

AN ILLUSTRATED LEXICON OF CYCLE FACILITIES

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Abstract

The purpose of this technical note is to define, describe and illustrate cycle facilities appropriate for use in New Zealand.

The wide range of terms available for the various types of cycle facilities often results in confusion. The non-descript 'cycleway' is perhaps the most ambiguous term in common use, but other terms such as "cycle path" are interpreted in different ways by different people. With the growing interest in separated bicycle facilities (SBFs), this confusion is set to continue.

This technical note attempts to reduce the current state of confusion by proposing terminology to define the various cycle facility types. It predominantly discusses mid-block facilities, rather than intersection facilities, as this is where most confusion seems to lie. The definitions are based on existing guides, legislation and the authors' collective experience with cycle facility planning and design. For each facility type, a brief description and some high level advice is given.

In addition to rationalising existing discrepancies, new (to New Zealand) terms for several types of SBFs and off road (typically unsealed) trails are proposed.

It is hoped that the illustrated lexicon will contribute to improved understanding and further discussion amongst transportation practitioners, ultimately leading to the standardisation of cycle facility terminology in New Zealand.

Introduction

The wide range of terms available for the various types of cycle facilities often results in confusion. The non-descript 'cycleway' is perhaps the most ambiguous, but other terms such as "cycle path" are interpreted in different ways by different people. With the growing interest in separated bicycle facilities (SBFs), this confusion is set to continue.

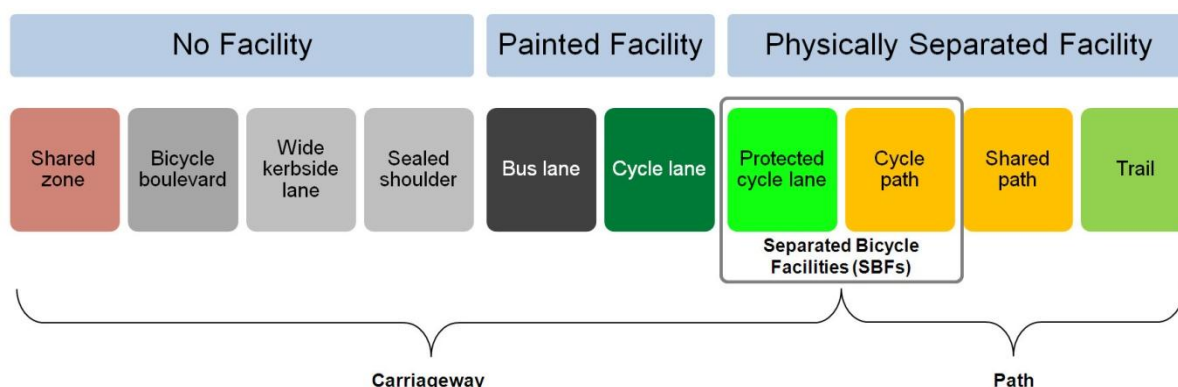
This technical note attempts to reduce the current state of confusion by proposing terminology to define the various cycle facility types. The definitions are based on existing guides, legislation and the authors' collective experience with cycle facility planning and design. For each facility type, a brief description and some high level advice is given. This is not a design guide, however further information is available in the cited literature.

Overview of Midblock Cycling Provision Types

Providing for cycling in the midblock sections of streets and in parks and reserves may be simply categorised as shown in Table 1. The terms in yellow are typical sealed paths available for cycling in urban environments.

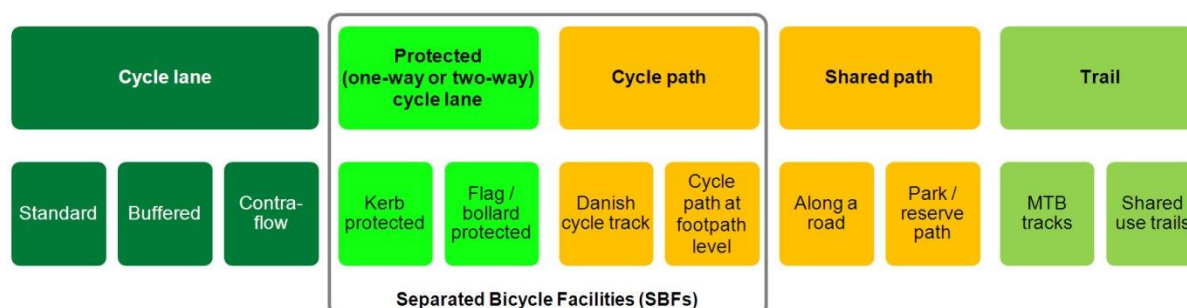
Within the road corridor (also known as the road reserve, between property boundaries), lanes are always at carriageway level and paths are elevated above the carriageway level by a kerb, where kerbs are provided. Separated bicycle facilities (SBFs) refer to physical separation from motorised traffic. They can be one-way (on each side of the road) or two-way (on one side of the road).

Table 1: Summary of midblock facility types by provision category



For those facilities dedicated to cyclists, or cyclists and pedestrians, the subcategories that are described in this glossary are shown in Table 2.

Table 2: Subcategories of facility types



In the following sections, citations are provided where the definition is derived entirely from one source. If no citation is provided, the definition is an amalgamation of various definitions or the authors' own work. All figures and photos are by the authors unless otherwise noted.

Recommended Cycling Provision Terms

Shared zone

A street or place accessible to all road users and designed to enable pedestrians to move freely by reducing traffic management features that encourage users of vehicles to assume priority.

Clause 10.2 of the Land Transport (Road User) Rule 2004 defines a shared zone as:

- (1) A driver of a vehicle entering or proceeding along or through a shared zone must give way to a pedestrian who is in the shared zone.
- (2) A pedestrian in a shared zone must not unduly impede the passage of any vehicle in the shared zone.

A sign has been gazetted and usage guidelines are currently under development for inclusion in the TCD Manual (G Dance 2011, pers.comm.).

A street designed with the shared space approach has minimal use of traffic signs, road markings and other traffic management features. This creates an environment where all road users share the space with courtesy. This approach takes place against a backdrop of concern at the proliferation of features such as pedestrian guard railing, traffic signs and highway regulation which reduce users' understanding of the complexity of the street environment and their personal responsibility for safe and appropriate behaviour (DfT 2010). Shared spaces may include level surface areas without kerbs and comfort space areas that preclude vehicular access using street furniture (ibid).



Shared zone sign
(image: NZTA)



Jean Batten Place, Auckland (image: Auckland Council)



Shared street with level surface, Christchurch

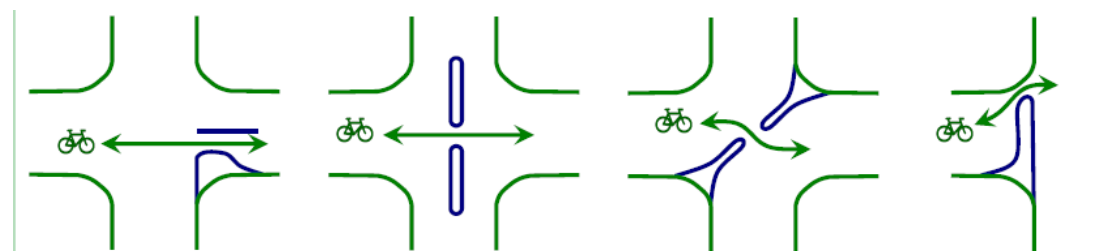
Bicycle boulevard

A roadway with low motor traffic volumes and speeds designed to provide a safe, attractive, convenient and comfortable cycling environment.

A bicycle boulevard treatment applied to an existing typical roadway creates an attractive, convenient and comfortable cycling environment. The treatment may include traffic calming and traffic reduction, signage and pavement markings, and intersection crossing aids. Motor vehicle access to properties along the route is maintained (Walker et al. 2009).



Bicycle boulevard, Eugene Oregon (photo: Glen Koorey)



Possible intersection treatments to create a bicycle boulevard (Koorey 2008)

Wide kerbside lane

A general traffic lane on the left side of the carriageway sufficiently wide to permit motorists to remain in the lane and overtake cyclists without crowding them.

A wide kerbside lane provides space for cycling in the outside lane. Two scenarios are possible; either without parking or with parking allowed outside of peak hours. Although typically found on low volume streets, it may also be a pragmatic solution for arterials where space does not exist to provide a better cycling facility. It does not provide the same level of service for cyclists as a cycle facility and is thus not the preferred treatment for road links that are part of a cycle network.



A wide kerbside lane on an arterial road, Burwood Highway, Melbourne (photo: Tim Hughes)

Sealed shoulder

That part of a sealed carriageway to the left of an edge line.

A sealed shoulder might be used for parking or for emergency stops and may serve as space for cyclists if sufficiently wide. This is typically (but not always) a rural treatment. If a sealed shoulder of 1.8 m width or greater is provided, motorists may interpret it as a parking lane. If such a sealed shoulder is to be available for cycling, then parking should be prevented through appropriate signs and/or markings.

Bus lane

A lane reserved by a marking and/or sign for the use of buses. Cycles, mopeds, and motorcycles are permitted unless specifically excluded by the sign.

The above definition is set out in clause 1.6 of the Road User Rule 2004 (MoT 2004). This rule permits pedal cycles in bus lanes by default, but it is up to the road controlling authority to determine which road user classes are permitted.

A bus lane becomes a transit lane when general traffic with a minimum number of occupants (generally 2 or more) is permitted (overseas, this may be known as a high occupancy vehicle (HOV) lane). From a cycling perspective, a transit lane is similar to a bus lane (LTSA 2004) so a separate transit lane definition is not given in this lexicon.

It is generally preferable to interrupt a cycle lane with a bus stop than not provide cycle lane at all, but this is not an option if the bus stop is a lay-over point.



Wide full-time bus lane enables cyclists and buses to pass one another easily, Christchurch

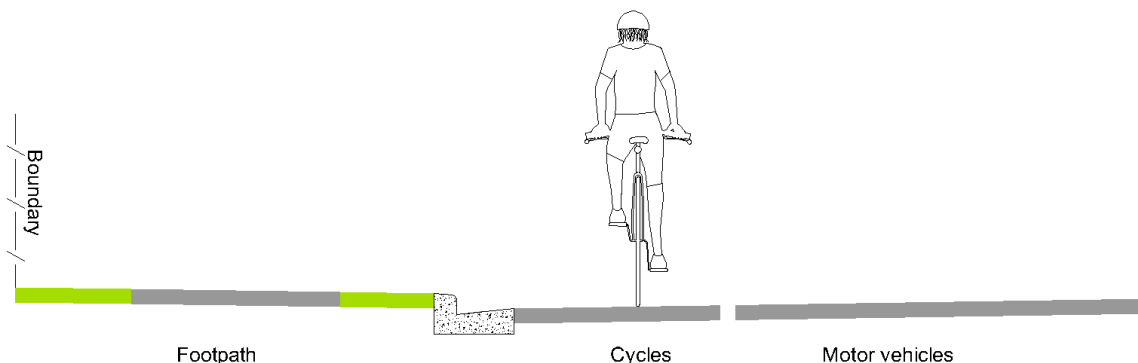


Wide part-time bus lane, Auckland

Cycle lane

A lane reserved for the exclusive use of cyclists, except that motor vehicle drivers may use the lane to access parking or to turn at intersections or driveways.

Subcategories of cycle lanes include buffered cycle lanes and contra-flow cycle lanes. Cycle lanes may be adjacent to the kerb ("kerb-side"), adjacent to motor vehicle parking ("car-side"), or between general traffic lanes on the approach to intersections. The delineation is typically achieved by use of pavement markings, with cycle symbols and lane lines as a minimum and coloured surfacing optional (Austroads 2011). Signs are not required in NZ. Widths depend on the traffic speed and adjacent lane widths, and are specified in the NZ Supplement (NZTA 2008).



Car-side cycle lane, Palmerston North



Kerbside cycle lane with colour highlight, white cycle logo and broken yellow no stopping lines, Auckland

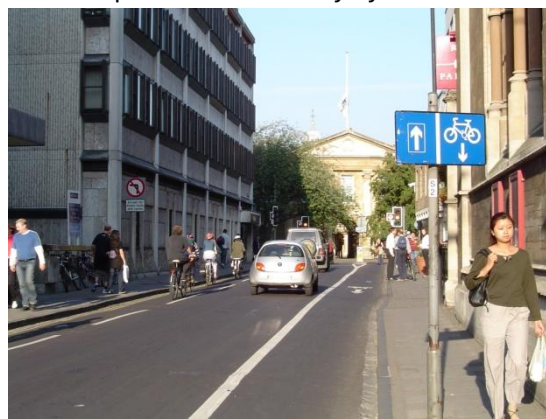
Contra-flow cycle lane

A cycle lane on a one-way street allowing cyclists to travel against the flow of other traffic (NZTA 2008).

Contra-flow cycle lanes are often provided by removing parking. Parking should be prohibited adjacent to contra-flow cycle lanes. Kerb separation should be considered; where provided this would create a contra-flow protected cycle lane. Widths should be specified as with any cycle lane.



Contra flow kerb protected cycle lane, Christchurch



Contra-flow cycle lane on right with normal cycle lane on left (one way general traffic travelling away from viewpoint), UK (photo: Tim Hughes)

Buffered cycle lane

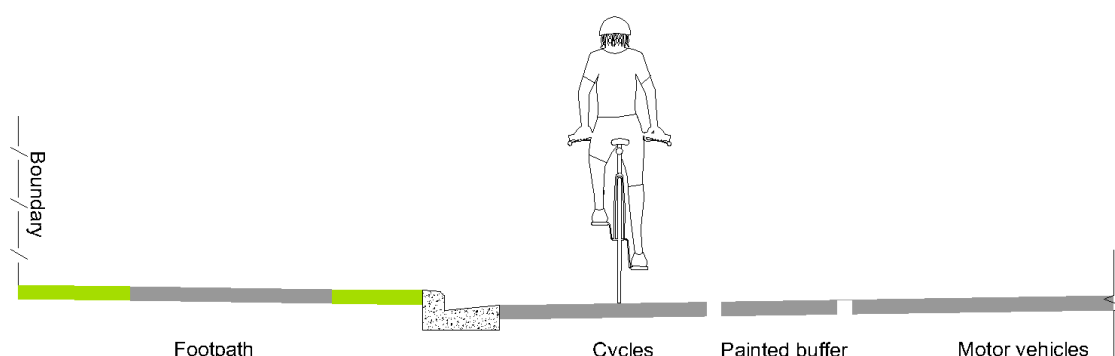
A cycle lane with a buffer space separating the lane from an adjacent motor vehicle travel lane and/or parking lane.

The buffer is usually created by hatched markings but may also be formed by textured surfaces such as flush pavers or flush printed asphalt.

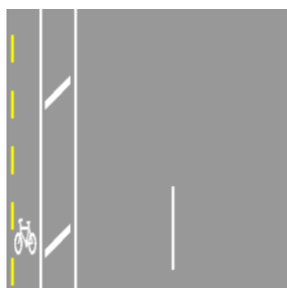
Kerb-side buffered cycle lanes are permissible, however consideration should be given to using the buffer space for stronger separation elements such as bollards, kerbs or flags whereupon the buffered cycle lane becomes a protected cycle lane.

Providing a buffer between kerb-side parking and a cycle lane should be avoided because motorist parking discipline is not as good (i.e. vehicles will encroach into the buffer). The buffer space should be incorporated into the cycle lane instead.

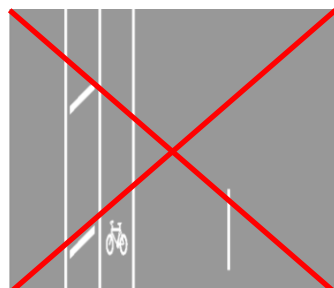
Providing a buffer between a general traffic lane and a car-side cycle lane may only be suitable if the cycle lane is wide enough to avoid opening car doors. In practice this width is generally not available; if it is then a SBF may be a better solution (swapping the lateral position of the car parking lane and the cycle facility).



Buffered kerbside bike lane, Cape Coral, Florida (reversed, photo: www.pedbikeimages.org – Dan Moser)



Kerb-side buffered cycle lane is permissible (Figure 2.11, NZTA 2009)



Buffer between parking and cycle lane is not recommended



Buffer between general traffic lane and cycle lane is not recommended

The subsequent terms (up to, but not including, *shared path*) are all forms of separated bicycle facilities (SBFs).

Separated bicycle facility (SBF)

A facility exclusively for cycling with physical separation from motor vehicles.

The physical separation prevents motor traffic from using the cycle facility. Although cycle is normally used in lieu of bicycle in New Zealand, retaining the full bicycle in this term promotes consistency with international terminology for this emerging category of facilities.

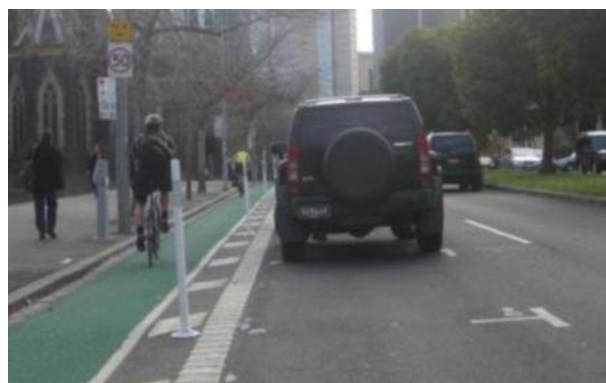
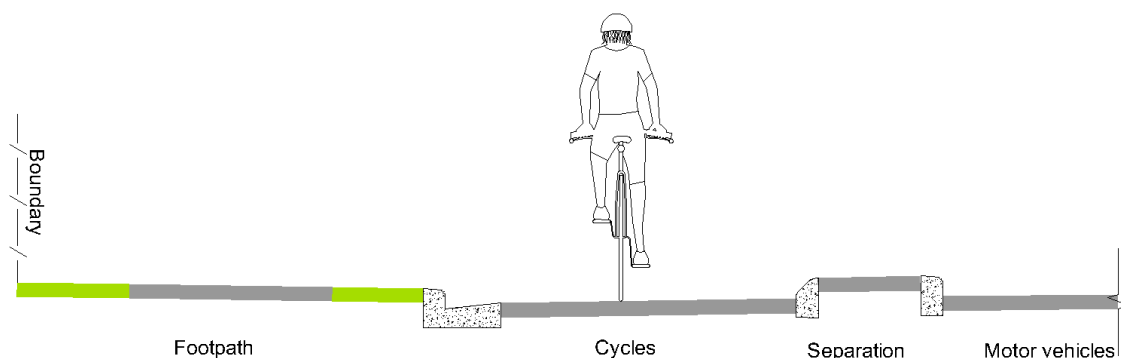
The SBF category includes protected cycle lanes, Danish cycle tracks, and cycle paths (Krizek et al. 2009). Shared paths are physically separated from motor traffic but not exclusively for cycling, and hence are not technically a SBF. Austroads (2011) considers a cycle lane to be a SBF; however this definition is not supported by the authors of this paper, as a painted line does not provide physical separation to motor vehicles.

Protected cycle lane

A cycle lane at carriageway level physically separated from a parking lane or other traffic lane by a raised kerb, bollards or other vertical feature.

Also known as a “separated bicycle lane”, a protected cycle lane is not accessible to cars (except to cross for driveway access). The protection may be provided via raised kerbs, flags, bollards, landscape planters, or other vertical elements. Consideration should be given to the durability of vertical elements employed. As standard road sweepers cannot access the protected cycle lane, implementation should include adequate provisions in the maintenance regime to ensure debris removal at regular time intervals.

One-way and two-way protected cycle lanes are described in Austroads (2011) sections 4.3.3 and 4.3.5, respectively. As with two-way Danish cycle tracks, two-way protected cycle lanes introduce additional difficulties at intersections and careful planning and design is required. In comparison to a two-way shared path, a two-way protected cycle lane is further from the nearest property boundary and therefore offers better intervisibility between cyclists and motor vehicle drivers exiting a driveway.



Buffered and flag protected cycle lane between footpath and clearway, Melbourne (photo: Richard Smithers, City of Melbourne)

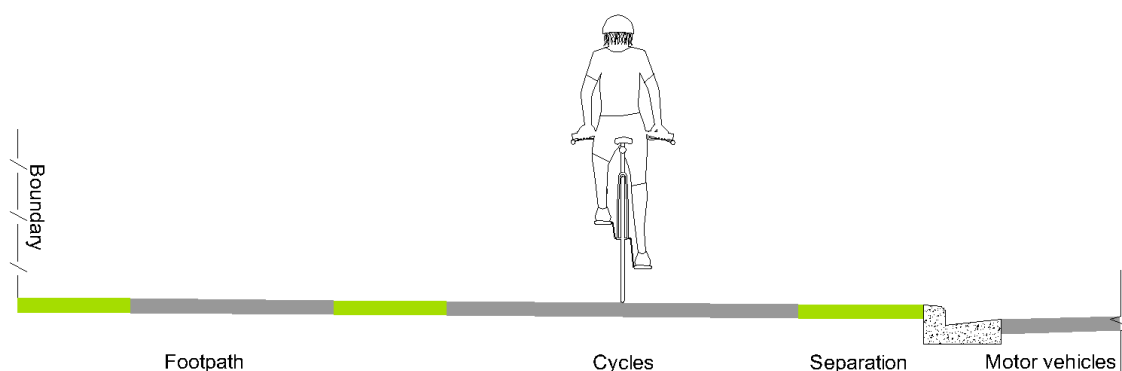


Kerb protected cycle lane, Melbourne (photo: Bicycle Network Victoria)

Cycle path

A facility physically separated from motor traffic and intended for the exclusive use of cyclists. If in a road corridor, it is at a different level than the carriageway.

Legally a cycle path may also be used by pedestrians and includes a cycle track formed under section 332 of the Local Government Act 1974. An off-street path can be an *exclusive* cycle path, a *shared-use* path or a *separated* path. (LTSA 2004) A cycle path may be within the road reserve, in a park, alongside a river, lake or railway line (NZTA 2008) although typically if not in a road corridor it will be termed a shared path. They may be marked and/or signposted for one-way or two-way cycling.



Two-way cycle path with kerb to carriageway (no parking) and berm to footpath, Christchurch



One-way cycle path with kerb to carriageway (with parking) and berm to footpath, Christchurch



Two-way cycle path not along road with landscaped kerb to footpath, Bolzano, Italy



One-way cycle path with kerb to carriageway and paint line to footpath, Symonds St, Auckland

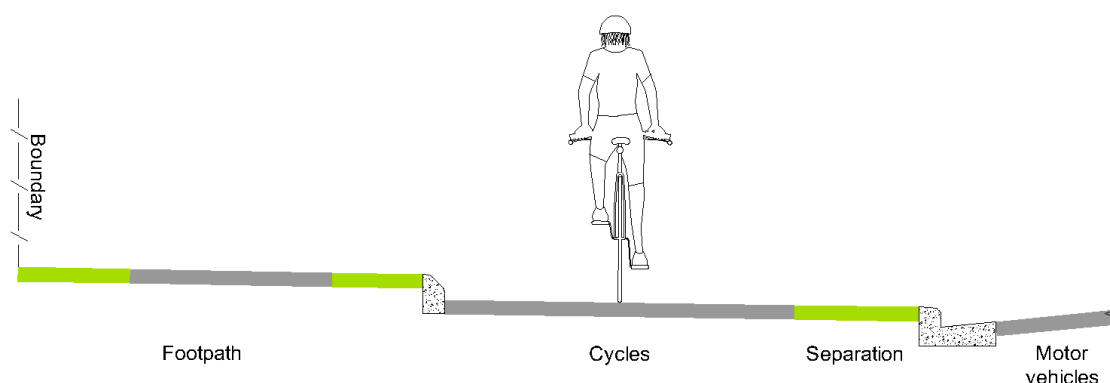
Danish cycle track

A cycle path higher than the adjacent road and lower than the adjacent footpath, separated from each by kerbs.

Cycle track is a term used in Danish guidance (Jensen et al. 2000). It is now being adopted in North America (Alta 2009), where the term is replacing the older (and generally lower level of service) *sidepath* (Forester 1994). In New Zealand the term *track* may be confused with mountain bike *trails*. Therefore, adding the word Danish helps distinguish the term.

A Danish cycle track is a sub-type of cycle path which is elevated above the carriageway, for the exclusive use of cyclists, separated from traffic, contained within a road corridor, and adjacent to the footpath. Motor vehicle parking, where provided, is located between the track and the general traffic lanes on the carriageway. As with protected cycle lanes, locating the facility on the passenger side of parked cars reduces car-door opening conflict as occupancy rates are typically around 1.2 persons per motor vehicle.

The separation to the carriageway can be a kerb only or may include space for parking meters, landscaping, or other kerb zone street furniture. The separation to the footpath can be a kerb only or a kerb plus a landscaping strip. A chamfered or mountable 40-60 mm kerb between the cycle track and footpath enables emergency avoidance manoeuvres for cyclists and has been shown to be sufficient to discourage pedestrian encroachment (Jensen et al. 2000). One-way Danish cycle tracks on each side of the road are preferred; however two-way facilities may be considered where side road, driveway and traffic flow characteristics allow relatively safe operation.



Danish cycle track with kerb zone for trees and parking meters, kerb and paver kerbing to footpath, Copenhagen



Danish cycle track¹ with mountable kerb to carriageway and full height kerb to footpath, Eugene USA (photo: Dan Burden)

¹ Image is mirrored to guide comprehension.

Shared path

A path provided for use by both cyclists and pedestrians (LTSA 2004).

If provided outside a road corridor, it may be called an off-road shared path, however this terminology may confuse some people who equate “off-road” with unsealed facilities for mountain biking. Shared paths can be alongside roads or separate from them, such as in parks or alongside rail lines, rivers, coastlines or lakeshores. They typically feature a sealed surface. They should have good separation from boundaries (to provide improved visibility at driveways), vegetation or other forms of potential side friction.



Shared path along road with cycle lane, North Shore



Two-way shared path along Albany Highway
(photo: Auckland Council)

Trail

A path intended for mountain biking, walking and tramping.

A trail is typically (but not necessarily) unsealed and located in a public reserve; recreational in focus; located in rural areas; and shared between cyclists, day walkers and trampers, and sometimes equestrians. Trails are graded 1 to 5 with grade 1 characterised by rail-trail or similar formed paths suitable for all types of bikes including tandems and hybrids; these are sometimes located alongside roads or on very low volume rural roads (ViaStrada 2011). Higher numbered trails are downhill and cross country unformed paths suitable for mountain bikes.

Mountain bike trails may include single-track and double-track sections. This terminology derives from the geometric characteristics of a route accessible to four-wheel motor vehicles (a double-track) versus the relatively tighter geometry of a narrower single-track route.

Using the term trail to describe a pathway intended for recreation, sport and tourism walking and cycling is consistent with the fundamental intent of the New Zealand Cycle Trail (NZCT).

Track is frequently used in New Zealand to mean a mountain bike facility. Many local authorities have embedded *track* into their databases and maps, so a change to *trail* is likely to be a lengthy process and it may prove that both terms are deemed acceptable.



Grade 1 Little River Rail Trail, Canterbury



Aorere Goldfields grade 5 trail (photo: Kennett Bros.)

The following terms are intersection facilities (not included in Tables 1 and 2).

Advanced stop box (ASB)

An area in front of a general traffic lane on an approach to a signalised intersection to raise awareness of cyclists by motorists and to give priority to cyclists over other traffic for a particular manoeuvre (NZTA 2008).

ASBs and ASLs have been shown to improve cyclist positioning behaviour (VicRoads 2000). The placement of these facilities is complex, however general guidance is provided in MOTSAM (NZTA 2009). ASB and ASLs should be coloured. When colouring existing cycle facilities, all other things being equal, preference should be given to colouring ASL sites before ASB sites and at sites with wider approaches. Traffic and cycle lane combinations greater than 5.0 m should be avoided, to discourage motorists queuing side-by-side and blocking cyclists (Koorey & Mangundu 2010).

Please refer to MOTSAM (NZTA 2009) for example layouts

Advanced stop line (ASL)

A lane limit line for a cycle lane that is extended beyond the limit lines of other adjacent lanes on an approach to a signalised intersection (NZTA 2008).

ASLs may be kerbside (to the left of all other traffic lanes) or between a left turn and through lane. Advanced stop lines should always be provided where ASBs are not feasible (NZTA 2009). For more information, please refer to the discussion of ASBs.

Please refer to MOTSAM (NZTA 2009) for example layouts

Hook Turn Facility

A marked box within the intersection which provides a waiting space for the second stage of a two-stage right turn made from the left side of a carriageway.

The Road User Rule amendment 2009 (MoT 2009) clause 2.5A (1) states that a cyclist may enter an intersection by making a right turn or a hook turn in accordance with the hook turn manoeuvre described in subclause (2). The manoeuvre does not require a marked hook turn box. If a box is provided, the approach cycle lanes should be coloured with appropriate limit lines to aid road user understanding of proper usage. The hook turn box marking must include the arrow.

Please refer to MOTSAM (NZTA 2009) for example layouts

Cycle bypass or slip lane

A facility to avoid a traffic calming device, public transport stop, or intersection control.

Where the traffic calming device (e.g. chicane, island, or kerb extension) results in a squeeze point for cyclists, a cycle bypass can be provided. Care needs to be taken that entry to and departure from the bypass does not get blocked by parked vehicles; this may be minimised by use of yellow no stopping lines and coloured surfacing. Bypasses may also be provided at the head of T-junction intersections or as a left turn slip lane.



Cycle slip lane to the left of a general traffic slip lane, Palmerston North (photo: G. Connolly)



Traffic calming island bypass blocked by car parking, North Shore

Other Terms for Cycling Provisions (not recommended)

This section contains a list of terms which are not recommended, but are provided to help the reader understand terms which might be used by others or found in other documents.

Cycleway	A lay term for a cycling facility. It does not define a specific type of provision and the term should thus generally be avoided.
Exclusive cycle lane	Term not recommended – refer cycle lane .
Exclusive cycle path	A path or path section intended for the exclusive use of cyclists. Refer also GTEP Part 14 Section 6.6.3 Exclusive Bicycle Paths (Austroads 1999). A path that can be used legally only by cyclists. (LTSA 2004). It is recommended that this is simplified to cycle path , notwithstanding the NZ legal allowance for pedestrian use.
Off-road path	The term <i>off-road</i> is often used to describe a trail, however it may mean simply “not on a road” to some people but to mountain bikers it has a strong connotation of “mountain bike route”. Virtually all off-road paths will be shared; therefore the preferred term is either shared path (generally applying to sealed surfaces) or trail (generally applying to unsealed surfaces).
Segregated cycle lane	An on-road facility with median or similar separation (Austroads 2011 p. 23). Not recommended – refer protected cycle lane .
Segregated path	Term not recommended – refer cycle path .
Separated cycle lane	The provision of a separated cycle lane aims to improve the safety for cyclists by providing (physical) separation from other motor traffic whilst maintaining directness of travel and priority at intersections. Separated cycle lanes are also referred to as <i>kerb separated cycle lanes</i> and <i>protected cycle lanes</i> (Austroads 2011 p.32). It is recommended to simply use the term protected cycle lane .
Separated path	A path where the section for cycling is separated from the section for walking (LTSA 2004). Generally this is achieved by a painted line. The provision of a separating line and/or pavement symbols to designate the bicycle path from the footpath is not considered a sufficient visual clue to separate users (VicRoads 2010) and if additional width and/or stronger separation elements (e.g. kerb) are not currently feasible, a simple keep left rule with or without centreline on a shared path is preferable. To minimise potential confusion with <i>protected</i> , this term is not recommended – refer cycle path .
Separated protected cycle lane	A particular form of separated cycle lane. This treatment: • may be applied in urban areas where parking is prevalent; • is characterised by a raised separation strip to physically prevent motor vehicle access to the cycle lane and provide clearance for opening car doors” (Austroads 2011, p.35). Term not recommended – refer protected cycle lane.
Shared lane marking	Called a “sharrow” (shared lane arrow) in the USA (FHWA 2009) and an advisory marking in Austroads, these markings are used to inform “road users of the potential presence of cyclists and of the location where cyclists may be expected to ride on a road” (Austroads 2011, p. 29). As formal trials have not been undertaken and the marking has not been approved for inclusion in the TCD Rule, this term is not yet recommended for use in New Zealand.

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