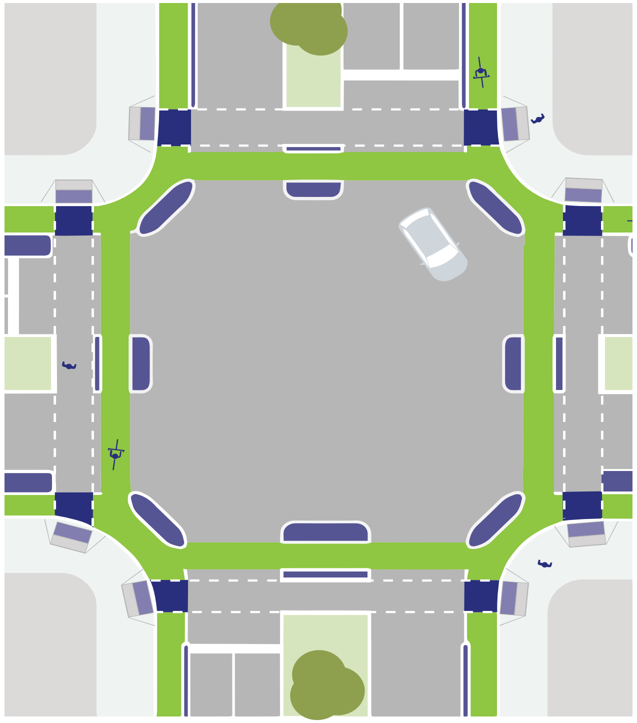
Crash safety

Perceived safety

5.3.2 Protected intersection

AAA

Description	• physical separator islands are positioned within the intersection to reduce vehicle turning speeds, improve sight lines and make it safer to cross the street • can be used at signalised intersection, or unsignalised where pedestrian crossings are used adjacent to the bicycle path
Benefits	• reduces speed of turning vehicles • improves visibility of riders by positioning the driver to see approaching riders through side window, reducing the blind spot • reduced number of conflict points – left turning riders have no interaction with motor vehicles • shortened crossing distance for people walking (some designs)
Applications	• major signalised intersections in medium- to high- volume and speed traffic environments (where the posted speed limit is between 40km/h and 60km/h, or where heavy left/right vehicular turning volumes) • often applied in conjunction with on-road protected lanes (see **Section 4.3.3**) on approach • may require additional road space to implement so may not be suitable in locations where the intersection footprint is restricted (see **5.3.2** for alternate approach)
Key features	• physical islands placed within the intersection slow turning movements and shift the conflict points to a location that visibility is better and speeds are slower • semi-mountable islands to allow for turning movements of large vehicles if necessary • physical separation provided up to the stop line – typically as per 'on-road protected lane' treatment (see **Section 4.3.3**) • use of slip resistant coloured surface treatment across all bicycle paths through intersection • pedestrian crossings to be provided on all intersection arms
Additional recommendations	• wider islands within the intersection to provide a mid-point refuge • traffic signal management approaches such as phasing separation and/or bicycle early start (see **Section 5.4**)



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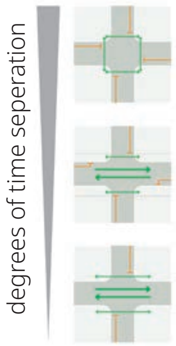
Perceived safety

5.4 Traffic signal management

5.4.1 Degrees of time separation

Conflict points arise where movement paths of vehicles and riders through the intersection intersect. Conflicts can be managed by separating vehicle and rider movements with dedicated signal time. Degrees of time separation are described below.



Exclusive phasing - riders and vehicles move through the intersection during dedicated phases. This provides a AAA environment but may reduce the capacity of the intersection (vehicle throughput). Note scramble phases may create conflict between riders and people walking.

Partial time separation – riders and/or pedestrians are given a head start before vehicles are released to reduce the likelihood of conflict between movements.

Concurrent movements – conflicting vehicle and rider movements move at the same time. Different users need to watch for one another and behave according to the road rules.

Design considerations for traffic signals

Signals should be positioned in a clearly visible position for approaching riders. People riding bicycles have better visibility than drivers, but are also generally lower to the ground. The signals should respond to a human scale.

Consider the minimum green time required for riders to react and clear the intersection. This needs to consider any hills, inexperienced riders, or large volumes of riders.

Bicycle detection

Preferably, bicycle phases should run by default at signalised intersections. Where this is not possible, bicycle detection may be required because bicycles may not be detected by motor vehicle induction loops. Considerations relating to bicycle detection include the following.

- Induction loops are used as standard to detect motor vehicles. The same technology is typically used to detect riders in a dedicated bicycle lane.
- Although uncommon, issues have been observed with the use of induction loops such as carbon fiber bicycle types not being detected. Alternative options include camera detectors or a bicycle push button. Push buttons can be used for bicycle hook turns at T-intersections.
- Seek to trigger the bicycle phase in advance of arrival at the stop line so the rider can maintain momentum.

5.4.2 Signal treatment selection tool

This tool has been developed to identify the degree of time separation which is desirable in different traffic environments. Examples of treatments that can be used to provide different levels of time separation are shown in Section 5.4.3.

Design speed*	Two-way traffic volume (busiest hour)**	Degrees of time separation		
		Concurrent movements	Partial time separation	Exclusive phasing
< 30 km/h	<400	AAA		
	≥ 400 or ≥ 200 left turn		AAA	
< 40 km/h	<400		AAA	
	≥ 400 or ≥ 200 left turn			AAA
< 50 km/h	<400			AAA
	≥ 400 or ≥ 200 left turn			AAA
< 60 km/h	Any			AAA

AAA	Likely the preferred AAA facility
	Provision should be suitable for most users
	Provision may not be suitable for all and may exclude some potential users
	Provision not recommended as it's unlikely to be suitable for a range of users
	Provision not considered suitable
	Provision may not be needed, consider local costs and benefits

Figure 5.2 Signal treatment selection matrix
* motor vehicle design speed
** two-way volumes should be observed on the street where the bicycle facility is to be provided.

5.4.3 Managing conflicts at intersections

Table 5.2 below details different treatments that can be applied at any signalised intersection, in conjunction with signalised intersection treatments presented in Section 5.3, to support safe and comfortable intersection design.

In addition to the recommended degree of time separation linked with the traffic volume and speed environment (as per Figure 5.2), Table 5.2 highlights the recommended application of each, based on features of the bicycle network.

For example, this shows that advanced start, bicycle boxes and coloured surfacing are recommended treatments at all signalised intersections on primary bicycle routes.

Degree of time separation provided	Approach / treatment	Description	Typical applications		
			Primary bicycle routes, or high rider flow (>20/hour)	Secondary and neighbourhood bicycle routes	At connecting routes / high rider right turn volume (>10/hour)
Concurrent	Coloured surfacing through intersection	Non-slip surfacing to alert drivers to the presence of riders, increase the level of comfort and support route wayfinding.	Recommended	Consider	
	No treatment (i.e. mixed traffic)	No treatment for riders provided, riders and vehicles move through intersection at the same time.	Where 'Concurrent movements' conditions met as per Figure 5.2		
Partial	Advanced start for bicycles	An example of a short bicycle-only phase, where riders enter into a green phase prior to motor vehicles (typically runs for 3-5 seconds). Note this provides no benefit for riders who arrive at the intersection during the general green phase.	Recommended	Consider	
	Bicycle box	Dedicated space (minimum 2m, or more to increase comfort) for riders to wait ahead of vehicle stop line at signalised intersections. These enable people riding to enter the intersection ahead of vehicles.	Recommended	Recommended	
	Bicycle hook turn box	A marked area is provided to identify a safe space for riders to wait to complete a right turn. Riders wait for the perpendicular green signal before proceeding.	Consider	Consider	Recommended
Exclusive	Bicycle only phase	A green phase exclusively for bicycles, allowing bicycles to move through the intersection without any conflict with vehicles. Likely to have a significant capacity impact to the intersection and hence is most suited to locations with high bicycle volumes.	Where 'Exclusive phasing' conditions met as per Figure 5.2		
	'Hold the left turn'	Separation of ahead and right, and left turning vehicle phases. A red bicycle lantern operates in conjunction with a green left turn arrow to allow motor vehicles to turn without risk of conflict with cyclists at the end of the ahead/right signal phase.			
	Vehicle turn bans	Signage is used to restrict vehicle turning movements. Can be applied permanently or at selected times. Enforcement may be required to ensure compliance.			

Table 5.2 Managing conflicts at intersections

5.5 Roundabouts

5.5.1 Protected roundabout

AAA

Description

- roundabout which separates people riding from the circulating carriageway, with priority crossings provided for each arm

Benefits

- improved safety and comfort for people riding through roundabout
- tighter turning movements reduce vehicle turning speeds, improve sight lines and safety for people walking/wheeling
- supports continuous bicycle, pedestrian and vehicle traffic flow through an intersection

Applications

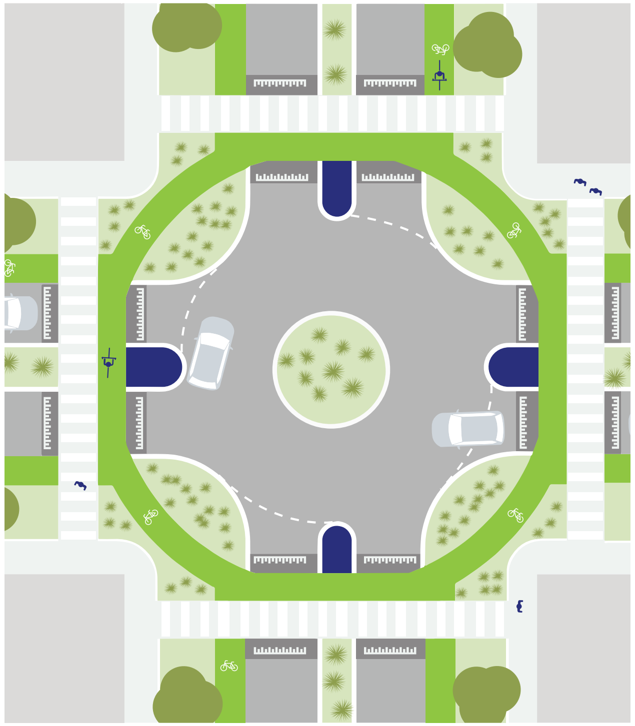
- single lane roundabouts in medium- to high- volume and speed traffic environments, where approach vehicle speeds are between 30km/h and 60km/h
- locations with high pedestrian and/or bicycle volumes, or where key bicycle routes meet
- compatible with on-road protected lanes (see **Section 4.3**) on approach
- requires substantial road space and application may be costly

Key features

- tight turning movements to reduce vehicle speeds, with the design speed less than 20km/h
- the circulating bicycle lane should typically be 1.5m width at a minimum, and must be uni-directional (not bi-directional)
- separated, raised, priority crossings on each arm
- signage and pavement markings to highlight conflict points with people walking
- legible and accessible footpaths and crossings

Additional recommendations

- wider islands within the intersection allow the crossing distances to be reduced
- provide space for a single vehicle (6m) to stop before crossing points when exiting the roundabout – this will increase the space required
- Bus services need to be carefully considered where raised crossings are introduced to ensure passenger comfort – see VicRoads Design Note 03-07 for further guidance



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5.5.2 Mixed traffic roundabout

AAA

Description

- riders share road space with vehicles through the roundabout in a low speed and low volume traffic environment
- riders feel comfortable in the centre of the traffic lane on approach, and through the roundabout

Benefits

- the tight and compact design reduces vehicle speeds to improve safety
- supports continuous bicycle and traffic flow through intersections
- provide priority and reduce crossing distances for people walking

Applications

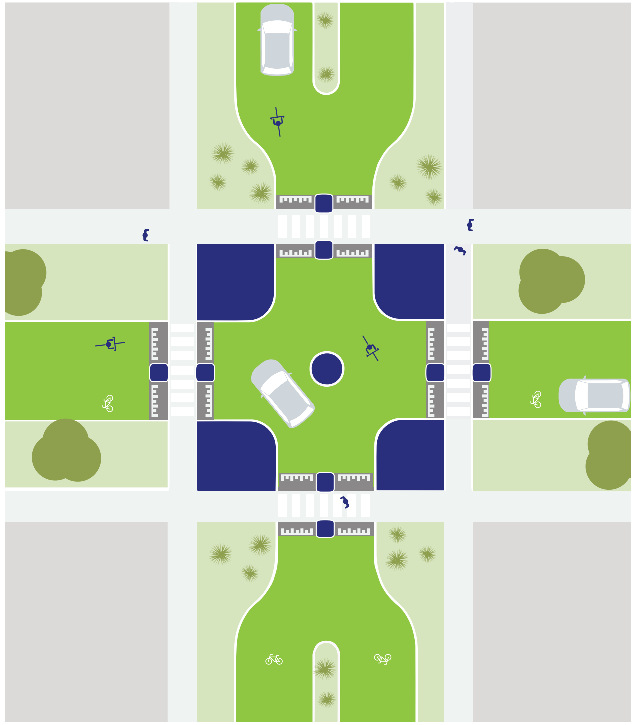
- single lane roundabouts in low volume (<6,000 vehicles per day on all arms) and low speed traffic environments, where approach vehicle speeds are less than 30km/h
- heavy vehicles represent no more than 5% of total traffic during any hour of the day
- locations where it is not feasible to introduce a protected roundabout due to space constraints
- often applied in conjunction with calm streets (see Section 4.3.2)

Key features

- the design is as compact as possible to reduce speeds and shorten crossing distances for people walking, with a design speed lower than 20km/h
- raised priority crossings provided on all arms
- sharrow symbols are provided on all approaches
- legibility and accessibility of footpaths with pedestrian crossings on the desire line (the most direct path for people walking)

Additional recommendations

- understorey planting of the kerb buildouts which does not impede sight lines
- small islands dividing the traffic lanes (splitter islands) can increase comfort for people walking and ensure vehicles use the roundabout correctly
- where the design is retrofitted in low traffic environments, line marking can be used to delineate priority for riders over vehicles on approach
- if there are constraints that prevent a raised pedestrian crossing, a speed hump may be substituted

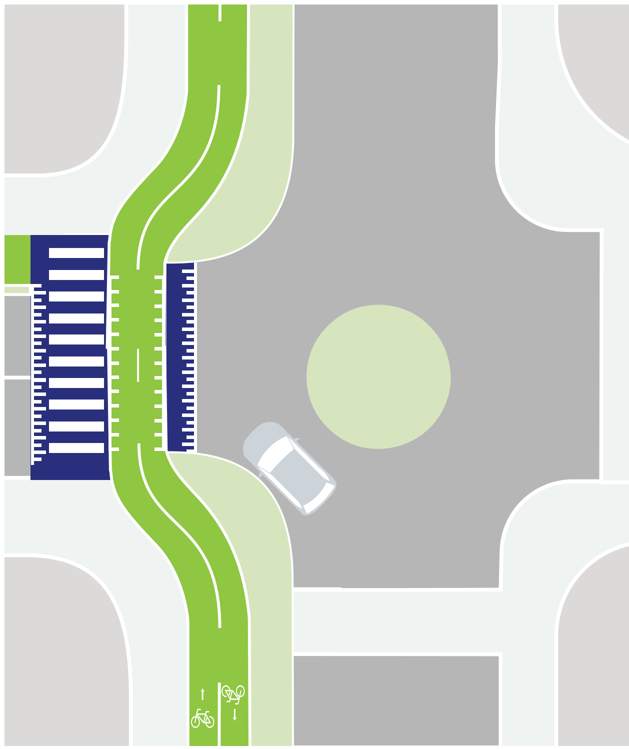


Crash safety

Perceived safety

5.5.3 Off-road path bypasses roundabout

Description	• the on-road cycling facility transitions to an off-road path to bypass the roundabout
Benefits	• for most people, riding through busy or multi-lane roundabouts is a very stressful environment and would prevent them from riding, therefore an off-road alternative provides for less confident riders
Applications	• roundabouts in high volume and/or high traffic speed environments (up to and including 60km/h) • where the conditions for a mixed traffic roundabout (as per **Section 5.5.2**) are not met, and installing a protected roundabout is not feasible due to space or cost constraints • heavy vehicles represent more than 5% of traffic during an hour of the day
Key features	• direct and seamless transition of on-road bicycle facility to off-road path in advance of the roundabout via a wide ramp flush to the road • provision of suitable crossings to move through the roundabout • see Section 5.7 for off-road crossing treatments
Other considerations	• a traffic signal may be added to the crossing for situations where there is a risk that drivers will not stop • roundabouts with traffic speeds above 60km/h should have grade separated or signalised crossings • bus services need to be carefully considered where raised crossings are introduced to ensure passenger comfort – further guidance is provided in Vicroads Design Note 03-07



Crash safety

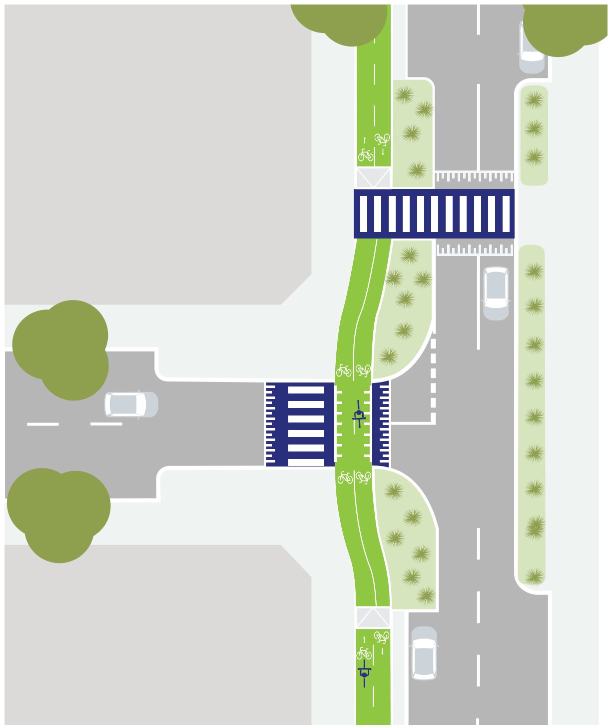
Perceived safety

5.6 Unsignalised intersections - on-road

5.6.1 Unsignalised intersection - bicycle facility on primary street

AAA

Description	• a connected and continuous priority treatment where an on-road bicycle facility meets a side road • at busier side streets, the on-road bicycle route can transition to an off-road path in advance of the intersection to provide a shared priority crossing
Benefits	• reduces speed of turning vehicles • provides visual reinforcement of pedestrian and bicycle priority at the side road • where provided, a 'bent out' crossing type gives space for cars to stop, while giving way to people walking and riding without blocking the vehicle travel lane
Applications	• at side streets including T-intersections and four-way intersections where the bicycle facility is on the primary street • at crossovers or driveways with high traffic volumes, such as commercial off-street car parks • typically provided as part of a route with high traffic volumes and on-road protected lanes • the treatment can be combined with a continuous footpath or raised crossing
Key features	• prioritises people walking and riding when crossing a side road using give way signage and markings for vehicles approaching the crossing • physically slow vehicles with a raised crossing • maintain continuous physical separation for the bicycle facility either side of the intersection • continuous green surface treatment and bicycle symbol markings through intersection to alert road users to potential conflict point • good sightlines between all users, with suitable bike speed management on approach to alert riders of the upcoming intersection
Additional recommendations	• kerb buildouts and refuge islands are provided to reduce crossing distances and to visually narrow the carriageway • the bicycle path should be set back if the primary street serves higher traffic speeds and volumes – with lower volumes or if there is a deceleration lane, a straight path is suitable • provide understorey planting of the kerb buildouts which does not impede sight lines



Crash safety

Perceived safety

5.6.2 Unsignalised intersection - bicycle facility on a secondary street

AAA

Description

- where the bicycle route meets a higher priority street at an unsignalised intersection, rider crossing movements are more safely facilitated

Benefits

- in a low/medium speed and low traffic environment, people riding can complete an uncontrolled crossing of a two-lane road (one or two directions)
- contributes to navigation and legibility of the bicycle route
- markings and signage alert drivers to be aware of riders

Applications

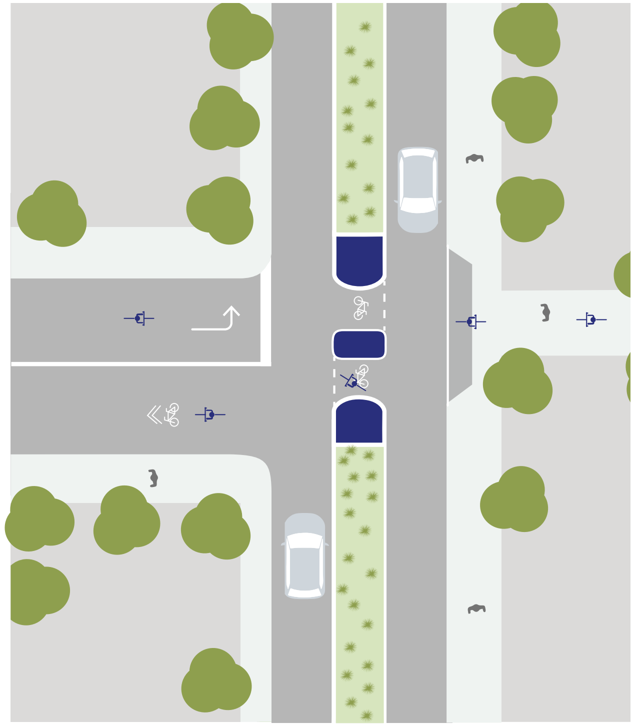
- riders can complete an uncontrolled crossing of a two lane road (one or two way) where the speed is up to 50km/h, and has less than 5,000 vehicles per day
- this includes bi-directional roads up to four lanes where a compliant refuge island is provided to stage the crossing
- to avoid forcing people walking and riding to cross busier/higher speed roads or more than two lanes in a single stage, consider instead:
  - providing a signalised intersection (see Section 5.3)
  - transitioning the bicycle route to an off-road path in advance of the intersection, combined with provision of a suitable off-road crossing (see Section 5.7)
  - reducing the speed and/or volume of the road, or number of lanes to be crossed at once

Key features

- use of signage, road markings and coloured pavement marking to alert road users to potential conflict points and presence of riders
- good sightlines between all users
- a compliant refuge island to allow for two stage crossing, to allow crossing a two way road, or where more than two lanes are to be crossed at once

Additional recommendations

- introduce kerb buildouts to reinforce reduced traffic speeds and slow turning vehicles



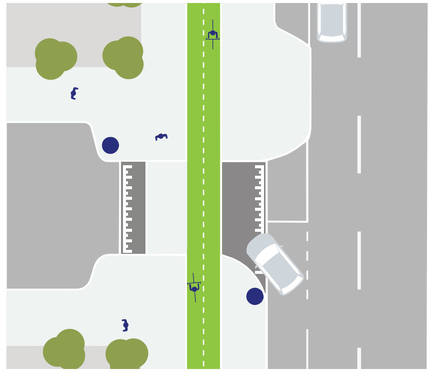
Crash safety

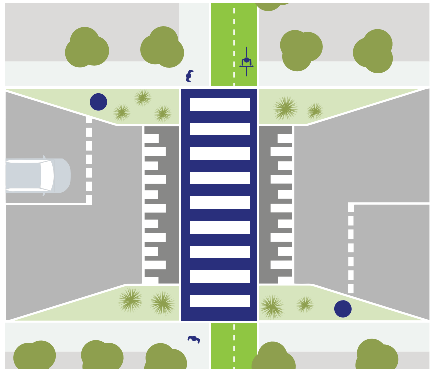
Perceived safety

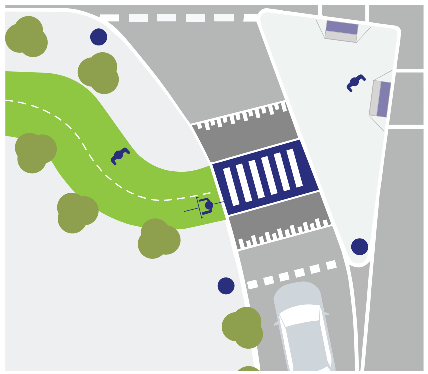
5.7 Off-road path crossing treatments

AAA

Description	• where an off-road path meets a road, a suitable crossing treatment is required to provide a safe, connected and continuous journey for people walking and riding
Applications	• locations where the posted speed is 50km/h or lower and there is up to one traffic lane in each direction to cross • well-suited to primary bicycle routes or locations with a high volume of riders, especially children and older people • to provide a safe and comfortable path for on-road routes through busy roads, intersections and roundabouts, where the on-road route transitions to an off-road crossing • in higher speed vehicle environments (more than 50km/h), or where there is more than one lane in each direction to cross, a signalised crossing should be provided
Benefits	• prioritises people walking and riding over vehicles to provide a direct and continuous route • improves safety for all road users
Key features	• provide a continuous, at-grade crossing for people walking and riding, for example through use of coloured surfacing and ramps that reinforce their priority over drivers • use buildouts to reduce the crossing distance, and tighten kerb radii and approach angles to reduce vehicle speeds • provide suitable warning of the crossing on vehicle approach, with give way signage for drivers • maintain good sight lines for all road users on approach to crossing, with treatments on approach to alert riders of the upcoming intersection (see Section 4.6) • for crossings of side roads, provide at least 5m set back from the intersection to allow a turning vehicle to store away from the through traffic lane • for crossings of slip lanes, ensure storage space for vehicles of at least 7m between crossing and the give way line – note that removing the slip lane is a safer treatment
Additional recommendations	• understorey planting of the kerb buildouts which does not impede sight lines







6 Additional features

The features in this chapter help to provide comfortable journeys from start to end, and should be considered as part of project design or as smaller individual projects.

6.1 Overview

AAA networks are a sum of their parts, and small design details can transform the rider experience. Techniques to manage traffic speeds and volumes are identified with traffic calming and filtered permeability. The components in this chapter can also enhance local streets to make them more attractive as places for people.

The following sections provide guidance for the following features:

- Traffic calming treatments – Section 6.2
- Filtered permeability – Section 6.3
- Urban design project opportunities - Section 6.4
- Wayfinding – Section 6.5
- Bicycle and micromobility parking – Section 6.6
- End-of-trip facilities - Section 6.7
- Bicycle friendly furniture - Section 6.8
- Lighting - Section 6.9

6.2 Traffic calming treatments

Where employed and designed well, traffic calming measures benefit all road users including people walking, residents and businesses by making the street a more pleasant place to move through and spend time, and reducing the risk of crashes.

6.2.1 Applications

Different approaches to reducing the average speed and volume of traffic are presented. These should be considered to:

- develop traffic conditions suitable for provision of specific bicycle infrastructure types, as discussed in Section 4.2, and
- as part of developing safe and attractive streets for riding in all locations, noting the influence this can have on willingness to ride as discussed in Section 1.5.

Where traffic calming treatments are not appropriate (e.g. where high vehicle speed is prioritised) practitioners should consider:

- a direct and convenient alternative route (for example, a quieter parallel road), or
- providing a different infrastructure treatment (for example, an off road path).

6.2.2 Treatment types

A wide variety of traffic calming treatment options are available to suit different contexts and outcomes (see Figure 6.1). Approaches to traffic calming can be grouped into the areas listed below.

- Area-wide traffic management, which includes the use of filtered permeability (see more info in Section 6.3), speed limit reduction and associated enforcement, and emphasising place function over movement.
- Street design, which includes visual narrowing for drivers, material differences, tightened turning radii, use of shared spaces, formal and informal crossing points, use of pinch points, visual narrowing and introducing parking lanes.
- Physical calming measures, which includes the use of horizontal and vertical deflections such as speed humps and footpath buildouts and continuous priority crossings of side streets. Kerb buildouts should be thoughtfully placed to avoid creating pinch points for people riding.

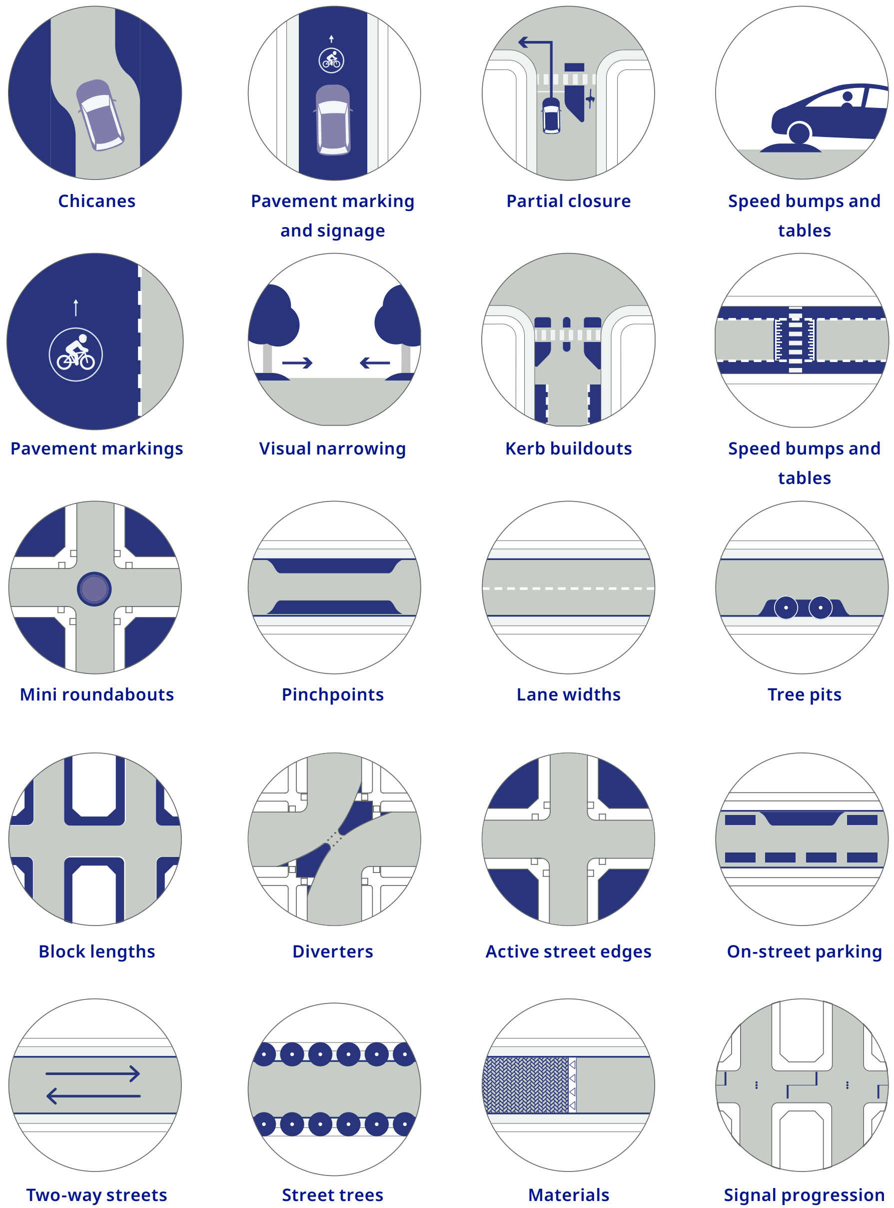


Figure 6.1 Traffic calming treatment options
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6.3 Filtered permeability

6.3.1 Overview

Treatments that allow riders and people walking through, but not vehicles is known as filtered permeability. This approach provides a low cost, low effort, highly effective means of transforming a local area. Through traffic is removed from the street while access is retained, such as the example shown in Figure 6.2. This can be considered where through traffic is not the main function of the street nor is it desirable, which is the case for most residential streets.

Filtered permeability provides benefit to people walking, riders and residents by reducing the traffic volume, and improving the associated congestion and pollution. For people riding, filtered permeability can support direct, convenient and comfortable routes and incentivises riding over driving. There are many of these treatments across local streets in Tasmania.

6.3.2 Design features

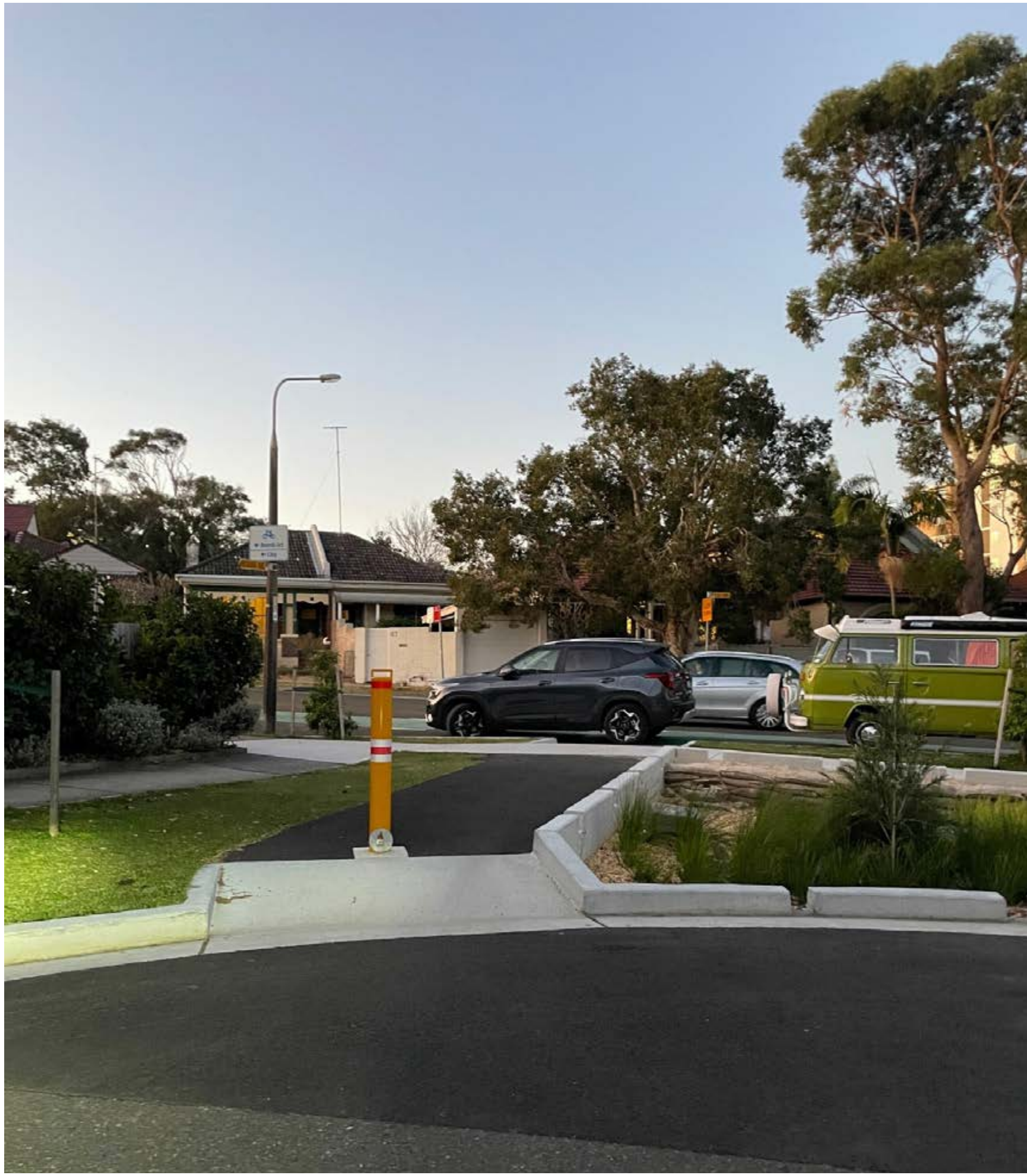
Filtered permeability can be delivered in several ways and is a treatment which is highly conducive to trialling as part of a tactical approach. Traffic 'filters' can be applied using:

- bollards
- planter boxes
- kerb buildouts.

Filter locations present an opportunity to create small public spaces and to introduce greenery and other people friendly infrastructure into the streetscape, such as benches and bicycle parking. The opening up of one-way streets to two-way riding (also called a 'contraflow cycle lane') is another form of filtered permeability, see Section 4.3.8 for more information.

Traffic filters can be designed to improve bus reliability with the use of bus-only segments. This ensures the bus will not get delayed by through traffic and is effective for routes shared by riders and buses.

Figure 6.2 Example of filtered permeability, Canning Street, Melbourne, Vic



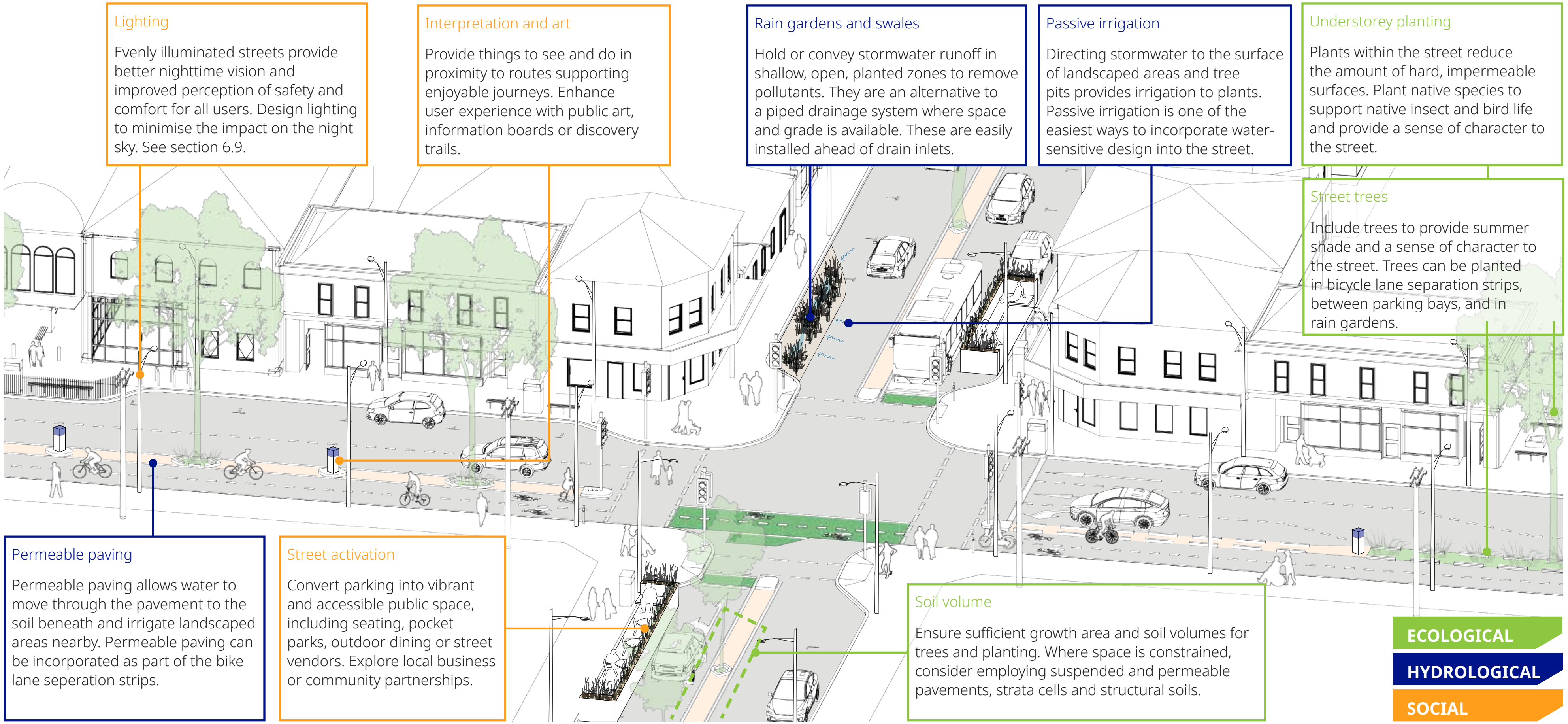
6.4 Urban design project opportunities

Streets as public spaces support a wide range of activities and purposes. Many of these activities relate to adjacent land uses and connect with the economic and social functions of streets, especially for small businesses and amenities for local communities.

The integration of cycling infrastructure into new and existing streets creates an opportunity to enhance the broader streetscape, delivering multiple public space benefits for both the movement and place functions.

For example, planting trees on a street can encourage riding as a comfortable, safe activity and increase the appeal of a specific route. Enhanced street environments have been shown to positively contribute to route choice. These benefits are realised by providing shade and a more attractive street.

The diagram below illustrates features that can be introduced or enhanced within the street, and can help to achieve more integrated design outcomes.



6.5 Wayfinding

Wayfinding helps riders navigate to their destination. Wayfinding signage and road markings should be regular and consistent. Approaches include:

- advanced directional signage, prior to intersections and other decision points
- confirmatory signage, on the far side of intersections and on straight sections of route
- route branding and information, including local area maps.

Incorporation of wayfinding into the streetscape could be through:

- signs attached to existing street furniture or existing posts, minimising the provision of new poles which clutter the street
- decals or painted markings on the bicycle route surface
- as part of delineators or kerbs.

Consider whether public art installations can incorporate wayfinding and that wayfinding can be public art, which enhances the vibrancy and appeal of the street.

6.6 Bicycle and micromobility parking

Bicycle parking should:

- be provided at key destinations and at regular intervals along routes
- meet demand - observational surveys of bicycles locked to poles and other street furniture provide a good indication of where there is demand
- not obstruct footpaths and kerb ramps
- be safe and secure - locate in areas with good lighting and people around
- include e-bike charging where feasible and demand would be high, such as at transport stations and major activity centres.

If required, designated parking areas for shared micromobility devices can be marked on the street. Geofencing can be used to limit parking to designated areas.

At public transport interchanges or park and ride facilities, secure bike parking supports longer integrated journeys. Providing this at no cost to the rider encourages bicycle use. Secure parking facilities typically incorporate CCTV.

Figure 6.3 Example of bicycle route wayfinding in Adelaide, South Australia

Figure 6.4 Designated shared e-scooter parking zone in Hobart

6.7 End-of-trip facilities

High-quality end-of-trip facilities support a wide range of bicycle types, micromobility devices and riders. Suitable end-of-trip facilities typically support people to ride to places of employment or education, and will include:

- secure bicycle parking
- personal hygiene and changing facilities (i.e. changing rooms, showers and towels, water stations, toilets, ironing, hair dryers and lockers)
- bicycle maintenance facilities such air pumps, locks, and repair stations.

While end-of-trip facilities are typically provided by the building owner, practitioners can work with businesses to coordinate the implementation of end-of-trip facilities.

6.8 Bicycle friendly furniture

Providing bicycle friendly furniture includes:

- footrests at stopping points so riders don't need to dismount their seat while waiting at traffic signals
- bins for people riding angled so they can discard rubbish while moving
- bicycle wash stations at trail points
- e-bike charging facilities
- bicycle maintenance stations including pumps
- seating along shared paths in convenient locations that does not obstruct riders.

6.9 Lighting

Public lighting influences riders' feeling of personal safety and security, particularly for riders of diverse genders. Routes need to be well lit, especially where passive surveillance may be limited such as off-road paths. High-quality lighting design can significantly contribute to the attractiveness of a route, as well as managing impacts on wildlife. Design considerations include the following.

- Lighting of paths and bicycle lanes (i.e. in addition to any carriageway lighting) should be considered on all routes, especially where they will be used during hours of darkness and where routes are in isolated locations.
- Use of solar-powered LED lighting to mitigate the need for electrical wiring.
- Key areas to place lighting are at tunnels and overpasses, bridges, crossings, entrances to off-road paths and on signage.

Figure 6.5 University of Tasmania end-of-trip facility with e-bike parking and changing facilities

Figure 6.6 Example of a secure bicycle parking facility

Figure 6.7 Bicycle path lighting example

Glossary

Term	Definition
Active transport/travel	Ways of getting around that involve physical activity, like walking or riding.
All ages and abilities	The users that cycling infrastructure needs to serve including all people, all types of bicycles and other devices and and types of trip purposes.
Bicycle	A small vehicle with one or more wheels that is built to be propelled by human power through a belt, chain or gears, which can include unicycles and tricycles/trikes.
Bicycle facility	A type of cycling infrastructure that may comprise of several integrated treatments.
Bicycle lane	A dedicated lane for bicycles, which can either be separated or not separated from vehicle traffic.
Cycling	Moving from one place to another on a bike. This term is not often used as riding captures a greater diversity of users and trips.
Cycling infrastructure	A range of treatments and facility types that are connected to form a safe and comfortable network for riding.
E-bike	A bike with an electric-powered motor, which primarily relies on human pedalling power, with the electric motor providing supplementary assistance.
Cargo e-bike	An electric bike with a cargo area for transporting loads. This area can be an open or enclosed box, a flat platform, or a wire basket, and is typically mounted over the wheels or between them.
Car dooring	A type of crash where a person in a vehicle opens a door into the path of a rider.
E-scooter	A scooter with an electric-powered motor that aids in movement.
Filtered permeability	A variety of treatments that prioritise selected transport modes.
Footpath	A path to walk on, usually next to a road.
Kerb buildouts	An extension of the footpath and kerb to reduce the crossing distance for people walking.
Micromobility	Refers to small, lightweight devices that are either human or electric powered, such as bicycles, scooters, skateboards, mobility scooters.

Glossary

Term	Definition
Modal filter	A treatment, sometimes called a point closure to provide filtered permeability.
Movement and place approach	"An approach that acknowledges that streets are both destinations and corridors for the movement of people and goods. Movement and Place principles are applied to plan, design and deliver a transport system that provides a range of transport options and rebalances streets into more people-friendly places."
Pedestrian	A person moving from place to place, either by foot or using an assistive mobility device.
Policy	Agreed principles by which decision makers are guided, often in the form of plans or actions.
Regulation	Rules or laws made by the government about what people can and cannot do in certain situations.
Riding	The act of using a bicycle or micromobility device such as an e-bike, scooter, cargo bike or trike to move from one place to another.
Shared path	A path that people either walking or riding bikes or scooters can use, which is typically wider than a normal footpath.
Sharrow	A painted surface treatment that signifies that it is safe for riders to use the shared traffic lane.
Tactical	A design and delivery approach which accelerates installation, whether by applying ‘pilots’ and ‘trials’ to test and evaluate new conditions prior to permanent changes or facilitating efficient travel demand management requirements.
Traffic calming	Road design techniques that improve safety for people cycling, micromobility and pedestrians by reducing traffic volumes and/or encouraging slower motor vehicle speeds.
Treatment	An individual component that forms part of a bicycle facility.
Walking	Moving from one place to another on foot, or using a mobility aid like a walking frame.
Wayfinding	Signage and information that assists users to navigate to their destination. Can be both fixed infrastructure or digital.
Wheeling	Moving from one place to another using a wheelchair, a scooter, skateboard, roller blades or pushing a pram.

References

This guide has been developed with reference to best practice international and national guidance. In particular, the Department of State Growth would like to thank Transport for NSW and Auckland Transport for providing graphic design elements featured in this guide for reproduction. Thanks is also extended to practitioners across Tasmania and Australia who provided extensive feedback to refine the guide.

The development of this guide has been led by WSP and Realm Studios in Hobart, Tasmania.

This guidance has been developed with reference to the following documents:

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How to reference this guide

Full title

Tasmanian Walk, Wheel, Ride Guidance - Cycling Infrastructure Design

Short title

Tasmanian Cycling Infrastructure Design Guide

List of Figures

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Part 2: Components

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